

JIS

JAPANESE INDUSTRIAL STANDARD

**Variable carbon composition
resistors for use in
electronic equipment
—Characteristics Y, W and UC**

Ⓒ JIS C 6444—1991

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J I S



Variable carbon composition resistors for use in electronic equipment - Characteristics Y, W and UC

C 6444-1991

1. Scope

This Japanese Industrial Standard specifies rotary type characteristics "Y", "W" and "UC" of variable carbon composition resistors (hereafter referred to as the "resistor"), principally for use in electric equipment.

Remarks 1. Applicable Standards are as follows:

JIS C 5260-General Rules of Variable Resistors for Electronic Equipment

JIS C 5261-Test Methods of Variable Resistors for Electronic Equipments

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. Corresponding International Standards are as follows:

IEC 393-5 Potentiometers for use in electronic equipment. Part 5 (1978): Sectional specification: Single-turn rotary low-power wirewound and non-wirewound potentiometers. Selection of methods of test and general requirements

3. In this standard, units and numerical values in { } are based on customary units, and are the reference values.

2. Definition

For the main terms used in this standard the definitions in JIS C 5260 and JIS C 5602 apply.

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3. Type Designation

3.1 Composition of Type Designation The composition of type designation shall be arranged as follows:

Symbol denoting kind of resistor	Symbol denoting size	Symbol denoting charac- teristic	Symbol denoting figure	Symbol denoting spindle
3.2.1	3.2.2	3.2.3	3.2.4	3.2.5

Example

1. RV	12	W	L	15S
2. RV	16	Y	D	20R
3. RV	24	Y	N	20S
4. RV	24	Y	G	20S

Symbol denoting resistance/ rotation relationship	Symbol denoting nominal total re- sistance	Symbol denoting tolerance on total resistance	Symbol denoting grade	Symbol denoting failure rate level	Symbol denoting attached switch
3.2.6	3.2.7	3.2.8	3.2.9	3.2.10	3.2.11

OB	103	K	E	M	-
OB501 +	15A502	M	X	X	-
15A	103	M	X	X	SE
OB	102 x 2	K	C	X	-

Remarks: Symbol denoting attached switch shall be applied only for resistors attached with the switches.

3.2 Symbols

3.2.1 Kind of Resistor The symbol denoting kind of resistor shall be represented by two large English characters RV.

3.2.2 Size The symbol denoting size shall represent the outer diameter by two numerals and follow Table 1.

Table 1. Size

Unit: mm

Symbol	Outer diameter of resistor	Spindle diameter	Mounting screw			Applicable characteristics
			Nominal diameter	Pitch	Length	
10	10 ± 1.5	3	6	0.75	6	Y, UC
12	12.5 ± 1.5	(2)				W
16	16 ± 1.5	3.2				Y, UC
20	20 ± 1.5	(8)	9		10	Y, W, UC
24	24 ± 1.5					W
28	28 ± 1.6					Y
30	30 ± 2					

Remarks: The values in parentheses shall be applied only to the diameter of inner or outer spindles in coaxial double axis lug terminal type. (See Attached Fig. 3)

3.2.3 Characteristics The symbol denoting the characteristics shall be represented by one or two large English characters, and follows Table 2.

Table 2. Characteristics

Symbol	Category temperature range °C	Rated ambient temperature °C	Size	Applicable resistance/rotation relationship	Use
Y	-10 to +85	40	10, 16, 20, 24, 30	15A, 15C, 0B	General
W	-55 to +125	70	12, 24, 28	10A, 15A, 0B	High power
UC	-10 to +85	40	10, 16, 20, 24	0B	High stability pre-set

3.2.4 Type The symbol denoting type shall be represented by one English large character, and follows Table 3.

Table 3. Types

Symbol	Type	Size	Remarks
N	Single lug terminal type	10, 12, 16, 20, 24, 28, 30	See Attached Fig. 1
G	Single-spindle tandem lug terminal type	16, 24, 30	See Attached Fig. 2
D	Coaxial double-spindle lug terminal type	16, 24, 30	See Attached Fig. 3
P	Single printed terminal type	16, 20	See Attached Fig. 4
L	Single lug terminal spindle-fixed type	12, 16, 20, 24, 28, 30	See Attached Fig. 5

Remarks: Symbol G, D and P shall be applied only for the characteristic Y.

