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**Generic specification of switches for
use in electronic equipment**

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Foreword

This translation has been made based on the original Japanese Industrial Standard established by the Minister of International Trade and Industry through deliberations at Japanese Industrial Standards Committee in accordance with the Industrial Standardization Law:

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Generic specification of switches for use in electronic equipment

Introduction This Japanese Industrial Standard is prepared based on IEC 1020-1, *Electromechanical switches for use in electronic equipment: Part 1: Generic specification* issued in 1991 as the first edition without modification of technical contents on the corresponding portions, but provisions (for classification, grade and symbolization thereof, performances and materials) not specified in the corresponding International Standard are added.

1 Scope This Japanese Industrial Standard is a generic specification of manually operated switches which are equipped with mechanical contact(s) of a rated voltage not exceeding 500 V (of a.c. at a frequency 50 Hz or 60 Hz, or d.c.) and a rated current not exceeding 63 A, and are used for electronic equipment (hereafter referred to as "switches"), and specifies the electrical and mechanical performances, weather resistance and other common requirements to be specified in the sectional specification, blank detail specification and detail specification of switches.

Remarks 1 The electronic equipment dealt with in this Standard means the equipment mainly accommodating electronic circuits in the category of household appliances, business equipment, communication equipment, instrumentation equipment, etc. and does not include the equipment for exclusive use in aircraft, rolling stocks, ships, etc.

2 The normative references to this Standard are shown below.

Technical Standard based on Electrical Appliance and Material Control Law

JIS C 5441 *Testing methods of switches for use in electronic equipment*

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

Equivalent to IEC 410 *Sampling plans and procedures for inspection by attributes*

IEC 1020-1 (1991) *Electromechanical switches for use in electronic equipment: Part 1 : Generic specification*

IECQ Publ. QC 001001 *Basic rule of the IEC Quality assessment system for electronic components*

IECQ Publ. QC 001002 *Rule of procedure of the IEC Quality assessment system for electronic components*

2 Definitions The definitions of main terms used in this Standard are given in Annex 1.

3 System and order of precedence of Standards The Standard of switches shall consist of a group of specifications shown below, and if any dispute arises between the specifications, the order of precedence is the order given below.

- (1) Detail specification
- (2) Blank detail specification
- (3) Sectional specification
- (4) Generic specification (**JIS C** □□□□)
- (5) Basic specification (e.g. **JIS C 5001**)

Remarks 1 The specifications of (1) to (3) are not always established as the Japanese Industrial Standard. In some cases, some of them are established as the specification of industrial groups.

Further, some of them are not established as Japanese Industrial Standards or industrial group specifications.

- 2 Hereafter the detail specification, blank detail specification and sectional specification are generically called "switch specification".

4 Type designation

4.1 Application of type designation The type designation may be used, if it is necessary to express the kind, shape, etc. of switches.

4.2 Structure of type designation The type designation shall consist of the symbols denoting the (1) to (7) prescribed below. The items (1) and (7) shall necessarily be specified, and necessary items shall be selected from (2) to (6) and specified in the switch specifications.

- (1) Symbol denoting kind of switch
- (2) Symbol denoting shape and/or size
- (3) Symbol denoting circuit characteristics and/or operating characteristics
- (4) Symbol denoting rated voltage and/or rated conducting current and rated switching current
- (5) Symbol denoting dimensions, positions and/or operated state of various parts
- (6) Symbol denoting other special functions, etc.
- (7) Symbol denoting grade

4.3 Symbols

4.3.1 Structure of symbol The symbol for type designation shall be structured by English capital letters and numerals and the number of characters shall be within 15.

The symbols excluding the symbol denoting the kind of switch and the symbol denoting the grade shall be specified in the specification for switches.

4.3.2 Symbol denoting kind of switch The symbol denoting the kind of switch be expressed by two English capital letters followed by three arabic numerals as shown in Table 1.

Table 1 Kind of switch

Symbol	Name of switch
SD1	Dip switch for electronic equipment
SD2	Dip-rotary switch for electronic equipment
SL1	Lever switch for electronic equipment
SP1	Push switch for electronic equipment
SP2	Tactile push switch for electronic equipment
SP3	Push switch for electronic equipment (for power supply, horizontal type)
SP4	Push switch for electronic equipment (for power supply, vertical type)
SR1	Rotary switch for electronic equipment
SS1	Slide switch for electronic equipment
SS2	Slide switch for electronic equipment (for power supply)
ST1	Toggle switch for electronic equipment
ST2	Toggle switch for electronic equipment (for power supply)
ST3	Rocker switch for electronic equipment (for power supply)
ST4	Rocker switch for electronic equipment

4.3.3 Symbols denoting grade The symbol denoting the grade shall express the classification by the combination of category temperature range and duration of test for damp, heat-steady state by means of an English capital letter as shown in Table 2.

