

JIS

JAPANESE INDUSTRIAL STANDARD

Toggle switches for use
in electronic equipment

JIS C 6571—1994

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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J I S

Toggle switches
for use in electronic equipment

C 6571-1994

1. Scope This Japanese Industrial Standard specifies toggle switches (hereafter referred to as "switches") used mainly for electronic equipment in the electric circuit of 250 V or less, with the rated make/break current of 25 A or less.

- Remarks
1. The toggle switch referred to herein is a switch with finger tip-operated bat-form lever capable of being linearly reciprocated.
 2. The standards cited in this Standard are as follows:
 - JIS B 1255 Toothed lock washers
 - JIS C 5441 Testing methods of switches for use in electronic equipment
 - JIS H 8610 Electroplated coatings of zinc on iron or steel
 - JIS K 6911 Testing methods for thermosetting plastics
 3. The International standards corresponding to this Standard are as follows:
 - IEC 131-1 (1984) Lever switches
Part 1: General requirements and rules for the preparation of detail specifications
 - IEC 131-2 (1963) Lever switches
Part 2: Requirements for switches of Type 1, slow-make, slow-break
 - IEC 131-3 (1969) Lever switches
Part 3: Requirements for switches of Type 2, quick-make quick-break (toggle switches)
 - IEC 131-4 (1987) Lever switches
Part 4: Requirements for miniature toggle switches

2. Definitions For the main terms used in this Standard the definitions in JIS C 5441 apply, and the rest of the terms are as follows:

- (1) lever A knob to operate the switch (refer to Attached Fig. 1).
- (2) bushing A part of switch which holds the lever and is the base for lever operating angle. In a nut mounting type switch, it is the fixture to mount the switch to an equipment with nut, by using the thread provided on its outside (refer to Attached Fig. 1).
- (3) key way A groove cut in one side of the bushing in the direction of throwing down the lever in a nut mounting type switch. This groove is taken as the basis for state of ON/OFF corresponding to the lever position and for the terminal number (refer to Attached Fig. 1).

- (4) lever turned up (to direction A) state The state when the lever is turned up in the opposite direction of the key way (refer to Attached Fig. 1).

For a screw mounting type switch, the state when the lever is turned up in the opposite direction of the marking (manufacturer's name or abbreviation) (refer to Attached Fig. 24).

- (5) lever turned down (to direction B) state The state when the lever is turned down in the direction of the key way (refer to Attached Fig. 1).

For a screw mounting type switch, the state when the lever is turned down in the direction of the marking (manufacturer's name or abbreviation) (refer to Attached Fig. 24).

- (6) lever center state The state when the lever is in center position (refer to Attached Fig. 3).

- (7) terminal No. The terminal position No. to indicate the state of ON/OFF. The terminal No. will not be changed even when there is omission of terminal (refer to Attached Fig. 1).

- (8) rated make/break voltage A voltage which can be switched on or off under a specified condition.

- (9) rated make/break current A current which can be switched on or off under the rated make/break voltage.

- (10) multiple rating Two or more ratings of a switch.

3. Type designation

- 3.1 Composition of type designation The type designation shall be arranged as follows:

Symbol denoting switch	Symbol denoting number of circuits	Symbol denoting rated make/break current at a.c. 125 V with resistance load	Symbol denoting state of ON/OFF corresponding to lever position
3.2 (1)	3.2 (2)	3.2 (3)	3.2 (4)

Example:

ST 2 03 D

Symbol denoting mounting type and mounting screw	Symbol denoting class and position of terminal	Symbol denoting size of body
3.2 (5)	3.2 (6)	3.2 (7)

Example

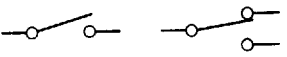
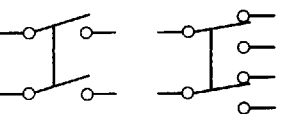
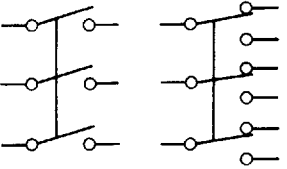
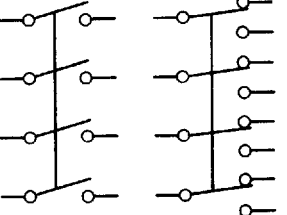
3 C 312

- 3.2 Symbol Symbol denoting type designation shall be as follows:

- (1) Switch A switch shall be denoted by 2 capital letters of ST.