3.2.5 Spindle The symbol denoting spindle is expressed by a combination of two numerals representing the length of spindle and one large English character representing the shape of the spindle. The symbols representing the length and shape follow Table 4. However, the symbol representing the spindle of type D express only the length and style of the inner spindle. (Except for the length and type of the outer spindle.)

Table 4. Length and Shape of Spindle (See Attached Fig. 6)

Unit: mm

Symbol	Length	Shape symbol of applicable spindle	Size
10	10 ± 0.5	S (Slotted shape)	10, 12, 16, 20
15	15 ± 0.5		
20	20 ± 0.5	F (Flat shape)	10, 12, 16, 20, 24, 28, 30
25	25 ± 1.0	R (Round shape)	24, 28, 30
30	30 ± 1.0	S (Slotted shape)	

Remarks 1. The length of the spindle means the dimension from the reference surface to the end of spindle.

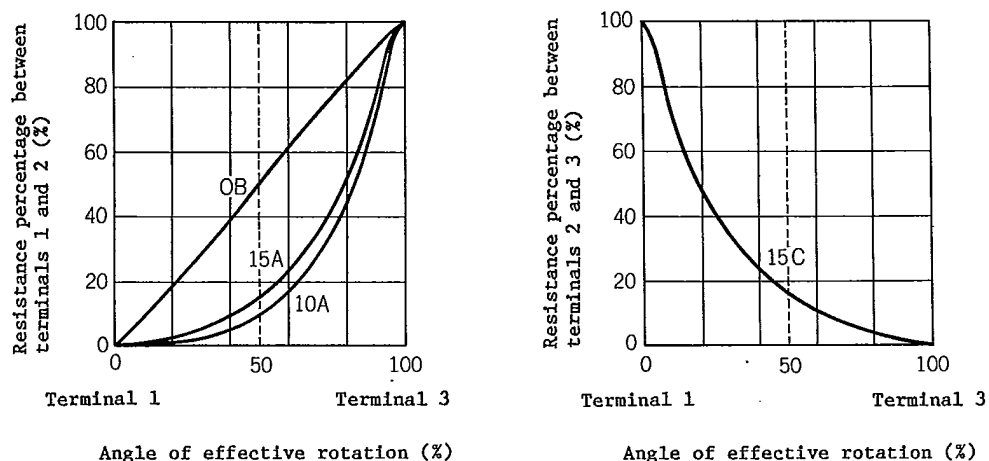
2. The shape of spindle R is applied only for Type D in size 16, 24 and 30 (See Attached Fig. 3).

3.2.6 Resistance/Rotation Relationship The symbols denoting resistance/rotation relationships shall be expressed by a combination of one or two numerals and one large English character based on JIS C 5260, and follow Table 5. and Fig. 1.

Table 5. Resistance/Rotation Relationship

Symbol	Resistance/rotation relationship	Applicable characteristics	Remarks
10A	See Fig. 1	W	See Table 12, No. 2
15 A		Y, W	
15 C		Y	
OB		Y, W, UC	

Fig. 1. Resistance/Rotation Relationship



3.2.7 Nominal Total Resistance The symbols denoting nominal total resistance shall be expressed by three numerals in ohmic (Ω) unit. The first and second numerals represent the effective numerals of the nominal total resistance, and the third numeral represents the number of zeros succeeding that.

Example:

101	100 Ω
102	1 k Ω
504	500 k Ω
504 x 2	tandem type resister, consisting of two 500 k Ω connected
504 + 104	tandem type resister in which the nominal total resistance of spindle side resister is 500 k Ω , and that of the reverse side is 100 k Ω

3.2.8 Tolerance on Total Resistance The symbol denoting the tolerance on total resistance shall be expressed by one large English character K for $\pm 10\%$ and M for $\pm 20\%$.

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3.2.9 Grade The symbol denoting the grade shall follow Table 6. And relation between the grade and the characteristics shall follow Table 7.

Table 6. Grade

Symbol	Contents of grade
C	Quality evaluation is required, that level is the simple level
E	Quality evaluation is required, that level is the general level II
X	Not specified about quality evaluation

Remarks: General level II corresponds to Assessment Level E specified in IEC 393-5.

Table 7. Grade and Characteristics

Grade	Characteristics
C and X	Y or UC
E	W

3.2.10 Failure Rate Level The symbol denoting the failure rate level shall follow Table 8.

Table 8. Failure Rate Level

Symbol	Failure rate %/1000 h	Applicable grade
M	1.0	E
P	0.1	
R	0.01	
X	Not specified	C, X

3.2.11 Attached Switch The symbols denoting the attached switch of the resistor shall follow Table 9.

And, switch terminal symbols and connection diagrams shall follow Fig. 2.

