

© Copyright SEK. Reproduction in any form without permission is prohibited.

Potentiometrar för elektronikutrustning – Del 2: Gruppspecifikation för trimpotentiometrar med skruv eller ratt

*Potentiometers for use in electronic equipment –
Part 2: Sectional specification –
Lead-screw actuated and rotary preset potentiometers*

Som svensk standard gäller europastandarden EN 60393-2:2016. Den svenska standarden innehåller den officiella engelska språkversionen av EN 60393-2:2016.

Nationellt förord

Europastandarden EN 60393-2:2016

består av:

- **europastandardens ikraftsättningsdokument**, utarbetat inom CENELEC
- **IEC 60393-2, Third edition, 2015 - Potentiometers for use in electronic equipment - Part 2: Sectional specification - Lead-screw actuated and rotary preset potentiometers**

utarbetad inom International Electrotechnical Commission, IEC.

ICS 31.040.20

Standarder underlättar utvecklingen och höjer elsäkerheten

Det finns många fördelar med att ha gemensamma tekniska regler för bl a mätning, säkerhet och provning och för utförande, skötsel och dokumentation av elprodukter och elanläggningar.

Genom att utforma sådana standarder blir säkerhetsfordringar tydliga och utvecklingskostnaderna rimliga samtidigt som marknadens acceptans för produkten eller tjänsten ökar.

Många standarder inom elområdet beskriver tekniska lösningar och metoder som åstadkommer den elsäkerhet som föreskrivs av svenska myndigheter och av EU.

SEK är Sveriges röst i standardiseringsarbetet inom elområdet

SEK Svensk Elstandard svarar för standardiseringen inom elområdet i Sverige och samordnar svensk medverkan i internationell och europeisk standardisering. SEK är en ideell organisation med frivilligt deltagande från svenska myndigheter, företag och organisationer som vill medverka till och påverka utformningen av tekniska regler inom elektrotekniken.

SEK samordnar svenska intressenters medverkan i SEKs tekniska kommittéer och stödjer svenska experters medverkan i internationella och europeiska projekt.

Stora delar av arbetet sker internationellt

Utformningen av standarder sker i allt väsentligt i internationellt och europeiskt samarbete. SEK är svensk nationalkommitté av International Electrotechnical Commission (IEC) och Comité Européen de Normalisation Electrotechnique (CENELEC).

Standardiseringsarbetet inom SEK är organiserat i referensgrupper bestående av ett antal tekniska kommittéer som speglar hur arbetet inom IEC och CENELEC är organiserat.

Arbetet i de tekniska kommittéerna är öppet för alla svenska organisationer, företag, institutioner, myndigheter och statliga verk. Den årliga avgiften för deltagandet och intäkter från försäljning finansierar SEKs standardiseringsverksamhet och medlemsavgift till IEC och CENELEC.

Var med och påverka!

Den som deltar i SEKs tekniska kommittéarbete har möjlighet att påverka framtida standarder och får tidig tillgång till information och dokumentation om utvecklingen inom sitt teknikområde. Arbetet och kontakterna med kollegor, kunder och konkurrenter kan gynnsamt påverka enskilda företags affärsutveckling och bidrar till deltagarnas egen kompetensutveckling.

Du som vill dra nytta av dessa möjligheter är välkommen att kontakta SEKs kansli för mer information.

SEK Svensk Elstandard

Box 1284
164 29 Kista
Tel 08-444 14 00
www.elstandard.se

April 2016

ICS 31.040.20

English Version

Potentiometers for use in electronic equipment - Part 2:
Sectional specification - Lead-screw actuated and rotary preset
potentiometers
(IEC 60393-2:2015)

Potentiomètres utilisés dans les équipements électroniques
- Partie 2 : Spécification intermédiaire - Potentiomètres
d'ajustement multitours et rotatifs
(IEC 60393-2:2015)

Potentiometer zur Verwendung in Geräten der Elektronik -
Teil 2: Rahmenspezifikation - Trimmopotentiometer mit
Einstellung durch Gewindespindel oder durch direktes
Drehen
(IEC 60393-2:2015)

This European Standard was approved by CENELEC on 2016-01-18. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.



European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

European foreword

The text of document 40/2407/FDIS, future edition 3 of IEC 60393-2, prepared by IEC/TC 40 "Capacitors and resistors for electronic equipment" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 60393-2:2016.

The following dates are fixed:

- latest date by which the document has to be implemented at (dop) 2016-10-18 national level by publication of an identical national standard or by endorsement
- latest date by which the national standards conflicting with (dow) 2019-01-18 the document have to be withdrawn

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC [and/or CEN] shall not be held responsible for identifying any or all such patent rights.

Endorsement notice

The text of the International Standard IEC 60393-2:2015 was approved by CENELEC as a European Standard without any modification.

