

# TemBreak

- New compact breakers -



**The Ultimate  
Safety Breaker**



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1

2

3

4

# FEATURES

## *Saving space and saving money !*

### No.4

Operation in pollution degree 3 to IEC standard

### No.1

Compact size: W75 H130 D68;  
and high breaking capacity: 40kA  
415V (S160-SF/SJ)

### No.6

IP20 protection for the terminals  
and IP30 protection for the front cover  
with toggle (with terminal covers)

### No.9

Two alarm  
switches can be  
easily installed

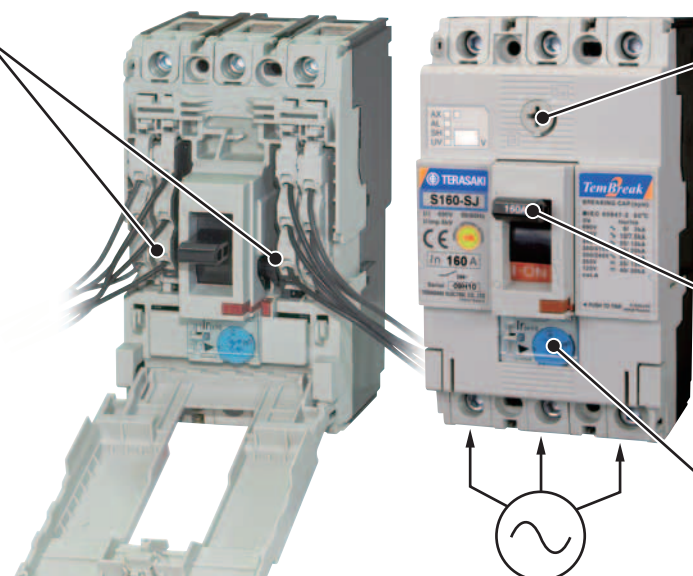
### No.8

Practical internal  
accessories can  
be installed with  
one touch

- auxiliary switch
- alarm switch
- shunt trip
- undervoltage trip

### No.10

Secure accessory cover  
retains nameplate



### No.7

Unique accessory  
cover opens with  
only one screw

### No.5

Suitable for isolation  
with positive contact  
indication

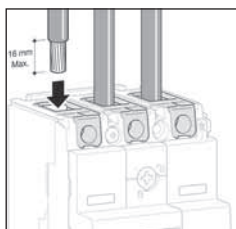
### No.2

Huge adjustment  
range for overload  
protection: 63 to 100%  
Dial cover can be  
sealed.  
(Adjustable thermal  
MCCBs)

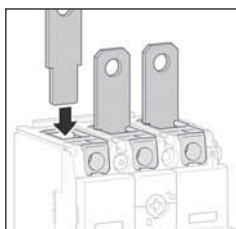
### No.3

Unlimited performance  
when reverse-connected

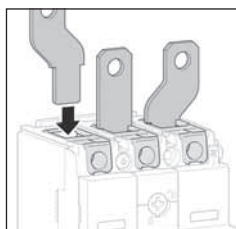
## VARIED TERMINATIONS



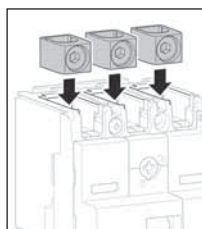
cable clamp



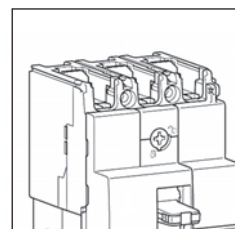
straight extension bar



spread extension bar



cable clamp for  
aluminum  
conductors



front connections

## 1

# Ratings and Specifications

## Molded Case Circuit Breakers

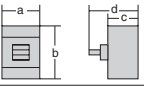
- 1 Fixed thermal and fixed magnetic MCCBs .....1-2
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- 3 Switch-disconnectors .....1-4

## 1

## Ratings and Specifications

## Molded Case Circuit Breakers

## 1 Fixed thermal and fixed magnetic MCCBs

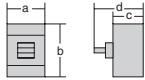
|                                                                                   |                                 |                         |                 |                |                 |                |                 |                 |       |  |
|-----------------------------------------------------------------------------------|---------------------------------|-------------------------|-----------------|----------------|-----------------|----------------|-----------------|-----------------|-------|--|
| Frame size (A)                                                                    |                                 |                         | 100             | 160            | 160             | 160            | 250             | 250             |       |  |
| Type                                                                              |                                 |                         | E100-SF         | E160-SF        | S160-SCF        | S160-SF        | E250-SF         | S250-SF         |       |  |
| Number of poles                                                                   |                                 |                         | 2   3           | 1              | 2   3   4       | 3   4          | 2 *   3   4     | 2 *   3   4     |       |  |
| ■ Ratings                                                                         |                                 |                         |                 |                |                 |                |                 |                 |       |  |
| Rated current, A                                                                  |                                 |                         | 10   50         | 16   63        | 15   75         | 15   75        | 125             | 125             |       |  |
| Calibrated at 40°C                                                                |                                 |                         | 15   60         | 20   80        | 20   100        | 20   100       | 150             | 150             |       |  |
|                                                                                   |                                 |                         | 20   75         | 25   100       | 30   125        | 30   125       | 175             | 175             |       |  |
|                                                                                   |                                 |                         | 30   100        | 32   125       | 40   160        | 40   160       | 200             | 200             |       |  |
|                                                                                   |                                 |                         | 40              | 40             | 50              | 50             | 225             | 225             |       |  |
|                                                                                   |                                 |                         |                 | 50             | 60              | 60             | 250             | 250             |       |  |
|                                                                                   |                                 |                         |                 | (45°C only)    |                 |                |                 |                 |       |  |
| * center pole omitted                                                             |                                 |                         |                 |                |                 |                |                 |                 |       |  |
| Rated insulation voltage [U <sub>i</sub> ] V                                      |                                 |                         | 690             | 690            | 690             | 690            | 690             | 690             |       |  |
| Rated impulse withstand voltage [U <sub>imp</sub> ] kV                            |                                 |                         | 6               | 8              | 8               | 8              | 8               | 8               |       |  |
| Utilization Category                                                              |                                 |                         | A               | A              | A               | A              | A               | A               |       |  |
| ■ Rated breaking capacity, kA                                                     |                                 |                         |                 |                |                 |                |                 |                 |       |  |
| IEC60947-2 AC 690V                                                                |                                 |                         | —               | —              | —               | 6/3            | —               | 4/4             |       |  |
| I <sub>cu</sub> /I <sub>cs</sub> (sym) 500V                                       |                                 |                         | 7.5/3.8         | —              | 7.5/4           | 10/7.5         | 10/7.5          | 25/13           |       |  |
|                                                                                   |                                 |                         | 440V            | 10/5           | —               | 15/7.5         | 25/13           | 15/12           | 30/15 |  |
|                                                                                   |                                 |                         | 415V            | 10/5           | —               | 25/13          | 40/20           | 25/19           | 40/20 |  |
|                                                                                   |                                 |                         | 380V            | 16/8           | —               | 25/13          | 40/20           | 25/19           | 40/20 |  |
|                                                                                   |                                 |                         | 240V            | 25/13          | 25/13           | 35/18          | 50/25           | 35/27           | 85/43 |  |
| ① DC 250V                                                                         |                                 |                         | 7.5/3.8         | —              | 20/10           | 25/13          | 15/12           | 25/13           |       |  |
|                                                                                   |                                 |                         | 125V            | 15/7.5         | 10/5            | 30/15          | 40/20           | 25/19           | 40/20 |  |
| ■ Rated short time withstand current, kA                                          |                                 |                         | —               | —              | —               | —              | —               | —               |       |  |
| ■ External dimensions, mm                                                         |                                 |                         |                 |                |                 |                |                 |                 |       |  |
|  |                                 |                         | a   50   75     | 25             | 50   75   100   | 75   100       | 105   105   140 | 105   105   140 |       |  |
|                                                                                   |                                 |                         | b   130         | 130            | 130             | 130            | 165             | 165             |       |  |
|                                                                                   |                                 |                         | c   68          | 68             | 68              | 68             | 68              | 68              |       |  |
|                                                                                   |                                 |                         | d   87          | 95             | 95              | 95             | 95              | 95              |       |  |
| Weight (● marked standard type) kg                                                |                                 |                         | 0.48   0.74     | 0.3            | 0.6   0.8   1.0 | 0.8   1.0      | 1.5   1.5   1.9 | 1.5   1.5   1.9 |       |  |
| ■ Connections and Mountings                                                       |                                 |                         |                 |                |                 |                |                 |                 |       |  |
| Front-connected (FC) Terminal screws                                              |                                 |                         | ●               | ●              | ●               | ●              | ●               | ●               |       |  |
| With straight extension bars                                                      |                                 |                         | —               | ○              | ○               | ○              | ○               | ○               |       |  |
| With spread extension bars                                                        |                                 |                         | —               | —              | —   ○           | ○              | —   ○           | —   ○           |       |  |
| Cable clamps                                                                      |                                 |                         | ○               | ○              | —               | —              | ○               | ○               |       |  |
| Rear-connected (RC) Bolt studs                                                    |                                 |                         | ○               | —              | —               | —              | —               | —               |       |  |
| Flat bar studs                                                                    |                                 |                         | —               | —              | ○               | ○              | ○               | ○               |       |  |
| Plug-in (PM) For switchboards Standard (PMC)                                      |                                 |                         | —               | —              | —               | —              | —               | —               |       |  |
| High-performance (PMB)                                                            |                                 |                         | —               | —              | —               | —              | —               | —               |       |  |
| For distribution boards (PMC)                                                     |                                 |                         | —               | —              | —               | —              | —               | —               |       |  |
| Draw-out type (DR)                                                                |                                 |                         | —               | —              | —               | —              | —               | —               |       |  |
| TemPlug70 (PG)                                                                    |                                 |                         | —               | —              | —               | —              | —               | —               |       |  |
| TemPlug45B (PG4)                                                                  |                                 |                         | —               | —              | —               | —              | —               | —               |       |  |
| DIN rail mount                                                                    |                                 |                         | —               | —              | —   ○ ①         | ○ ①            | —               | —               |       |  |
| Clip-in chassis mount                                                             |                                 |                         | —               | —              | —               | —              | —               | —               |       |  |
| ■ Accessories (optional) Symbol                                                   |                                 |                         |                 |                |                 |                |                 |                 |       |  |
| Internally mounted                                                                | Auxiliary switch                | A X                     | ●               | —              | ●               | ●              | ●               | ●               |       |  |
|                                                                                   | Alarm switch                    | A L                     | ●               | —              | ●               | ●              | ●               | ●               |       |  |
|                                                                                   | Shunt trips                     | S H                     | ●               | —              | ●               | ●              | ●               | ●               |       |  |
|                                                                                   | Undervoltage trips              | U V                     | ●               | —              | ●               | ●              | ●               | ●               |       |  |
|                                                                                   | Motor operator                  | M C                     | —   ●           | —              | —               | —              | ●               | ●               |       |  |
| Externally mounted                                                                | External operating handle       | Breaker-mounted H B     | —   ●           | —              | —   ●           | ●              | ●               | ●               |       |  |
|                                                                                   | Door-mounted (variable depth)   | H P                     | —   ●           | —              | —   ●           | ●              | ●               | ●               |       |  |
|                                                                                   | Toggle extension                | H A                     | —               | —              | —               | —              | —               | —               |       |  |
|                                                                                   | Mechanical interlock Slide type | M S                     | —   ●           | —              | —   ●           | ●              | ●               | ●               |       |  |
|                                                                                   | Toggle holder                   | H H                     | ●               | ●              | ●               | ●              | ●               | ●               |       |  |
|                                                                                   | Toggle lock                     | H L                     | ●               | ●              | ●               | ●              | ●               | ●               |       |  |
|                                                                                   | Terminal cover                  | For front-connected C F | ●               | ●              | ●               | ●              | ●               | ●               |       |  |
|                                                                                   | For rear-connected and plug-in  | C R                     | ●               | —              | ●               | ●              | ●               | ●               |       |  |
|                                                                                   | For cable clamps                | C S                     | —               | —              | —               | —              | ●               | ●               |       |  |
|                                                                                   | Interpole barrier               | B A                     | ●               | —              | ● ③             | ● ③            | ● ③             | ● ③             |       |  |
|                                                                                   | Terminal block for lead         | T F                     | ●               | ●              | ●               | ●              | ●               | ●               |       |  |
|                                                                                   | Door flange                     | D F                     | ●               | ●              | ●               | ●              | ●               | ●               |       |  |
| ■ Standard specifications                                                         |                                 |                         |                 |                |                 |                |                 |                 |       |  |
| Overcurrent trip mechanism                                                        |                                 |                         | Fixed thermal   | Fixed thermal  | Fixed thermal   | Fixed thermal  | Fixed thermal   | Fixed thermal   |       |  |
|                                                                                   |                                 |                         | Fixed magnetic⑦ | Fixed magnetic | Fixed magnetic  | Fixed magnetic | Fixed magnetic  | Fixed magnetic  |       |  |
| Trip button (color)                                                               |                                 |                         | Yes (Red)       | Yes (Red)      | Yes (Red)       | Yes (Red)      | Yes (Red)       | Yes (Red)       |       |  |
| Handle position indication (ON: Red, OFF: Green)                                  |                                 |                         | Yes             | Yes            | Yes             | Yes            | Yes             | Yes             |       |  |
| Suitability for isolation                                                         |                                 |                         | Non             | Yes            | Yes             | Yes            | Yes             | Yes             |       |  |
| CE marking                                                                        |                                 |                         | Non             | Yes            | Yes             | Yes            | Yes             | Yes             |       |  |

## Notes:

● : Standard. This configuration used unless otherwise specified. ○ : Optional standard. Specify when ordering. ● : "yes" or "available". — : "no" or "not available".

① : DC rating available on request. ③ : Line side interpole barriers are supplied as standard. (Front connection only) ⑦ : Hydraulic-magnetic type for below 10A rating.

①① : Provided with DIN rail adaptor.