- (2) Number of circuits The number of circuits shall be denoted by one figure as given in Table 1.

Table 1. Symbol denoting number of circuits

Symbol	Number of circuits	Circuit diagram	Number of terminals
1	1		2 or 3
2	2		4 or 6
3	3		6 or 9
4	4		8 or 12

- (3) Rated make/break current at a.c. 125 V with resistance load The rated make/break current at a.c. 125 V with resistance load shall be denoted by 2 figures as given in Table 2.

Remarks: The switch ratings specified in this Standard are all the multiple ratings. For the purpose of type designation, the rated make/break current at a.c. 125 V with resistance load is mentioned as an example.

Table 2. Symbol denoting rated make/break current

Symbol	Current A
03	3
05	5
06	6
10	10
15	15
20	20
25	25

- (4) State of ON/OFF corresponding to lever position The state of ON/OFF corresponding to lever position shall be denoted by one capital letter as given in Table 3.

Table 3. Symbol denoting state of ON/OFF corresponding to lever position

Symbol	State of ON/OFF corresponding to lever position		
	Lever up to direction A	Center	Lever down to direction B
A	ON	—	OFF
B	ON	—	OFF, non-locking
C	OFF	—	ON, non-locking
D	ON	—	ON
E	ON	OFF	ON
F	ON	—	ON, non-locking
G	ON, non-locking	OFF	ON, non-locking
H	ON	OFF	ON, non-locking

- Remarks 1. In the column "State of ON/OFF corresponding to lever position, Center", the dash (—) means that the lever does not stop at the center.
2. Non-locking means that the lever bounces at that position. It is indicated with an asterisk (*) in Attached figures.

- (5) Mounting type Mounting types are classified into 3 types: nut mounting, screw mounting and printed wiring board mounting. They shall be denoted by one figure according to nominal size and length of screw and interval of mounting holes as given in Table 4.

Table 4. Symbol denoting mounting type

Unit: mm

Symbol	Mounting type	Nominal size and length of screw
1	Screw mounting type	M3 × 0.5 interval of mounting holes, 22.2
2	Nut mounting type	M12 × 1 × 12
3	Nut mounting type	M12 × 1 × 9.5
4	Nut mounting type	M6 × 0.75 × 8
5	Printed wiring board mounting type	—

- (6) Terminal The kind and position of the terminal shall be denoted by one capital letter as given in Table 5.

Table 5. Symbol denoting kind and position of terminal

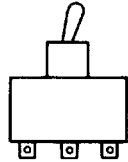
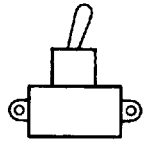
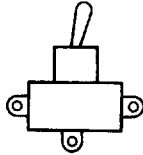
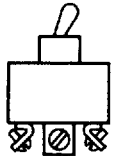
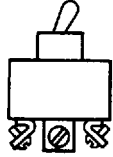
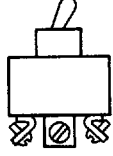
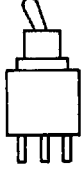
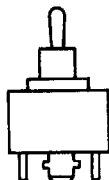
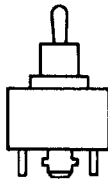
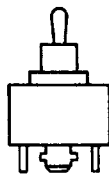
Symbol	Kind of terminal	Position of terminal	Schematic drawing
A	Lug terminal	Bottom	
B	Lug terminal	Side	
C	Lug terminal	Bottom and side	
D	M3.5 × 0.6 screw terminal	Bottom	
E	M4 × 0.7 screw terminal	Bottom	
F	M4.5 × 0.75 screw terminal	Bottom	
G	Terminal for printed wiring board	Bottom	

Table 5. (continued)

Symbol	Kind of terminal	Position of terminal	Schematic drawing
H	Terminal for vertical printed wiring board	Side	
J	Terminal for right angle printed wiring board	Side	
K	110 tab terminal	Bottom	
L	187 tab terminal	Bottom	
M	250 tab terminal	Bottom	

- Remarks**
- The 110 tab terminal is 2.8 (wide) $\times$ 0.5 (thick).
The 187 tab terminal is 4.8 (wide) $\times$ 0.5 (thick).
The 250 tab terminal is 6.4 (wide) $\times$ 0.8 (thick).
 - In the terminal for vertical printed wiring board, the knob operation direction is the same as the terminal bending.
In the terminal for right angle printed wiring board, the knob operation direction forms the right angle with the terminal bending.