Table 9. Attached Switch

Symbol	Kind	Rated voltages V	Rated current A	Size
SD	Single-pole single-throw	110 AC (Effective value in commercial frequency)	0.5	16
SE			1	24, 30
SF			3	
ME	Single-pole double-throw		1	

Remarks 1. The switch shall not be attached to resistors of size 10, 12 and 20.

2. The switch shall not be attached to resistors of characteristics W and UC.

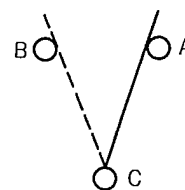
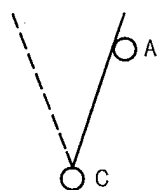
3. The switch shall not be attached to resistors of type D, G, L and P.

Fig. 2. Switch Terminal Symbols and Connection Diagrams

(The connection which is made when the spindle rotates clockwise is expressed by a continuous line, and when the connection is open or broken by a broken line.)

Single-pole single-throw (S)

Single-pole double-throw (M)



4. Ratings

4.1 Rated Dissipation The rated dissipation of a resistor means the maximum power which can be dissipated continuously from the whole resistor body (between terminals 1 and 3) at the rated ambient temperature, and follow Table 10.

And, the rated ambient temperature following Table 2.

If the nominal total resistance is over the limiting resistance, the rated dissipation of which shall be the dissipation corresponds to the maximum working voltage.

Table 10. Rated Dissipation (when not mounted on heat sink)

Charac- teristic	Existence of switch	Size.	Resistance/ rotation relationship	Rated dissipation W						Maximum working voltage V
				Nominal total resistance						
				1 kΩ or less	1 kΩ (excl.) to 10 kΩ (incl.)	10 kΩ (excl.) to 50 kΩ (incl.)	50 kΩ (excl.) to 300 kΩ (incl.)	300 kΩ (excl.) over		
Y	No	10	0B	0.1						200
		16	15A, 15C	—	0.05					160
			0B	0.1						200
		20	15A, 15C	—	0.125					200
			0B	0.25						250
		24	15A, 15C	—	0.2	0.125				200
			0B	0.4	0.3	0.25				315
		30	15A, 15C	0.8		0.6	0.3	0.2	315	
0B	1.0		0.8	0.6	0.4	500				
Y	Yes	16	15A, 15C	—	0.05					160
			0B	0.1						200
		24	15A, 15C	—	0.15	0.125				200
			0B	0.35	0.25					315
		30	15A, 15C	0.6		0.5	0.3	0.2	315	
			0B	1.0	0.8	0.7	0.6	0.4	500	
W	No	12	10A, 15A	—	0.125					160
			0B	0.25						160
		24	10A, 15A	—	0.25					200
			0B	0.5						250
		28	10A, 15A	—	0.5					200
			0B	1.0						315
UC	No	10	0B	0.05			—		—	
		16		0.05						
		20		0.1						
		24		0.2						

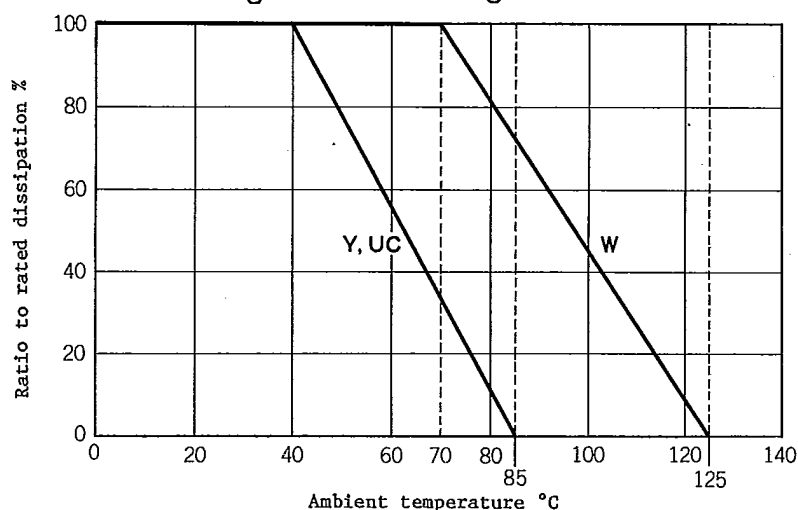
Remarks: For resistors of type D and G, the above rated dissipations shall be applied to each resistor.