|                                                                                   |                                    |                     |                    |                     |                     |     |  |  |
|-----------------------------------------------------------------------------------|------------------------------------|---------------------|--------------------|---------------------|---------------------|-----|--|--|
| Frame size (A)                                                                    | 160                                | 160                 | 250                | 250                 |                     |     |  |  |
| Type                                                                              | <b>\$160-SCJ</b>                   | <b>\$160-SJ</b>     | <b>E250-SJ</b>     | <b>\$250-SJ</b>     |                     |     |  |  |
| Number of poles                                                                   | 3   4                              | 3   4               | 3   4              | 3   4               |                     |     |  |  |
| ■ Ratings                                                                         |                                    |                     |                    |                     |                     |     |  |  |
| Rated current, A                                                                  | 25                                 | 25                  | 100                | 160                 |                     |     |  |  |
| Calibrated at 45°C                                                                | 40                                 | 40                  | 125                | 200                 |                     |     |  |  |
|                                                                                   | 63                                 | 63                  | 160                | 250                 |                     |     |  |  |
|                                                                                   | 80                                 | 80                  | 200                |                     |                     |     |  |  |
|                                                                                   | 100                                | 100                 | 250                |                     |                     |     |  |  |
|                                                                                   | 125                                | 125                 |                    |                     |                     |     |  |  |
|                                                                                   | 160                                | 160                 |                    |                     |                     |     |  |  |
| Rated insulation voltage [ $U_i$ ] V                                              | 690                                | 690                 | 800                | 800                 |                     |     |  |  |
| Rated impulse withstand voltage [ $U_{imp}$ ] kV                                  | 8                                  | 8                   | 8                  | 8                   |                     |     |  |  |
| Utilization Category                                                              | A                                  | A                   | A                  | A                   |                     |     |  |  |
| ■ Rated breaking capacity, kA                                                     |                                    |                     |                    |                     |                     |     |  |  |
| IEC60947-2                                                                        | AC                                 | 690V                | —                  | 6/3                 | —                   | 4/4 |  |  |
| $I_{cu}/I_{cs}$ (sym)                                                             | 525V                               | 7.5/4               | 10/7.5             | 7.5/6               | 10/7.5              |     |  |  |
|                                                                                   | 440V                               | 15/7.5              | 25/13              | 15/12               | 30/15               |     |  |  |
|                                                                                   | 415V                               | 25/13               | 40/20              | 25/19               | 40/20               |     |  |  |
|                                                                                   | 380V                               | 25/13               | 40/20              | 25/19               | 40/20               |     |  |  |
|                                                                                   | 240V                               | 35/18               | 50/25              | 35/27               | 85/43               |     |  |  |
| ① DC                                                                              | 250V                               | 20/10               | 25/13              | 15/12               | 25/13               |     |  |  |
|                                                                                   | 125V                               | 30/15               | 40/20              | 25/19               | 40/20               |     |  |  |
| ■ Rated short time withstand current, kA                                          | —                                  | —                   | —                  | —                   |                     |     |  |  |
| ■ External dimensions, mm                                                         |                                    |                     |                    |                     |                     |     |  |  |
|  | a                                  | 75   100            | 75   100           | 105   140           | 105   140           |     |  |  |
|                                                                                   | b                                  | 130                 | 130                | 165                 | 165                 |     |  |  |
|                                                                                   | c                                  | 68                  | 68                 | 68                  | 68                  |     |  |  |
|                                                                                   | d                                  | 95                  | 95                 | 95                  | 95                  |     |  |  |
| Weight (● marked standard type) kg                                                | 0.8   1.0                          | 0.8   1.0           | 1.5   1.9          | 1.5   1.9           |                     |     |  |  |
| ■ Connections and Mountings                                                       |                                    |                     |                    |                     |                     |     |  |  |
| Front-connected (FC)                                                              | Terminal screws                    | ●                   | ●                  | ●                   | ●                   |     |  |  |
|                                                                                   | With straight extension bars       | ○                   | ○                  | ○                   | ○                   |     |  |  |
|                                                                                   | With spread extension bars         | ○                   | ○                  | ○                   | ○                   |     |  |  |
|                                                                                   | Cable clamps                       | ○                   | ○                  | ○                   | ○                   |     |  |  |
| Rear-connected (RC)                                                               | Bolt studs                         | —                   | —                  | —                   | —                   |     |  |  |
|                                                                                   | Flat bar studs                     | ○                   | ○                  | ○                   | ○                   |     |  |  |
| Plug-in (PM)                                                                      | For switchboards Standard (PMC)    | —                   | —                  | —                   | —                   |     |  |  |
|                                                                                   | High-performance (PMB)             | —                   | —                  | —                   | —                   |     |  |  |
|                                                                                   | For distribution boards (PMC)      | —                   | —                  | —                   | —                   |     |  |  |
| Draw-out type (DR)                                                                | —                                  | —                   | —                  | —                   |                     |     |  |  |
| TemPlug70 (PG)                                                                    | —                                  | —                   | —                  | —                   |                     |     |  |  |
| TemPlug45B (PG4)                                                                  | —                                  | —                   | —                  | —                   |                     |     |  |  |
| DIN rail mount                                                                    | ○ ①                                | ○ ①                 | —                  | —                   |                     |     |  |  |
| Clip-in chassis mount                                                             | —                                  | —                   | —                  | —                   |                     |     |  |  |
| ■ Accessories (optional)                                                          | Symbol                             |                     |                    |                     |                     |     |  |  |
| Internally mounted                                                                | Auxiliary switch                   | A X                 | ●                  | ●                   | ●                   |     |  |  |
|                                                                                   | Alarm switch                       | A L                 | ●                  | ●                   | ●                   |     |  |  |
|                                                                                   | Shunt trips                        | S H                 | ●                  | ●                   | ●                   |     |  |  |
|                                                                                   | Undervoltage trips                 | U V                 | ●                  | ●                   | ●                   |     |  |  |
| Externally mounted                                                                | Motor operator                     | M C                 | —                  | —                   | ●                   | ●   |  |  |
|                                                                                   | External operating handle          | Breaker-mounted H B | ●                  | ●                   | ●                   | ●   |  |  |
|                                                                                   | Door-mounted (variable depth)      | H P                 | ●                  | ●                   | ●                   | ●   |  |  |
|                                                                                   | Toggle extension                   | H A                 | —                  | —                   | —                   | —   |  |  |
|                                                                                   | Mechanical interlock Slide type    | M S                 | ●                  | ●                   | ●                   | ●   |  |  |
|                                                                                   | Toggle holder                      | H H                 | ●                  | ●                   | ●                   | ●   |  |  |
|                                                                                   | Toggle lock                        | H L                 | ●                  | ●                   | ●                   | ●   |  |  |
|                                                                                   | Terminal cover For front-connected | C F                 | ●                  | ●                   | ●                   | ●   |  |  |
|                                                                                   | For rear-connected and plug-in     | C R                 | ●                  | ●                   | ●                   | ●   |  |  |
|                                                                                   | For cable clamps                   | C S                 | ●                  | ●                   | ●                   | ●   |  |  |
|                                                                                   | Interpole barrier                  | B A                 | ● ③                | ● ③                 | ● ③                 | ● ③ |  |  |
|                                                                                   | Terminal block for lead            | T F                 | ●                  | ●                   | ●                   | ●   |  |  |
|                                                                                   | Door flange                        | D F                 | ●                  | ●                   | ●                   | ●   |  |  |
|                                                                                   | Standard specifications            |                     |                    |                     |                     |     |  |  |
| Overcurrent trip mechanism                                                        | Adjustable thermal                 | Adjustable thermal  | Adjustable thermal | Adjustable thermal  |                     |     |  |  |
|                                                                                   | Fixed magnetic                     | Fixed magnetic      | Fixed magnetic     | Adjustable magnetic | Adjustable magnetic |     |  |  |
| Trip button (color)                                                               | Yes (Red)                          | Yes (Red)           | Yes (Red)          | Yes (Red)           |                     |     |  |  |
| Handle position indication (ON: Red, OFF: Green)                                  | Yes                                | Yes                 | Yes                | Yes                 |                     |     |  |  |
| Suitability for isolation                                                         | Yes                                | Yes                 | Yes                | Yes                 |                     |     |  |  |
| CE marking                                                                        | Yes                                | Yes                 | Yes                | Yes                 |                     |     |  |  |

## Notes:

● : Standard. This configuration used unless otherwise specified. ○ : Optional standard. Specify when ordering. ● : "yes" or "available". — : "no" or "not available".

① : DC rating available on request. ③ : Line side interpole barriers are supplied as standard. (Front connection only)

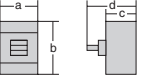
①① : Provided with DIN rail adaptor.

## 1

## Ratings and Specifications

## Molded Case Circuit Breakers

## 3 Switch-disconnectors

|                                                                                   |                                    |                 |                 |     |  |  |  |  |  |  |  |
|-----------------------------------------------------------------------------------|------------------------------------|-----------------|-----------------|-----|--|--|--|--|--|--|--|
| Frame size (A)                                                                    |                                    | 160             | 250             |     |  |  |  |  |  |  |  |
| <b>Type</b>                                                                       |                                    | <b>\$160-SN</b> | <b>\$250-SN</b> |     |  |  |  |  |  |  |  |
| Number of poles                                                                   |                                    | 3   4           | 3   4           |     |  |  |  |  |  |  |  |
| <b>■ Ratings</b>                                                                  |                                    |                 |                 |     |  |  |  |  |  |  |  |
| Rated current, A                                                                  |                                    | 160             | 250             |     |  |  |  |  |  |  |  |
| Rated insulation voltage [ $U_i$ ] V                                              |                                    | 690             | 800             |     |  |  |  |  |  |  |  |
| Rated operational voltage V                                                       | AC                                 | 690             | 690             |     |  |  |  |  |  |  |  |
|                                                                                   | DC                                 | 250             | 250             |     |  |  |  |  |  |  |  |
| Rated short circuit making capacity, kA peak                                      |                                    | 2.8             | 6               |     |  |  |  |  |  |  |  |
| Rated short time withstand current, kA                                            |                                    | 2 (0.3sec)      | 3 (0.3sec)      |     |  |  |  |  |  |  |  |
| Rated impulse withstand voltage [ $U_{imp}$ ] kV                                  |                                    | 8               | 8               |     |  |  |  |  |  |  |  |
| <b>■ Performance</b>                                                              |                                    |                 |                 |     |  |  |  |  |  |  |  |
| Utilization category                                                              | AC                                 | 690V            | AC-23A          |     |  |  |  |  |  |  |  |
|                                                                                   | DC                                 | 250V            | DC-22A          |     |  |  |  |  |  |  |  |
| IEC 60947-3                                                                       |                                    |                 |                 |     |  |  |  |  |  |  |  |
| Upstream breaker (OCPD) ②                                                         |                                    | S160-SF         | S250-SF         |     |  |  |  |  |  |  |  |
| <b>■ External dimensions, mm</b>                                                  |                                    |                 |                 |     |  |  |  |  |  |  |  |
|  | a                                  | 75   100        | 105   140       |     |  |  |  |  |  |  |  |
|                                                                                   | b                                  | 130             | 165             |     |  |  |  |  |  |  |  |
|                                                                                   | c                                  | 68              | 68              |     |  |  |  |  |  |  |  |
|                                                                                   | d                                  | 95              | 95              |     |  |  |  |  |  |  |  |
| Weight (● marked standard type) kg                                                |                                    | 0.7   0.9       | 1.5   1.9       |     |  |  |  |  |  |  |  |
| <b>■ Connections and Mountings</b>                                                |                                    |                 |                 |     |  |  |  |  |  |  |  |
| Front-connected (FC)                                                              | Terminal screws                    | ●               | ●               |     |  |  |  |  |  |  |  |
|                                                                                   | With straight extension bars       | ○               | ○               |     |  |  |  |  |  |  |  |
|                                                                                   | With spread extension bars         | ○               | ○               |     |  |  |  |  |  |  |  |
|                                                                                   | Cable clamps                       | ○               | ○               |     |  |  |  |  |  |  |  |
| Rear-connected (RC)                                                               | Bolt studs                         | —               | —               |     |  |  |  |  |  |  |  |
|                                                                                   | Flat bar studs                     | ○               | ○               |     |  |  |  |  |  |  |  |
| Plug-in (PM)                                                                      | For switchboards Standard (PMC)    | —               | —               |     |  |  |  |  |  |  |  |
|                                                                                   | High-performance (PMB)             | —               | —               |     |  |  |  |  |  |  |  |
|                                                                                   | For distribution boards (PMC)      | —               | —               |     |  |  |  |  |  |  |  |
| Draw-out type (DR)                                                                |                                    | —               | —               |     |  |  |  |  |  |  |  |
| TemPlug70 (PG)                                                                    |                                    | —               | —               |     |  |  |  |  |  |  |  |
| TemPlug45B (PG4)                                                                  |                                    | —               | —               |     |  |  |  |  |  |  |  |
| DIN rail mount                                                                    |                                    | ○ ①             | —               |     |  |  |  |  |  |  |  |
| Clip-in chassis mount                                                             |                                    | —               | —               |     |  |  |  |  |  |  |  |
| <b>■ Accessories (optional)</b>                                                   |                                    |                 |                 |     |  |  |  |  |  |  |  |
| Internally mounted                                                                | Auxiliary switch                   | A X             | ●               |     |  |  |  |  |  |  |  |
|                                                                                   | Alarm switch                       | A L             | ●               |     |  |  |  |  |  |  |  |
|                                                                                   | Shunt trips                        | S H             | ●               |     |  |  |  |  |  |  |  |
|                                                                                   | Undervoltage trips                 | U V             | ●               |     |  |  |  |  |  |  |  |
| Externally mounted                                                                | Motor operator                     | M C             | —               | ●   |  |  |  |  |  |  |  |
|                                                                                   | External operating handle          | H B             | ●               | ●   |  |  |  |  |  |  |  |
|                                                                                   | Door-mounted (variable depth)      | H P             | ●               | ●   |  |  |  |  |  |  |  |
|                                                                                   | Toggle extension                   | H A             | —               | —   |  |  |  |  |  |  |  |
|                                                                                   | Mechanical interlock Slide type    | M S             | ●               | ●   |  |  |  |  |  |  |  |
|                                                                                   | Toggle holder                      | H H             | ●               | ●   |  |  |  |  |  |  |  |
|                                                                                   | Toggle lock                        | H L             | ●               | ●   |  |  |  |  |  |  |  |
|                                                                                   | Terminal cover For front-connected | C F             | ●               | ●   |  |  |  |  |  |  |  |
|                                                                                   | For rear-connected and plug-in     | C R             | ●               | ●   |  |  |  |  |  |  |  |
|                                                                                   | For cable clamps                   | C S             | ●               | ●   |  |  |  |  |  |  |  |
|                                                                                   | Interpole barrier                  | B A             | ● ③             | ● ③ |  |  |  |  |  |  |  |
|                                                                                   | Terminal block for lead            | T F             | ●               | ●   |  |  |  |  |  |  |  |
|                                                                                   | Door flange                        | D F             | ●               | ●   |  |  |  |  |  |  |  |
| <b>■ Standard specifications</b>                                                  |                                    |                 |                 |     |  |  |  |  |  |  |  |
| Trip button (color)                                                               |                                    | Yes (Red)       | Yes (Red)       |     |  |  |  |  |  |  |  |
| Handle position indication (ON: Red, OFF: Green)                                  |                                    | Yes             | Yes             |     |  |  |  |  |  |  |  |
| Suitability for isolation                                                         |                                    | Yes             | Yes             |     |  |  |  |  |  |  |  |
| CE marking                                                                        |                                    | Yes             | Yes             |     |  |  |  |  |  |  |  |

## Notes:

● : Standard. This configuration used unless otherwise specified. ○ : Optional standard. Specify when ordering. ● : "yes" or "available". — : "no" or "not available".

③ : Line side interpole barriers are supplied as standard. (Front connection only) ① : Provided with DIN rail adaptor.

② : Required for overcurrent protection. Rated conditional short-circuit current [ $I_{cc}$ ] will be the same as Rated short-circuit breaking capacity of upstream breaker.

# 2

## Mounting and Connection

### 2

#### Mounting and Connection

|          |                                                  |            |
|----------|--------------------------------------------------|------------|
| <b>1</b> | <b>Type of connections and mountings</b>         | <b>2-2</b> |
|          | List of connecting type                          | 2-2        |
|          | Connecting parts                                 | 2-3        |
| <b>2</b> | <b>Compression terminals</b>                     | <b>2-4</b> |
| <b>3</b> | <b>Terminal screw sizes and standard torques</b> | <b>2-6</b> |
| <b>4</b> | <b>Insulation distance from the line side</b>    | <b>2-7</b> |
| <b>5</b> | <b>Reverse connection</b>                        | <b>2-8</b> |
| <b>6</b> | <b>Lists of breaker mounting screws</b>          | <b>2-8</b> |

# 2

## Mounting and Connection

### Molded Case Circuit Breakers

#### 1 Type of connections and mountings

#### List of connecting types

| Connecting types<br>(Abbreviation)                  | Front-connected (FC)                                                                                                      |                                                                                                                                                                     |                                                                                                                                         | Rear-connected (RC)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |               |                            |  |           |           |      |          |            |      |            |          |      |          |          |      |            |            |  |
|-----------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|----------------------------|--|-----------|-----------|------|----------|------------|------|------------|----------|------|----------|----------|------|------------|------------|--|
|                                                     | For compression<br>terminals / flat bars                                                                                  | With extension bars                                                                                                                                                 | With cable clamps                                                                                                                       | Flat bar studs                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Bolt studs    |                            |  |           |           |      |          |            |      |            |          |      |          |          |      |            |            |  |
|                                                     |                                                                                                                           |                                                                                                                                                                     |                                                                                                                                         | Stud can be turned 45° or 90°                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |               |                            |  |           |           |      |          |            |      |            |          |      |          |          |      |            |            |  |
| Outer view<br><br>Breaker                           |                                          |                                                                                    |                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |               |                            |  |           |           |      |          |            |      |            |          |      |          |          |      |            |            |  |
| E100-SF                                             | ●                                                                                                                         | —                                                                                                                                                                   | ○                                                                                                                                       | —                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | ○             |                            |  |           |           |      |          |            |      |            |          |      |          |          |      |            |            |  |
| E160-SF                                             | ●                                                                                                                         | ○                                                                                                                                                                   | ○                                                                                                                                       | —                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | —             |                            |  |           |           |      |          |            |      |            |          |      |          |          |      |            |            |  |
| S160-SCF<br>S160-SF                                 | ●                                                                                                                         | ○                                                                                                                                                                   | —                                                                                                                                       | ○                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | —             |                            |  |           |           |      |          |            |      |            |          |      |          |          |      |            |            |  |
| S160-SCJ<br>S160-SJ<br>S160-SN                      | ●                                                                                                                         | ○                                                                                                                                                                   | ○                                                                                                                                       | ○                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | —             |                            |  |           |           |      |          |            |      |            |          |      |          |          |      |            |            |  |
| E250-SF<br>S250-SF<br>E250-SJ<br>S250-SJ<br>S250-SN | ●                                                                                                                         | ○                                                                                                                                                                   | ○                                                                                                                                       | ○                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | —             |                            |  |           |           |      |          |            |      |            |          |      |          |          |      |            |            |  |
| Remarks                                             | <ul style="list-style-type: none"><li>Connect compression terminals or flat bars directly to breaker terminals.</li></ul> | <ul style="list-style-type: none"><li>Extension bars are attached to breaker terminals. Connect compression terminals or flat bars to the extension bars.</li></ul> | <ul style="list-style-type: none"><li>Cable clamps are attached to breaker terminals. Connect wires directly to cable clamps.</li></ul> | <ul style="list-style-type: none"><li>Flat bar studs will be factory installed in the horizontal position unless otherwise specified.</li><li>For E250, S250, the flat bar studs in the vertical position are available on request. Please select a position code from those shown in the table below:<table border="1"><tr><th rowspan="2">Position code</th><th colspan="2">Position of flat bar studs</th></tr><tr><th>Line side</th><th>Load side</th></tr><tr><td>RC-A</td><td>Vertical</td><td>Horizontal</td></tr><tr><td>RC-B</td><td>Horizontal</td><td>Vertical</td></tr><tr><td>RC-C</td><td>Vertical</td><td>Vertical</td></tr><tr><td>RC-D</td><td>Horizontal</td><td>Horizontal</td></tr></table></li><li>For S160, the studs are horizontal direction only.</li></ul> | Position code | Position of flat bar studs |  | Line side | Load side | RC-A | Vertical | Horizontal | RC-B | Horizontal | Vertical | RC-C | Vertical | Vertical | RC-D | Horizontal | Horizontal |  |
| Position code                                       | Position of flat bar studs                                                                                                |                                                                                                                                                                     |                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |               |                            |  |           |           |      |          |            |      |            |          |      |          |          |      |            |            |  |
|                                                     | Line side                                                                                                                 | Load side                                                                                                                                                           |                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |               |                            |  |           |           |      |          |            |      |            |          |      |          |          |      |            |            |  |
| RC-A                                                | Vertical                                                                                                                  | Horizontal                                                                                                                                                          |                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |               |                            |  |           |           |      |          |            |      |            |          |      |          |          |      |            |            |  |
| RC-B                                                | Horizontal                                                                                                                | Vertical                                                                                                                                                            |                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |               |                            |  |           |           |      |          |            |      |            |          |      |          |          |      |            |            |  |
| RC-C                                                | Vertical                                                                                                                  | Vertical                                                                                                                                                            |                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |               |                            |  |           |           |      |          |            |      |            |          |      |          |          |      |            |            |  |
| RC-D                                                | Horizontal                                                                                                                | Horizontal                                                                                                                                                          |                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |               |                            |  |           |           |      |          |            |      |            |          |      |          |          |      |            |            |  |

See page 2-6 for dimensions and tightening torques of terminal screws.