Table 2 Grade

Symbol	Category temperature range °C	Duration of test for damp, heat-steady state d (day)
A	-55 to +85	56
B		21
C		10
D		4
E	-40 to +85	56
F		21
G		10
H		4
J	-25 to +70	56
K		21
L		10
M		4
N	-10 to +70	56
P		21
Q		10
R		4
S	-10 to +55	4
T	0 to +55	4

5 Ratings

5.1 Rated voltage The rated voltage shall be expressed by the rated make-break voltage and shall have one of the values given below.

Rated switching voltage (V)

A.C. 100, 120, 125, 200, 250, 500

D.C. 3, 6, 12, 18, 24, 30, 48, 60, 100, 125, 200, 250, 500

5.2 Rated current The rated current shall be expressed by the rated conducting current and the rated switching current and shall have respective values given below.

(1) Rated conducting current (A)

0.1, 0.5, 1, 3, 5, 10, 15, 20, 25, 63

(2) Rated switching current (A)

0.01, 0.03, 0.05, 0.07, 0.1, 0.3, 0.5, 0.7, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 25, 63

5.3 Category temperature range The category temperature range shall consist of a combination of the lower side temperature and the higher side temperature as shown in Table 2.

6 Performances and test methods

6.1 Performances The performances shall be as given in Table 3.

The electrical, mechanical and climatic performances of switches shall be selected from the items prescribed in Table 3 respectively and be specified in the switch specifications.

6.2 Test methods The test methods shall be as prescribed in **JIS C 5441** and Table 3.

Remarks 1 The measurement conditions and procedures in the initial measurement and the final measurement shall be identical, unless otherwise specified in the specification for switches.

2 In such a case as the type test where the tests are carried out for plural test items, the final measurement in each test may serve as the initial measurement of the next test.

If specified in the switch specifications specific measurements items shall be measured at the first and the last of a test sequence.

3 The test methods shall be as specified in **JIS C 5441**, unless otherwise specified.

Table 3 Performance

No.	Item	Performance	Test method (JIS C 5441)								
1	Functional operation	The opening and closing operations of contacts are adequate, and the mechanical rotation stop, latching, interlock and automatic reset mechanism function correctly.	Comply with 6 and the following: Items and sequence of test: To be specified in switch specifications.								
2	Contact resistance	The resistance shall have a value not more than one of the values given below which is specified in the switch specifications. In the case of conductive rubber contacts, however, the resistance shall be not more than 1 kΩ. 15, 20, 30, 50, 100, 200, 300, 500 (mΩ) When the difference between two or more measured values is specified, the value of difference shall not exceed 25 % of the specified value stated above.	The switch specifications shall specify necessary matters in addition to any one of the methods stated below which are based on 7.1. Method A: Specified current method (by d.c.) Method B: Specified current method (by a.c.) Method C: Low voltage and current method (by d.c.) Method D: Low voltage and current method (by a.c.) If there is no dispute, the change of polarity in the case where d.c. is employed may be omitted.								
3	Insulation resistance	The resistance shall have a value not less than one of the values given below which is specified in the switch specifications. 10 MΩ, 100 MΩ, 1 GΩ	Comply with 7.2 and the following: Measurement position: The switch specifications shall specify one of A, B, C and D. Test voltage: The switch specifications shall specify one of the test conditions given in the following table. The test voltage shall be higher than the rated voltage of switch under test (specimen). <table><tr><th>Rated voltage (U) V</th><th>Test condition</th></tr><tr><td>$U \leq 60$</td><td>A, E or F</td></tr><tr><td>$60 < U < 100$</td><td>B</td></tr><tr><td>$100 \leq U$</td><td>C or D</td></tr></table>	Rated voltage (U) V	Test condition	$U \leq 60$	A, E or F	$60 < U < 100$	B	$100 \leq U$	C or D
Rated voltage (U) V	Test condition										
$U \leq 60$	A, E or F										
$60 < U < 100$	B										
$100 \leq U$	C or D										

Table 3 Performance (continued)