- (7) Size of body The size of body shall denoted by a , b and c in Fig. 1. The dimensions shall be indicated by symbols as given in Table 6.

The symbols shall be written in the order of a , b and c .

Fig. 1. Size of body

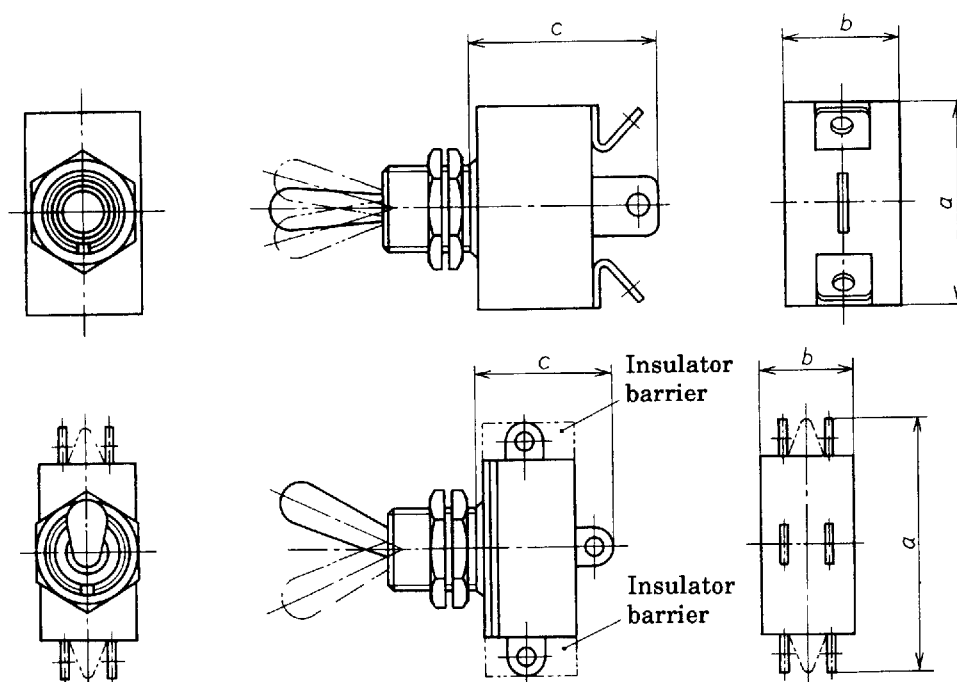


Table 6. Symbol denoting size of body

Unit: mm

Symbol	Dimension of body, a , b or c
1	20 or under
2	Over 20 up to and incl. 30
3	Over 30 up to and incl. 40

4. Rating

4.1 Rated make/break voltage Rated make/break voltage shall be as follows:

a.c.: 125 V, 250 V

d.c.: 30 V, 125 V, 250 V

4.2 Rated make/break current The rated make/break current shall be as follows:

3 A, 5 A, 6 A, 10 A, 15 A, 20 A, 25 A

4.3 Combination of rated make/break voltage and rated make/break current
The combination of rated make/break voltage and rated make/break current depends on kind of load as given in Attached Figs. 1 to 41.

The switches specified in this Standard are all of multiple rating. All the descriptions in type designation column of Attached Figs. 1 to 41 shall be the rating.