#### Notes:

● : Standard. This configuration used unless otherwise specified.

○ : Optional standard. Specify when ordering.

▲ : Semi-standard.

△ : Custom-built. Contact us for details.

— : "no" or "not available".

①. See page 2-3 for details.

## Connecting parts

There are the following connecting/mounting hardware available as options:

### 1. Extension bars for front connection

| Type       | Number of poles | Applicable breakers                           | Min order qty | Constituent parts |         |         | Remarks |
|------------|-----------------|-----------------------------------------------|---------------|-------------------|---------|---------|---------|
|            |                 |                                               |               | Extension bar     | Screw B | Screw C |         |
| T2FB12L2SH | 2               | S160-SCF, S160-SF, S160-SCJ, S160-SJ, S160-SN | 1/2<br>①      | 2                 | 2       | 2       |         |
| T2FB12L3SH | 3               |                                               |               | 3                 | 3       | 3       |         |
| T2FB12L4SH | 4               |                                               |               | 4                 | 4       | 4       |         |
| T2FB12L2SB | 2               | S160-SCF, S160-SF, S160-SCJ, S160-SJ, S160-SN | 1             | 4                 | 4       | 4       |         |
| T2FB12L3SB | 3               |                                               |               | 6                 | 6       | 6       |         |
| T2FB12L4SB | 4               |                                               |               | 8                 | 8       | 8       |         |
| T2FB25L3WH | 3               | E250-SF, S250-SF, E250-SJ, S250-SJ, S250-SN   | 1/2<br>①      | 3                 | 3       | 3       |         |
| T2FB25L4WH | 4               |                                               |               | 4                 | 4       | 4       |         |
| T2FB25L3WB | 3               | E250-SF, S250-SF, E250-SJ, S250-SJ, S250-SN   | 1             | 6                 | 6       | 6       |         |
| T2FB25L4WB | 4               |                                               |               | 8                 | 8       | 8       |         |
| T2FB25L2SH | 2               | E250-SF, S250-SF, E250-SJ, S250-SJ, S250-SN   | 1/2<br>①      | 2                 | 2       | 2       |         |
| T2FB25L3SH | 3               |                                               |               | 3                 | 3       | 3       |         |
| T2FB25L4SH | 4               |                                               |               | 4                 | 4       | 4       |         |
| T2FB25L2SB | 2               | E250-SF, S250-SF, E250-SJ, S250-SJ, S250-SN   | 1             | 4                 | 4       | 4       |         |
| T2FB25L3SB | 3               |                                               |               | 6                 | 6       | 6       |         |
| T2FB25L4SB | 4               |                                               |               | 8                 | 8       | 8       |         |

• See page 2-6 for screws B and C.

**Note** ①: Two sets, one for the line side and one for the load side, are required per breaker.

### 2. Frat bar stud for rear connection

| Type      | Number of poles | Applicable breakers                           | Min order qty | Constituent parts |         |         | Remarks |
|-----------|-----------------|-----------------------------------------------|---------------|-------------------|---------|---------|---------|
|           |                 |                                               |               | Stud bar          | Screw D | Screw E |         |
| T2RP12L2S | 2               | S160-SCF, S160-SF, S160-SCJ, S160-SJ, S160-SN | 1             | 4                 | 4       | 4       |         |
| T2RP12L3S | 3               |                                               |               | 6                 | 6       | 6       |         |
| T2RP12L4S | 4               |                                               |               | 8                 | 8       | 8       |         |
| T2RP25L2S | 2               | E250-SF, S250-SF, E250-SJ, S250-SJ, S250-SN   | 1<br>①        | 4                 | 4       | 4       |         |
| T2RP25L3S | 3               |                                               |               | 6                 | 6       | 6       |         |
| T2RP25L4S | 4               |                                               |               | 8                 | 8       | 8       |         |

• See page 2-6 for screws D and E.

**Note** ①: The studs can be rotated to four angular positions: 0 (horizontal), 45, 90 (vertical) and 135 degrees.

# 2 Mounting and Connection

## Molded Case Circuit Breakers

### 2 Compression terminals

#### Front connected type (without extension bar)

| Frame size (A) | Breaker                                     | Nominal wire size (mm <sup>2</sup> ) |                    |                |       |                        |                                   |                  |              |                  |                   |         |
|----------------|---------------------------------------------|--------------------------------------|--------------------|----------------|-------|------------------------|-----------------------------------|------------------|--------------|------------------|-------------------|---------|
|                |                                             | 2                                    | 5.5                | 8              | 14    | 22                     | 38                                | 60               | 70           | 80               | 100               | 150     |
| 100            | <b>E100-SF</b> (15-50A)                     | R2-5<br>(R2-6)                       | R5.5-5<br>(R5.5-6) | R8-5<br>(R8-6) | R14-5 | NTMCB22-5S<br>AMP33114 |                                   |                  |              |                  |                   |         |
|                | (60-160A)                                   |                                      |                    | R8-8           | R14-8 | R22-8                  | AMP322870<br>JST38-S8<br>NTM38-8S | 60-2BA<br>Note ② |              |                  |                   |         |
| 160            | <b>S160-SCF, S160-SF, S160-SCJ</b> (15-50A) | R2-5<br>(R2-6)                       | R5.5-5<br>(R5.5-6) | R8-5<br>(R8-6) | R14-5 | NTMCB22-5S<br>AMP33114 |                                   |                  |              |                  |                   |         |
|                | (60-160A)                                   |                                      |                    | R8-8           | R14-8 | R22-8                  | AMP322870<br>JST38-S8<br>NTM38-8S | 60-2BA<br>Note ② | MELEC TM70-8 |                  |                   |         |
| 250            | <b>E250-SF, S250-SF, E250-SJ</b>            |                                      |                    |                |       |                        | R38-8                             | R60-8            |              | 80-3BA<br>Note ② | 100-3BA<br>Note ② | CB150-8 |
|                | <b>S250-SJ, S250-SN</b>                     |                                      |                    |                |       |                        |                                   |                  |              | CB80-8           | CB100-8           |         |

#### Front connected type (with extension bar)

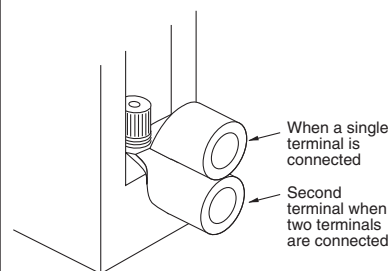
| Frame size (A) | Breaker                                            | Nominal wire size (mm <sup>2</sup> ) |        |        |         |          |     |
|----------------|----------------------------------------------------|--------------------------------------|--------|--------|---------|----------|-----|
|                |                                                    | 38                                   | 60     | 80     | 100     | 150      | 200 |
| 250            | <b>E250-SF, S250-SF, E250-SJ, S250-SJ, S250-SN</b> | R38-10                               | R60-10 | R80-10 | R100-10 | R150-10  |     |
|                |                                                    |                                      |        |        |         | CB150-10 |     |

#### Notes:

- Commercially made compression terminals can be used (refer to  boxes)
  - R/RD : JIS-compliant
  - CB : JEM 1399-compliant
  - AMP : Made by Nippon AMP Co., Ltd.
  - JST : Made by Japan Solderless Terminal Manufacturing Co., Ltd.
  - NTK : Made by Nippon Tanshi Co., Ltd.
  - NTM : Made by Nichifu Terminal Industries Co., Ltd.
  - MELEC : Made by Shanghai JiaMeng Electrical Equipment Co., Ltd.
- Compression terminals in  box cells are made by us at Terasaki. They are available from us or our authorized agents.
- Compression terminals enclosed in parentheses are to be used as the lower terminal when two terminals are connected.

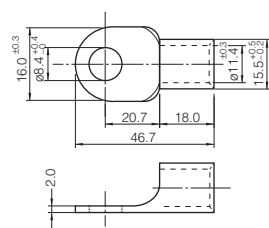
### Connection (two terminals)

If a shortage of insulating occurs between the mounting plate and a terminal, use a recommended taping or insulator.

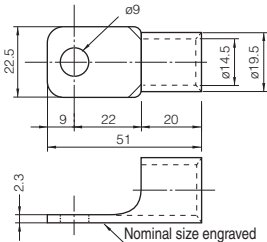


Terasaki made compression terminals are used (refer to  box)

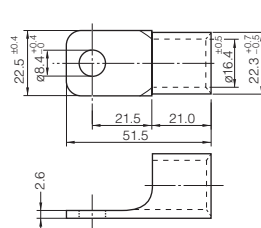
60-2BA



80-3BA

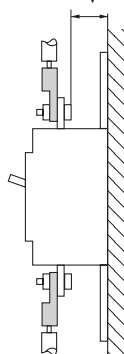


100-3BA



### Connection (one electric cable)

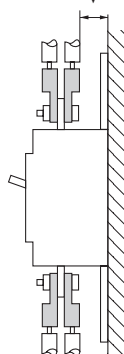
If a shortage of insulating occurs, use a recommended taping or insulator.



( Make connection so that the screw heads face toward the mounting surface. )

### Connection (two electric cables)

If a shortage of insulating occurs, use a recommended taping or insulator.



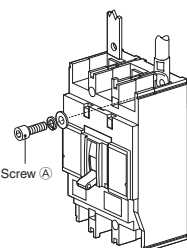
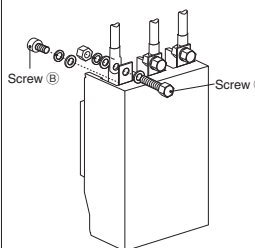
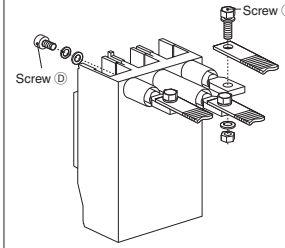
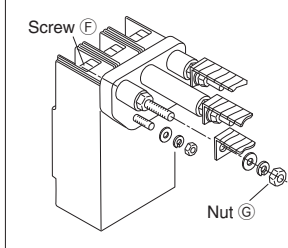
( Make connection so that the screw heads face toward the mounting surface. )

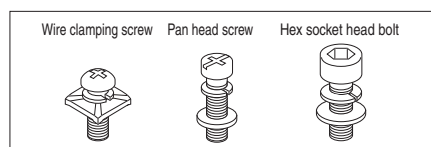
# 2

## Mounting and Connection

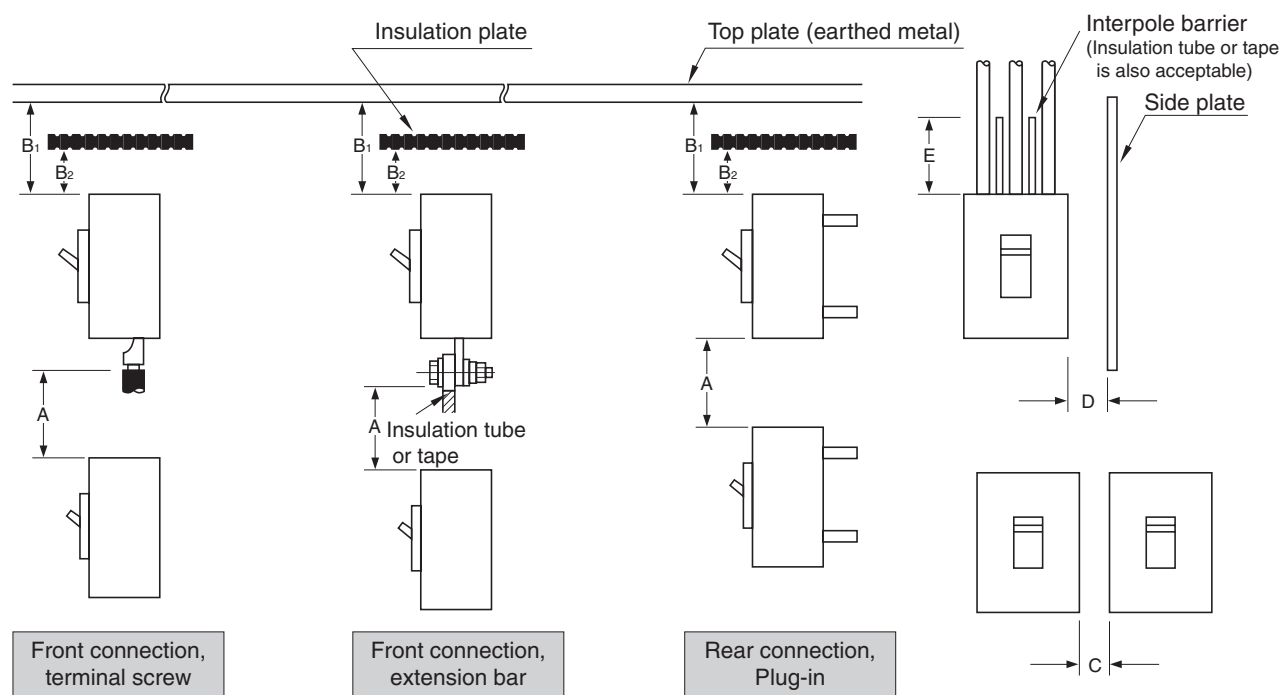
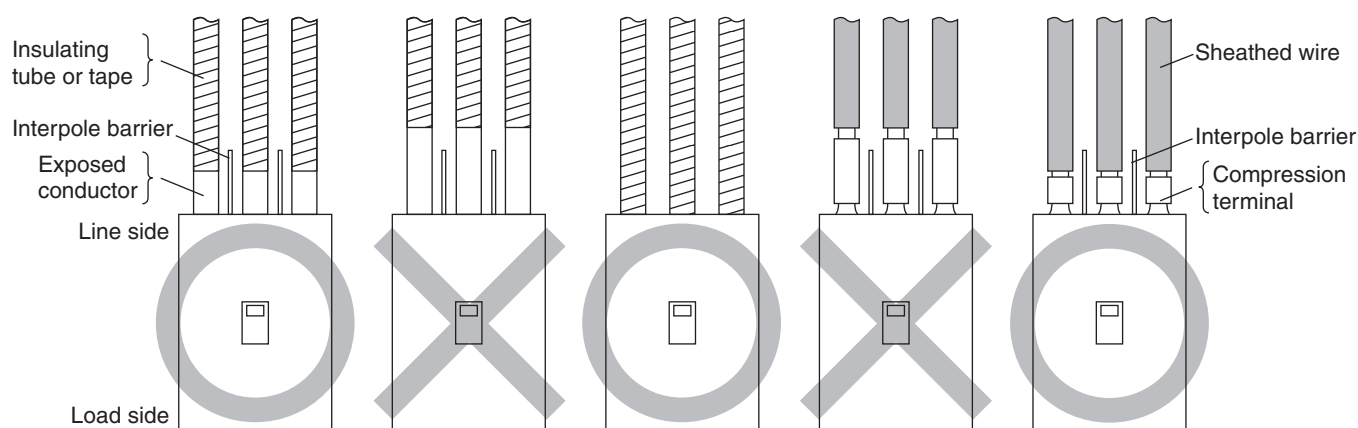
### Molded Case Circuit Breakers

#### 3 Terminal screw sizes and standard torques

| Connecting types |                                                         | Front connection (FC)                                                             |                                                                                   | Rear connection (RC) (Flat bar stud)                                               |                                                                                     | Rear connection (RC) (Bolt stud) |                                  |                                  |
|------------------|---------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|----------------------------------|----------------------------------|----------------------------------|
|                  |                                                         |  |  |  |  |                                  |                                  |                                  |
| Type             | Frame size (A)                                          | Compression terminal                                                              |                                                                                   | Extension bar                                                                      |                                                                                     |                                  |                                  |                                  |
|                  |                                                         | Screw size (A)<br>Torque (N · m)                                                  | Screw size (B)<br>Torque (N · m)                                                  | Screw size (C)<br>Torque (N · m)                                                   | Screw size (D)<br>Torque (N · m)                                                    | Screw size (E)<br>Torque (N · m) | Screw size (F)<br>Torque (N . m) | Screw size (G)<br>Torque (N . m) |
| 100              | E100-SF<br>(10~50A)                                     | Pan head M5×12 Wire clamping screw<br>2.3~3.4                                     | —                                                                                 | —                                                                                  | —                                                                                   | —                                | Pan head M4×14<br>1.1~1.7        | Hex. nut M6<br>2.7~4.5           |
|                  | E100-SF<br>(60~100A)                                    | Pan head M8×14<br>4.9~6.9                                                         | —                                                                                 | —                                                                                  | —                                                                                   | —                                | Hex head M6 nut<br>2.7~4.5       | Hex. nut M8<br>6.9~10.8          |
| 160              | S160-SCF<br>S160-SF<br>S160-SCJ<br>S160-SJ<br>(15~50A)  | Wire clamping M5×14<br>2.3~3.4                                                    | Wire clamping M5×14<br>2.3~3.4                                                    | Hex head M8×30<br>11.8~18.6                                                        | Pan head M5×14<br>2.3~2.8                                                           | Hex head M8×23<br>2.7~4.5        | —                                | —                                |
|                  | S160-SCF<br>S160-SF<br>S160-SCJ<br>S160-SJ<br>(60~160A) | Pan head M8×14<br>4.9~6.9                                                         | Pan head M8×14<br>4.9~6.9                                                         | Hex head M8×30<br>11.8~18.6                                                        | Hex socket head M6×18<br>7.8~11.8                                                   | Hex head M8×23<br>11.8~18.6      | —                                | —                                |
|                  | S160-SN                                                 | Pan head M8×14<br>4.9~6.9                                                         | Pan head M8×14<br>4.9~6.9                                                         | Hex head M8×30<br>11.8~18.6                                                        | Hex socket head M6×18<br>7.8~11.8                                                   | Hex head M8×23<br>11.8~18.6      | —                                | —                                |
|                  | E250-SF<br>S250-SF<br>E250-SJ<br>S250-SJ<br>S250-SN     | Hex socket head M8×18<br>7.8~12.7                                                 | Hex socket head M8×18<br>7.8~12.7                                                 | Hex head M10×25<br>22.5~37.2                                                       | Hex socket head M6×18<br>7.8~11.8                                                   | Hex head M8×25<br>11.8~18.6      | —                                | —                                |



The insulation distance between the breaker and earthed metal parts and insulators shown in the table on the next page must be maintained to prevent arcing faults occurring due to conductive ionised gas. In addition, completely cover exposed conductors, to their roots at the breaker or to below the height protected by interpole barriers, on the line side of the breaker using insulation tube or tape, in order to provide positive protection against short circuit or ground fault due to metal chipping, surge voltage, dust particles or salt. Be sure to install the interpole barriers supplied with the breaker.



