
British Standard

Harmonized system of quality assessment for electronic components. Potentiometers for use in electronic equipment. Sectional specification: lead screw actuated and rotary preset potentiometers

Système harmonisé d'assurance de la qualité des composants
électroniques. Potentiomètres utilisés dans les équipements électroniques.
Spécification intermédiaire : Potentiomètres d'ajustement multitours et rotatifs

Harmonisiertes Gütebestätigungssystem für Bauelemente der
Elektronik. Potentiometer für die Anwendung in Geräten der
Elektronik. Rahmenspezifikation : Trimpotentiometer mit
Einstellung durch Gewindespindel oder durch direktes Drehen

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National foreword

This British Standard has been prepared under the direction of the Electronic Components Standards Policy Committee. It is identical with IEC Publication 393-2 (QC 410100) 'Potentiometers for use in electronic equipment. Part 2. Sectional specification : Lead screw actuated and rotary preset potentiometers', published in 1989 by the International Electrotechnical Commission (IEC).

This standard is a harmonized specification within the IECQ system of quality assessment for electronic components.

For the purposes of this standard 1.1 and 1.2 should be regarded as constituting the scope. The page numbers referred to in the text are IEC page numbers. Notes 3 to 9 can be found on page 24.

Cross-references. The British Standard that is harmonized with QC 001001 and QC 001002 is BS 9000 'General requirements for a system for electronic components of assessed quality' Part 1 : 1981 'Specification of basic rules and procedures'.

International standard	Corresponding British Standard
IEC 63 : 1963	BS 2488 : 1966 Schedule of preferred numbers for the resistance of resistors and the capacitance of capacitors for telecommunication equipment (Technically equivalent)
IEC 68	BS 2011 Environmental testing
IEC 68-1 : 1982	Part 1.1 : 1983 General and guidance (Identical)
IEC 393-1 : 1989	BS QC 410000 Potentiometers for use in electronic equipment generic specifications (Identical)
IEC 393-2-1 : 1989	BS QC 410101 Potentiometers for use in electronic equipment Blank detail specification : Lead screw actuated and rotary preset potentiometers, Assessment level E (Identical)
IEC 410 : 1973	BS 6001 : 1972 Sampling procedures for inspection by attributes (Technically equivalent)

Compliance with a British Standard does not of itself confer immunity from legal obligations.

INTERNATIONAL ELECTROTECHNICAL COMMISSION

POTENTIOMETERS FOR USE IN ELECTRONIC EQUIPMENT.
PART 2: SECTIONAL SPECIFICATION: LEAD-SCREW ACTUATED
AND ROTARY PRESET POTENTIOMETERS

FOREWORD

- 1) The formal decisions or agreements of the IEC on technical matters, prepared by Technical Committees on which all the National Committees having a special interest therein are represented, express, as nearly as possible, an international consensus of opinion on the subjects dealt with.
- 2) They have the form of recommendations for international use and they are accepted by the National Committees in that sense.
- 3) In order to promote international unification, the IEC expresses the wish that all National Committees should adopt the text of the IEC recommendation for their national rules in so far as national conditions will permit. Any divergence between the IEC recommendation and the corresponding national rules should, as far as possible, be clearly indicated in the latter.

PREFACE

This standard has been prepared by IEC Technical Committee No. 40: Capacitors and Resistors for Electronic Equipment.

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

Six Months' Rule	Report on Voting	Two Months' Procedure	Report on Voting
40(CO)507	40(CO)581		

Further information can be found in the relevant Report on Voting indicated in the table above.

This standard replaces the first edition of IEC Publication 393-2 (1976).

The QC number that appears on the front cover of this publication is the specification number in the IEC Quality Assessment System for Electronic Components (IECQ).

POTENTIOMETERS FOR USE IN ELECTRONIC EQUIPMENT.
PART 2: SECTIONAL SPECIFICATION: LEAD-SCREW ACTUATED
AND ROTARY PRESET POTENTIOMETERS

SECTION ONE - GENERAL

1. General

1.1 Scope

This standard is applicable 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.

1.2 Object

The object of this standard is to prescribe preferred ratings and characteristics and to select from IEC Publication 393-1, appropriate Quality Assessment procedures, tests and measuring methods and to give general performance requirements for this type of potentiometer.

Test severities and requirements prescribed in detail specifications referring to this sectional specification shall be of equal or higher performance level, because lower performance levels are not permitted.

