

JIS

JAPANESE INDUSTRIAL STANDARD

Wirewound potentiometers

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Wirewound potentiometers

C 6445-1995

1. **Scope** This Japanese Industrial Standard specifies wirewound potentiometers, mainly for use in electrical communication equipment and electronic equipment (hereafter referred to as the "resistors").

Remarks 1. This resistor means such device that a resistance wire wound around a core bent into circular is employed as the resistor body, and that the resistance can be changed as needed by means of the slider which moves on the resistor body by the rotation of less than one revolution of the spindle.

2. The following Standards are cited in this Standard:

JIS C 0010	Environmental testing	Part 1: General and guidance
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 2522	Copper-manganese alloy wires, bars 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 potentiometers for use in electronic equipment	
JIS H 3130	Copper beryllium alloy, phosphor bronze and nickel silver sheets, plates and strips for springs	
JIS K 6915	Phenolic molding compounds	

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

IEC 393-5 (1992)	Potentiometers for use in electronic equipment
	Part 5: Sectional specification: Single-turn rotary low-power wirewound and non-wirewound potentiometers

2. **Definitions** For the purpose of this Standard, in addition to the definitions specified in JIS C 5260 and JIS C 5261, the following definition shall apply:

rated dissipation The maximum allowable power which can be dissipated continuously by all area of resistor body (between terminations 1 and 3) at an ambient temperature of 40°C or lower.

3. Type designation

3.1 Structure of type designation The type designation is structured by arranging the symbols as given below.

Symbol denoting kind	Symbol denoting nominal outside diameter	Symbol denoting character- istics	Symbol denoting type	Symbol denoting spindle	Symbol denoting resist- ance law
3.2.1	3.2.2	3.2.3	3.2.4	3.2.5	3.2.6

Example:

RA 30 Y N 40R B

Size

Symbol denoting nominal total re- sistance	Symbol denoting tolerance on total resistance
3.2.7	3.2.8
500 Ω	K

Remarks: The combination of symbol denoting kind and symbol denoting nominal outside diameter is called "Size".

3.2 Symbols

3.2.1 Kind The symbol denoting kind shall be two English capital letters RA which represent wirewound potentiometers.

3.2.2 Nominal outside diameter The symbol denoting nominal outside diameter shall be as given in Table 1 (see Attached Figs. 1 and 2).

Table 1. Nominal outside diameter

Unit: mm	
Symbol	Outside diameter
16	16 ± 0.5
20	20 ± 0.5
25	25^{+2}_{-1}
30	30^{+2}_{-1}
40	40 ± 2

3.2.3 Characteristics The symbols denoting characteristics are classified into four kinds, i.e., X and Y according to electrical and mechanical performances and further XC and YC if they are preset ones ⁽¹⁾, as shown in Table 2.

Note ⁽¹⁾ Preset resistor means a resistor which is generally not readjusted after it has been adjusted to meet the purpose unless any variation occurs in the function of the resistor or the apparatus in which the resistor is used.

Table 2. Symbol denoting characteristics

Symbol	Mechanical endurance (rotation)	Operation at cold	Resistance to vibration	Resistance to electrolytic corrosion	Change of temperature
X	Variation of resistance after 15000 cycles with a current corresponding to rated dissipation being passed through slider: $\pm 5\%$	-30°C , 1 h Variation of resistance: $\pm 3\%$	10 Hz to 55 Hz, 2 directions, 4 h, variation of resistance between terminations 1 and 3: $\pm 1\%$	40°C, RH 90% to 95%, 500 h, variation of resistance: $\pm 5\%$, insulation resistance: 5 M Ω and over	-30°C to 85°C , 5 cycles, variation of resistance: $\pm 4\%$
XC	Variation of resistance after 1200 cycles with a current corresponding to rated dissipation being passed through slider: $\pm 5\%$		10 Hz to 55 Hz, 2 directions, 4 h, variation of resistance between terminations 1 and 3 and that between terminations 1 and 2: $\pm 1\%$ and $\pm 3\%$ respectively		
Y	Variation of resistance after 15000 cycles with 1/2 of rated dissipation being consumed: $\pm 3\%$	-10°C , 1 h Variation of resistance: $\pm 3\%$	10 Hz to 55 Hz, 2 directions, 4 h, variation of resistance between terminations 1 and 3: $\pm 1\%$	—	—
YC	Variation of resistance after 1200 cycles with 1/2 of rated dissipation being consumed: $\pm 3\%$		10 Hz to 55 Hz, 2 directions, 4 h, variation of resistance between terminations 1 and 3 and that between terminations 1 and 2: $\pm 1\%$ and $\pm 3\%$ respectively	—	—

Note (2) Applicable to resistors of resistance law B (see No. 2 of Table 12).

3.2.4 Type The symbols denoting types are classified into two kinds according to construction of the terminations as shown in Table 3.

Table 3. Symbol denoting type

Symbol	Construction of termination	Applicable size	Remarks
N	Standard type	RA16 to RA40	Attached Fig. 1
P	Printed circuit board type	RA16	Attached Fig. 2

3.2.5 Spindle The symbol denoting spindle consists of a combination of the symbol denoting length of spindle given in Table 4 and the symbol denoting shape of spindle given in Table 5 (see Attached Figs. 1 and 2).

Table 4. Symbol denoting length of spindle

Symbol	Length mm	Applicable size
10	10 ± 1	RA16, RA20
15	15 ± 1	RA16 to RA40
20	20 ± 1	
25	25 ± 1	
30	30 ± 1	
35	35 ± 1	
40	40 ± 1	

Remarks: The length of spindle means the dimension from the reference plane to the end of spindle.