Table 10. (Continued) Rated Dissipation
(When mounted on heat sink)

Charac- teristic	Size	Resistance/ rotation relationship	Rated dissipation W		Maximum working voltage V
			Nominal total resistance		
			1 kΩ or less	Over 1 kΩ	
W	12	10 A, 15 A	—	0.25	200
		0B	0.5		250
	24	10 A, 15 A	—	0.5	200
		0B	1.0		250
	28	10 A, 15 A	—	1.0	315
		0B	2.0		500

4.2 Maximum Dissipation The maximum dissipation at the temperature less than the rated ambient temperature shall be equal to the rated dissipation. The maximum dissipation in case of exceeding the rated ambient temperature shall be the derated value from the rated dissipation by means of the derating curve given in Fig. 3.

Fig. 3. Derating Curve



4.3 Working Temperature Range For working temperature range follow Table 2.

4.4 Nominal Total Resistance For nominal total resistance follow Table 11.

Table 11. Nominal Total Resistance

Charac- teristic	Size	Resistance/ rotation relationship	Nominal total resistance
Y, W	10 12 16	0B	500 Ω , 1 k Ω , 2 k Ω , 5 k Ω , 10 k Ω , 20 k Ω , 50 k Ω , 100 k Ω , 200 k Ω , 500 k Ω , 1 M Ω
	20		200 Ω , 500 Ω , 1 k Ω , 2 k Ω , 5 k Ω , 10 k Ω , 20 k Ω , 50 k Ω , 100 k Ω , 200 k Ω , 500 k Ω , 1 M Ω , 2 M Ω
	24 28 30		100 Ω , 200 Ω , 500 Ω , 1 k Ω , 2 k Ω , 5 k Ω , 10 k Ω , 20 k Ω , 50 k Ω , 100 k Ω , 200 k Ω , 500 k Ω , 1 M Ω , 2 M Ω
UC	10 16 20 24		500 Ω , 1 k Ω , 2 k Ω , 5 k Ω , 10 k Ω , 20 k Ω , 50 k Ω
Y, W	12 16 20	10 A 15 A 15 C	2 k Ω , 5 k Ω , 10 k Ω , 20 k Ω , 50 k Ω , 100 k Ω , 200 k Ω , 500 k Ω , 1 M Ω
	24 28 30		1 k Ω , 2 k Ω , 5 k Ω , 10 k Ω , 20 k Ω , 50 k Ω , 100 k Ω , 200 k Ω , 500 k Ω , 1 M Ω , 2 M Ω

4.5 Tolerance on Total Resistance The tolerance on total resistance shall be $\pm 10\%$ and $\pm 20\%$.

4.6 Rated Voltage The rated voltage is the d.c. or a.c. (r.m.s. value at commercial frequency) voltage corresponding to the rated dissipation, and is obtained from the formula given below. However, if the rated voltage so obtained exceeds the maximum working voltage given in Table 10, the latter shall be taken as the rated voltage.

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

where, E : rated voltage (V)

P : rated dissipation (W)

R : nominal total resistance (Ω)

5. Performance and Test Methods

5.1 Test Methods The test methods for the electrical performance, mechanical performance and environmental performance follow the specifications in JIS C 5261.

