


## FEATURES

This micro drum switch is compact and highly functional with high reliability. The control switch has critical roles among the control devices that constitute the core of the neural system of a plant. The micro drum switch ensures stable reliability in emergency as well as in normal use. In addition, it effectively utilizes the panel surface as the interface for the control devices, and plays great roles for improving the panel design.

## ISliding contact method

The sliding contact method has been adopted to ensure high contact reliability. In this method, the contacting
surfaces of the contactors rub each other so that dust and other foreign matter can be cleaned completely.

## High density of mounting

LED indicators are mounted in the nameplate part. This design further improves the density of mounting on the panel (ML type).

## Correspond to various power sources

The power source for indicators is selectable from 110 and 220 V AC, $24,48,110$, and 125 V DC. This variety of options allows for complying with different needs.

## SPECIFICATIONS (RATINGS, PERFORMANCE)

| Type | M TYPE, ML TYPE |
| :--- | :---: |
| Specification | 250 V |
| Rated insulation voltage (Ui) | 8 A |
| Rated current-carying capacity (th) | $5.5 \mathrm{~mm}^{2}$ |
| Max. wire size | $\mathrm{M} 4 \times 8$ |
| Screw size | $2,500 \mathrm{~V} \mathrm{AC} / 1 \mathrm{~min}$. |
| Withstand voltage | $\pm 7 \mathrm{kV} 1.2 / 50 \mu \mathrm{~s}$ |
| Lightning impulse | $50 \mathrm{~m} \Omega$ or less |
| Contact resistance | 50,000 operations or more, Class 5 |
| Mechanical life | 10,000 operations or more, Class 5 |
| Electrical life | $294 \mathrm{~m} / \mathrm{s}^{2}$ |
| Shock resistance | Acceleration: $50 \mathrm{~Hz}, 20 \mathrm{~m} / \mathrm{s}^{2}$, Time: 2 hours (3 directions) |
| Vibration resistance | -20 to $50^{\circ} \mathrm{C}$ |
| Operating temperature | -40 to $70^{\circ} \mathrm{C}$ |
| Storing temperature | $2,000 \mathrm{~m}$ or less |
| Altitude |  |

Breaking capacity [electrical life of 10,000 operations (class 5)]

| AC |  |  | DC |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Rated voltage (V) | Rated operating current (resistance load) (A) | Rated operating current (inductive load) (A) | Rated voltage <br> (V) | $\begin{array}{\|c} \text { Rated operating } \\ \text { current } \\ \text { (resistance load) (A) } \end{array}$ | Rated operating current (inductive load) (A) | 2 contacts used in series Rated operating current (resistance load) (A) | 2 contacts used in series Rated operating current (inductive load) (A) |
| 110 | 8 | 8 | - | - | - | - | - |
| 220 | 5 | 4 | 48 | 8 | 8 | 8 | 8 |
| - | - | - | 110 | 3 | 2 | 3 | 3 |
| - | - | - | 220 | 1 | 0.7 | 1 | 1 |

* Inductive load: For AC: Power factor 0.6 to 0.7 (Class: AC11), For DC: Time constant $40 \pm 6 \mathrm{~ms}$ (Class: DC12)

No.
(1)
Basic type


## Notch code

| Code | H | T | F | S | SB |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Notch configuration |  |  |  | ${ }^{\mathrm{B}} \stackrel{\mathrm{C}}{\mathrm{~A}}$ |  |
| Operation | $\begin{aligned} & \hline\left(90^{\circ}-2\right) \\ & 2 \text { notches } \end{aligned}$ | $\begin{aligned} & \left(45^{\circ}-3\right) \\ & 3 \text { notches } \end{aligned}$ | $\begin{aligned} & \left(45^{\circ}-4\right) \\ & 4 \text { notches } \end{aligned}$ | $\begin{aligned} & \left(45^{\circ}-3\right) \\ & 3 \text { notches } \end{aligned}$ | Automatic rotating return |
|  | Manual return |  |  | Automatic return | Automatic axial return |

(Note) In the above table, the mark indicates the ordinary stop position of the switch. The $\rightarrow$ mark shows that the switch moves in this direction and then automatically stops in the arrowhead position.