Annex ZA
(normative)

**Normative references to international publications
with their corresponding European publications**

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

NOTE 1 When an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here:
www.cenelec.eu.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60062	-	Marking codes for resistors and capacitors	EN 60062	-
IEC 60068-1	2013	Environmental testing -- Part 1: General and guidance	EN 60068-1	2014
IEC 60068-2-1	2007	Environmental testing -- Part 2-1: Tests -EN 60068-2-1 Test A: Cold	-EN 60068-2-1	2007
IEC 60068-2-2	2007	Environmental testing -- Part 2-2: Tests -EN 60068-2-2 Test B: Dry heat	-EN 60068-2-2	2007
IEC 60393-1	2008	Potentiometers for use in electronic equipment -- Part 1: Generic specification	EN 60393-1	2009
IEC 61193-2	2007	Quality assessment systems -- Part 2:EN 61193-2 Selection and use of sampling plans for inspection of electronic components and packages	EN 61193-2	2007

CONTENTS

FOREWORD.....	4
1 General	6
1.1 Scope	6
1.2 Normative references.....	6
1.3 Information to be given in a detail specification	6
1.3.1 General	6
1.3.2 Outline drawing and dimensions	7
1.3.3 Mounting	7
1.3.4 Style	7
1.3.5 Resistance law	7
1.3.6 Ratings and characteristics.....	7
1.3.7 Marking	8
1.3.8 Ordering information.....	8
1.3.9 Additional information (not for inspection purposes).....	8
1.4 Marking.....	8
1.4.1 General	8
1.4.2 Marking for potentiometers	8
1.4.3 Marking for packaging	8
1.4.4 Additional marking	8
2 Preferred ratings, characteristics and test severities	9
2.1 Preferred characteristics	9
2.1.1 General	9
2.1.2 Preferred climatic categories	9
2.1.3 Temperature coefficients and temperature characteristics of resistance.....	9
2.1.4 Limits for change in resistance or output voltage ratio	10
2.1.5 Total mechanical travel.....	11
2.2 Preferred values of ratings	11
2.2.1 General	11
2.2.2 Nominal total resistance	11
2.2.3 Tolerances on nominal total resistance.....	12
2.2.4 Rated dissipation	12
2.2.5 Limiting element voltage	13
2.2.6 Insulation voltage	13
2.2.7 Limits for insulation resistance.....	13
2.3 Preferred test severities	13
2.3.1 General	13
2.3.2 Drying.....	13
2.3.3 Vibration.....	14
2.3.4 Shock	14
2.3.5 Low air pressure	14
2.3.6 Change of temperature	14
3 Quality assessment procedures	14
3.1 General.....	14
3.2 Definitions.....	14
3.2.1 Primary stage of manufacture	14
3.2.2 Structurally similar components	14

3.2.3	Assessment levels EZ and FZ (zero nonconforming).....	15
3.3	Qualification approval	15
3.3.1	General	15
3.3.2	Qualification approval on the basis of the fixed sample size procedure	15
3.3.3	Tests	16
3.4	Quality conformance inspection	23
3.4.1	Formation of inspection lots	23
3.4.2	Test schedule	23
3.4.3	Assessment levels	23
3.5	Delayed delivery	26
	Bibliography.....	27
	Figure 1 – Rated dissipation curve.....	12
	Figure 2 – Rated dissipation curve	13
	Table 1 – Temperature coefficients and temperature characteristics of resistance	10
	Table 2 – Limits for change in resistance or output voltage ratio	11
	Table 3 – Fixed sample size test schedule for qualification approval (<i>1 of 7</i>).....	17
	Table 4 – Quality conformance inspection: Lot-by-lot inspection	24
	Table 5 – Quality conformance inspection: Periodic testing (<i>1 of 2</i>).....	25

INTERNATIONAL ELECTROTECHNICAL COMMISSION

POTENTIOMETERS FOR USE IN ELECTRONIC EQUIPMENT –**Part 2: Sectional specification – Lead-screw actuated
and rotary preset potentiometers****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 60393-2 has been prepared by IEC technical committee 40: Capacitors and resistors for electronic equipment.

This third edition cancels and replaces the second edition published in 1989 and constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- a) revision of the information on the assessment level EZ and FZ (zero nonconforming);
- b) complete editorial revision.

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

FDIS	Report on voting
40/2407/FDIS	40/2422/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 International Standard is to be used in conjunction with IEC 60393-1:2008.

A list of all parts in the IEC 60363 series, published under the general title *Potentiometers for use in electronic equipment*, can be found on the IEC website.

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

The committee has decided that the contents of this publication 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.

POTENTIOMETERS FOR USE IN ELECTRONIC EQUIPMENT –

Part 2: Sectional specification – Lead-screw actuated and rotary preset potentiometers

1 General

1.1 Scope

This part of IEC 60393 applies to lead-screw actuated and rotary preset potentiometers, wirewound and non-wirewound for use in electronic equipment. These potentiometers are primarily intended for use in circuits for trimming purposes which require infrequent adjustments.

This part of IEC 60393 prescribes preferred ratings and characteristics and selects from IEC 60393-1 the appropriate quality assessment procedures, tests and measuring methods. It provides general performance requirements for this type of potentiometer.

This standard gives the minimum performance requirements and test severities.

1.2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60062, *Marking codes for resistors and capacitors*

IEC 60068-1:2013, *Environmental testing – Part 1: General and guidance*

IEC 60068-2-1:2007, *Environmental testing – Part 2-1: Tests – Test A: Cold*

IEC 60068-2-2:2007, *Environmental testing – Part 2-2: Tests – Test B: Dry heat*

IEC 60393-1:2008, *Potentiometers for use in electronic equipment – Part 1: Generic specification*

IEC 61193-2:2007, *Quality assessment systems – Part 2: Selection and use of sampling plans for inspection of electronic components and packages*