5.2 Electrical Performance The electrical performance shall follow Table 12.

Table 12. Electrical Performance

No.	Item	Performance	Test Methods (JIS C 5261)																		
1	Total resistance	Shall be within the specified tolerances.	Follow 5.1 (Resistance value).																		
2	Resistance/rotation relationship	<table><tr><td colspan="2">Shall satisfy the following values.</td><td>Unit: %</td></tr><tr><td>Symbol</td><td>Measuring point</td><td></td></tr><tr><td>10 A</td><td>Resistance percentage at 50 % of effective rotation angle</td><td></td></tr><tr><td>15 A and 15 C⁽¹⁾</td><td>6 to 15</td><td></td></tr><tr><td>0 B</td><td>10 to 25</td><td></td></tr><tr><td></td><td>40 to 60</td><td></td></tr></table> ⁽¹⁾ For 15 C, measure the resistance between terminals 2 and 3.	Shall satisfy the following values.		Unit: %	Symbol	Measuring point		10 A	Resistance percentage at 50 % of effective rotation angle		15 A and 15 C ⁽¹⁾	6 to 15		0 B	10 to 25			40 to 60		Follow 5.1. (1) Follow resistance method. (2) Measure at the position of 50 % effective rotational angle.
Shall satisfy the following values.		Unit: %																			
Symbol	Measuring point																				
10 A	Resistance percentage at 50 % of effective rotation angle																				
15 A and 15 C ⁽¹⁾	6 to 15																				
0 B	10 to 25																				
	40 to 60																				
3	Residual resistance value	<table><tr><td colspan="2">Shall satisfy the following values.</td></tr><tr><td rowspan="3">Nominal total resistance</td><td>Classification by resistance/rotation-relationship and measuring terminal</td></tr><tr><td>Between terminals 1 and 2 of 10 A and 15 A</td><td>Between terminals 2 and 3 of 10 A and 15 A</td></tr><tr><td>Between terminals 2 and 3 of 15 C</td><td>Between terminals 1 and 2 of 15 C</td></tr><tr><td></td><td>Between terminal 1 and 2, 2 and 3 of 0 B</td><td></td></tr></table>	Shall satisfy the following values.		Nominal total resistance	Classification by resistance/rotation-relationship and measuring terminal	Between terminals 1 and 2 of 10 A and 15 A	Between terminals 2 and 3 of 10 A and 15 A	Between terminals 2 and 3 of 15 C	Between terminals 1 and 2 of 15 C		Between terminal 1 and 2, 2 and 3 of 0 B		Follow 5.1.							
Shall satisfy the following values.																					
Nominal total resistance	Classification by resistance/rotation-relationship and measuring terminal																				
	Between terminals 1 and 2 of 10 A and 15 A	Between terminals 2 and 3 of 10 A and 15 A																			
	Between terminals 2 and 3 of 15 C	Between terminals 1 and 2 of 15 C																			
	Between terminal 1 and 2, 2 and 3 of 0 B																				

Table 12. (Continued)

No.	Item	Performance				Test Methods (JIS C 5261)
		10 kΩ or less	3 Ω max.	10 Ω max.		
		10 kΩ (excl.) to 1 MΩ (excl.)	0.2 % max. of nominal total resistance, but not exceeding 50 Ω	1 % max. of nominal total resistance		
		1 MΩ or more	200 Ω max.			
4	Resistance temperature characteristics	Shall satisfy the following values.				Follow 5.3 (Resistance temperature characteristics and aberration of total resistance).
		Characteristic	Size	Allowable variation in total resistance		(1) Measure resistance at condition B, stage 4 and 7.
				Nominal total resistance	Nominal total resistance	(2) Temperature of stage 7:
				Nominal total resistance	Nominal total resistance	Characteristics Y and UC: 85 + 3°C
		Y	10, 16	+ 8	+ 12	Characteristic W : 125 + 3°C
			20, 24, 30	+ 6	+ 10	Measure total resistance.
		W	12, 24, 28	-1.58 to -6.3		
		UC	10, 16 20, 24	+5		

Table 12. (Continued)