## Contact code

| Code | Graphic symbol | Type | Description | Code | Graphic symbol | Type | Description |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| B | $\downarrow$ 仡 | Normal contact | Making at the B position $<45^{\circ}>$ | (B)L | + | Over-lapping contact | Shows for overlap contact. To be added to the standard contact symbol ( $B$ to $F$ ). |
| A |  |  | Making at the A position $\left\langle 45^{\circ}>\right.$ | M |  | Continuous closing contact | Contacts close between left and center positions. |
| T | $\dagger$ ¢ | Normal contact | Making at the T position $<45^{\circ}>$ | N | $1 \longrightarrow$ |  | Contacts close between right and center positions. |
| F | $1 \mid 1$ |  | Making at the F position $<45^{\circ}>$ |  |  |  |  |

## Handle code

| Code | SP | SD | SF |
| :---: | :---: | :---: | :---: |
|  | Pistol shape | Rose shape | Octagonal shape |

## LED display circuit type

| Code | 1 | 2 | 3 |
| :---: | :---: | :---: | :---: |
|  | H circuit (for DC circuit) | Y circuit (for DC circuit) | H.Y circuit (AC circuit only) |
|  |  |  |  |
| Code | 4 | 5 | 6 |
|  | S circuit (for AC / DC circuit) | T.C circuit (for AC / DC circuit) | Y circuit (for DC circuit, P common) |
|  |  |  |  |

ML type lamp circuit
R: Limit resistor D: Rectifying diode LED: LED element

|  | 1 lamp | 2 lamps | 2 lamps | 2 lamps, P common |
| :---: | :---: | :---: | :---: | :---: |
|  | S circuit (DC circuit) | H circuit (DC circuit) | Y circuit (DC circuit) | Y circuit (DC circuit) |
|  |  |  |  |  |
|  | 3 lamps | 1 lamp | 2 lamps | 3 lamps |
|  | T.C circuit (DC circuit) | S circuit (AC circuit) | H.Y circuit (AC circuit) | T.C circuit (AC circuit) |
|  |  |  |  |  |

## OUTLINES M TYPE

Automatic return and manual return type
M－S，H，T，F


## Automatic return type by pulling

## M－SB



Automatic return and manual return type（with padlock mechanism）

## M－KH－S，H，T，F

Key lock position

＊「NUKI」 means key lock position


ORemove the padlock and push the lock release lever，then allows you to operate the switch．After finishing the operation，if you release your finger， the switch will be locked automatically．
＊Padlock size： 5 mm ．

| No．of units | $\mathbf{1}$ | $\mathbf{2}$ | $\mathbf{3}$ | $\mathbf{4}$ | $\mathbf{5}$ | $\mathbf{6}$ | $\mathbf{7}$ | $\mathbf{8}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $\mathbf{L}(\mathbf{m m})$ | 58.5 | 68.5 | 78.5 | 88.5 | 98.5 | 108.5 | 118.5 | 128.5 |

Key－operated type：Automatic return type and manual return type

## M－KMC－S，H，T，F

## Key lock position



The figure shows the switch with the C－88MS type cylinder lock．There are no more than 10 kinds of keys available and no master key is supplied．In case of the key type C110，there are more than 10 kinds of keys available and the master key comes with the switch，the L dimension of the switch becomes longer by 5 mm ．Please see page A14 for key system and specify the key No．

| No．of units | $\mathbf{1}$ | $\mathbf{2}$ | $\mathbf{3}$ | $\mathbf{4}$ | $\mathbf{5}$ | $\mathbf{6}$ | $\mathbf{7}$ | $\mathbf{8}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $\mathbf{A}(\mathbf{m m})$ | 31 | 41 | 51 | 61 | 71 | 81 | 91 | 101 |
| $\mathbf{L}(\mathbf{m m})$ | 66 | 76 | 86 | 96 | 106 | 116 | 126 | 136 |

## OUTLINES

## ML TYPE

* If the LED lamp circurt is T or C, it's necessary to attach an unit for wiring to the switch body.