- A . Distance from lower breaker to exposed live part of upper breaker terminal (front connection) or distance from lower breaker to end face of upper breaker (rear connection).  
 B1 . Distance from end face of breaker to top plate.  
 B2 . Distance from end face of breaker to insulation plate.  
 C . Gap between breakers.  
 D . Distance from side of breaker to side plate (earthed metal).  
 E . Dimension of insulation over exposed conductors.

# 2

## Mounting and Connection

### Molded Case Circuit Breakers

#### 4 Insulation distance from the line side

Insulation distance, mm (AC 460 V or less) Note ①

#### Molded Case Circuit Breakers

| Breaker                              | A<br><small>Note ②</small> | B1 | B2 |   | C                     | D  | E                                                                    |
|--------------------------------------|----------------------------|----|----|---|-----------------------|----|----------------------------------------------------------------------|
| E100-SF                              | 30                         | 10 | 10 | * | Possible to set close | 25 | Not less than the length of the bare live part <small>Note ③</small> |
| E250-SF, E250-SJ                     | 50                         | 40 | 40 | * | Possible to set close | 50 | Not less than the length of the bare live part <small>Note ③</small> |
| S160-SCF, S160-SF, S160-SCJ, S160-SJ | 50                         | 50 | 10 | * | Possible to set close | 25 | Not less than the length of the bare live part <small>Note ③</small> |
| S250-SF, S250-SJ                     | 50                         | 50 | 40 | * | Possible to set close | 50 | Not less than the length of the bare live part <small>Note ③</small> |

#### Notes:

- ①. Required to allow free and uninterrupted flow of arc gases. Ensure additional clearance or insulation distance if required to perform wiring, barrier installation or electrical work or to meet the need for more insulation distance between bare live parts and grounded metal members in a switchboard or the like.
  - ②. The figures are for lower breakers.
  - ③. For front connection breakers, insulate all exposed conductors of the line side until the breaker end. If interpole barriers are packed, be sure to use the barriers; more over, insulate all exposed conductors by insulating tape or the like so that the tape overlaps with the barriers.
- \*. If using extension bars (optional), ensure the insulation distance specified for the application.

# 2

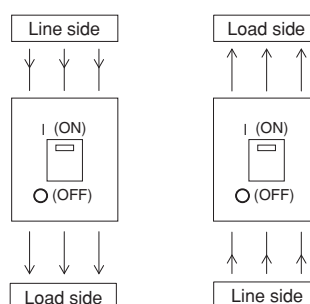
## Mounting and Connection

### Molded Case Circuit Breakers

#### 5 Reverse connection

The breakers are available for normal connection by default. Reverse connection is optionally allowed. See the tables below.

| Breaker                                                                                                | AC240V | AC415V | AC450V |
|--------------------------------------------------------------------------------------------------------|--------|--------|--------|
| E100-SF<br>S160-SCF, S160-SF, S160-SCJ, S160-SJ, 160-SN<br>E250-SF, S250-SF, E250-SJ, S250-SJ, S250-SN | ○      | ○      | ○      |



Normal connection      Reverse connection

# 2

## Mounting and Connection

### Molded Case Circuit Breakers

#### 6 Lists of breaker mounting screws

| Breaker                                       | Number of poles | Front-connected (FC) |     | Rear-connected (RC) |     |
|-----------------------------------------------|-----------------|----------------------|-----|---------------------|-----|
|                                               |                 | Screw size           | Qty | Screw size          | Qty |
| E100-SF                                       | 2,3             | Pan head M4×65       | 2   | Pan head M4×65      | 2   |
| S160-SCF, S160-SF, S160-SCJ, S160-SJ, S160-SN | 2,3             | Pan head M4×61       | 2   | Pan head M4×61      | 2   |
|                                               | 4               |                      |     |                     |     |
| E250-SF, S250-SF, E250-SJ, S250-SJ, S250-SN   | 2,3             | Pan head M4×55       | 2   | Pan head M4×55      | 2   |
|                                               | 4               | Pan head M4×55       | 4   | Pan head M4×55      | 4   |

# 3

## Accessories

|                                                                  |            |
|------------------------------------------------------------------|------------|
| <b>1 Internally mounted accessories</b>                          | <b>3-2</b> |
| 1. Connection diagrams and terminal numbers                      | 3-2        |
| 2. Possible combinations                                         | 3-2        |
| 3. Ratings and operation data of auxiliary and alarm switches    | 3-3        |
| 4. Shunt trip device (SHT)                                       | 3-3        |
| 5. Undervoltage trip device (UVT)                                | 3-4        |
| <b>2 Externally mounted accessories</b>                          | <b>3-6</b> |
| 1. Motor operators (MC)                                          | 3-6        |
| 2. Toggle holder (HH) and toggle lock (HL)                       | 3-9        |
| 3. External operating handles                                    | 3-10       |
| (1) Breaker-mounted (HB) for E100                                | 3-10       |
| (2) Breaker-mounted (field installable)(HB) for S160, E250, S250 | 3-12       |
| (3) Door-mounted (depth adjustable) (HS) standard type           | 3-16       |
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| 4. Interpole barriers (BA)                                       | 3-25       |
| 5. Terminal covers CF/CR/CS                                      | 3-26       |
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| (2) CR for rear-connected and plug-in breakers                   |            |
| CS for front-connected breakers with cable clamps                | 3-27       |
| 6. Terminal blocks (TF)                                          | 3-28       |
| 7. Mechanical interlock                                          | 3-30       |
| • Slide interlock (MS)                                           | 3-30       |
| 8. Door Flange (DF)                                              | 3-33       |

# 3

## Accessories

### Molded Case Circuit Breakers

#### 1 Internally mounted accessories

## 1. Connection diagrams and terminal numbers

| Accessory                     | Combination symbol | Connection diagram and terminal No. |  | Remarks                                                                                                    |
|-------------------------------|--------------------|-------------------------------------|--|------------------------------------------------------------------------------------------------------------|
| Shunt trip device (SH)        |                    | • With anti-burn switch             |  | Applicable to E100-SF. Shunt trips are fitted with anti-burn switches.                                     |
|                               |                    | • Without anti-burn switch          |  | Applicable to other breakers except E100-SF. Shunt trips are continuous rating without anti-burn switches. |
| Undervoltage trip device (UV) |                    | For AC<br>With UVT controller       |  | Applicable to E100-SF. UVT controller is required for AC UVT. See page 3-5 for the details.                |
|                               |                    | For DC                              |  |                                                                                                            |
| Auxiliary switch (AX)         |                    |                                     |  | 1pc Aux. SW installed.                                                                                     |
|                               |                    |                                     |  | 2pcs Aux. SW installed.                                                                                    |
|                               |                    |                                     |  | 4pcs Aux. SW installed.                                                                                    |
| Alarm switch (AL)             |                    |                                     |  | 1pc Alarm. SW installed.                                                                                   |
|                               |                    |                                     |  | 2pcs Alarm. SW installed.                                                                                  |

## 2. Possible combinations

### Molded Case Circuit Breakers

| Type                                                  | Number of poles ① | AX<br>Auxiliary switch | AL<br>Alarm switch | SH<br>Shunt trip | UV<br>Under voltage trip | AX<br>AL | AX<br>SH | AX<br>UV | AL<br>SH | AL<br>UV | AX<br>AL<br>SH | AX<br>AL<br>UV |
|-------------------------------------------------------|-------------------|------------------------|--------------------|------------------|--------------------------|----------|----------|----------|----------|----------|----------------|----------------|
| E100-SF                                               | 2                 |                        |                    |                  |                          |          |          |          |          |          |                |                |
| E100-SF                                               | 3                 |                        |                    |                  |                          |          |          |          |          |          |                |                |
| S160-SCF                                              | 2                 |                        |                    |                  |                          |          |          |          |          |          |                |                |
| S160-SCF<br>S160-SF<br>S160-SCJ<br>S160-SJ<br>S160-SN | 3-4               |                        |                    |                  |                          |          |          |          |          |          |                |                |
| E250-SF<br>S250-SF<br>E250-SJ<br>S250-SJ<br>S250-SN   | 3-4               |                        |                    |                  |                          |          |          |          |          |          |                |                |

#### Notes:

①: The two-pole type breaker obtained by modifying a three-pole breaker by removing the conductive part of its central pole is regarded as the same as the three-pole type.

## 3. Ratings and operation data of auxiliary and alarm switches

### (1) Ratings of AX and AL

• The applicable load of the switch shall be no larger than the rating and no smaller than the minimum load.

| Type of breaker                                                                              | Standard    |                |                  |             |                |                  |                                | For microload ① |             |                                |
|----------------------------------------------------------------------------------------------|-------------|----------------|------------------|-------------|----------------|------------------|--------------------------------|-----------------|-------------|--------------------------------|
|                                                                                              | AC (V)      |                |                  | DC (V)      |                |                  | Minimum load                   | DC (V)          |             | Minimum load                   |
|                                                                                              | Voltage (V) | Current (A)    |                  | Voltage (V) | Current (A)    |                  |                                | Voltage (V)     | Current (A) |                                |
|                                                                                              |             | Resistive load | Inductive load ② |             | Resistive load | Inductive load ② |                                |                 |             |                                |
| E100-SF                                                                                      | 480         | —              | —                | 250         | 0.2            | 0.03             | DC6V<br>100mA<br>DC24V<br>25mA | 125             | 0.1         | DC6V<br>5mA<br>DC24V<br>1.25mA |
|                                                                                              | 250         | 3              | 2                | 125         | 0.4            | 0.05             |                                | 30              | 0.1         |                                |
|                                                                                              | 125         | 3              | 2                | 30          | 3              | 2                |                                |                 |             |                                |
| S160-SCF, S160-SF, S160-SCJ, S160-SJ, S160-SN<br>E250-SF, S250-SF, E250-SJ, S250-SJ, S250-SN | 480         | —              | —                | 250         | —              | —                | DC15V<br>100mA                 | 30              | 0.1         | DC5V<br>1mA                    |
|                                                                                              | 250         | 3              | 2                | 125         | 0.4            | 0.05             |                                |                 |             |                                |
|                                                                                              | 125         | 3              | 2                | 30          | 3              | 2                |                                |                 |             |                                |

**Note:** ① This is a custom-made product. When ordering for this product, specify that it is intended for minute load use.

**Note:** ② The inductive load means power factor of no smaller than 0.4 and time constant of no larger than 7 ms.

### (2) Operation of AX and AL

| Switch                       | Breaker status                                                                      | [ON]                   | [OFF]                  | [TRIP]                 |
|------------------------------|-------------------------------------------------------------------------------------|------------------------|------------------------|------------------------|
| Auxiliary switch (AX) status |  | 11/AXc-14/AXa "Closed" | 11/AXc-14/AXa "Open"   | 11/AXc-14/AXa "Open"   |
|                              |                                                                                     | 11/AXc-12/AXb "Open"   | 11/AXc-12/AXb "Closed" | 11/AXc-12/AXb "Closed" |
| Alarm switch (AL) status     |  | 91/ALc-94/ALa "Open"   | 91/ALc-94/ALa "Open"   | 91/ALc-94/ALa "Closed" |
|                              |                                                                                     | 91/ALc-92/ALb "Closed" | 91/ALc-92/ALb "Closed" | 91/ALc-92/ALb "Open"   |

## 4. Shunt trip device (SH)

### Ratings of SHT

| Type of breaker | Peak exciting current, A |         |         |        |      |         |         |
|-----------------|--------------------------|---------|---------|--------|------|---------|---------|
|                 | Rated voltage            | AC (V)  |         | DC (V) |      |         |         |
|                 |                          | 100-115 | 200-480 | 24     | 48   | 100-115 | 200-230 |
| E100-SF         |                          | 3.4     | 0.83    | 1.6    | 0.71 | 0.4     | 0.16    |

| Type of breaker                                                                              | Peak exciting current, A |         |         |         |        |      |         |         |
|----------------------------------------------------------------------------------------------|--------------------------|---------|---------|---------|--------|------|---------|---------|
|                                                                                              | Rated voltage            | AC (V)  |         |         | DC (V) |      |         |         |
|                                                                                              |                          | 100-120 | 200-240 | 380-450 | 24     | 48   | 100-120 | 200-240 |
| S160-SCF, S160-SF, S160-SCJ, S160-SJ, S160-SN<br>E250-SF, S250-SF, E250-SJ, S250-SJ, S250-SN |                          | 0.014   | 0.014   | 0.0065  | 0.03   | 0.03 | 0.011   | 0.011   |

**Notes:**

(1) The permissible voltage range is from 70% to 110% of the rated voltage.

Ensure that the voltage does not drop exceeding the permissible voltage range when SHT is actuated.

(2) Breaker contacts usually start opening within 30 ms after the rated voltage is applied to the breaker.

## Molded Case Circuit Breakers

## 1 Internally mounted accessories

## 5. Undervoltage trip device (UV)

## Ratings of UVT with Inst

| Type of breaker                                                                              | Power supply capacity, VA |         |         | Exciting current, mA |        |                    |
|----------------------------------------------------------------------------------------------|---------------------------|---------|---------|----------------------|--------|--------------------|
|                                                                                              | Rated voltage             | AC (V)  |         |                      | DC (V) |                    |
|                                                                                              |                           | 100-120 | 200-240 | 380-450              | 24     | 100-120<br>200-240 |
| E100-SF                                                                                      |                           | 5 min ② | 5 min ② | 5 min ②              | 18.2 ① | 4.8 ①<br>—         |
| S160-SCF, S160-SF, S160-SCJ, S160-SJ, S160-SN<br>E250-SF, S250-SF, E250-SJ, S250-SJ, S250-SN |                           | 1.4 ①   | 1.5 ①   | 2.3 ①                | 23 ①   | 10 ①<br>3.5 ①      |

Note: ①: No UVT controller is required.

②: Equipped with the UVT controller. See page 3-5 for specifications of the UVT controller.

TemBreak2 UVT are available with 500±300 msec time delays.

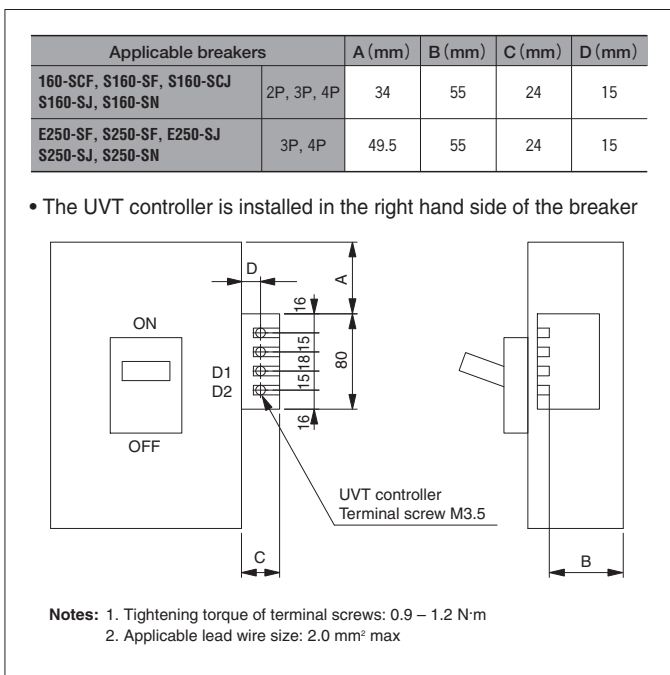
UVT controller is installed on the breaker.