No.	Item	Performance	Test Methods (JIS C 5261)																				
5	Insulation resistance	Shall satisfy the following values. <table><tr><th rowspan="2">Charac- teristic</th><th colspan="2">Test position</th></tr><tr><th>Between ex- posed metal- lic portions, resistor terminals and switch terminals of each other.</th><th>Between terminals of tandem type resistor, of each other.</th></tr><tr><td>Y and UC</td><td colspan="2">100 MΩ or more</td></tr><tr><td>W</td><td>1000 MΩ or more</td><td>—</td></tr></table>	Charac- teristic	Test position		Between ex- posed metal- lic portions, resistor terminals and switch terminals of each other.	Between terminals of tandem type resistor, of each other.	Y and UC	100 MΩ or more		W	1000 MΩ or more	—	Follow 5.6 (Insulation resistance). (1) Test voltage (d.c.) Size: 10 : 250 + 25 V 12, 16 and 20: 500 $\pm$ 50 V 24, 28 and 30: 1000 $\pm$ 100 V (2) Voltage duration : 60 $\pm$ 5 sec.									
Charac- teristic	Test position																						
	Between ex- posed metal- lic portions, resistor terminals and switch terminals of each other.	Between terminals of tandem type resistor, of each other.																					
Y and UC	100 MΩ or more																						
W	1000 MΩ or more	—																					
6	Dielectric withstand voltage	No abnormalities such as arcing and dielectric breakdown shall appear, when the following test voltage is applied. Unit: V <table><tr><th rowspan="2">Size</th><th colspan="2">Test voltage (r.m.s. at commercial frequency)</th></tr><tr><th>At air pressure of the standard state</th><th>At reduced pressure (8.5 kPa)</th></tr><tr><td>10</td><td>250 $^{+125}_0$</td><td>—</td></tr><tr><td>12</td><td>500 $^{+25}_0$</td><td>170 $^{+85}_0$ (2)</td></tr><tr><td>16, 20</td><td></td><td></td></tr><tr><td>24, 28</td><td>1000 $^{+50}_0$</td><td>340 $^{+17}_0$ (2)</td></tr><tr><td>30</td><td></td><td>—</td></tr></table> Note (2) The test at reduced pressure shall be applied only for the resistor of characteristic W.	Size	Test voltage (r.m.s. at commercial frequency)		At air pressure of the standard state	At reduced pressure (8.5 kPa)	10	250 $^{+125}_0$	—	12	500 $^{+25}_0$	170 $^{+85}_0$ (2)	16, 20			24, 28	1000 $^{+50}_0$	340 $^{+17}_0$ (2)	30		—	Follow 5.7 (Dielectric withstand voltage). (1) Testing position (a) Between disclosed metallic part, resistor terminals and switch terminals each other. (b) Between terminals of a tandem type resistor each other. (c) Between switch terminals of the same pole in "off" state. (2) Voltage duration: 60 $^{+10}_0$ sec. (Slowly raise the voltage from 0 V to the rated voltage, at a rate of about 100 V/sec., and keep it at that voltage for 60 sec)
Size	Test voltage (r.m.s. at commercial frequency)																						
	At air pressure of the standard state	At reduced pressure (8.5 kPa)																					
10	250 $^{+125}_0$	—																					
12	500 $^{+25}_0$	170 $^{+85}_0$ (2)																					
16, 20																							
24, 28	1000 $^{+50}_0$	340 $^{+17}_0$ (2)																					
30		—																					

Table 12. (Continued)

No.	Item	Performance	Test Methods (JIS C 5261)																																																																			
7	Rotational noise	In case of method A, it shall not exceed the following value. And, in the case of method C it shall not exceed the larger value in either 3 % of nominal total resistance or 3 Ω. Unit: mV <table><thead><tr><th rowspan="2">Charac- teristic</th><th rowspan="2">Size</th><th colspan="6">Resistance/rotation relationship</th></tr><tr><th colspan="3">10 A, 15 A, 15 C</th><th colspan="3">0 B</th></tr></thead><tbody><tr><td rowspan="2">Y</td><td>10, 16</td><td>33</td><td>39</td><td>39</td><td>27</td><td>33</td><td>39</td></tr><tr><td>20, 24, 30</td><td>27</td><td>33</td><td></td><td>22</td><td>27</td><td>33</td></tr><tr><td rowspan="2">W</td><td>12</td><td>33</td><td>39</td><td></td><td>27</td><td>33</td><td>39</td></tr><tr><td>24, 28</td><td>27</td><td>33</td><td></td><td>22</td><td>27</td><td>33</td></tr><tr><td rowspan="2">UC</td><td>10, 16</td><td>-</td><td>-</td><td>-</td><td>18</td><td>18</td><td>-</td></tr><tr><td>20, 24</td><td>-</td><td>-</td><td>-</td><td>15</td><td>15</td><td>-</td></tr><tr><td colspan="2">Nominal total resistance</td><td>1kΩ or less</td><td>1kΩ excl. to 10kΩ incl.</td><td>10kΩ excl. over 100kΩ incl.</td><td>10kΩ or less</td><td>10kΩ excl. to 100kΩ incl.</td><td>100kΩ excl. over</td></tr></tbody></table>	Charac- teristic	Size	Resistance/rotation relationship						10 A, 15 A, 15 C			0 B			Y	10, 16	33	39	39	27	33	39	20, 24, 30	27	33		22	27	33	W	12	33	39		27	33	39	24, 28	27	33		22	27	33	UC	10, 16	-	-	-	18	18	-	20, 24	-	-	-	15	15	-	Nominal total resistance		1kΩ or less	1kΩ excl. to 10kΩ incl.	10kΩ excl. over 100kΩ incl.	10kΩ or less	10kΩ excl. to 100kΩ incl.	100kΩ excl. over	Follow 5.8 (Rotation noise). (1) Follow method A or C. (2) Rotate spindle at a speed of 30 cycles per sec. (3) Except the parts near the both ends of effective rotation angle.
Charac- teristic	Size	Resistance/rotation relationship																																																																				
		10 A, 15 A, 15 C			0 B																																																																	
Y	10, 16	33	39	39	27	33	39																																																															
	20, 24, 30	27	33		22	27	33																																																															
W	12	33	39		27	33	39																																																															
	24, 28	27	33		22	27	33																																																															
UC	10, 16	-	-	-	18	18	-																																																															
	20, 24	-	-	-	15	15	-																																																															
Nominal total resistance		1kΩ or less	1kΩ excl. to 10kΩ incl.	10kΩ excl. over 100kΩ incl.	10kΩ or less	10kΩ excl. to 100kΩ incl.	100kΩ excl. over																																																															
8	Contact resistance of attached switch	0.05 Ω or less	Follow 5.10 (Contact Resistance of Attached Switch). Test current: Attached switch of size 16: 0.5 A Attached switch of size 24 and 30: 1 A																																																																			