1.3 Related documents

IEC Publications:

Publication 63 (1963):	Preferred Number Series for Resistors and Capacitors. Amendment No. 1 (1967) Amendment No. 2 (1977)
Publication 68:	Basic Environmental Testing Procedures
Publication 393-1 (1988):	Potentiometers for Use in Electronic Equipment. Part 1: Generic Specification.
Publication 410 (1973):	Sampling Plans and Procedures for Inspection by Attributes.
Publication QC 001001 (1986):	Basic Rules of the IEC Quality Assessment System for Electronic Components (IECQ).
Publication QC 001002 (1986):	Rules of Procedure of the IEC Quality Assessment System for Electronic Components (IECQ).

Note. -The above references apply to the current editions except for IEC Publication 68, for which the referenced edition in the applicable test clauses of the generic specification shall be used.

1.4 Information to be given in a detail specification

Detail specifications shall be derived from the relevant blank detail specification.

Detail specifications shall not specify requirements inferior to those of the generic, sectional or blank detail specification. When more severe requirements are included, they shall be listed in Sub-clause 1.8 of the detail specification and indicated in the test-schedules, for example by an asterisk.

Note. -The information given in Sub-clauses 1.4.1 and 1.4.3 may, for convenience, be presented in tabular form.

The following information shall be given in each detail specification and the values quoted shall preferably be selected from those given in the appropriate clause of this sectional specification.

1.4.1 Outline drawing and dimensions

The detail specification shall incorporate an illustration of the potentiometer being specified. Where space is insufficient to show the detail dimensions required for inspection purposes, such dimensions shall appear on a drawing forming an Appendix to the detail specification.

All dimensions shall preferably be stated in mm, however when the original dimensions are still given in inches, the converted metric dimensions in mm shall be added.

When the potentiometer is not designed for use on printed boards, this shall be clearly indicated in the detail specification.

1.4.2 Mounting

The detail specification shall specify the method of mounting to be applied for the voltage proof and the insulation resistance tests and for the application of the vibration and bump or shock tests. The potentiometers shall be mounted by their normal means, but the design may be such that special mounting fixtures are required. In this case the detail specification shall describe the mounting fixtures and they shall be used for the voltage proof and the insulation resistance tests and for the application of the vibration and bump or shock tests. For the latter tests the mounting shall be such that there shall be no parasitic vibration.

1.4.3 Style (IEC Publication 393-1, Sub-clause 2.2.3)

The style shall be presented by a double-letter code e.g. AB, which is arbitrarily chosen for each detail specification.

The style designation, therefore, has no meaning unless the number of the detail specification is also given.

1.4.4 Resistance law

The resistance law is generally not verified. If required, the detail specification shall prescribe the measuring points and the associated limits for the output ratio and shall specify the position of the corresponding tests in the test schedules.

1.4.5 Ratings and characteristics

The ratings and characteristics shall be in accordance with the relevant clauses of this specification together with the following:

1.4.5.1 Rated resistance range

See Sub-clause 2.2.1

The preferred values are those of the E-series of IEC Publication 63.

Note. -When products approved to the detail specification have different ranges, the following statement should be added.

"The range of values available in each style is given in the Qualified products List".

1.4.5.2 Bump and shock

The bump and shock tests are considered to be alternatives. The detail specification shall indicate which test has been selected.

1.4.6 Marking

The detail specification shall specify the content of the marking on the potentiometer and on the package. Deviations from Sub-clause 1.5 of this sectional specification shall be specifically stated.

1.4.7 Ordering information

The detail specification shall indicate that the following information, in clear or in coded form, is required when ordering:

- 1) Rated resistance and tolerance on rated resistance.
- 2) Resistance law (if other than linear).
- 3) Number and issue reference of the detail specification and style reference.

1.4.8 Additional information (not for inspection purposes)

The detail specification may include information (which is not required to be verified by the inspection procedure), such as circuit diagrams, curves, drawings and notes needed for the clarification of the detail specification.

1.5 Marking

1.5.1 General

The information given in the marking is normally selected from the following list; the relative importance of each item is indicated by its position in the list:

- a) rated resistance;
- b) tolerance on rated resistance;
- c) resistance law;

- d) detail specification and style reference;
- e) year and month (or week) of manufacture;
- f) manufacturer's name and trademark.