## Rating of UVT with time delay

Time delays: 500±300 msec.

| Applicable breakers                                                                          | Power supply capacity, VA |         |         |         |         |         | Exciting current, mA |        |         |         |                    |
|----------------------------------------------------------------------------------------------|---------------------------|---------|---------|---------|---------|---------|----------------------|--------|---------|---------|--------------------|
|                                                                                              | Rated voltage             | AC (V)  |         |         |         |         |                      | DC (V) |         |         |                    |
|                                                                                              |                           | 100-110 | 115-120 | 200-220 | 230-240 | 380-415 | 440-450              | 24     | 100-110 | 115-120 | 200-220<br>230-240 |
| S160-SCF, S160-SF, S160-SCJ, S160-SJ, S160-SN<br>E250-SF, S250-SF, E250-SJ, S250-SJ, S250-SN |                           | 1.1     | 1.3     | 2.1     | 2.5     | 1.5     | 1.7                  | 22     | 7.6     | 8.3     | 8.6<br>9.3         |

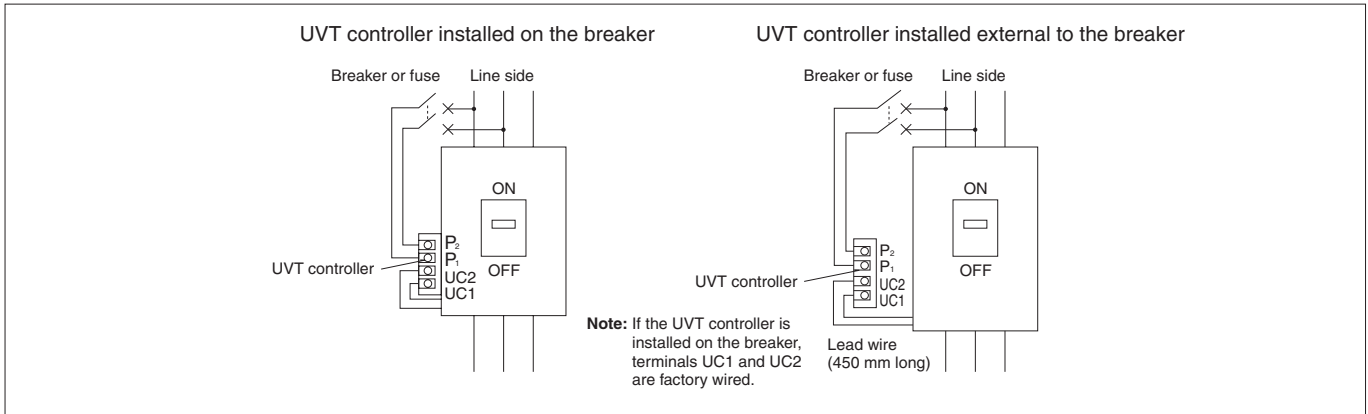
- Mounting dimensios and terminal arrangement of the UVT controller installed on the breaker



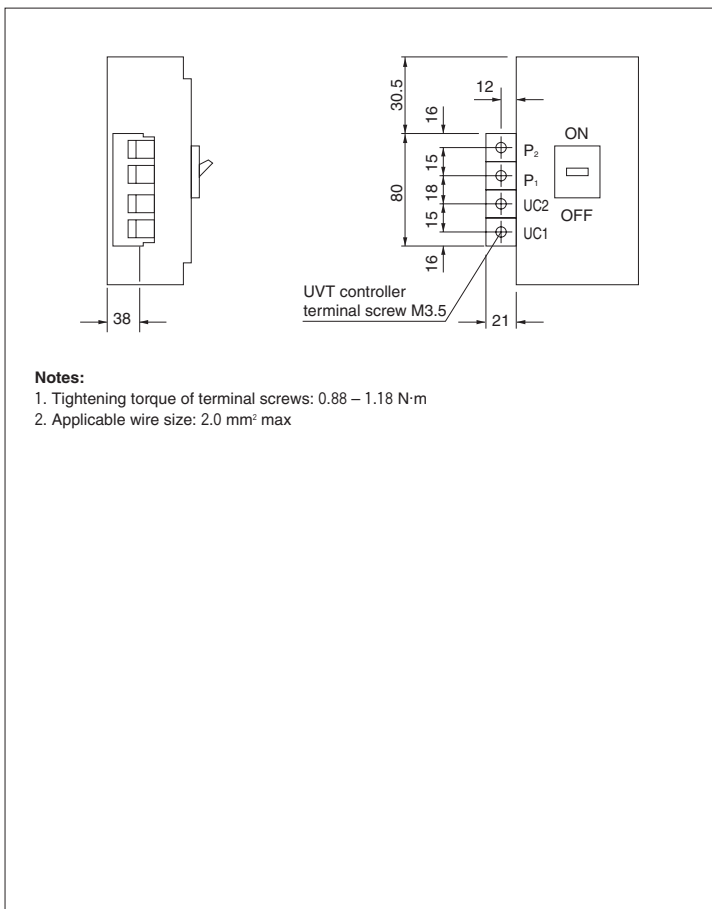
### UVT controller for Type E100-SF

E100-SF equipped with the AC UVT need a UVT controller. The UVT controller is installed on the breaker by default. Separate installation of the controller is also available on request. Also a UVT controller (type XCU1D) with a time delay of less than 500 ms is available on request.

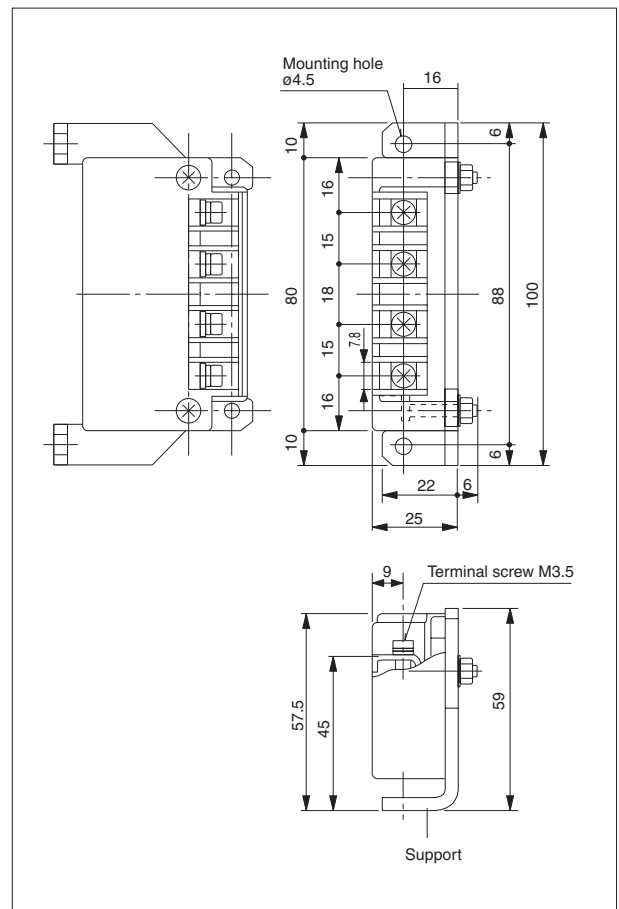
#### ● UVT controller connection diagram



#### ● Mounting dimensions and terminal arrangement of the UVT controller installed on the breaker



#### ● Outline of the UVT controller installed external to the breaker



# 3

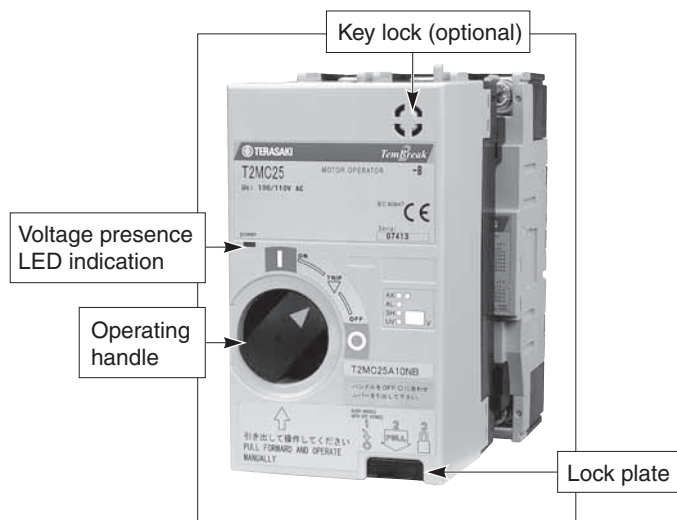
## Accessories

### Molded Case Circuit Breakers

#### 2 Externally mounted accessories

## 1. Motor operators (MC)

### Motor driven type



### Ratings and Specifications

| T2MC25L                                       |                                                                                                    |
|-----------------------------------------------|----------------------------------------------------------------------------------------------------|
| Type of breaker                               | E250-SF, S250-SF, E250-SJ, S250-SJ, S250-SN                                                        |
| Rated operational voltage ①                   | ● AC100-110V<br>● AC200-220V<br>● AC230-240V<br>● DC24V<br>● DC48V<br>● DC100-110V<br>● DC200-220V |
| Peak steady-state/<br>starting current, A ②   | AC100-110V 4.5/8                                                                                   |
|                                               | AC200-220V 4/8                                                                                     |
|                                               | AC230-240V 3.5/7                                                                                   |
|                                               | DC24V 18/26                                                                                        |
|                                               | DC48V 12/18                                                                                        |
|                                               | DC100-110V 2.2/6                                                                                   |
|                                               | DC200-220V 2.2/5.5                                                                                 |
| Operation method                              | Motor driven (direct drive system)                                                                 |
| Operating time, s<br>at rated voltage         | ON 0.1                                                                                             |
|                                               | OFF/RESET 0.1 ③④                                                                                   |
| Operating switch ratings                      | 100V 0.1A (Open voltage/current: 44 V/4 mA) ⑤                                                      |
| Power supply required                         | 300VA or higher                                                                                    |
| Dielectric withstand voltage (for one minute) | AC1500V (AC 1000 V for DC 24/48 V)                                                                 |
| Weight                                        | 1.4kg                                                                                              |

#### Notes:

- ① : Permissible operating range is 85 to 110%. A power transformer is available as option for AC380V or AC400-460V.  
 ② : The currents shown are the maximum values at the maximum rated operational voltage.  
 ③ : The operating time is the value when the rated operational voltage is supplied.  
 Allow a longer time for the motor operator to complete the operation.  
 ④ : The motor operator is of a short time duty. Do not subject it to more than 10 continuous ON-OFF operations. If this occurs, allow the motor operator to cool for at least 15 minutes.  
 ⑤ : When the rated operational voltage is DC24V the open voltage will be DC22V.

### Features

#### ★ Installation and removal ease

Simply rotate two knobs allows the motor operator to be installed on or removed from the breaker.

#### ★ High-speed, stable actuation

The operating time as short as up to 0.1 second makes it possible to use the motor operators for synchronized closing of breakers.

#### ★ Silent operation

T2MC25L use a direct drive system, providing operational silence.

#### ★ “Lock-in off” capability

This capability allows the breaker to be padlocked in the OFF state. Up to three padlocks with a 5 to 8 mm hasp diameter can be used. Padlocks are not supplied.

## Motorized operation

The motor operator has an input-signal self-hold circuit; closing the ON or OFF switch (see circuit diagrams shown below) momentarily allows activating the motor operator. To reset the tripped breaker to the OFF position, close the OFF (RESET) switch. The voltage presence LED indication is on when the power is supplied to the motor operator.

### ■ Auto reset feature (optional)

The auto reset feature allows the breaker to be automatically reset approx. 1.5 seconds after the breaker trips open. This option contains auto-reset switches and does not require to use auxiliary or alarm switches installed in the breaker.

Note : that after the thermal OCR trips a thermal-magnetic breaker, the breaker cannot be immediately closed though it can be auto-reset.

Wait for a few minutes after the tripping and provide a close signal to the breaker.

This option resets the tripped breaker automatically, regardless of the cause of the tripping.

## Manual operation

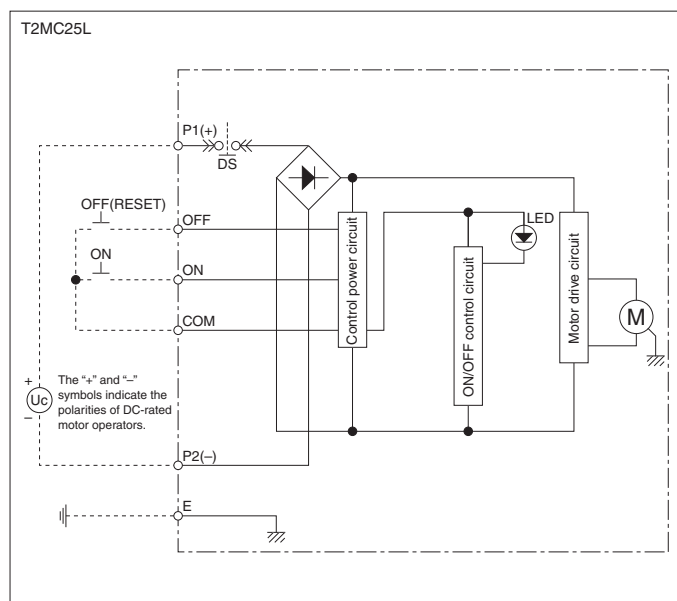
Pull the operating handle out. Rotating the handle counterclockwise turns ON the breaker and clockwise turns OFF or resets the breaker.

### Operation precautions

1. Ensure that the actual operation voltage ranges from 85% to 110% of the rated one.
2. Use operation switches whose ratings and power capacity is as specified in the “Ratings and Specifications” table on the previous page.
3. Use noise filters if the control power supply of the motor operator is shared by peripheral devices. Otherwise, power supply noise may cause malfunction of the peripheral devices.
4. When the motors are used in conjunction with the mechanical interlock the electrical interlock should be provided between the motors in order to avoid the simultaneous closing. The followings are the available electrical interlock cables.

| Interlock cables<br>Order codes | Length | Remarks                                                        |
|---------------------------------|--------|----------------------------------------------------------------|
| T2MM25L05                       | 500mm  | for the electrical interlock between T2MC12 and T2MC25/25L.    |
| T2MM25L15                       | 1500mm |                                                                |
| T2MM40L06                       | 600mm  | for the electrical interlock between T2MC40 and T2MC80.        |
| T2MM40L21                       | 2100mm |                                                                |
| T2MM40S06                       | 600mm  | for the electrical interlock between T2MC40 and T2MC12/25/25L. |
| T2MM40S21                       | 2100mm |                                                                |

## Control circuit diagrams of motor operators



# 3

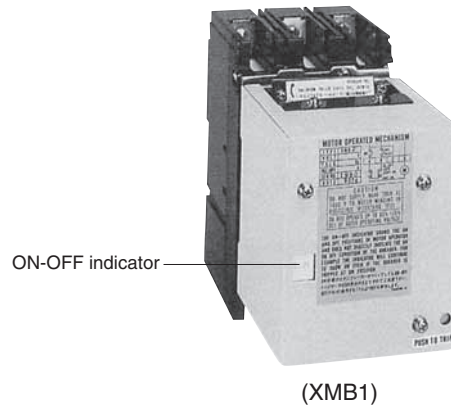
## Accessories

### Molded Case Circuit Breakers

#### 2 Externally mounted accessories

## 1. Motor operators (MC)

### Motor driven type



(XMB1)

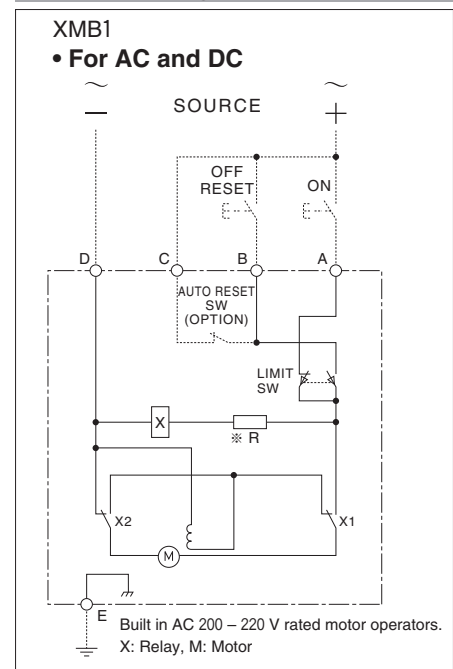
#### Ratings and Specifications

|                                               | XMB1                                                 |         |
|-----------------------------------------------|------------------------------------------------------|---------|
| Series/type of breaker                        | E100-SF                                              |         |
| Rated operational voltage ①                   | ● AC100-110V<br>● AC200-220V<br>● DC100V<br>● DC110V |         |
| Auto reset                                    | Optional ②                                           |         |
|                                               | Non                                                  |         |
| Peak steady-state/<br>starting current, A ③   | AC100-110V                                           | 2.0/4.5 |
|                                               | AC200-220V                                           | 1.0/2.0 |
|                                               | DC100V                                               | —⑥      |
|                                               | DC110V                                               | —⑥      |
| Operation method                              | Motor driven                                         |         |
| Operating time, s<br>at rated voltage         | ON                                                   | 1.2     |
|                                               | OFF/RESET                                            | 0.85 ④⑤ |
| Operating switch ratings                      | 250V, 5A                                             |         |
| Power supply required                         | 100 VA or higher                                     |         |
| Dielectric withstand voltage (for one minute) | AC1000V                                              |         |
| Weight                                        | 1.8                                                  |         |

#### Notes:

- ① Ensure that the actual operation voltage is within the following range: 85% to 110% of the AC rated voltage, or 75% to 110% of the DC rated voltage. In case the rated operation voltage is AC 380 V or AC 400 to 460 V, optional power supply transformers are available on request.
- ② Auto reset require to use auxiliary switch (1b) installed in the breaker. If the number of auxiliary switches is insufficient, actuate an external relay via an auxiliary switch (1a) and use the relay contact (1b) for auto reset.
- ③ The currents shown are the maximum values at the maximum rated operational voltage.
- ④ The operating time assume the motor operator is supplied with the rated operation voltage. Longer operating time will be required under actual operating conditions.
- ⑤ The motor operator is short-time rated. The number of continuous switching (ON-OFF) cycles must not exceed 10. After any 10 continuous switching cycles, provide a pause of at least 15 minutes to the motor operator for cooling.
- ⑥ Can be custom-made on request. The outline dimensions of the motor operator will be larger. An auto-reset switch cannot be used. Contact us for details.