No.	Item	Performance	Test method (JIS C 5441)						
4	Voltage proof (dielectric withstand voltage)	There shall be no such abnormality as short circuit, burning, dielectric breakdown.	Comply with 7.3 and the following: Test position: The switch specifications shall specify one of the measurement points A, B, C and D. Test voltage: The switch specifications shall specify one of the test conditions given below. <table><tr><th>Rated voltage (U) V</th><th>Test condition</th></tr><tr><td>$U < 100$</td><td>A, B, C, D, E or J</td></tr><tr><td>$100 \leq U$</td><td>E, F, G, H or I</td></tr></table> Maximum leakage current: The switch specifications shall specify one of the currents given below. 0.5, 1, 2, 3 (mA)	Rated voltage (U) V	Test condition	$U < 100$	A, B, C, D, E or J	$100 \leq U$	E, F, G, H or I
Rated voltage (U) V	Test condition								
$U < 100$	A, B, C, D, E or J								
$100 \leq U$	E, F, G, H or I								
5	Low air pressure	There shall be no such abnormality as short circuit, burning, dielectric breakdown.	Comply with 7.4 and the following: Measurement position: The detail specifications shall specify the position. Test voltage and its duration in test chamber: The detail specifications shall specify these data. Test voltage and its duration in voltage proof test carried out after taking out of test chamber: The detail specifications shall specify these data. Maximum leakage current: The detail specification shall specify one of the currents given below. 0.5, 1, 2, 3 (mA)						

Table 3 Performance (continued)

No.	Item	Performance	Test method (JIS C 5441)
6	Capacitance	The criteria of switch specifications shall be satisfied.	Comply with 7.5 and the following: Measurement position: Between one termination and the other terminations and metal parts connected together with the ground. Test frequency: The detail specifications shall specify one of the frequencies given below. 1 kHz±200 Hz, 1 MHz±200 kHz
7	Temperature rise of termination	The temperature rise shall not exceed 45°C. However, switches used in power supply circuit which are subjects of the Electrical Appliance and Material Control Law shall follow the provisions of Annex 2.	Comply with 7.6 and the following: Test method: Method A shall be applied, excluding the case where the method is specified in the switch specifications. Test current: This shall be the rated switching current.
8	Contact bounce	The criteria of switch specifications shall be satisfied.	Comply with 7.7 and the following: Operating rate of switch: The switch specifications shall specify the value. Actuating force of switch: The switch specifications shall specify the values.
9	Contact chattering	The criteria of switch specifications shall be satisfied.	Comply with 7.8 and the following: Magnitudes of current passed through specimen and of voltage applied to specimen: The switch specification shall specify the magnitudes. Duration of interruption or connection: The switch specifications shall specify one of the following durations. 1 µs, 10 µs, 100 µs, 1 ms, 10 ms

Table 3 Performance (continued)

No.	Item	Performance	Test method (JIS C 5441)
10	Stability of contact resistance	The criteria of switch specifications shall be satisfied.	Comply with 7.9 and the following: Number of tests for mechanical endurance—standard atmosphere conditions: This shall be 10 % of the number of tests for mechanical endurance—standard atmosphere conditions. Operating rate in test for mechanical endurance—standard atmospheric conditions: The switch specifications shall specify the rate. Temperature in high temperature test: This shall be the upper limit value of the category temperature range specified in the switch specifications. Duration of high temperature test: The switch specifications shall specify one of the durations stated below. 100, 200, 500, 1 000, 2 000 (h)
11	Resistance from actuator to mounting bushing (surface)	The criteria of switch specifications shall be satisfied.	Comply with 7.10 and the following: Measuring method: Measure the electrical resistance between adequate portion of mounting bushing and the metallic part of actuator of the specimen.
12	Robustness of termination	Appearance: No damage, deformation or abnormality detrimental to service on every part. Functional operation: To satisfy the requirement of No. 1. Contact resistance: To satisfy the requirement of No. 2.	Comply with 8.1 and the following: Test method: The switch specifications shall specify the method. Tension and thrust of lug termination and screw termination: The switch specifications shall specify the forces. Test methods for bending strength of lead termination, strip termination, and lug termination: The switch specification shall specify these methods.