5. Performance and test method The performance and test method shall be as specified in Table 7.

Table 7. Performance and test method

No.	Item	Performance	Test method (JIS C 5441)
1	Contact resistance	20 mΩ or less at each time of measurement	7.1 and the following requirements (1) Method: Method A (of d.c.). However, method B (of a.c.) may be used if there is no doubt. (2) Test current: 1 A (3) Test voltage: 2 V to 4 V (4) Number of measurements: 3 times (5) Measuring point: Between live metal terminals
2	Insulation resistance	100 MΩ or more	7.2 and the following requirements (1) Parts to be measured: Measuring point A (a) Between live metallic parts having different polarity and circuit (b) Between terminals of the same polarity at the condition of open circuit (c) Between live metallic part and dead metallic part to be touched. Between live metallic part and insulated operating part. (2) Test voltage: Test condition C d.c. 500 ± 50 V
3	Voltage proof	There shall be no short circuit, burning, dielectric breakdown and other abnormalities.	7.3 and the following requirements (1) Parts to be measured: Measuring point A (a) Between live metallic parts having different polarity (b) Between terminals of the same polarity at the condition of open circuit (c) Between live metallic part and dead metallic part to be touched. Between live metallic part and insulated operating part. (2) Test voltage (a) When the maximum voltage is 125 V among the rated voltage Condition E $\left(\begin{array}{l} \text{X-series a.c. } 1000 + \begin{smallmatrix} 50 \\ 0 \end{smallmatrix} \text{ V} \\ \text{Y series a.c. } 1200 + \begin{smallmatrix} 60 \\ 0 \end{smallmatrix} \text{ V} \end{array} \right)$

Table 7. (continued)

No.	Item	Performance	Test method (JIS C 5441)
3 (con- tin- ued)	Voltage proof (continued)	Ditto	(b) When the maximum voltage is 250 V among the rated voltage Condition F $\left(\begin{array}{l} \text{X-series a.c. } 1500^{+75}_0 \text{ V} \\ \text{Y series a.c. } 1800^{+90}_0 \text{ V} \end{array} \right)$ (3) Maximum leak current: 3 mA
4	Temperature rise of terminal	For switching contact of copper or copper alloy: 35°C or lower. For switching contact of silver or silver alloy: 60°C or lower.	7.6 and the following requirement Test method A. However, the test current shall be the maximum current among the rated currents.
5	Robustness of terminal	Terminals shall be free from breakage, coming off and excessive looseness. The switch body shall be free from breakage and defect of contact mechanism. However, play and bending are allowable, if they do not affect electrical performance (1. contact resistance; 2. insulation resistance; and 3. voltage proof), and mechanical performance.	8.1 and the following requirements (1) Load and duration (1.1) Screw terminal Tensile load: 133 N Torque: for M3.5 0.8 N·m for M4 1.2 N·m for M4.5 1.8 N·m (1.2) Lug terminal (a) Tensile load for switches of Attached Figs. 1 to 5, 12 to 14 and 21 to 29 of this Standard (JIS C 6571): 24.5 N (b) Tensile load for switches of Attached Figs. 30 to 37 of this Standard (JIS C 6571): 14.7 N (1.3) Terminal for printed wiring board Tensile and pushing load: 14.7 N (1.4) Duration shall be 10 ± 1 s in either case. (2) Direction of load (2.1) Screw terminal (a) Mount the switch on a horizontal plate with its lever upward. Apply tensile load in the direction of the screw axis of terminal. (b) Apply torque in the direction parallel to the plane of terminal.

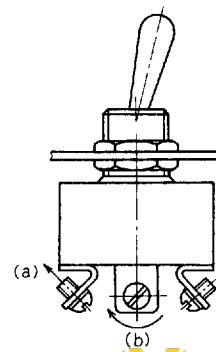


Table 7. (continued)

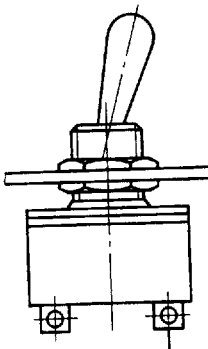
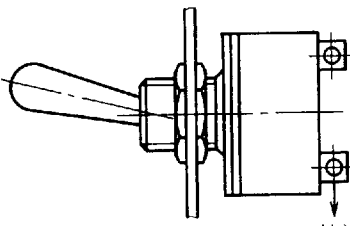
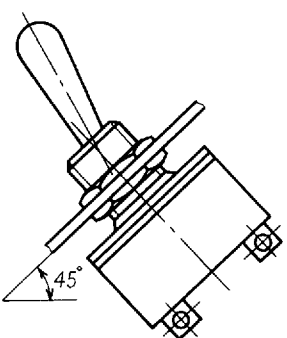
No.	Item	Performance	Test method (JIS C 5441)
5 (con- tin- ued)	Robustness of terminal (continued)	Ditto	(2.2) Lug terminal (a) Mount the switch on a horizontal plate with its lever upward. Apply tensile load downward.  (a) (b) Mount the switch on a vertical plate with terminal under test downward. Apply tensile load downward.  (b) (c) Mount the switch on a plate forming an angle of 45 degrees with a horizontal plane. Apply tensile load downward.  (c)