#### Control circuit diagrams of motor operators



#### Motorized Operation

##### Breaker ON

Operating the ON switch energises the motor which turns ON the breaker. When the breaker is energised the limit switch operates to de-energise the motor.

**Note:** This is not a self-holding type. Gives a signal exceeding the operating time.

##### Breaker OFF

Operating the OFF/RESET switch energises the motor which turns OFF the breaker. When the breaker is energised the limit switch operates to de-energise the motor.

**Note:** This is not a self holding type. Gives a signal exceeding the operating time.

##### Breaker RESET

Operate the OFF/RESET switch to reset the tripped breaker. When the breaker is reset (OFF) the limit switch operates to de-energise the motor.

**Note:** This is not a self holding type. Gives a signal exceeding the operating time.

#### Automatic Reset (Optional)

The automatic reset feature can be incorporated by adding the breaker's auxiliary switch contact (b-contact) in parallel with the OFF/RESET control switch.

**Note:** When the cause of the trip has not been removed the ON-TRIP-RESET-ON operation is repeated. Therefore, do not use the ON operation switch which is normally closed.

#### Manual Operation

To operate the mechanical test facility of the motor operator pump the manual lever left and right approximately 20 times.

**Note:** This facility must not be used for ON load operations.

#### Lock in OFF position

The breaker can be padlocked in the OFF position. (padlock not supplied).

#### CAUTIONARY NOTES

If the motor operator is turned ON with the breaker OFF and the UVT de-energised, apply the power and complete one ON-OFF operation. (The breaker cannot be turned ON). Then complete one ON operation again (The breaker can be turned ON).

When the breaker is ON and is then tripped, the ON/OFF indicator on the motor operator will be indicating ON until the breaker is reset.

**Note:** The breaker's condition may differ.

**Note:** Allow several minutes to cool when a thermal-magnetic breaker is tripped by a thermal overload trip, then reset the breaker.

## 2. Toggle holder (HH) and toggle lock (HL)

### Toggle holder (HH)

Simply fitting the toggle holder onto the breaker toggle disables breaker operation without using padlocks.

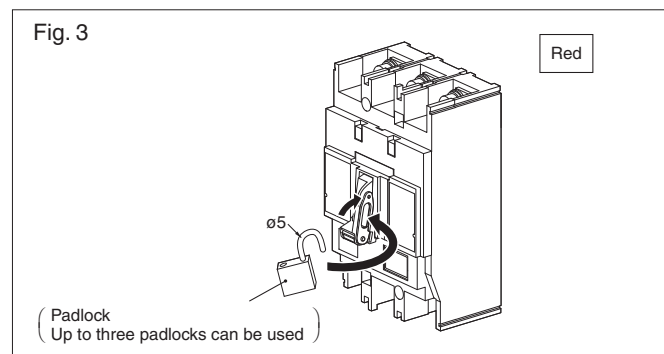
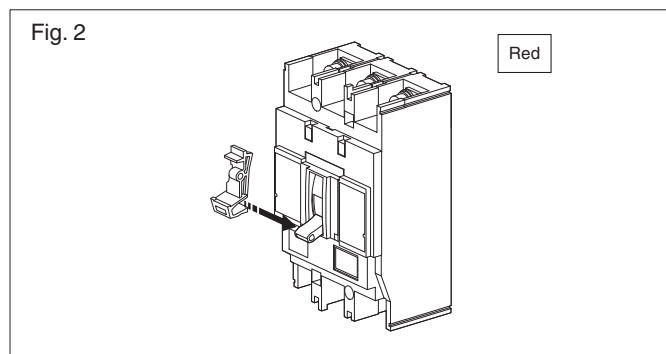
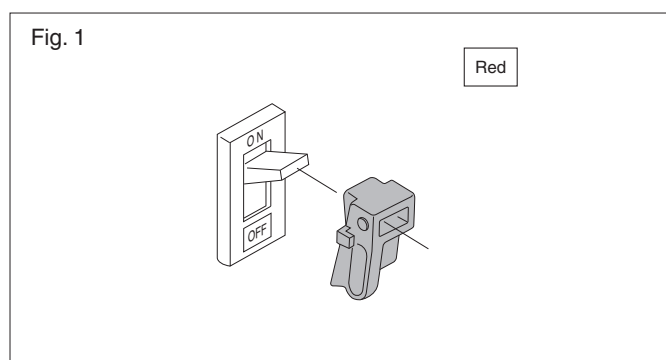
### Toggle lock (HL)

The toggle lock is a tool that locks the breaker on or off. When an overcurrent occurs, the breaker will trip even if the breaker toggle is locked in the ON position.  
(Use commercially available padlocks).

### Toggle holders/toggle locks

| Type of breaker                                                                                       | Toggle holder |               | Figure | Toggle lock |               | Figure |
|-------------------------------------------------------------------------------------------------------|---------------|---------------|--------|-------------|---------------|--------|
|                                                                                                       | Order codes   | Marking codes |        | Order codes | Marking codes |        |
| E100-SF                                                                                               | TKB-1DH       | —             | 1      | ①           | —             | 1      |
| E160-SF, S160-SCF, S160-SF, S160-SCJ, S160-SJ, S160-SN<br>E250-SF, S250-SF, E250-SJ, S250-SJ, S250-SN | T2HH25L       | T2HH25L       | 2      | T2HL25L     | T2HL25L       | 3      |

Notes: ①. A hole must be drilled in the breaker toggle. Please state "with toggle lock (HL)" when ordering.



# 3

## Accessories

### Molded Case Circuit Breakers

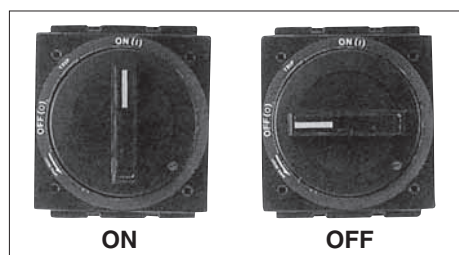
#### 2 Externally mounted accessories

## 3. External operating handles

### 3-1. Breaker-mounted (HB) for E100

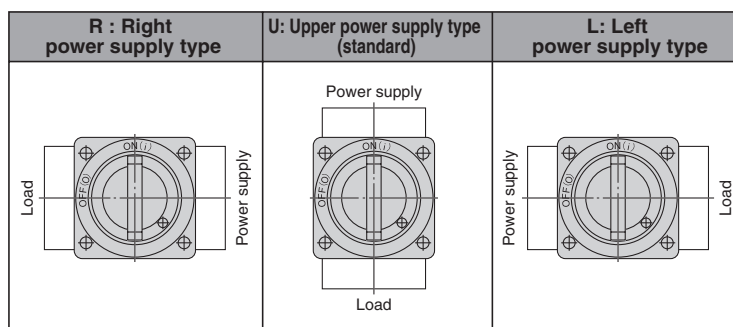
The external operating handle is a tool that allows the breaker installed in a switchboard to be operated from outside. The breaker-mounted type external operating handle is designed to be mounted directly to the breaker body.

#### Outer view



#### Breaker mounting direction

The ON and OFF positions of the handle and the positions of drilled holes in the panel do not need to be changed depending on the breaker mounting direction. The upper power supply type is standard. If a non-standard type is required, state the type when ordering.



- For a change in mounting direction, see the Operating Instructions packaged with the product.

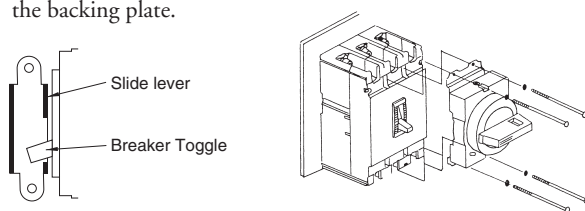
#### Mounting instructions

The external operating handle has not been mounted on the breakers. For details on how to mount the handle, see the Operating Instructions packaged with the product.

#### [1] Mounting of external operating handle assembly

##### Secured to backing plate (TFJ21XH)

- Make sure that the breaker is in the OFF position.
- Put the external operating handle assembly onto the breaker in place so that the breaker toggle is engaged with the slide lever of the assembly. Secure the assembly together with the breaker to the backing plate.



#### Panel lock mechanism

The external operating handle keeps the panel door locked when in the 'ON' position. There are two types, RESET, Open and OFF, Open.

##### (1) Reset, Open (Standard type)

The handle is turned to the 'RESET/OPEN COVER' position to open the panel door.

##### (2) OFF, Open

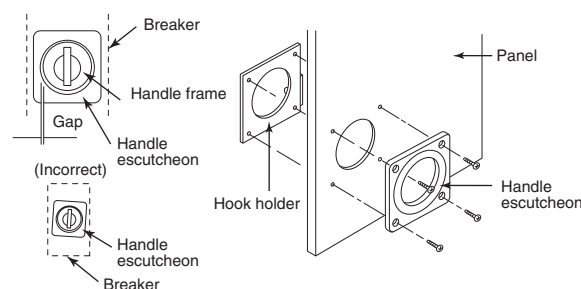
The handle is turned to the OFF position to open the panel door.

##### Panel lock release knob

The release knob enables the panel door to be opened with the handle in the 'ON' position. To release: turn the release knob in the direction of anti-clockwise with a flat-bladed screwdriver.

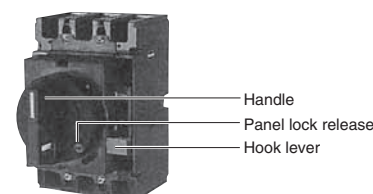
#### [2] Installation of handle escutcheon and latch plate

- Drill holes in the panel according to the panel cutout dimensions. Sandwich the panel between the handle escutcheon and latch plate and temporarily tighten using the supplied screws.
- Close the panel. Make adjustment so that the gap between the handle assembly and handle escutcheon is even and the assembly is not inclined against the breaker.



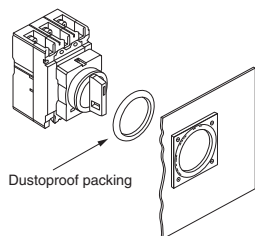
##### Safety interlock (Standard)

The safety interlock prevents the breaker from turning ON as long as the panel is open. This interlock can be released using the hook lever.



### Protection degree (IEC 60529)

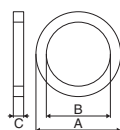
|      |                                     |
|------|-------------------------------------|
| IP30 | standard specification              |
| IP50 | optional, with a dust proof packing |
| IP55 | special specification               |



Dustproof packing

Dustproof packing for IP50 (optional) mm

| Type of handle | Type of dustproof packing | A  | B  | C |
|----------------|---------------------------|----|----|---|
| TFJ21XH        | Dustproof packing /2      | 93 | 73 | 7 |



### Toggle lock mechanism

#### ● Padlock (Standard)

This mechanism allows the breaker to be padlocked in the ON or OFF position.

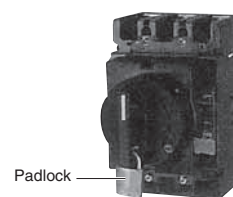
Padlocks are not supplied.

Up to three padlocks can be installed.



Padlock dimensions (mm)

| Type of handle | A      | Dia.   |
|----------------|--------|--------|
| TFJ21XH        | 13 min | ø3.5-6 |



Padlock

### Possible combinations of breaker and external operating handle

| Type of external operating handle | Type of breaker |
|-----------------------------------|-----------------|
| TFJ21XH                           | E100-SF         |

### To be stated when ordering

Order code TFJ21XH U R 3 B

| Type of external operating handle | Breaker mounting direction                                                              | Panel lock                       | Protection degree                                  | Colour                                                          |
|-----------------------------------|-----------------------------------------------------------------------------------------|----------------------------------|----------------------------------------------------|-----------------------------------------------------------------|
| TFJ21XH                           | U: Upper power supply type *<br>R: Right power supply type<br>L: Left power supply type | R : RESET open *<br>F : OFF open | 3 : IP30 *<br>5 : IP50<br>55: IP55 (special spec.) | B : Black handle (Black base) *<br>R : Red handle (Yellow base) |

\*: standard specification

ASL: Arrangement Standard Line

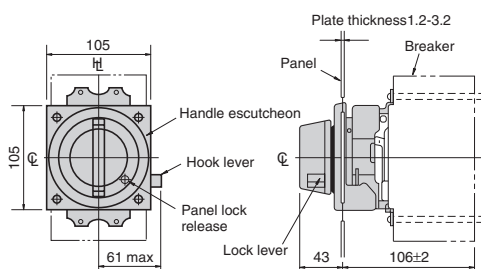
HL: Handle Frame Centre Line

CL: Handle Centre Line

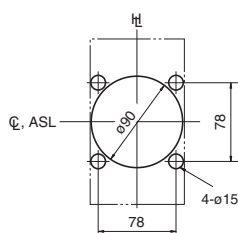
### TFJ21XH

| Applicable breaker types | Mounting screw |
|--------------------------|----------------|
| E100-SF                  | M4×75, 2 pcs   |

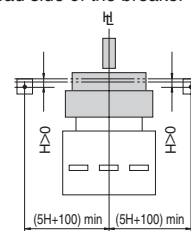
#### ● Outline dimensions



#### ● Panel cutout dimensions



#### ● Relative positions of the hinge and handle as seen from the load side of the breaker



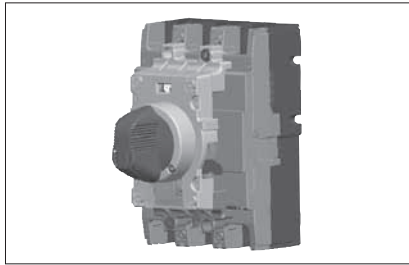
### 3. External operating handles

#### 3-2. Breaker-mounted (field installable) (HB) for S160, E250, S250

The external operating handle is a tool that allows the breaker installed in a switchboard to be operated from outside and complies with IEC 60204-1.

The breaker-mounted type external operating handle is designed to be mounted directly to the breaker body.

##### ■ Outer view



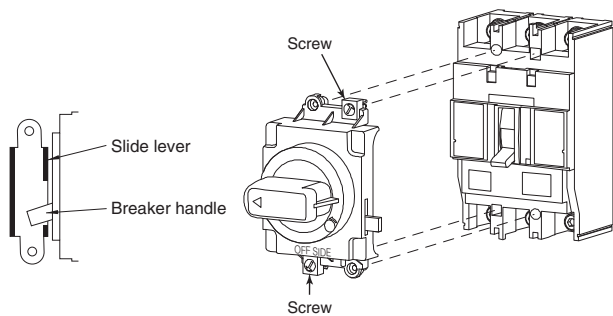
##### ■ Mounting instructions

The external operating handle has not been mounted on the breakers.

For details on how to mount the handle, see the Operating Instructions packaged with the product.

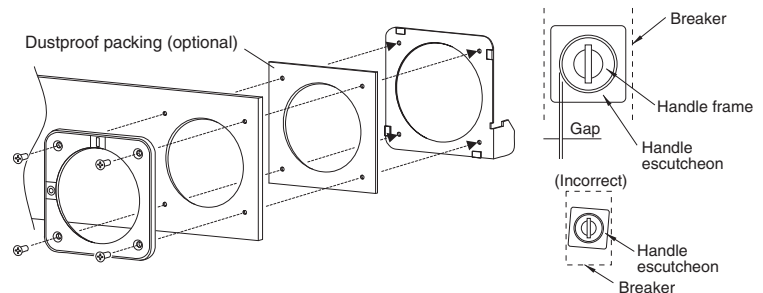
##### [1] Mounting of external operating handle assembly

- Make sure that the breaker is in the OFF position.
  - Put the external operating handle assembly onto the breaker in place so that the breaker handle is engaged with the handle catch of the assembly.
- Tighten the screw to secure the handle assembly.