Automatic return type and manual return type with indicators

## ML-S,H,T,F



Automatic return type by pulling

## ML-SB



Automatic return type and manual return type with padlock mechanism

## ML-KH-S,H,T,F



Key lock position

* Same as the M-KH type. (A108)

| No. of units | $\mathbf{1}$ | $\mathbf{2}$ | $\mathbf{3}$ | $\mathbf{4}$ | $\mathbf{5}$ | $\mathbf{6}$ | $\mathbf{7}$ | $\mathbf{8}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $\mathbf{L}(\mathrm{mm})$ | 58.5 | 68.5 | 78.5 | 88.5 | 98.5 | 108.5 | 118.5 | 128.5 |

## STANDARD ARRANGEMENT DIAGRAM

a) For voltmeter (standard handle: SD)

b) For ammeter (standard handle: SD)


## STANDARD ARRANGEMENT DIAGRAM

| -Automatic return type and pulling type (S) (SB) -2 contacts (2 units) |  |  |  | (SB) |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | S2001M | S2002M | S2003M | S2004M | S2005M | S2101M |
| Detail | S2-1C1A | S2-181A | S2-1M1N | S2-1N1B | S2-1N1A | S2-1A1B |
| Contact arrangement |  |  |  |  |  |  |
| Type (pulling) | SB2001M | SB2002M | SB2003M | SB2004M | SB2005M | SB2101M |

-3 contacts (3 units)

| $\begin{gathered} \text { Type } \\ \hline \text { (automatic return) } \\ \hline \end{gathered}$ | S3001M | S3002M | S3003M | S3004M | S3005M | S3006M |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Detail | S3-1C1B1A | S3-1B2A | S3-1M1N1A | S3-1N1B1A | S3-1N2A | S3-2N1B |
| Contact arrangement |  |  |  |  |  |  |
| Type (pulling) | SB3001M | SB3002M | SB3003M | SB3004M | SB3005M | SB3006M |

-4 contacts (4 units)

| $\begin{aligned} & \text { Type } \\ & \text { (automatic return) } \end{aligned}$ | S4001M | S4002M | S4003M | S4004M | S4005M | S4006M |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Detail | S4-1C1B2A | S4-2C1B1A | S4-2B2A | S4-1N1B2A | S4-1N1C1B1A | S4-1M1N1B1A |
| Contact arrangement |  |  |  |  |  |  |
| Type (pulling) | SB4001M | SB4002M | SB4003M | SB4004M | SB4005M | SB4006M |
| $\begin{array}{\|c\|} \hline \text { Type } \\ \hline \text { (automatic retur) } \\ \hline \end{array}$ | S4007M | S4008M | S4009M | S4010M | S4011M | S4101M |
| Detail | S4-1M1N2A | S4-2N1B1A | S4-2N2B | S4-2N2A | S4-2M2N | S4-2 (1A1B) |
| Contact arrangement |  |  |  |  |  |  |
| Type (pulling) | SB4007M | SB4008M | SB4009M | SB4010M | SB4011M | SB4101M |

-6 contacts ( 6 units)

| $\begin{array}{\|c\|} \hline \text { Type } \\ \hline \text { (automatic return) } \\ \hline \end{array}$ | S6001M | S6002M | S6003M | S6004M | S6005M | S6006M |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Detail | S6-3B3A | S6-2B4A | S6-4B2A | S6-2C1B3A | S6-2C2B2A | S6-2N2B2A |
| Contact arrangement |  |  |  |  |  |  |
| Type (pulling) | SB6001M | SB6002M | SB6003M | SB6004M | SB6005M | SB6006M |
| Type <br> (automatic return) <br> Detail | S6007M | S6008M | $\begin{gathered} \hline \text { S6009M } \\ \hline \text { S6-1M1N2B2A } \end{gathered}$ |  |  |  |
| Contact arrangement |  |  |  |  |  |  |
| Type (pulling) | SB6007M | SB6008M | SB6009M |  |  |  |


$90^{\circ}$ 2-position changeover (H)
(H)
-1 contact (1 unit)

| Type | H1001M | H1002M |
| :---: | :---: | :---: |
| Detail | H1-1A | H1-1B |
| Contact arrangement |  |  |

-2 contacts (2 units)

| H 2001 M | H 2002 M | H 2003 M | H 2004 M |
| :---: | :---: | :---: | :---: |
| $\mathrm{H} 2-2 \mathrm{~A}$ | $\mathrm{H} 2-2 \mathrm{~B}$ | $\mathrm{H} 2-1 \mathrm{~B} 1 \mathrm{~A}$ | $\mathrm{H} 2-1 \mathrm{BLLAL}$ |
| (3) <br> (1) <br> B | A | B |  |

-3 contacts (3 units)

| Type | H3001M | H3002M | H3003M | H3004M | H3005M |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Detail | H3-3A | H3-3B | H3-1B2A | H3-2B1A | H3-1B2BL |
| Contact arrangement |  |  |  |  |  |