Table 7. (continued)

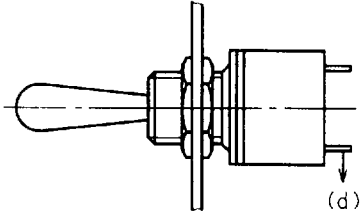
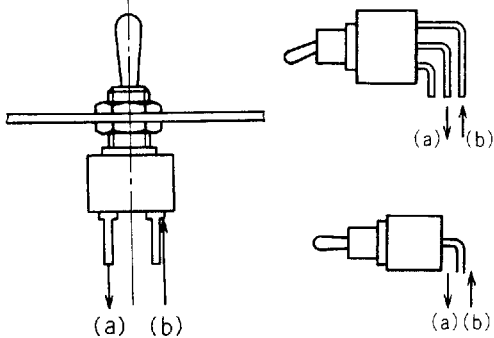
No.	Item	Performance	Test method (JIS C 5441)
5 (con- tin- ued)	Robustness of terminal (continued)	Ditto	(d) Mount the switch on a vertical plate with terminal under test downward. Apply tensile load in the direction of thickness of terminal.  (3) Terminal for printed wiring board (a) Mount the switch on a horizontal plate with its lever upward. Apply tensile load downward. (b) Mount the switch on a horizontal plate with its lever upward. Apply a pushing load upward.  (4) Items of initial measurement: Appearance of terminal part Contact resistance Insulation resistance Voltage proof (5) Items of final measurement: The same items as those of initial measurement
6	Robustness of mounting part	Mounting part shall not be damaged.	8.3 and the following requirements (1) Fastening torque For switches of Attached Figs. 1 to 29 of this Standard (JIS C 6571): 2 N·m For switches of Attached Figs. 30 to 37 of this Standard (JIS C 6571): 0.8 N·m

Table 7. (continued)

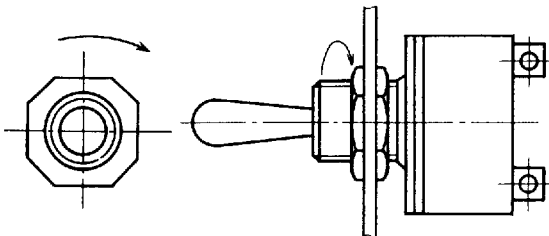
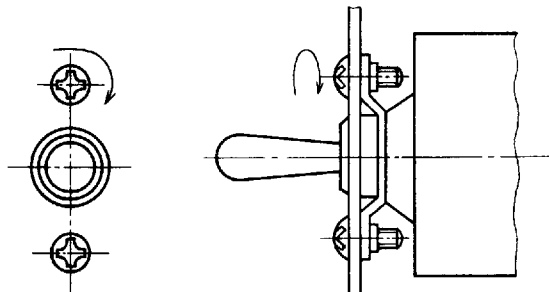
No.	Item	Performance	Test method (JIS C 5441)
6 (con- tin- ued)	Robustness of mounting part (continued)	Ditto	(2) Direction of torque For nut mounting type  For screw mounting type  (3) Items of initial measurement: Appearance of terminal part (4) Items of final measurement: The same as those of initial measurement
7	Static load of lever or robustness of operating part	Levers shall be free from deformation, breakage and other abnormalities.	8.2 and the following requirements (1) Load and duration For switches of Attached Figs. 1 to 29 of this Standard (JIS C 6571): 112.8 N For switches of Attached Figs. 30 to 37 of this Standard (JIS C 6571): 68.6 N Duration shall be 1 min in either case. (2) Direction of load (a) Apply load perpendicularly to lever axis and in parallel to lever motion, at stop positions in both ends of lever motion. (b) Apply load perpendicularly to lever axis and to lever motion, at all stop positions. (c) At the center position of lever mo- tion, pulling direction opposite to the fulcrum in the direction of lever axis.