##### [2] Installation of handle escutcheon and latch plate

- Drill holes in the panel according to the panel cutout dimensions.
- Sandwich the panel between the handle escutcheon and latch plate and temporarily tighten using the supplied screws.
- Close the panel.
- Make adjustment so that the gap between the handle assembly and handle escutcheon is even and the assembly is not inclined against the breaker.



##### ■ Breaker mounting direction

The ON and OFF positions of the handle and the positions of drilled holes in the panel do not need to be changed depending on the breaker mounting direction. The upper power supply type is standard. If a non-standard type is required, state the type when ordering.

| R : Right power supply type | U: Upper power supply type (standard) | L: Left power supply type |
|-----------------------------|---------------------------------------|---------------------------|
|                             |                                       |                           |

- For a change in mounting direction, see the Operating Instructions packaged with the product.

### ■ Panel lock mechanism

The external operating handle keeps the panel door locked when in the 'ON' position. There are two types, RESET, Open and OFF, Open.

#### (1) Reset, Open (Standard type)

The handle is turned to the 'RESET/OPEN COVER' position to open the panel door.

#### (2) OFF, Open

The handle is turned to the OFF position to open the panel door.

#### ● Panel lock release knob

The release knob enables the panel door to be opened with the handle in the 'ON' position. To release: turn the release knob in the direction of anti-clockwise with a flat-bladed screwdriver.

#### ● Safety interlock (Standard)

The safety interlock prevents the breaker from turning ON as long as the panel is open. This interlock can be released using the hook lever.

### ■ Toggle lock mechanism

#### ● Padlock (Standard)

This mechanism allows the breaker to be padlocked in the OFF position.

Padlocks are not supplied.

Up to three padlocks can be installed.



Padlock dimensions (mm)

| Type of handle | A      | Dia.   |
|----------------|--------|--------|
| T2HB           | 13 min | ø5.5-8 |

### ■ Protection degree (IEC 60529)

|      |                                     |
|------|-------------------------------------|
| IP30 | standard specification              |
| IP50 | optional, with a dust proof packing |
| IP55 | special specification ①             |

Note ① : For the depth of switchboard, take account of thickness of the packing.  
See the Operating Instructions packaged with the product.

### Possible combinations of breaker and external operating handle

#### TemBreak2

| Type of breaker                               | Type of external operating handle |
|-----------------------------------------------|-----------------------------------|
| S160-SCF, S160-SF, S160-SCJ, S160-SJ, S160-SN | T2HB16L ①                         |
| E250-SF, S250-SF, E250-SJ, S250-SJ, S250-SN   | T2HB25L ①                         |

Note ① : Key lock is not available.

### ■ To be stated when ordering

Order code T2HB16L U R 3 B N

| Type of external operating handle | Breaker mounting direction                                                              | Panel lock                       | Protection degree                                  | Colour                                                          | Key lock               |
|-----------------------------------|-----------------------------------------------------------------------------------------|----------------------------------|----------------------------------------------------|-----------------------------------------------------------------|------------------------|
| T2HB16L T2HB25L                   | U: Upper power supply type *<br>R: Right power supply type<br>L: Left power supply type | R : RESET open *<br>F : OFF open | 3 : IP30 *<br>5 : IP50<br>S : IP55 (special spec.) | B : Black handle (Black base) *<br>R : Red handle (Yellow base) | N : without key lock * |

\*: standard specification

# 3

## Accessories

### Molded Case Circuit Breakers

#### 2 Externally mounted accessories

## 3. External operating handles

ASL: Arrangement Standard Line

HL: Handle Frame Centre Line

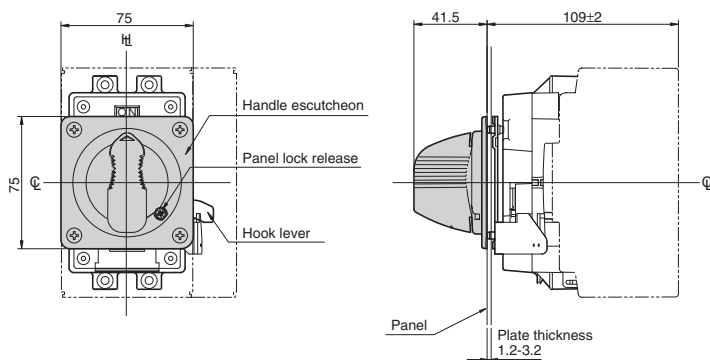
CL: Handle Centre Line

#### Outline dimensions

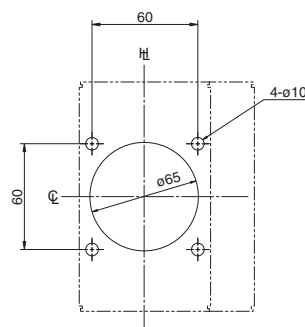
##### T2HB16L

| Applicable breaker types |         |          |
|--------------------------|---------|----------|
| S160-SCF                 | S160-SF | S160-SCJ |
| S160-SJ                  | S160-SN |          |

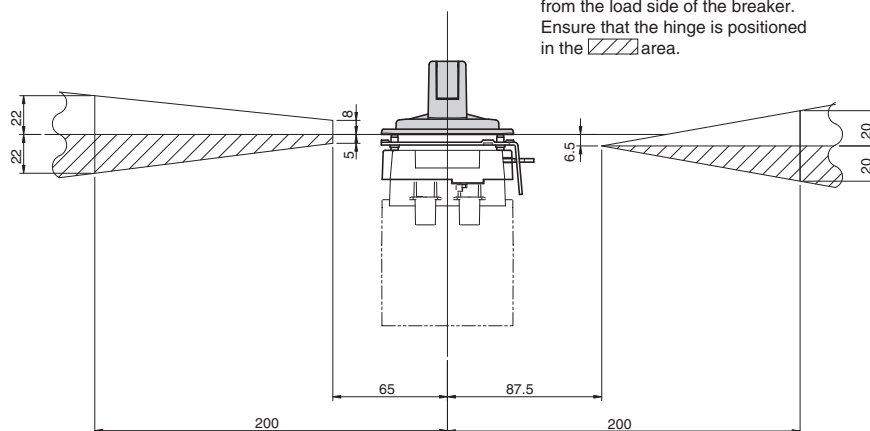
#### Outline dimensions



#### Panel cutout dimensions



- Positions of the hinge and handle as seen from the load side of the breaker. Ensure that the hinge is positioned in the hatched area.



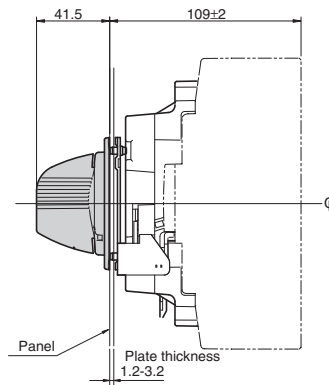
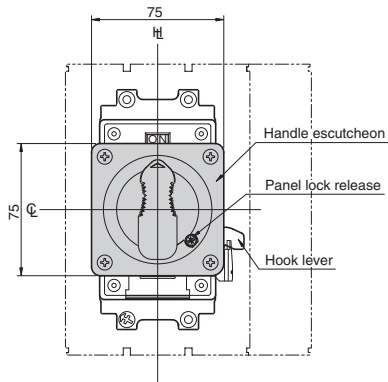
ASL: Arrangement Standard Line  
 HL: Handle Frame Centre Line  
 CL: Handle Centre Line

## T2HB25L

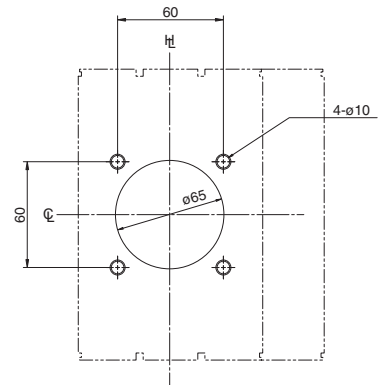
### Applicable breaker types

|         |         |         |
|---------|---------|---------|
| E250-SF | S250-SF | E250-SJ |
| S250-SJ | S250-SN |         |

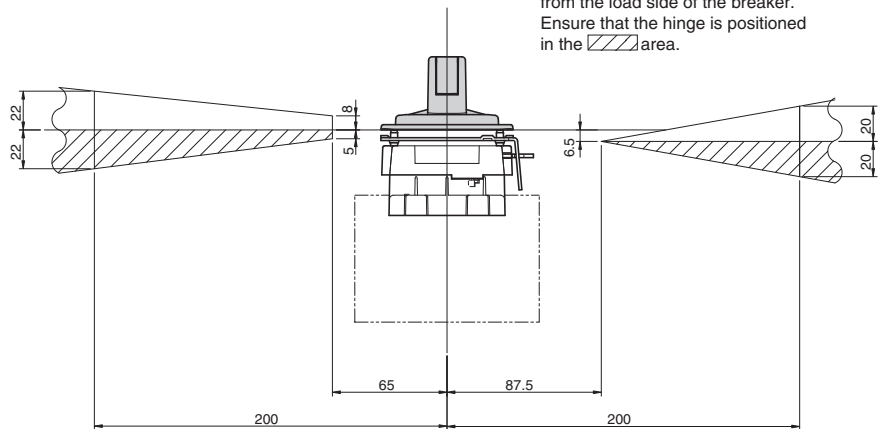
#### • Outline dimensions



#### • Panel cutout dimensions



- Positions of the hinge and handle as seen from the load side of the breaker. Ensure that the hinge is positioned in the hatched area.



# 3

## Accessories

### Molded Case Circuit Breakers

#### 2 Externally mounted accessories

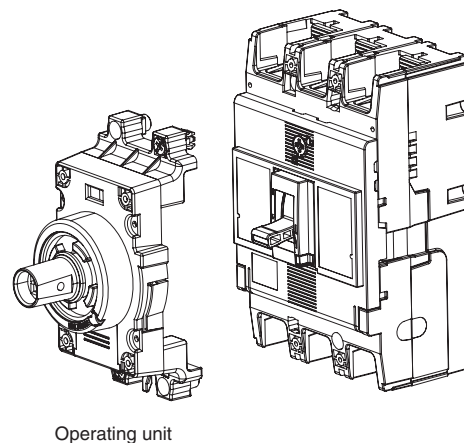
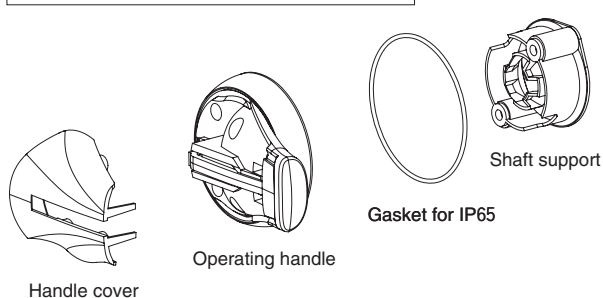
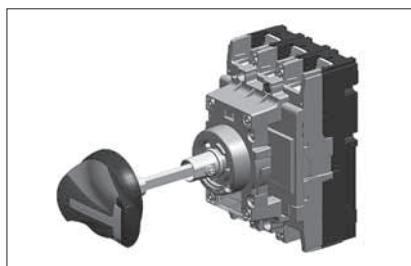
## 3. External operating handles

### 3-3. Door-mounted (depth adjustable) (HS) standard type

Door-mounted type external operating handles allow breakers installed in control centers or switchboards to be manually operated from outside and complies with IEC 60204-1.

This handle assembly consists of an operation mechanism section which is to be installed in the breaker body, a handle section which is to be installed in a panel and a square shaft which couples both the sections.

#### Outer view



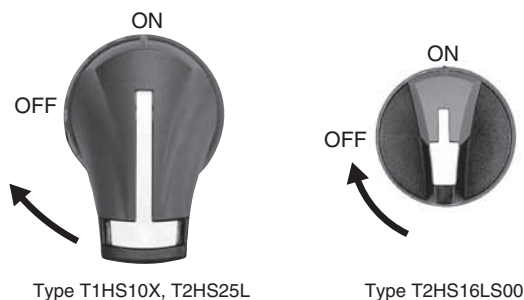
#### Breaker mounting direction

The ON and OFF positions of the handle and the positions of drilled holes in the panel do not need to be changed depending on the breaker mounting direction.

| Horizontal mounting /<br>ON to move the breaker handle right | Vertical mounting /<br>ON to move the breaker handle up | Horizontal mounting /<br>ON to move the breaker handle left |
|--------------------------------------------------------------|---------------------------------------------------------|-------------------------------------------------------------|
|                                                              |                                                         |                                                             |

#### Operation direction of handles

Rotate the operating handle clockwise to turn the breaker on.



Rotate clockwise to turn the breaker ON

### ■ Panel lock mechanism

The external operating handle keeps the panel door locked when in the 'ON' position. There is OFF open type only.

#### OFF open type

The handle is turned to the OFF position to open the panel door.

#### ● Panel lock release button

The release button enables the panel door to be opened with the handle in the 'ON' position. To release: push the release button on the side of the operating handle with a flat-bladed screwdriver.



Type T1HS10X, T2HS25L

Type T2HS16LS00

### ■ Protection degree (IEC 60529)

|      |                         |
|------|-------------------------|
| IP55 | standard specification  |
| IP65 | special specification * |

\*: Special handle unit and gasket are used for IP65.

Possible combinations of breaker and external operating handle

| Type of breaker                               | Type of external operating handle | Shafts order codes |
|-----------------------------------------------|-----------------------------------|--------------------|
| E100-SF                                       | T1HS10X                           | T2PS083            |
| S160-SCF, S160-SF, S160-SCJ, S160-SJ, S160-SN | T2HS16LS00                        | T2PS053            |
| E250-SF, S250-SF, E250-SJ, S250-SJ, S250-SN   | T2HS25L                           | T2PS083            |

### ■ To be stated when ordering

Order code T2HS25L F 5 B P N

| Type of external operating handle | Panel lock   | Protection degree        | Colour                                                         | Pad locking lever          | Optional                                |
|-----------------------------------|--------------|--------------------------|----------------------------------------------------------------|----------------------------|-----------------------------------------|
| T1HS10X<br>T2HS16LS00<br>T2HS25L  | F : OFF open | 5 : IP55 *<br>6 : IP65 ① | B : Gray handle (Black base) *<br>R : Red handle (Yellow base) | P : Plastic<br>M : Metal ② | N : No option<br>S : With shaft support |

\*: standard specification

Note ①: T1HS10X is not available for IP65.

Note ②: Metal is not available for T2HS16S00.

### ■ Toggle lock mechanism

#### ● Padlock (Standard)

This mechanism allows the breaker to be padlocked in the OFF position.

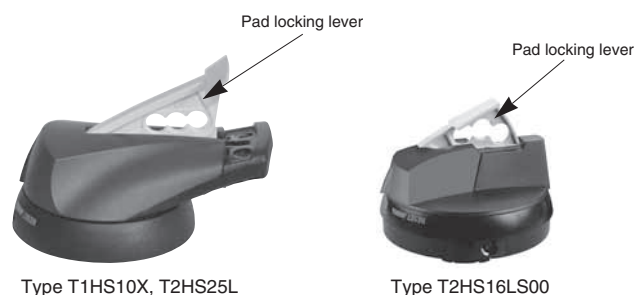
Padlocks are not supplied.

Up to three padlocks can be installed.



Padlock dimensions (mm)

| Type of handle | A      | Dia. |
|----------------|--------|------|
| T2HS16L/25L    | 13 min | ø5-8 |

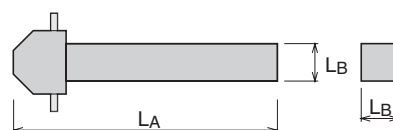


Type T1HS10X, T2HS25L

Type T2HS16LS00

### ■ Dimensions of square shafts available

There are the following shaft dimensions available. Select an appropriate shaft depending on the mounting position of the breaker. Cut the shaft to an appropriate length if required. Coat the cut end faces of the shaft with an anti-corrosion paint.



| Shafts order codes | LA (mm) | LB (mm) |
|--------------------|---------|---------|
| T2PS083            | 358     | 8       |
| T2PS053            | 352.5   | 5       |

### ■ Shaft support (optional)

The shaft support makes easy to insert to the operating handle when the panel door is being closed.

### ■ Key fitting facility (optional)

Key fitting facility is available for Castell FS1. Contact us for the details of mounting dimension.

# 3

## Accessories

### Molded Case Circuit Breakers

#### 2 Externally mounted accessories

### 3. External operating handles

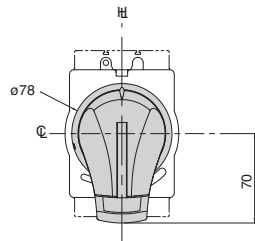
HL: Handle Frame Centre Line

CL: Handle Centre Line

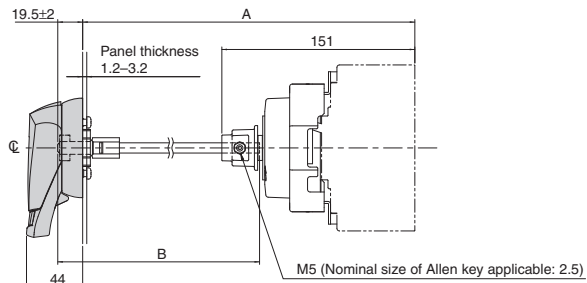
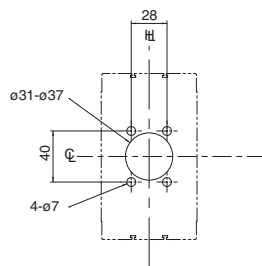
#### Outline dimensions

##### T1HS10X

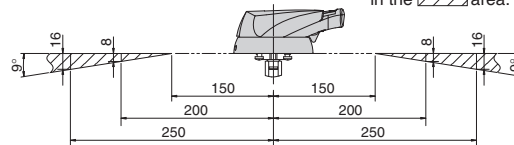
#### ● Outline dimensions



#### ● Panel cutout dimensions



- Positions of the hinge and handle as seen from the load side of the breaker. Ensure that the hinge is positioned in the  area.



| Applicable breaker types | A±2 ①    | B±0.5 |
|--------------------------|----------|-------|
| E100-SF                  | 182 min. | 80    |
|                          | 460 max. | 358   |

#### Note ①:

"Min (minimum)" means the minimum possible distance from the panel surface to the breaker mounting surface, which can be formed by cutting the square shaft.

