

Detail specification for

**Single turn low power
non-wirewound rotary
potentiometers —
Spindle insulated from
resistance element,
spindle and panel
sealed or container,
spindle and panel
sealed —
Full assessment level**

UDC 621.39.03:621.316.82

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Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 19 and a back cover.

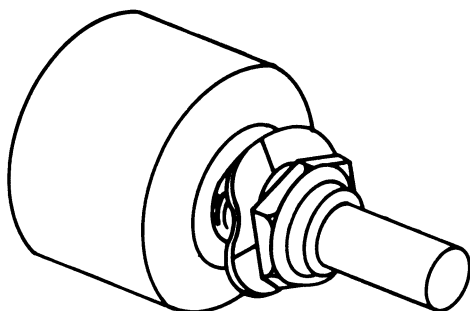
This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

Amendments issued since publication

Amd. No.	Date of issue	Comments
2087	September 1976	Indicated by a sideline in the margin

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ELECTR	QUALITY: DETAIL SPECIFICATIONS
For individual details see Table 1 and Appendix A and Appendix B	SINGLE TURN LOW POWER ROTARY POTENTIOMETERS
	FULL ASSESSMENT
	NON-WIREWOUND
	CONSTRUCTION: SPINDLE: INSULATED FROM RESISTANCE ELEMENT SEALING: SPINDLE AND PANEL SEALED OR CONTAINER, SPINDLE AND PANEL SEALED

For ordering information see clause 5.

1 Ratings and characteristics

Resistance laws	Linear (law A)) Non-linear (law B)) See Table 2 Reverse non-linear (law C))
Resistance range	The range of values available in each law and in each style will be given in the qualified products list (BS 9002)
Resistance values	The preferred values are 1.0, 2.2 and 4.7 in each decade, and are selected from BS 2488. Other values should not be used in any new equipment designs.
Selection tolerances	$\pm 20\%$, $\pm 10\%$
Rated dissipation at 70 °C	See Table 1
Environmental classification	See Table 1
Limiting element voltage	See Table 1
Isolation voltage	See Table 1
Bump severity	390 m/s ² : 4 000 bumps
Vibration severity	10 Hz to 500 Hz; 0.75 mm or 98 m/s ² , whichever is less severe
Low air pressure severity	8.5 kPa (85 mbar)
Limits of resistance change (after 1 000 h endurance)	15 %
Starting torque	7.5 – 90 mN m
Temperature characteristic of resistance (+ 20 °C to + 70 °C)	$\pm 6.5\%$ (t.c. $\pm 1\,300$ p.p.m./°C)

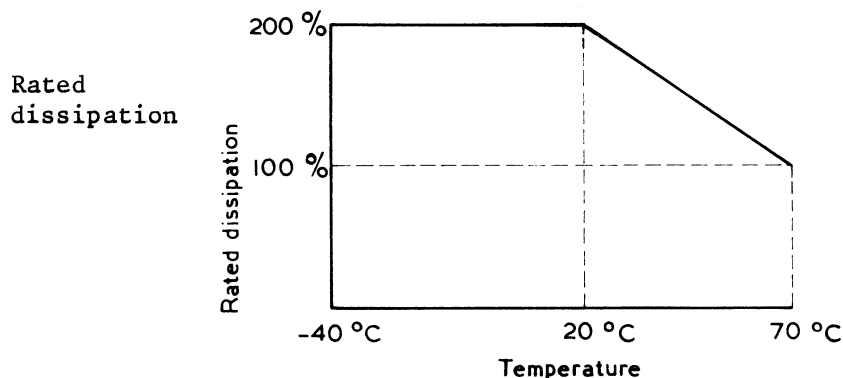
Table 1 — Selection chart of styles and detail specifications

Type of sealing	Rated dissipation W at 70 °C		Limiting element voltage V d.c. or a.c. r.m.s	Isolation voltage V d.c. or a.c. peak		Environmental classification	Outline drawing (Appendix A)	Style	
	Resistance law A	Resistance law B and C		Normal air pressure	Low air pressure			Detail specification number BS 9133 N...	Mounting variant (See note and Appendix B)
Spindle and panel sealed	0.25	0.125	250	360	240	40/070/56	A/1	001	B.1 series B.2 series
	1.375	0.688	500	710	470	40/070/21	A/2	002	B.1 series B.2 series
Container, spindle and panel sealed	0.75	0.375	500	710	470	40/070/56	A/3	003	B.1 series B.2 series
NOTE The dimensions and identifying codes of mounting variants are given with associated drawings in Appendix A. They are grouped according to whether the mounting variants are metric originals (B.1 series) or inch originals (B.2 series). Dimensions for mounting accessories are also in Appendix B.									

