

JIS

JAPANESE INDUSTRIAL STANDARD

Power type coated wire wound potentiometers

JIS C 6450—1992

Translated and Published

by

Japanese Standards Association

Printed in Japan

In the event of any doubt arising,
the original Standard in Japanese is to be final authority.

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Power type coated wire wound potentiometers C 6450-1992

1. Scope This Japanese Industrial Standard specifies power type coated wire wound potentiometers to be used mainly in electronic equipment (hereafter referred to as "resistors"), based on JIS C 5260.

Remarks 1. The following standards are cited in this Standard:

JIS C 2520 Wires and rolled wires for electrical heating

JIS C 2521 Copper-nickel alloy wires, rolled wires, ribbons and sheets for electrical resistance

JIS C 2532 Electrical resistance wires, ribbons and sheets for general use

JIS C 5260 General rules of variable resistors for electronic equipment

JIS C 5261 Test methods of variable resistors for electronic equipment

JIS C 5602 Glossary of passive components for electronic equipment

JIS Z 9015 Sampling inspection procedures and tables by attributes with severity adjustment (receiving inspection where a consumer can select suppliers)

2. The International Standard corresponding to this Standard is given below.

IEC 393-4 (1978) Part 4 : Sectional specification : Single-turn rotary power potentiometers. Selection of methods of test and general requirements

2. Definitions For the purpose of this Standard, the definitions specified in JIS C 5260 and JIS C 5602 shall apply.

3. Type designation

3.1 Structure of type designation The type designation shall be arranged as follows:

Symbol denoting kind of resistor 3.2.1	Symbol denoting style 3.2.2	Symbol denoting off position 3.2.3	Symbol denoting spindle 3.2.4	Symbol denoting resistance law 3.2.5
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Example:

RP S50 A 20R 0B

Symbol denoting nominal total resistance 3.2.6	Symbol denoting tolerance on total resistance 3.2.7	Symbol denoting grade 3.2.8	Symbol denoting failure rate level 3.2.9
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Example:

102 K E X

3.2 Symbols

3.2.1 Kind of resistor The symbol denoting kind of resistor shall be two English capital letter RP, based on 4.2.1 (kind of resistor) of JIS C 5260.

3.2.2 Style The symbol denoting style shall consist of an English capital letter and a number of 2 to 3 digits denoting rated dissipation, and shall be as shown in Table 1.

Table 1. Style

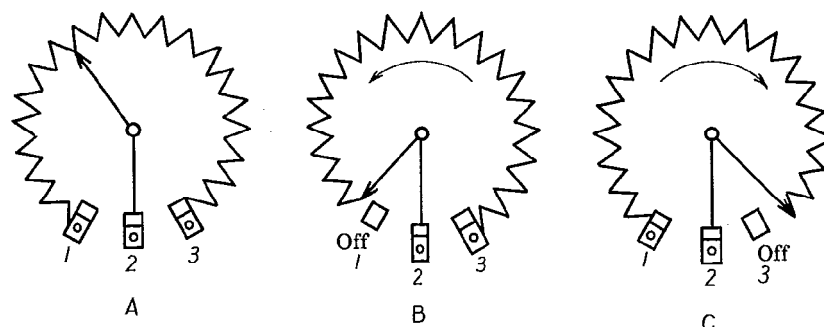
Symbol denoting style	Style	Rated dissipation W	Range of resistance values		Remarks
		Ambient temperature 20 °C	Minimum value Ω	Maximum value kΩ	
S 25	Open type	25	2	3	Attached Fig. 1
S 50		50		5	
S 75		75		6.8	
S100		100		10	Attached Fig. 2
S200		200		2.2	
F10S	Bottom-plate type	10	2	1	Attached Fig. 3
F10L					
F 25		25		3	
F 50		50		5	
F 75		75		6.8	
F100		100		10	

3.2.3 Off position The symbols denoting existence or non-existence and the position of electrical off are A, B and C, i.e. three kinds, as given in Table 2.

In resistors equipped with off position, the angle of rotation from the point where the resistance is infinity to the end stop shall be within 15 degrees.

Table 2. Off position

Symbol	Off position
A	No electrical off position exists.
B	Off position exists at the end of counter-clockwise rotation of spindle.
C	Off position exists at the end of clockwise rotation of spindle.



3.2.4 Spindle The symbol denoting spindle shall be a combination consisting of two numerals denoting spindle length and an English capital letter denoting shape of spindle. The symbols which denote the length and shape shall be as shown in Table 3 and Table 4.