Table 7. (continued)

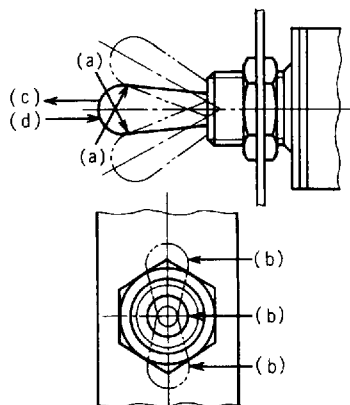
No.	Item	Performance	Test method (JIS C 5441)
7 (con- tin- ued)	Static load of lever or robustness of operating part (continued)	Ditto	(d) Push toward fulcrum in the direction of lever axis, at the center position of lever motion.  (3) Item of initial measurement: Appearance of terminal part (4) Item of final measurement: The same as those of initial measurement
8	Resistance to soldering heat	1. Switches shall be free from mechanical damage. The appearance of switches shall be free from noticeable abnormalities. 2. Contact resistance shall meet the requirements of No. 1.	8.7 and the following requirements (1) Test method: Method 1A Solder tank 260°C (2) Dipping depth in solder: Up to 2.5 mm from root of terminal (3) Temperature of solder (a) For lug terminal: $350 \pm 10^\circ\text{C}$ (b) For printed wiring board terminal: $260 \pm 5^\circ\text{C}$ (4) Dipping time in solder (a) For lug terminal: 3.5 ± 0.5 s (b) For printed wiring board terminal: 5 ± 0.5 s (5) Exposure duration after solder dipping: 1 h (6) Items of initial measurement: Appearance of terminal part Contact resistance (7) Items of final measurement: The same as those of initial measurement
9	Solderability	At least 75 % of terminal surface area dipped in solder shall be covered with new solder.	8.8 and the following requirements (1) Test method: Method 1 Solder tank 235°C (2) Dipping depth in solder: Up to 2.5 mm from root of terminal

Table 7. (continued)

No.	Item	Performance	Test method (JIS C 5441)
9 (continued)	Solderability (continued)	Ditto	(3) Temperature of solder (a) For lug terminal: $270 \pm 5^{\circ}\text{C}$ (b) For printed wiring board terminal: $235 \pm 5^{\circ}\text{C}$ (4) Dipping time in solder: 2.0 ± 0.5 s in either case (5) Item of initial measurement: Appearance of terminal part (6) Item of final measurement: The same as those of initial measurement
10	Vibration proof	1. During the test, contacts shall not have electrical discontinuity of 1 ms or more. 2. After the test, the ON/OFF state by the lever position shall be normal. 3. Each part shall be free from looseness and breakage.	8.9 and the following requirements (1) Type of test: Type A (2) Total amplitude: 1.5 mm or 98 m/s² (3) For sweeping: 10-55-10, about 5 min (4) Test duration and direction: 2 h each for 3 mutually perpendicular directions (6 h in total) (5) Test: The test shall be made at each stop position of the lever. For ON/OFF state of Table 3 of this Standard (JIS C 6571), if it is of bilateral symmetry, the test may be omitted on one side stop position of lever. Different specimens may be used depending on the lever positions. On the non-locking side, the lever shall be fixed using suitable metal fittings during the test. (6) Items of initial measurement: Appearance of terminal part Function and operation: ON/OFF state by lever position (7) Item of measurement during test: Electrical discontinuity of contact (8) Items of final measurement: The same as those of initial measurement
11	Shock	1. During the test, contacts shall not have electrical discontinuity of 1 ms or more.	8.10 and the following requirements (1) Severity of test: Condition A Peak acceleration: 147 m/s² Operating duration: 11 ms Change of speed: 1.0 m/s Waveform: Half-sine wave

Table 7. (continued)