- 1.5.2 The potentiometer shall be clearly marked with a) and b) above and with as many of the remaining items as is practicable. Any duplication of information in the marking of the potentiometer should be avoided.
- 1.5.3 The package containing the potentiometer(s) shall be clearly marked with all the information listed above.
- 1.5.4 Any additional marking shall be so applied that no confusion can arise.
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SECTION TWO - PREFERRED RATINGS, CHARACTERISTICS AND TEST SEVERITIES2. Preferred ratings, characteristics and test severities2.1 Preferred characteristics

The values given in the detail specification shall preferably be selected from the following:

2.1.1 Preferred climatic categories

The potentiometers covered by this specification are classified into climatic categories according to the general rules given in IEC Publication 68-1.

The lower and upper category temperature and the duration of the damp heat, steady state test shall be chosen from the following:

Lower category temperature:	-65 °C, -55 °C, -40 °C, -25 °C and -10 °C.
Upper category temperature	+70 °C, +85 °C, +100 °C, +125 °C and + 155 °C.
Duration of the damp heat, steady state test: 4, 10, 21 and 56 days.	

The severities for the cold and dry heat tests are the lower and upper category temperatures respectively. Because of the construction of some potentiometers these temperatures will occur between two of the preferred temperatures given in IEC Publication 68-2. In this case the nearest preferred temperature within the actual temperature range of the potentiometer shall be chosen for this severity.

2.1.2 Temperature coefficients and temperature characteristics of resistance

The limits of change in resistance for the preferred temperature characteristic of resistance test are given in the table overpage.

Each line in the table gives the preferred temperature coefficient and corresponding temperature characteristic for 20 °C to 70 °C and limits of change in resistance for the measurement of the temperature characteristics of resistance (see IEC Publication 393-1, Sub-clause 4.14) on the basis of the category temperature ranges of Sub-clause 2.1.1 of this sectional specification.

Different portions of the resistance range may be covered by different temperature characteristics (or coefficients) of resistance although they appear in a single detail specification.

If measurements at additional temperatures are required, they shall be specified in the detail specification.

TABLE I

Temperature coefficient	Temperature characteristic 20/70 °C		Temperature characteristic of resistance (limits of percentage change in resistance)							
			Reference temperature/ Lower category temperature				Reference temperature/Upper category temperature			
-6 10 /°C	%	±20/-65	±20/-55	±20/-40	±20/-25	±20/-10	±20/±85 [*]	±20/±100	±20/±125	±20/±155
-800/ -2 500	-4/ -12.5	±6.8/ ±21.3	±6/ ±18.75	±4.8/ ±15	±3.6/ ±11.3	±2.4/ ±7.5	-5.2/ -16.25	-6.4/ -20	-8.4/ -26.25	-10.8/ -33.75
-400/ -1 000	-2/ -5	±3.4/ ±8.5	±3/ ±7.5	±2.4/ ±6	±1.8/ ±4.5	±1.2/ ±3	-2.6/ -6.5	-3.2/ -8	-4.2/ -10.5	-5.4/ -13.5
-150/ -600	-0.75/ -3	±1.3/ ±5.1	±1.13/ ±4.5	±0.9/ ±3.5	±0.68/ ±2.7	±0.4/ ±1.8	-0.98/ -3.9	-1.2/ -4.8	-1.58 -6.3	-2.02/ -8.1
±1 000	±5	±8.5	±7.5	±6	±4.5	±3	±6.5	±8	±10.5	±13.5
±500	±2.5	±4.3	±3.75	±3	±2.25	±1.5	±3.25	±4	±5.25	±6.75
±250	±1.25	±2.15	±1.88	±1.5	±1.13	±0.75	±1.62	±2	±2.62	±3.38
±150	±0.75	±1.3	±1.15	±0.9	±0.68	±0.45	±0.98	±1.2	±1.6	±2.05
±100	±0.5	±0.85	±0.75	±0.6	±0.45	±0.3	±0.65	±0.8	±1.05	±1.35
±50	±0.25	±0.43	±0.375	±0.3	±0.23	±0.15	±0.325	±0.4	±0.525	±0.675
±25	±0.125	±0.215	±0.188	±0.15	±0.113	±0.075	±0.162	±0.2	±0.262	±0.34

* Potentiometers having an upper category temperature of ± 85 °C need not be measured between 20 °C and 70 °C.