Table 5. Symbol denoting shape of spindle
(see Attached Fig. 3)

Symbol	Shape
F	Flat shape
R	Round shape
S	Grooved shape

Remarks: The F shape is applicable to spindles of 20 mm and over in length.

3.2.6 Resistance law The resistance law is, as shown in Figs. 1-1 and 1-2, classified into three classes according to the behavior of the ratio of output voltage between terminations 1 and 2 or between terminations 2 and 3 when the spindle is rotated clockwise or counterclockwise respectively, while a voltage (not exceeding the rated voltage) is applied across the terminations 1 and 3 (see Attached Figs. 1 and 2), and the symbols shall be as shown below.

Symbol A : Expresses the relationship which can be represented by a polygonal line (two straight lines inclined to each other) as shown by A in Fig. 1-1.

Symbol B : Expresses the linear relationship as shown by B in Fig. 1-1.

Symbol C : Expresses the relationship which can be represented by a polygonal line as shown by C in Fig. 1-2.

Fig. 1-1

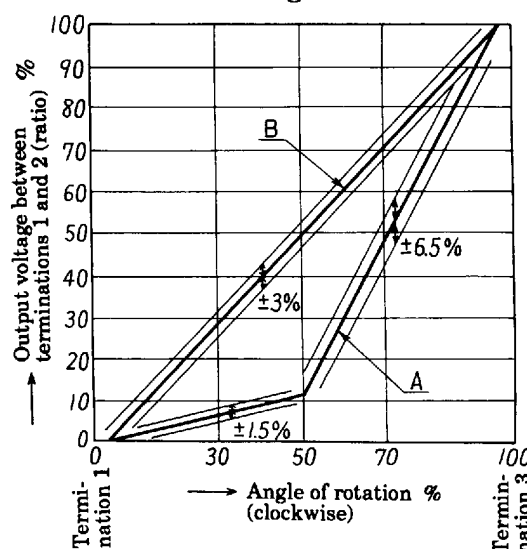
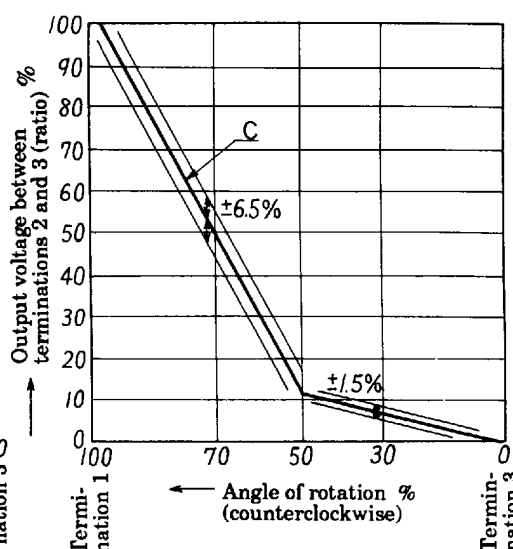


Fig. 1-2



- Remarks 1.** In the above figures, the thin continuous lines on both sides of continuous lines A, B and C indicate the tolerances on respective output voltages, and the value is indicated in percentage of the applied voltage.
2. At both ends of angle of rotation, there are small areas where, due to the treatment of termination, the resistance does not vary.

3.2.7 Nominal total resistance The symbols denoting nominal total resistances, in which the resistance is expressed in the unit of ohm (Ω) or kilohm ($k\Omega$), shall be as given in Table 6.

Table 6. Symbol denoting nominal total resistance

Size	Resistance law symbol	Symbol (nominal total resistance)
RA16	B	10 Ω , 20 Ω , (30 Ω), 50 Ω , 100 Ω , 200 Ω , (300 Ω), 500 Ω , 1 k Ω
	A, C	100 Ω , 200 Ω , (300 Ω), 500 Ω
RA20	B	10 Ω , 20 Ω , (30 Ω), 50 Ω , 100 Ω , 200 Ω , (300 Ω), 500 Ω , 1 k Ω , 2 k Ω
	A, C	100 Ω , 200 Ω , (300 Ω), 500 Ω , 1 k Ω
RA25	B	5 Ω , 10 Ω , 20 Ω , (30 Ω), 50 Ω , 100 Ω , 200 Ω , (300 Ω), 500 Ω , 1 k Ω , 2 k Ω , (3 k Ω), 5 k Ω
	A, C	100 Ω , 200 Ω , (300 Ω), 500 Ω , 1 k Ω , 2 k Ω
RA30	B	5 Ω , 10 Ω , 20 Ω , (30 Ω), 50 Ω , 100 Ω , 200 Ω , (300 Ω), 500 Ω , 1 k Ω , 2 k Ω , (3 k Ω), 5 k Ω , 10 k Ω
	A, C	100 Ω , 200 Ω , (300 Ω), 500 Ω , 1 k Ω , 2 k Ω , (3 k Ω), 5 k Ω
RA40	B	10 Ω , 20 Ω , (30 Ω), 50 Ω , 100 Ω , 200 Ω , (300 Ω), 500 Ω , 1 k Ω , 2 k Ω , (3 k Ω), 5 k Ω , 10 k Ω
	A, C	100 Ω , 200 Ω , (300 Ω), 500 Ω , 1 k Ω , 2 k Ω , (3 k Ω), 5 k Ω

Remarks: Use of the resistances in parentheses should be avoided as far as possible.

3.2.8 Tolerance on total resistance The symbols denoting tolerances on total resistances shall be as given in Table 7.

Table 7. Symbol denoting tolerance on total resistance

Symbol	Tolerance on total resistance %
F	± 1
G	± 2
J	± 5
K	± 10

Remarks: F and G are not applicable to the ones with total resistance less than 100 Ω .