No.	Item	Performance	Test method (JIS C 5441)
11 (continued)	Shock (continued)	2. After the test, the ON/OFF state by the lever position shall be normal. 3. Each part shall be free from looseness, breakage and the like.	(2) Number of tests and direction: The shock shall be applied along one of the 3 mutually perpendicular axes. Three times to one direction and another three times to the other direction. Six times per axis (18 times in total). (3) Test: The test shall be conducted at each stop position of the lever with condition C. For ON/OFF state of Table 3 of this Standard (JIS C 6571), if it is of bilateral symmetry, the test may be omitted on one side stop position of lever. Different specimens may be used, depending on the lever stop positions. On the non-locking side, the lever shall be fixed using suitable metal fittings during the test. (4) Items of initial measurement: Appearance of terminal part Function and operation: ON/OFF state by lever position (5) Item of measurement during test: Electrical discontinuity of contact (6) Items of final measurement: The same as those of initial measurement
12	Operating force of lever or operating force	The operating force of lever during reciprocating stroke shall be at maximum at one point in the range specified in Attached Figures.	8.4 and the following requirements The direction and position of applying the operating force and the measuring position shall be as specified in Fig. 7.
13	Operating angle of lever or operating angle	The operating angle of lever shall satisfy the specification of Attached Figures.	8.6 and the following requirements Type of operating angle, operating angle
14	Cold proof or low temperature	1. The insulation resistance shall be 10 MΩ or more at any measurement point specified in No. 2. 2. The voltage proof shall meet No. 3.	11.2 and the following requirements (1) Severity of test: Test temperature: $-40 \pm 3^{\circ}\text{C}$ Exposure duration: 16 h (2) Posttreatment: 3.1 Leave the specimens for 1 h to 2 h (at the test site in standard conditions)

Table 7. (continued)

No.	Item	Performance	Test method (JIS C 5441)
14	Cold proof or low temperature (continued)	3. The lever operating force shall meet No. 12. 4. Robustness of terminal shall meet No. 5. 5. The appearance and construction shall be free from excessive looseness, play and other noticeable abnormalities.	(3) Items of initial measurement (a) Appearance and construction (b) Contact resistance (c) Voltage proof (d) Lever operating force or operating force (e) Robustness of terminal (4) Items of final measurement: The same as those of initial measurement
15	Heat resistance or high temperature	1. The insulation resistance shall meet No. 2. 2. The operating force of lever shall meet No. 12. 3. The robustness of terminal shall meet No. 5. 4. The appearance and construction shall be free from excessive looseness, play and other noticeable abnormalities.	11.3 and the following requirements (1) Severity of test Test temperature: $70 \pm 2^{\circ}\text{C}$ Exposure duration: 16 h (2) Items of initial measurement (a) Appearance and construction (b) Contact resistance (c) Lever operating force or operating force (d) Robustness of terminal (3) Items of final measurement: The same as those of initial measurement
16	Temperature cycle	1. The insulation resistance shall meet No. 2. 2. The voltage proof shall meet No. 3. 3. The operating force of lever shall meet No. 12. 4. The robustness of terminal shall meet No. 5.	11.5 Moisture proof and the following requirements (1) Severity of test (a) Low temperature: $-40 \pm 3^{\circ}\text{C}$, 30 min (b) High temperature: $70 \pm 2^{\circ}\text{C}$, 30 min (c) Duration of replacement: 10 min to 15 min (d) Number of cycles: 5 cycles (2) Items of initial measurement (a) Appearance and construction (b) Insulation resistance (c) Voltage proof (d) Lever operating force or operating force (e) Robustness of terminal

Table 7. (continued)

No.	Item	Performance	Test method (JIS C 5441)
16 (con- tin- ued)	Temperature cycle (continued)	5. The appearance and construction shall be free from excessive looseness, play and other noticeable abnormalities.	(3) Items of final measurement: The same as those of initial measurement
17	Moisture proof (steady state) or damp heat at steady state	1. The insulation resistance shall be 10 MΩ or more at any measurement point specified in No. 2. 2. The contact resistance shall meet No. 1. 3. The voltage proof shall meet No. 3. 4. The appearance and construction shall be free from excessive looseness, play and other noticeable abnormalities.	11.4 and the following requirements (1) Severity of test (a) Temperature: 40 ± 2°C (b) Exposure duration: 96 ± 4 h (2) Items of initial measurement (a) Appearance and construction (b) Contact resistance (c) Insulation resistance (d) Voltage proof (3) Items of measurement at the end of test duration: Take the specimens out of the tank after the test. Wipe water drops. Measure the insulation resistance within 5 min. (4) Items of final measurement: The same as those of initial measurement
18	Moisture proof (cyclic) or damp heat combination at cyclic state	1. The insulation resistance shall be 10 MΩ or more at any measurement point specified in No. 2. 2. The appearance and construction shall be free from excessive looseness, play and other noticeable abnormalities.	11.5 and the following requirements (1) Severity of test (a) Number of cycles: 5 cycles (b) Low-temperature subcycles: 4 cycles (2) Posttreatment: 3.1 Leave the specimens for 24 h (at the test site in standard conditions). (3) Items of initial measurement (a) Appearance and construction (b) Insulation resistance (4) Items of final measurement: The same as those of initial measurement