Table 3 Performance (continued)

No.	Item	Performance	Test method (JIS C 5441)
12	Robustness of termination (concluded)	Insulation resistance: To satisfy the requirement of No. 3. Voltage proof: To satisfy the requirement of No. 4. Actuation force: To satisfy the requirement of No. 15.	Severity of torque strength of screw termination: The switch specifications shall specify the severity. Value of torque when nominal diameter of screw termination exceeds 6 mm: The switch specifications shall specify the value. Bending strength: The switch specifications shall specify the strength. Initial measurement items: Appearance Functional operation Contact resistance Insulation resistance Voltage proof Operating force Final measurement items: Same as initial measurement items
13	Robustness of actuator	Appearance: No damage, deformation or abnormality detrimental to service on every part. Functional operation: To satisfy the requirement of No. 1. Contact resistance: To satisfy the requirement of No. 2. Insulation resistance: To satisfy the requirement of No. 3. Voltage proof: To satisfy the requirement of No. 4.	Comply with 8.2 and the following: Classification of test: The switch specification shall specify the classification. Magnitude of thrust, tension or torque: The switch specifications shall specify the magnitude. Position and direction of application of thrust, tension or torque: The switch specifications shall specify the position and direction. Duration of thrust, tension or torque: The switch specifications shall specify one of the following durations. 10, 15, 60 (s)

Table 3 Performance (continued)

No.	Item	Performance	Test method (JIS C 5441)
13	Robustness of actuator (concluded)	Actuation force: To satisfy the requirement of No. 15.	Initial measurement items: Appearance Functional operation Contact resistance Insulation resistance Voltage proof Operating force Final measurement items: Same as initial measurement items
14	Robustness of mounting bushing	Appearance: No damage, deformation or abnormality detrimental to service on every part. Functional operation: To satisfy the requirement of No. 1. Contact resistance: To satisfy the requirement of No. 2. Insulation resistance: To satisfy the requirement of No. 3. Voltage proof: To satisfy the requirement of No. 4. Actuation force: To satisfy the requirement of No. 15.	Comply with 8.3 and the following: Kind of test: The switch specifications shall specify the kind. Tightening torque: The switch specifications shall specify the torque. Nominal diameter of mounting screw: The switch specifications shall specify the diameter. Initial measurement items: Appearance Functional operation Contact resistance Insulation resistance Voltage proof Operating force Final measurement items: Same as initial measurement items

Table 3 Performance (continued)

No.	Item	Performance	Test method (JIS C 5441)
15	Operating force	To satisfy the provisions of switch specifications.	Comply with 8.4 and the following: Kind of operation: The switch specification shall specify the kind. Direction and position for operating force application: As specified in the switch specification. Number of measurement: As specified in the switch specification. Test condition: As specified in the switch specification.
16	Returning force	Construction: The actuator shall return to the normal position. Returning force: To satisfy the provisions of switch specifications.	Comply with 8.5 and the following: Mounting posture: As specified in the switch specification. Mounting or not of push switches or the like: As specified in the switch specification. Position and direction of force application: As specified in the switch specification. Measuring point of returning force: As specified in the switch specification.
17	Operating range	To satisfy the provisions of switch specifications.	Comply with 8.6 and the following: Test method: As specified in the switch specification. Kind of operating range of actuator: As specified in the switch specification. Measurement position: As specified in the switch specification. Number of measurements: The switch specifications shall specify the number.

Table 3 Performance (continued)

No.	Item	Performance	Test method (JIS C 5441)
18	Resistance to soldering heat	Appearance: No mechanical damage on the terminations and no abnormality on the appearance. Functional operation: To satisfy the requirement of No. 1. Contact resistance: To satisfy the requirement of No. 2. Insulation resistance: To satisfy the requirement of No. 3. Voltage proof: To satisfy the requirement of No. 4. Actuation force: To satisfy the requirement of No. 15.	Comply with 8.7 and the following: Test method: As specified in the switch specification. Details when heat screen or heat sink is used: As specified in the switch specification. Kind of bit of soldering iron: As specified in the switch specification. Distance from switch body to the part to be tested: As specified in the switch specification. Depth of immersion: As specified in the switch specification. Duration of immersion: As specified in the switch specification. Initial measurement items: Appearance Functional operation Contact resistance Insulation resistance Voltage proof Operating force Final measurement items: Same as initial measurement items
19	Solderability	Appearance: At least 95 % of the solderable surface of immersed termination shall be covered with smooth bright solder. Functional operation: To satisfy the requirement of No. 1.	Comply with 8.8 and the following: Test method: As specified in the switch specification. Defatting: As specified in the switch specification. Aging method: As specified in the switch specification. Use of activated flux: As specified in the switch specification. Details when heat screen or heat sink is used: As specified in the switch specification.