Table 3. Length of spindle
(see Attached Figs. 1 to 4)

Unit: mm

Symbol	Length
10 ⁽¹⁾	10 ± 1
15	15 ± 1
20	20 ± 1
25	25 ± 1
30	30 ± 1
35	35 ± 1
40	40 ± 1
50	50 ± 1
60	60 ± 1

Note (1) The length of spindle symbolized as 10 is applicable for S 25 to S 200.

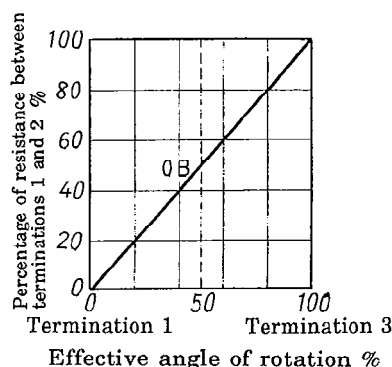
Remarks: The length of spindle means the dimension from the mounting face to the end of spindle.

Table 4. Shape of spindle
(see Attached Fig. 4)

Symbol	Shape
F	Flat shape
R	Round shape
S	Splined shape

3.2.5 Resistance law The symbol denoting resistance law (characteristic of resistance change) shall be a combination consisting of one numeral and an English capital letter based on 4.2.6 (resistance law) of JIS C 5260, and it shall be 0B. The resistance law is shown in Fig. 1.

Fig. 1. Resistance law



3.2.6 Nominal total resistance The symbol denoting nominal total resistance shall consist of three numerals, based on 4.2.7 (nominal total resistance) of JIS C 5260. The first and second numerals shall represent the significant figures in the unit of ohm (Ω) and the third numeral shall represent the number of zeros following the significant figures. If there is a decimal point, it shall be expressed by an English capital letter R, and all the numerals shall represent the significant figures.

Examples: 2R0 2.0 Ω 101 100 Ω
 100 10 Ω 102 1 k Ω

3.2.7 Tolerance on total resistance The symbol denoting tolerance on total resistance shall consist of an English capital letter, based on 4.2.8 (tolerance on total resistance) of JIS C 5260, and it shall be J ($\pm 5\%$), K ($\pm 10\%$) or M ($\pm 20\%$).

3.2.8 Grade The symbol denoting grade shall be as given in Table 5, based on 4.2.9 (grade) of JIS C 5260.

Table 5. Grade

Symbol	Description
E	A grade that needs quality assessment of general level II.

Informative reference: This corresponds to Assessment Level E specified in IEC 393-4.

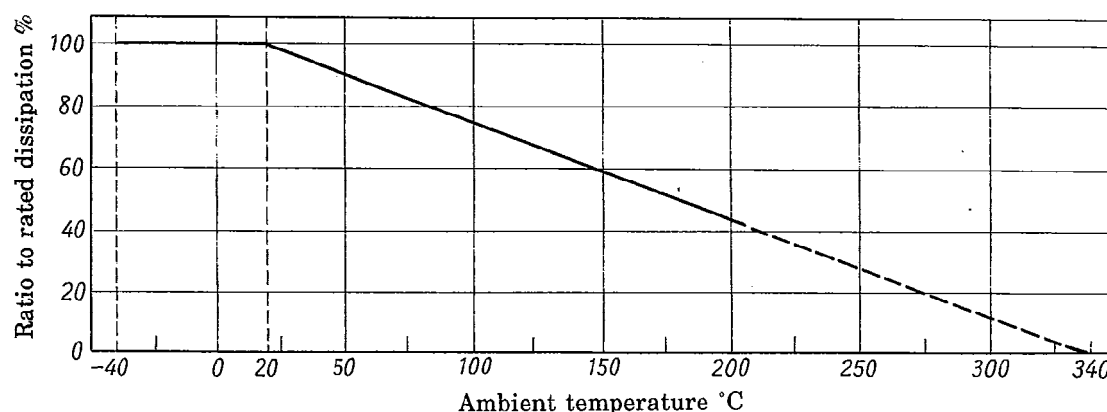
3.2.9 Failure rate level The symbol denoting failure rate level shall be an English capital letter X (no failure rate is specified), based on 4.2.10 (failure rate level) of JIS C 5260.

4. Ratings

4.1 Rated dissipation The rated dissipation is the maximum power which can be dissipated continuously from all the areas of a resistor element at a rated ambient temperature of 20 °C, the values of which shall be as given in Table 1.

4.2 Maximum dissipation The maximum dissipation at temperatures not exceeding rated ambient temperature and that exceeding rated ambient temperature mean such dissipations that the rated dissipation is reduced by means of the derating curve as illustrated in Fig. 2.