-4 contacts (4 units)

| Type | H4001M | H4002M | H4003M | H4004M | H4005M | H4006M |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Detail | H4-4A | H4-4B | H4-1B3A | H4-3B1A | H4-2B2A | H4-1B1A1BL1AL |
| Contact arrangement |  |  |  |  |  |  |


| Type | H 4007 M | H 4008 M | H 4102 M |  |
| :---: | :---: | :---: | :---: | :---: |
| Detail | $\mathrm{H} 4-2 \mathrm{BL} 2 \mathrm{AL}$ | $\mathrm{H} 4-1 \mathrm{BL} 3 \mathrm{AL}$ | $\mathrm{H} 4-2 \mathrm{AL} 2 \mathrm{~B}$ |  |
|  |  |  |  |  |
| Contact |  |  |  |  |
| arrangement |  |  |  |  |

## STANDARD DEVELOPMENT DIAGRAM

$90^{\circ}$ 2-position changeover (H)

## -6 contacts (6 units)

(H)
${ }^{B} y^{\mathrm{A}}$

| Type | H6001M | H6002M | H6003M | H6004M | H6005M |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Detail | H6-6A | H6-6B | H6-3B3A | H6-1B5A | H6-2B4A |
| Contact arrangement |  |  |  |  |  |
| Type | H6006M | H6007M | H6008M | H6009M |  |
| Detail | H6-4B2A | H6-5B1A | H6-2BL4AL | H6-3BL3AL |  |
| Contact arrangement |  |  |  |  |  |

## -8 contacts (8 units)

| Type | H8001M | H8002M | H8003M | H8004M | H8005M |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Detail | H8-8A | H8-1B7A | H8-2B6A | H8-3B5A | H8-4B4A |
| Contact arrangement |  |  |  |  |  |
| Type | H8006M | H8007M | H8008M | H8101M |  |
| Detail | H8-5B3A | H8-6B2A | H8-4BL4AL | H8-4A4B |  |
| Contact arrangement |  |  |  |  |  |

$145^{\circ}$ 3-position changeover ( T )
-2 contacts ( 2 units)


| Type | T2001M | T2002M | T2003M | T2004M | T2101M |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Detail | T2-1A1T | T2-1B1A | T2-1B1T | T2-1BA1AT | T2-1AT1T |
| Contact arrangement |  |  |  |  |  |

$145^{\circ}$ 3-position changeover ( T )

-3 contacts (3 units)

| Type | T3001M | T3002M | T3003M | T3004M | T3005M | T3006M |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Detail | T3-1A2T | T3-1B1A1T | T3-1BL1AL1TL | T3-1B2A | T3-2B1A | T3-1B1T1AT |
| Contact arrangement |  |  |  |  |  |  |

-4 contacts (4 units)

| Type | T4001M | T4002M | T4003M | T4004M | T4005M |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Detail | T4-2A2T | T4-2B2A | T4-1B1A2T | T4-1B2A1T | T4-2B2T |
| Contact arrangement |  |  |  |  |  |
| Type | T4006M | T4007M | T4008M | T4009M | T4010M |
| Detail | T4-2B1A1T | T4-3B1T | T4-1B1A1T1BA | T4-1A1T2AT | T4-1BL1AL2TL |
| Contact arrangement |  |  |  |  |  |

06 contacts (6 units)

| Type | T6001M | T6002M | T6003M | T6004M | T6005M |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Detail | T6-2A4T | T6-1B1A4T | T6-1B3A2T | T6-1B4A1T | T6-2B2A2T |
| Contact arrangement |  |  |  |  |  |
| Type | T6006M | T6007M | T6008M | T6009M | T6010M |
| Detail | T6-2B4T | T6-2B4A | T6-2B1A3T | T6-3B3A | T6-3B3T |
| Contact arrangement |  |  |  |  |  |
| Type | T6011M | T6012M |  |  |  |
| Detail | T6-2A2T2AT | T6-2BL2AL2TL |  |  |  |
| Contact arrangement |  |  |  |  |  |

## STANDARD ARRANGEMENT DIAGRAM

$45^{\circ}$ 4-position changeover (F)

## (F)

## -3 contacts (3 units)

| Type | F3001M | F3002M |
| :---: | :---: | :---: |
| Detail | F3-1A1T1F | F3-1F1TF1ATF |
| Contact arrangement |  |  |