Table 2 — Limits of resistance law
(See clause 1)

Resistance law	% Angle of effective rotation	Output ratio $\% \frac{y_{ab}}{y_{ac}}$
A	47 to 53	$R < 0.22 \text{ M}\Omega$: 40 to 60 $R \geq 0.22 \text{ M}\Omega$: 35 to 65
B	30 to 36 64 to 70	1.5 to 8 10 to 40
C	30 to 36 64 to 70	60 to 90 92 to 98.5

1.1 Derating



2 Marking

The marking of the potentiometer and package shall be in accordance with 1.1.6 of BS 9130.

3 Related documents

BS 84, "Parallel screw threads of Whitworth form".

BS 903, "Methods of testing vulcanized rubber", Part A26 "Determination of hardness".

BS 2011, "Methods for the environmental testing of electronic components and electronic equipment".

BS 2045, "Preferred numbers".

BS 2488, "Schedule of preferred numbers for the resistance of resistors and the capacitance of capacitors".

BS 3222, "Low compression set butadiene/acrylonitrile vulcanized rubber compounds".

BS 3401, "Beryllium copper crinkle washers".

BS 4463, "Crinkle washers for general engineering purposes (metric sizes)".

BS 5054, "Specification for dimensions of spindle ends for manually operated electronic components".

BS 6001, "Sampling procedures and tables for inspection by attributes".

BS 9000, "General requirements for electronic components of assessed quality".

BS 9002, "Qualified products list for electronic compounds of assessed quality (including list of approved firms)".

BS 9130, "Potentiometers of assessed quality: generic data and methods of test".

BS 9133, "Rules for the preparation of detail specifications for single turn low power rotary potentiometers".

4 Terminology

No terminology in addition to that given in BS 9130 is required.

5 Ordering information

Orders for potentiometers covered by this specification shall contain the following information (in accordance with the requirements of 1.1.15 of BS 9130):

- Value of rated resistance and tolerance and law.
- Style, and number of the relevant detail specification (see Table 1).
- Spindle length and any details not already covered by b) above.

Example: 1 k Ω , $\pm 20\%$, law A, style B.1/1, BS 9133 N001, 25 mm with cross-hole.

6 Additional information

6.1 Limiting slider current. The limiting slider current is given by the formula

$$I = \sqrt{\frac{\text{rated dissipation}}{\text{rated resistance}}}$$

or 50 mA, whichever is the lesser.

6.2 Materials and finishes. These detail specifications contain no information regarding the external finishes used on the potentiometers. Where the finish may affect compatibility with mounting surfaces (e.g. avoidance of electrolytic corrosion), equipment designers can obtain this information from the manufacturers listed in BS 9002 as having qualification approval to the appropriate detail specification.

7 Certified test records

Certified test records shall be prepared in accordance with **1.1.11** of BS 9130 and shall be presented in the style of the layout given in Appendix D to that document.

8 Inspection requirements

8.1 Where drying is called for, procedure 1 of **1.2.4.1** of BS 9130 shall be used.

8.2 There shall be a satisfactory balance between high, low and critical resistance values in the sample taken (see Appendix A of BS 9130). Sampling tables are given in BS 6001.

8.3 Throughout this schedule, the unit of product shall be one potentiometer.

8.4 Where a subgroup contains more than one test, the tests shall be carried out in the order given.

8.5 Samples submitted to tests marked “(D)” shall not be accepted for release under BS 9000 (see **2.6.5** of BS 9000-1).

8.6 The potentiometers shall be mounted in the normal manner.

Inspection	BS 9130 reference and conditions of test	Performance requirements
<i>Group A</i>	To be applied on a sampling basis lot-by-lot	
	Subgroups A3 and A4 not applicable	
<i>Subgroup A0</i>	<i>100 % inspection</i>	
Resistance <i>a</i> to <i>c</i>	1.2.4.3.2	Shall be within the selection tolerance
<i>Subgroup A1</i>	<i>Inspection level 1, AQL 1.5 %</i>	
Visual inspection	1.2.2	As in BS 9130
<i>Subgroup A2</i>	<i>Inspection level S-2, AQL 4.0 %</i>	
Resistance <i>a</i> to <i>b</i>	1.2.4.3.3)	$\Delta R: \leq 25 \Omega$ for $R \leq 1 \text{ k}\Omega$
<i>b</i> to <i>c</i>	1.2.4.3.4)	$\leq 50 \Omega$ for $R > 1 \text{ k}\Omega$
Continuity	1.2.4.2	As in BS 9130
Rotational noise	1.2.4.13 Method A	$\leq 47 \text{ mV}$
Voltage proof	1.2.4.10	As in BS 9130
<i>Subgroup A5</i>		
CTR information	1.1.11 Attributes information for subgroup A2 without reference to the individual tests	