Table 3 Performance (continued)

No.	Item	Performance	Test method (JIS C 5441)
19	Solderability (concluded)	Contact resistance: To satisfy the requirement of No. 2. Insulation resistance: To satisfy the requirement of No. 3. Voltage proof: To satisfy the requirement of No. 4. Actuation force: To satisfy the requirement of No. 15.	Kind of tip of soldering iron: As specified in the switch specification. Distance from switch body to the part to be tested: As specified in the switch specification. Depth of immersion: As specified in the switch specification. Duration of immersion: As specified in the switch specification. Initial measurement items: Appearance Functional operation Contact resistance Insulation resistance Voltage proof Operating force Final measurement items: Same as initial measurement items
20	Resistance to vibration	Appearance: No damage, loosening or other abnormalities on every part. Functional operation: To satisfy the requirement of No. 1. Contact resistance: To satisfy the requirement of No. 2. Insulation resistance: To satisfy the requirement of No. 3. Voltage proof: To satisfy the requirement of No. 4. Actuation force: To satisfy the requirement of No. 15.	Comply with 8.9 and the following: Kind of test: As specified in the switch specification. Peak to peak amplitude or acceleration: As specified in the switch specification. Operating test or electric loading during test: As specified in the switch specification. Intermediate measurement: As specified in the switch specification. Recovery: As specified in the switch specification. Initial measurement items: Appearance Functional operation Contact resistance

Table 3 Performance (continued)

No.	Item	Performance	Test method (JIS C 5441)
20	Resistance to vibration (concluded)	Chattering of contacts: Not more than one of the values stated below which is specified in the switch specification. 1 μ s, 10 μ s, 100 μ s, 1 ms, 10 ms	Insulation resistance Voltage proof Operating force Chattering of contacts during test: As specified in the switch specification. Final measurement items: Same as initial measurement items
21	Shock	Appearance: No damage, loosening or other abnormalities on every part. Functional operation: To satisfy the requirement of No. 1. Contact resistance: To satisfy the requirement of No. 2. Insulation resistance: To satisfy the requirement of No. 3. Voltage proof: To satisfy the requirement of No. 4. Actuation force: To satisfy the requirement of No. 15. Chattering of contacts: Not more than one of the values stated below which is specified in the switch specification. 1 μ s, 10 μ s, 100 μ s, 1 ms, 10 ms	Comply with 8.10 and the following: Waveform of pulse: As specified in the switch specification. Method of mounting: As specified in the switch specification. Severity, acceleration and duration: As specified in the switch specification. Initial measurement items: Appearance Functional operation Contact resistance Insulation resistance Voltage proof Operating force Chattering of contacts during test: As specified in the switch specification. Final measurement items: Same as initial measurement items

Table 3 Performance (continued)

No.	Item	Performance	Test method (JIS C 5441)
22	Mechanical endurance—standard atmospheric conditions	Appearance: No deformation, loosening or other abnormalities on every part. Contact resistance: To satisfy the provisions of the switch specification. Resistance from actuator to mounting bushing (surface): To satisfy the requirement of No. 11 (if applied). Insulation resistance: To satisfy the provision of the switch specification. Operating force: To satisfy the requirement of No. 15. Panel sealing characteristic: To satisfy the requirement of one of No. 42, 43, 44 or 45 (if applied).	Comply with 9.1 and the following: Number of switching cycles: As specified in the switch specification. Rate of switching: As specified in the switch specification. Test temperature: The temperature specified in 9.1.1 of this Standard. Panel sealing characteristic: As specified in the switch specification. Initial measurement items: Appearance Contact resistance Resistance from actuator to mounting bushing (surface) Insulation resistance Operating force Panel sealing characteristic Final measurement items: Same as initial measurement items
23	Mechanical endurance—category temperature range	Appearance: No deformation, loosening or other abnormalities on every part. Contact resistance: To satisfy the provisions of the switch specification. Resistance from actuator to mounting bushing (surface): To satisfy the requirement of No. 11 (if applied). Insulation resistance: To satisfy the provision of the switch specification.	Comply with 9.2 and the following: Number of switching cycles: As specified in the switch specification. Rate of switching: As specified in the switch specification. Lowest test temperature: The lower limit temperature in the category temperature range specified in the switch specification. Highest test temperature: The higher limit temperature in the category temperature range specified in the switch specification.