Table 7. (continued)

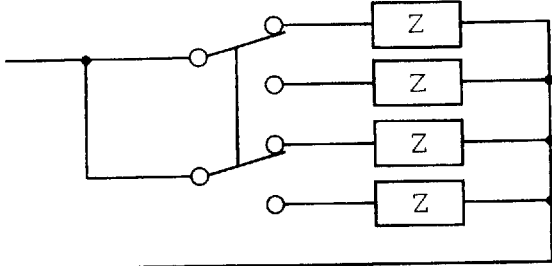
No.	Item	Performance	Test method (JIS C 5441)
19	Endurance (load) or electrical endurance with load	- After the test, the switch shall make ON/OFF the rated make/break current satisfactorily. - The temperature rise shall meet No. 4. - The static load of lever shall meet No. 7. - The insulation resistance shall be 10 MΩ or more at any measurement point specified in No. 2. - The voltage proof test shall not show any short circuit, burning and dielectric breakdown.	10.5 and the following requirements (1) Common matters (1.1) Switches of multiple rating shall be tested on each rating. (1.2) Different specimens shall be used for each rating of multiple ratings (type of load, combination of rated make/break voltage and rated make/break current). However, the same specimen shall be used for the overload test and subsequent load test. (1.3) The test voltage for voltage proof test after make/break test shall be 1000 V. (1.4) Number of make/break tests at the rated make/break current shall be 10000 for the switches shown in Attached Figs. 1 and 2. It shall be 20000 for those shown in Attached Figs. 3 to 41. (1.5) The test voltage for make/break test shall be the rated make/break voltage. (1.6) Initial measurement: Items of initial measurement shall be as follows, as specified in Table 7 of this Standard (JIS C 6571). (a) No. 1 Contact resistance (b) No.12 Lever operating force (c) No. 2 Insulation resistance (d) No. 3 Voltage proof (1.7) Load circuit: The load circuit for the switches shown in Attached Figs. 31 to 33, 35 to 37, and 39 to 41 of this Standard (JIS C 6571) shall be as shown in Figure below.  Z: specified load

Table 7. (continued)

No.	Item	Performance	Test method (JIS C 5441)
19 (con- tin- ued)	Endurance (load) or electrical endurance with load (continued)	Ditto	(2) When the rated make/break voltage is d.c. and lamp load (a) Method 10.1 shall apply. (b) Load condition: 25 W tungsten lamps are combined. Lamps shall be switched on and off intermittently, with off state of 15 s or more after each on state. Lamps shall not be lit continuously. (c) Test voltage: 30 V d.c. (d) Test current: Rated make/break current (e) Rate of make and break: About 600 times/h (3) When the rated make/break voltage is d.c. and resistance load (a) Method 10.1 shall apply. (b) Load condition: Resistance load Power factor 1 (c) Test sequence: First, carry out 50 times with test current of 1.5 times rated make/break current. Next, carry out with rated make/break current test. Finally, carry out 100 times with no load. (d) Rate of make and break: About 600 times/h (4) When the rated make/break voltage is d.c. and inductive load (a) Method 10.1 shall apply. (b) Load condition: Inductive load Power factor corresponding to the time constant 2 ms to 3 ms (c) Test sequence: First, carry out 50 times with test current of 1.5 times rated make/break current. Next, carry out the test with rated make/break current. (d) Rate of make and break: For 1.5 times the rated make/break current: 300 times/h to 360 times/h For the rated make/break current: About 600 times/h