Fig. 2. Derating curve



4.3 Rated voltage The rated voltage means a d.c. or a.c (r.m.s. value at power frequency) voltage corresponding to the rated dissipation and it is obtained from the following formula:

$$E = \sqrt{P \cdot R}$$

where, E : rated voltage (V)
 P : rated dissipation (W)
 R : nominal resistance (Ω)

4.4 Category temperature range The category temperature range shall be -40°C to $+200^{\circ}\text{C}$.

4.5 Nominal total resistance The nominal total resistance shall be expressed in the unit of ohm (Ω) and the values shall be as given in Table 6.

The range of resistance corresponding to the rated dissipation shall be the range given in Table 1.

Table 6. Nominal total resistance

Unit: Ω						
2	2.2	3	3.3	4.7	5	6.8
10	15	20	22	30	33	47
50	68	100	150	200	220	300
330	470	500	680	1 000	1 500	2 000
2 200	3 000	3 300	4 700	5 000	6 800	10 000

4.6 Tolerance on total resistance The tolerance on total resistance shall be expressed in percent (%) and it shall be as stated in 3.2.7.

5. Performances and test methods The performances shall be as specified in Table 7. The test methods shall be as specified in JIS C 5261 and Table 7.

Table 7. Performances and test methods

No.	Item	Performance	Test method (JIS C 5261)
1	Appearance and marking	Free from such abnormalities as remarkable flaw and cracks. Specified marking shall be clearly stated.	As specified in 4.1 (appearance and construction) and 4.2 (marking).
2	Dimension	Specified dimensions shall be satisfied.	As specified in 4.3 (dimensions).
3	Total resistance	Within specified tolerance.	As specified in 5.1 (resistance).
4	Residual resistance	The residual resistance shall not exceed $0.2\ \Omega$ or 0.2% of nominal total resistance whichever is the larger. However, the above requirement does not apply to a resistor with off-position symbol B or C.	As specified in 5.1.
5	Dielectric withstand voltage	No such abnormality as flashover, burning or dielectric breakdown.	As specified in 5.7 (dielectric withstand voltage). Test voltage: condition F, but condition E for resistors with style symbol F10S or F10L.

Table 7. Performances and test methods (continued)

No.	Item	Performance	Test method (JIS C 5261)										
6	Rotating torque	To satisfy the following values. Unit: mN·m <table><tr><th>Style</th><th>Torque</th></tr><tr><td>F10S, F10L</td><td>10 to 50</td></tr><tr><td>F25, F50, F75, F100</td><td>28.5 to 345</td></tr><tr><td>S25, S50, S75, S100</td><td></td></tr><tr><td>S200</td><td>60 to 500</td></tr></table>	Style	Torque	F10S, F10L	10 to 50	F25, F50, F75, F100	28.5 to 345	S25, S50, S75, S100		S200	60 to 500	As specified in 6.2 [torque (actuating force)]. Measure starting torque.
Style	Torque												
F10S, F10L	10 to 50												
F25, F50, F75, F100	28.5 to 345												
S25, S50, S75, S100													
S200	60 to 500												
7	Solderability	At least 3/4 of flat portion of termination shall be covered with new solder.	As specified in 6.8 (solderability). (1) No aging is applied. (2) Temperature: 350 ± 10 °C (3) Duration of immersion: 2 ± 0.5 s										
8	Robustness of end stop for spindle	No deformation or remarkable damage when appropriate torsional moment given below is applied to spindle. Unit: mN·m <table><tr><th>Style</th><th>Torsional moment</th></tr><tr><td>F10S, F10L</td><td>1 000</td></tr><tr><td>S25, S50, S75, S100</td><td>1 700</td></tr><tr><td>S200</td><td></td></tr><tr><td>F25, F50, F75, F100</td><td></td></tr></table>	Style	Torsional moment	F10S, F10L	1 000	S25, S50, S75, S100	1 700	S200		F25, F50, F75, F100		As specified in 6.3 (robustness of actuator).
Style	Torsional moment												
F10S, F10L	1 000												
S25, S50, S75, S100	1 700												
S200													
F25, F50, F75, F100													
9	End play of spindle (applicable to spindle length 25 mm or more)	The angle made by reference plane and spindle is a right angle and end play of spindle shall not exceed the value given below, reference plane being the reference. $r = 0.5 \times \frac{l}{30}$ where, r: end play of spindle l: distance from reference plane to point of measurement.	As specified in 6.4 (bending and end play of actuator).										