5.3 Mechanical Performance The mechanical performance shall follow Table 13.

Table 13. Mechanical Performance

No.	Item	Performance	Test Methods (JIS C 5261)																																						
1	Angle of total rotation	<table><tr><td colspan="4">Shall satisfy the following values.</td></tr><tr><td colspan="2"></td><td colspan="2">Unit: degree</td></tr><tr><td rowspan="2">Characteristic</td><td>Size</td><td colspan="2">Angle of total rotation</td></tr><tr><td></td><td></td><td></td></tr><tr><td rowspan="3">Y and UC</td><td>10</td><td colspan="2">300 ± 10</td></tr><tr><td>16, 20</td><td colspan="2">260 ± 10</td></tr><tr><td>24, 30</td><td colspan="2">300 ± 5</td></tr><tr><td rowspan="3">W</td><td>12</td><td colspan="2">300 ± 10</td></tr><tr><td>24</td><td colspan="2">300 ± 5</td></tr><tr><td>28</td><td colspan="2">315 ± 5</td></tr></table>	Shall satisfy the following values.						Unit: degree		Characteristic	Size	Angle of total rotation					Y and UC	10	300 ± 10		16, 20	260 ± 10		24, 30	300 ± 5		W	12	300 ± 10		24	300 ± 5		28	315 ± 5		Follow 6.1 (Mechanical performance test)			
Shall satisfy the following values.																																									
		Unit: degree																																							
Characteristic	Size	Angle of total rotation																																							
Y and UC	10	300 ± 10																																							
	16, 20	260 ± 10																																							
	24, 30	300 ± 5																																							
W	12	300 ± 10																																							
	24	300 ± 5																																							
	28	315 ± 5																																							
2	Rotation torque	<table><tr><td colspan="4">Shall satisfy the following values.</td></tr><tr><td colspan="4">Unit: mN·m{gf·cm}</td></tr><tr><td rowspan="2">Charac- teristic</td><td rowspan="2">Size</td><td colspan="2">Rotation torque</td></tr><tr><td colspan="2">Type</td></tr><tr><td rowspan="6">Y</td><td rowspan="3">10</td><td rowspan="3">2 to 20 {20.4 to 204}</td><td>N, P</td><td>G, D</td></tr><tr><td colspan="2">-</td></tr><tr><td colspan="2">2 to {20.4 to 357}</td></tr><tr><td rowspan="2">16</td><td colspan="2"></td></tr><tr><td colspan="2"></td></tr><tr><td rowspan="2">20</td><td rowspan="2">5 to 30 {51 to 306}</td><td colspan="2">-</td></tr><tr><td colspan="2"></td></tr><tr><td>24, 30</td><td></td><td colspan="2">5 to 50 {51 to 510}</td></tr></table>	Shall satisfy the following values.				Unit: mN·m{gf·cm}				Charac- teristic	Size	Rotation torque		Type		Y	10	2 to 20 {20.4 to 204}	N, P	G, D	-		2 to {20.4 to 357}		16					20	5 to 30 {51 to 306}	-				24, 30		5 to 50 {51 to 510}		Follow 6.2 [Torque (Operating power)]. Measure the starting torque.
Shall satisfy the following values.																																									
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