Table 3 Performance (continued)

No.	Item	Performance	Test method (JIS C 5441)
23	Mechanical endurance—category temperature range (concluded)	Operating force: To satisfy the requirement of No. 15. Panel sealing characteristic: To satisfy the requirement of one of No. 42, 43, 44 or 45 (if applied).	Panel sealing characteristic: As specified in the switch specification Initial measurement items: Appearance Contact resistance Resistance from actuator to mounting bushing (surface) Insulation resistance Operating force Panel sealing characteristic Final measurement items: Same as initial measurement items
24	Electrical endurance—standard atmospheric conditions	Appearance: No deformation, loosening, or other abnormalities on every part. Functional operation: To satisfy the requirement of No. 1. Contact resistance: To satisfy the provision of the switch specification. Insulation resistance: To satisfy the provision of the switch specification. Voltage proof: To satisfy the requirement of No. 4. Operating force: To satisfy the requirement of No. 15. Temperature rise: To satisfy the requirement of No. 7 (if applied). Fail to open ("stick") or close ("miss") during test: To satisfy the allowable number of failures specified in the switch specification.	Comply with 10.1 and the following: Number of switching cycles: As specified in the switch specification. Load conditions: As specified in the switch specification. Test temperature: The temperature specified in 9.1.1 of this Standard. Initial measurement items: Appearance Functional operation Contact resistance Insulation resistance Voltage proof Operating force Measurement items during test: Number of "sticks" and "misses" Final measurement items: Temperature rise of terminations (if applied) in addition to the initial measurement items.

Table 3 Performance (continued)

No.	Item	Performance	Test method (JIS C 5441)
25	Electrical endurance—upper category temperature	Appearance: No deformation, loosening, or other abnormalities on every part. Functional operation: To satisfy the requirement of No. 1. Contact resistance: To satisfy the provision of the switch specification. Insulation resistance: To satisfy the provision of the switch specification. Voltage proof: To satisfy the requirement of No. 4. Operating force: To satisfy the requirement of No. 15. Temperature rise: To satisfy the requirement of No. 7 (if applied). "Stick" and "miss" during test: To satisfy the allowable numbers of failures specified in the switch specification.	Comply with 10.2 and the following: Number of switching cycles: As specified in the switch specification. Load conditions: As specified in the switch specification. Test temperature: The upper limit temperature in the category temperature range specified in the switch specification. Initial measurement items: Appearance Functional operation Contact resistance Insulation resistance Voltage proof Operating force Measurement items during test: Number of "sticks" and "misses" Final measurement items: Temperature rise of terminations (if applied) in addition to the initial measurement items.
26	Electrical endurance—category temperature range	Appearance: No deformation, loosening, or other abnormalities on every part. Functional operation: To satisfy the requirement of No. 1. Contact resistance: To satisfy the provision of the switch specification. Insulation resistance: To satisfy the provision of the switch specification. Voltage proof: To satisfy the requirement of No. 4.	Comply with 10.3 and the following: Number of switching cycles: As specified in the switch specification. Load conditions: As specified in the switch specification. Lowest test temperature: The lower limit temperature in the category temperature range specified in the switch specification. Highest test temperature: The upper limit temperature in the category temperature range specified in the switch specification.

Table 3 Performance (continued)

No.	Item	Performance	Test method (JIS C 5441)
26	Electrical endurance—category temperature range (concluded)	Operating force: To satisfy the requirement of No. 15. Temperature rise: To satisfy the requirement of No. 7 (if applied). "Stick" and "miss" during test: To satisfy the allowable numbers of failures specified in the switch specification.	Initial measurement items: Appearance Functional operation Contact resistance Insulation resistance Voltage proof Operating force Measurement items during test: Number of "sticks" and "misses" Final measurement items: Temperature rise of terminations (if applied) in addition to the initial measurement items.
27	Electrical endurance—low air pressure	Appearance: No deformation, loosening or other abnormalities on every part. Functional operation: To satisfy the requirement of No. 1. Voltage proof: To satisfy the requirement of No. 4. "Stick" and "miss" during test: To satisfy the allowable number of failure specified in the switch specification.	Comply with 10.4 and the following: Number of switching cycles: As specified in the switch specification. Load conditions: As specified in the switch specification. Low air pressure: As specified in the switch specification. Initial measurement items: Appearance Functional operation Voltage proof Measurement item during test: Number of "sticks" and "misses". Final measurement items: Same as the initial measurement items
28	Electrical endurance—loading	Appearance: No deformation, loosening, or other abnormalities on every part. Functional operation: To satisfy the requirement of No. 1.	Comply with 10.5 and the following: Test method: One of the method 1 to method 10 shown in the tables given below shall be specified in the switch specification.