-4 contacts (4 units)

| F4001M | F4002M | F4003M |
| :---: | :---: | :---: |
| F4-1B1A1T1F | F4-1A1T2F | F4-1A2T1F |
|  |  |  |

-6 contacts (6 units)

| Type | F6001M | F6002M | F6003M | F6004M |
| :---: | :---: | :---: | :---: | :---: |
| Detail | F6-2A2T2F | F6-2B2T2F | F6-2B1A1T2F | F6-2B2A1T1F |
| Contact arrangement |  |  |  |  |

-8 contacts (8 units)

| Type | F8001M | F8002M | F8003M |
| :---: | :---: | :---: | :---: |
| Detail | F8-2B2A2T2F | F8-2A2T4F | F8-3B2T3F |
| Contact arrangement |  |  |  |

## ACCESSORIES

## Jumper (selling separately)



For adjacent terminals


For skipping one terminal


For skipping two terminals


## ACCESSORIES

## ML LED pack

## OM remover


＊For circuits，see the specification of the LED display part circuit on A107．


Material．．．．．．Aluminum
Letter ．．．．．．．．．Round Gothic

| Nameplate No． | B | A | $\mathbf{T}$ | $\mathbf{F}$ | N |
| :--- | :---: | :---: | :---: | :---: | :---: |
| MA－452 | O | R | S | T | 電圧計 |
| MA－453 | O | $\mathrm{R}-\mathrm{S}$ | $\mathrm{S}-\mathrm{T}$ | $\mathrm{T}-\mathrm{R}$ | 電圧計 |
| MA－455 | O | R | S | T | 電流計 |
| MA－464 | O | $\mathrm{R}-\mathrm{N}$ | $\mathrm{N}-\mathrm{T}$ | $\mathrm{T}-\mathrm{R}$ | 電圧計 |
| MA－1401E | OFF | R | Y | B | AMMETER |


| Nameplate No． | B | A | N |
| :---: | :---: | :---: | :---: |
| MA－000 | Plain |  |  |
| MA－200 | 切 | 入 |  |
| MA－201 | 手 動 | 自 動 |  |
| MA－202 | 単 独 | 連 動 |  |
| MA－209 | 停 止 | 運 転 |  |
| MA－211 | 現 場 | 電 気 室 |  |
| MA－212 | 電 気 室 | 中 央 |  |
| MA－251 | 切 | 入 | しゃ断器 |
| MA－252 | 切 | 入 | 操作スイッチ |
| MA－253 | 手 動 | 自 動 | 切換スイッチ |
| MA－270 | 不使 用 | 使 用 | 切換スイッチ |
| MA－277 | 閉 | 開 |  |
| MA－278 | 現 場 | 中 央 |  |
| MA－279 | No． 1 | No． 2 |  |
| MA－292 | 切 | 入 | しゃ断器テスト |
| MA－293 | 現 場 | 中 操 | 操作切換器 |
| MA－227E | OPEN | CLOSE |  |
| MA－281E | OFF | ON | CIRCUIT BREAKER |
| MA－282E | LOCAL | REMOTE | CONTROL |
| MA－1201E | OFF | ON | AUTO RECLOSING |


| Nameplate No． | B | A | T | N |
| :--- | :---: | :---: | :---: | :---: |
| MA－290 | 切 | 交流しゃゃ断器 | 入 |  |
| MA－291 | 切 | 線路開問 | 入 |  |
| MA－292 | 切 | しゃゃ断機テスト | 入 |  |
| MA－293 | 現 場 | 操作切換器 | 中 操 |  |
| MA－300 | 閉 | 停止 | 開 |  |
| MA－376E | LOCAL | OFF | REMOTE | CONTROL |



## REPRESENTATION OF ARRANGEMENT DIAGRAM

## 1 Graphic symbol

| Action of contact | Symbol |
| :---: | :---: |
| Normal making contact | $\bullet$ |
| Close keep contact |  |
| Continuous closing contact |  |
| Over-lapping contact |  |


| Operation | Symbol |
| :---: | :---: |
| Manual return (rotating direction) | Not indicated |
| Manual return (axial direction) | $\bullet$ |
| Automatic return (return direction) | $\longrightarrow$ |
| Automatic return (axial direction) | $\bullet$ |

2 Representation method for contact arrangement


The development is diagrammatically represented as follows. For further details, see "B Example of diagrammatical representation of development".

1. Denote a terminal with $\bigcirc$ and enter its number in that circle.
2. The extent of the development figure is defined by a solid-line frame.
3. An operation position is shown with a vertical thin line between terminals.
4. An operation position name is shown on the handle in the development figure.
5. The contact symbol in the above $\mathbf{1}$, which is shown on the thin line showing the operation position, indicates that the mutually opposite terminals in that position are closed.
6. The function symbols showing the operation direction and the return position are shown on the handle in the development figure.
7. The handle of the switch is shown in the lower position of the figure.

## 3 Example of diagrammatic representation of development

(1)

(2)


The figure shows the switch that is designed to stop in the switching position. More specifically, when the switch is set to the AUTO position, the circuit between terminals 3 and 4 is closed and that between terminals 1 and 2 opened. When the switch is set to the MANU. position, opening and closing are reversed.

The figure shows the same switching position stop mechanism as in (1) with 4point switching.
The circuit between terminals 5 and 6 shows that it is continuously closed when the switch becomes positions A and T .
The circuit between terminals 9 and 10 shows that it is closed until the switch goes from position $A$ to the middle between positions $A$ and $T$, and is opened in position T .
The circuit between terminals 11 and 12 shows that it is closed until the switch goes from position T to the middle between positions T and A , and is opened in position A. Therefore, the circuit between terminals 9 and 10 and that between terminals 11 and 12 are simultaneously closed when the switch goes to the middle between positions A and T .

Example of selecting a contact arrangement figure


For example, please select the right figure T6005M from the standard development figures (A110 to A115) when the switch with the circuit in the left figure is required. In this case, the terminal numbers should be assigned as in the standard drawing.

T 6005 M


## TECHNICAL DATA

## Breaking and making current capacity

| Type |  | AC |  |  | DC |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | Test voltage (V) | Test current (A) | Load condition | Test voltage (V) | Test voltage (V) | Load condition |
| M, ML | Rotating operation type | 121 | 8 | Power factor:$\mathrm{Pf}=0.6 \text { to } 0.7$ | 52.8 | 11 | Time constant: <br> $\mathrm{L} / \mathrm{R}=40 \pm 6 \mathrm{~ms}$ |
|  |  | 242 | 4 |  | 121 | 2.2 |  |
|  |  | - | - |  | 242 | 0.77 |  |

## Break / make circuit current capacity test

To conduct the break / make circuit current capacity test, connect the air-core reactor, which is connected in series to a resistor, to the switch as illustrated in Fig. 1 or 2. Using the test current specified in Table 1, perform CO 50 times for AC and 20 times for DC at intervals of 10 seconds when the voltage is 1.1 times the rated operating voltage of the switch. At this test, check for:
(1) Short-circuit between poles or earth fault due to generated arc, or broken or burnt switch.
(2) Any other harmful fault in use

Note: CO means performing the making action (C) and then the breaking action (O) about 50 ms later. For a switch that has some identical structures used for the same electric potential, select an adjacent contact or a contact that is most likely to lead the arc to the frame and then carry out the test using the circuit shown in Fig. 1. For a switch in which an adjacent contact is used at a different electric potential, perform the test as shown in Fig. 2.

Fig. 1


Fig. 2


Note: For DC, connect a parallel resistor so that $1 \%$ of the test current value flows in parallel with the loads (R.L).

Table 1

| AC or DC | Class | Test voltage | Test current |  | Power factor (AC) or time constant (DC L/R: ms) |
| :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  | Making | Breaking |  |
| Alternating current (AC) | AC11 | 1.1Ue | 11.0 le | 11.0 le | 0.6 to 0.7 |
|  | AC12 | 1.1 Ue | 2.2 le | $2.21 e$ | 0.6 to 0.7 |
|  | AC13 | 1.1 Ue | 1.1 le | 1.1 le | 0.9 to 1.0 |
| Direct current (DC) | DC11 | 1.1 Ue | 1.1 le | 1.1 le | $100 \pm 15$ |
|  | DC12 | 1.1 Ue | 1.1 le | 1.1 le | $40 \pm 6$ |
|  | DC13 | 1.1Ue | 1.1 le | 1.1 le | $7 \pm 1$ |
|  | DC14 | 1.1Ue | 1.1 le | 1.1 le | 1 or less |

Note: le shows for rated operating current and Ue shows rated operating voltage.