"Max (maximum)" means the maximum distance of the same section, which is formed with no cutting of the square shaft.

A: Distance from the panel surface to the breaker mounting surface

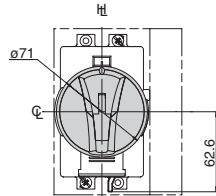
B: Length of the square shaft used

## Outline dimensions

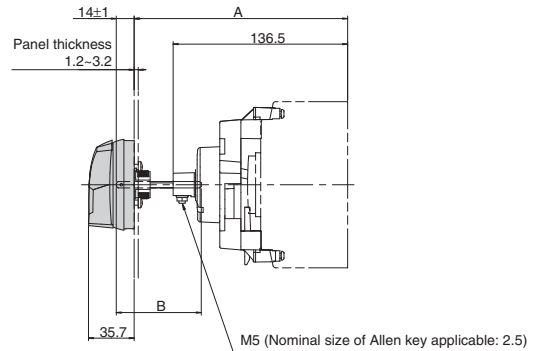
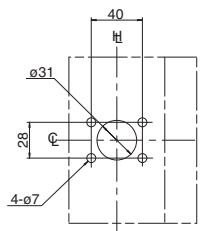
H: Handle Frame Centre Line  
C: Handle Centre Line

### T2HS16LS00

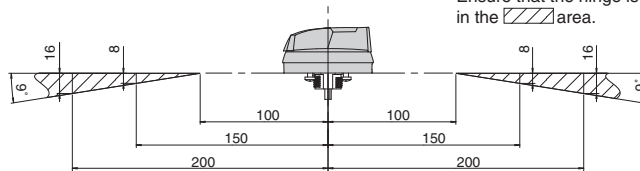
#### Outline dimensions



#### Panel cutout dimensions



- Positions of the hinge and handle as seen from the load side of the breaker. Ensure that the hinge is positioned in the area.



| Applicable breaker types |         |          | A±1 ①    | B±0.5 |
|--------------------------|---------|----------|----------|-------|
| S160-SCF                 | S160-SF | S160-SCJ | 175 min. | 74.5  |
| S160-SJ                  | S160-SN |          | 453 max. | 352.5 |

Note ①:

"Min (minimum)" means the minimum possible distance from the panel surface to the breaker mounting surface, which can be formed by cutting the square shaft.

"Max (maximum)" means the maximum distance of the same section, which is formed with no cutting of the square shaft.

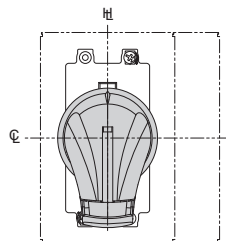
A: Distance from the panel surface to the breaker mounting surface

B: Length of the square shaft used

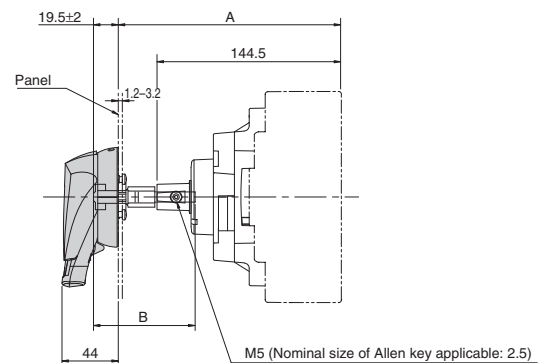
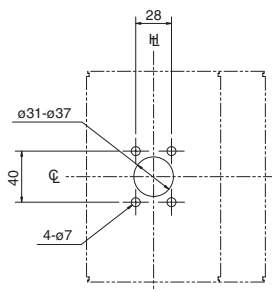
## Outline dimensions

### T2HS25L

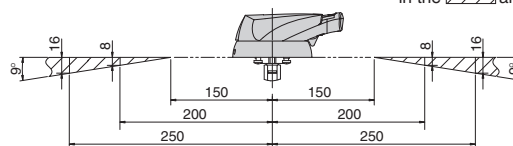
#### Outline dimensions



#### Panel cutout dimensions



- Positions of the hinge and handle as seen from the load side of the breaker. Ensure that the hinge is positioned in the area.



| Applicable breaker types |         |         | A±2 ①    | B±0.5 |
|--------------------------|---------|---------|----------|-------|
| E250-SF                  | S250-SF | E250-SJ | 175 min. | 80    |
| S250-SJ                  | S250-SN |         | 453 max. | 358   |

Note ①:

"Min (minimum)" means the minimum possible distance from the panel surface to the breaker mounting surface, which can be formed by cutting the square shaft.

"Max (maximum)" means the maximum distance of the same section, which is formed with no cutting of the square shaft.

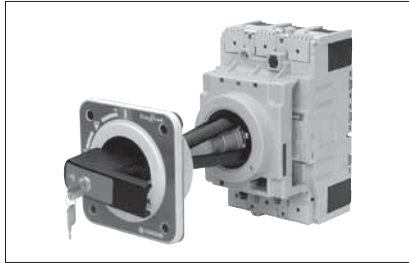
A: Distance from the panel surface to the breaker mounting surface

B: Length of the square shaft used

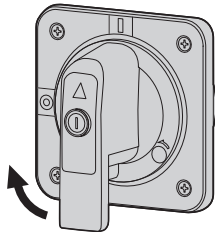
**Molded Case Circuit Breakers****2 Externally mounted accessories****3. External operating handles****3-4. Door-mounted (depth adjustable) (HP) ordinal type**

Door-mounted type external operating handles allow breakers installed in control centers or switchboards to be manually operated from outside and complies with IEC 60204-1.

This handle assembly consists of an operation mechanism section which is to be installed in the breaker body, a handle section which is to be installed in a panel and a square shaft which couples both the sections.

**Outer view****Operation direction of handles**

Rotate the operating handle clockwise to turn the breaker on.



Rotate clockwise  
to turn the breaker ON

**Breaker mounting direction**

The ON and OFF positions of the handle and the positions of drilled holes in the panel do not need to be changed depending on the breaker mounting direction.

| Horizontal mounting /<br>ON to move the breaker handle right | Vertical mounting /<br>ON to move the breaker handle up | Horizontal mounting /<br>ON to move the breaker handle left |
|--------------------------------------------------------------|---------------------------------------------------------|-------------------------------------------------------------|
|                                                              |                                                         |                                                             |

### ■ Panel lock mechanism

The external operating handle keeps the panel door locked when in the 'ON' position. There are two types, RESET, Open and OFF, Open.

#### (1) Reset, Open (Standard type)

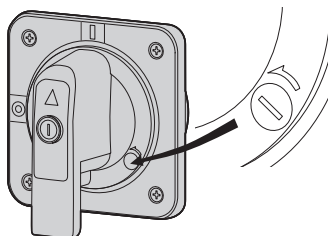
The handle is turned to the 'RESET/OPEN COVER' position to open the panel door.

#### (2) OFF, Open

The handle is turned to the OFF position to open the panel door.

#### ● Panel lock release knob

The release knob enables the panel door to be opened with the handle in the 'ON' position. To release: turn the release knob in the direction of anti-clockwise with a flat-bladed screwdriver.



### ■ Protection degree (IEC 60529)

|      |                        |
|------|------------------------|
| IP54 | standard specification |
| IP65 | special specification  |

### ■ Toggle lock mechanism

#### ● Padlock (Standard)

This mechanism allows the breaker to be padlocked in the OFF position.

Padlocks are not supplied.

Up to three padlocks can be installed.



Padlock dimensions (mm)

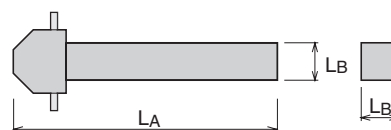
| Type of handle | A      | Dia.   |
|----------------|--------|--------|
| T2HP           | 13 min | ø5,5-8 |

#### ● Key lock (Optional)

Key locking is possible in the OFF position.

### ■ Dimensions of square shafts available

There are the following shaft dimensions available. Select an appropriate shaft depending on the mounting position of the breaker. Cut the shaft to an appropriate length if required. Coat the cut end faces of the shaft with an anti-corrosion paint.



| Shafts order codes | LA (mm) | LB (mm) |
|--------------------|---------|---------|
| T2PS251            | 121     |         |
| T2PS252            | 221     |         |
| T2PS253            | 321     | 8       |
| T2PS254            | 421     |         |

### ■ To be stated when ordering

Order code T2HP16L R 5 B N

| Type of external operating handle | Panel lock                       | Protection degree      | Colour                                                          | Key lock                                    |
|-----------------------------------|----------------------------------|------------------------|-----------------------------------------------------------------|---------------------------------------------|
| T1HP10X<br>T2HP16L    T2HP25L     | R : RESET open *<br>F : OFF open | 5 : IP54 *<br>6 : IP65 | B : Black handle (Black base) *<br>R : Red handle (Yellow base) | K : with key lock<br>N : without key lock * |

※: standard specification

Possible combinations of breaker and external operating handle

| Type of breaker                               | Type of external operating handle |
|-----------------------------------------------|-----------------------------------|
| E100-SF                                       | T1HP10X                           |
| S160-SCF, S160-SF, S160-SCJ, S160-SJ, S160-SN | T2HP16L                           |
| E250-SF, S250-SF, E250-SJ, S250-SJ, S250-SN   | T2HP25L                           |

# 3

## Accessories

### Molded Case Circuit Breakers

#### 2 Externally mounted accessories

## 3. External operating handles

ASL: Arrangement Standard Line

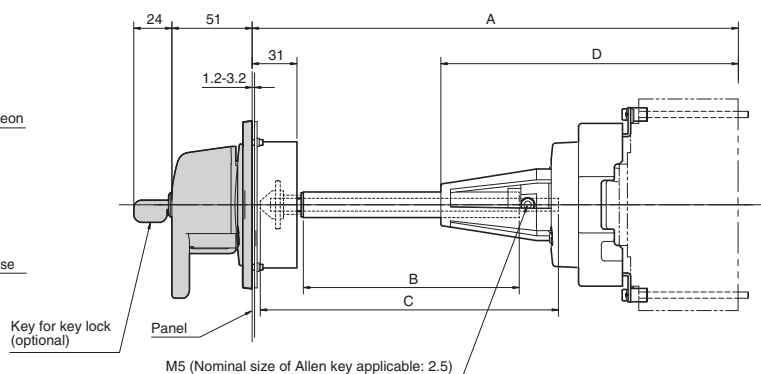
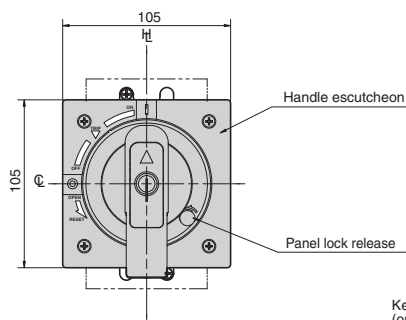
HL: Handle Frame Centre Line

CL: Handle Centre Line

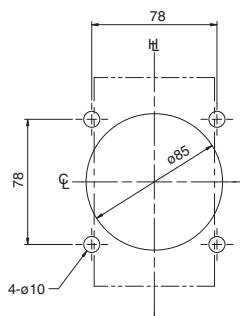
#### Outline dimensions

#### T1HP10X

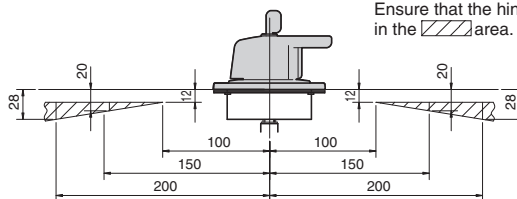
##### Outline dimensions



##### Panel cutout dimensions



• Positions of the hinge and handle as seen from the load side of the breaker. Ensure that the hinge is positioned in the  area.



| Applicable breaker types | A ①     | B   | C   | D   | Square shaft applicable | Shaft support |
|--------------------------|---------|-----|-----|-----|-------------------------|---------------|
| E100-SF                  | 236min. | 56  | 107 | 194 | T2PS251                 | Yes           |
|                          | 250max. | 70  | 121 | 194 |                         | Yes           |
|                          | 350max. | 170 | 221 | 194 | T2PS252                 | Yes           |
|                          | 450max. | 270 | 321 | 194 | T2PS253                 | Yes           |
|                          | 550max. | 370 | 421 | 194 | T2PS254                 | Yes           |

##### Note ①:

"Min (minimum)" means the minimum possible distance from the panel surface to the breaker mounting surface, which can be formed by cutting the square shaft.

"Max (maximum)" means the maximum distance of the same section, which is formed with no cutting of the square shaft.

A: Distance from the panel surface to the breaker mounting surface

B: Length of the tube used to cover the square shaft

C: Length of the square shaft used

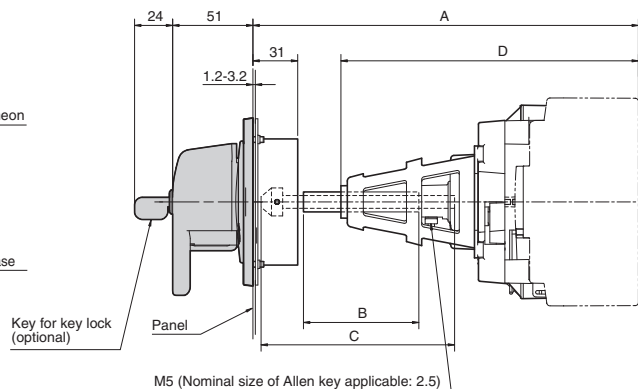
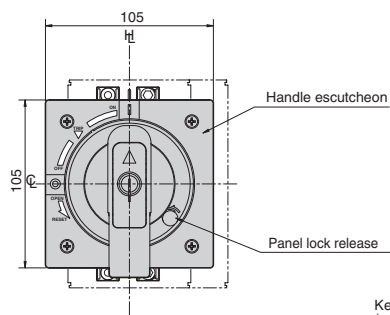
D: Distance from the tip of the shaft support to the breaker mounting surface

ASL: Arrangement Standard Line  
 H: Handle Frame Centre Line  
 CL: Handle Centre Line

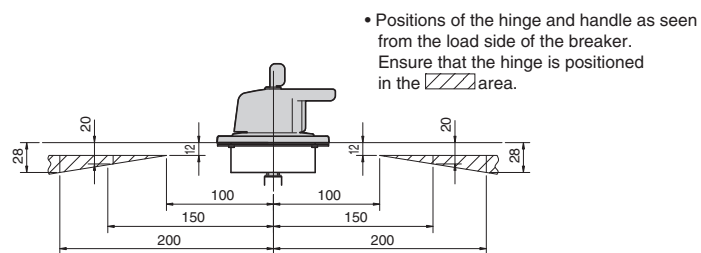
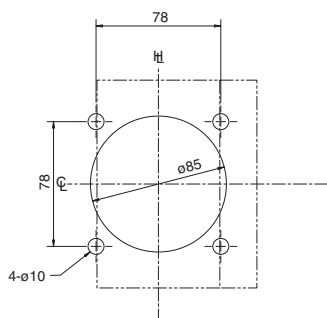
## ■ Outline dimensions

### T2HP16L

#### ● Outline dimensions



#### ● Panel cutout dimensions



| Applicable breaker types |                    |          | A ①      | B   | C   | D   | Square shaft applicable | Shaft support |
|--------------------------|--------------------|----------|----------|-----|-----|-----|-------------------------|---------------|
| S160-SCF<br>S160-SJ      | S160-SF<br>S160-SN | S160-SCJ | 229 min. | 56  | 107 | 186 | T2PS251                 | Yes           |
|                          |                    |          | 243 max. | 70  | 121 | 186 |                         | Yes           |
|                          |                    |          | 343 max. | 170 | 221 | 186 | T2PS252                 | Yes           |
|                          |                    |          | 443 max. | 270 | 321 | 186 | T2PS253                 | Yes           |
|                          |                    |          | 543 max. | 370 | 421 | 186 | T2PS254                 |               |

#### Note ①:

"Min (minimum)" means the minimum possible distance from the panel surface to the breaker mounting surface, which can be formed by cutting the square shaft.  
 "Max (maximum)" means the maximum distance of the same section, which is formed with no cutting of the square shaft.

- A: Distance from the panel surface to the breaker mounting surface  
 B: Length of the tube used to cover the square shaft  
 C: Length of the square shaft used  
 D: Distance from the tip of the shaft support to the breaker mounting surface

# 3

## Accessories

### Molded Case Circuit Breakers

#### 2 Externally mounted accessories

### 3. External operating handles

ASL: Arrangement Standard Line

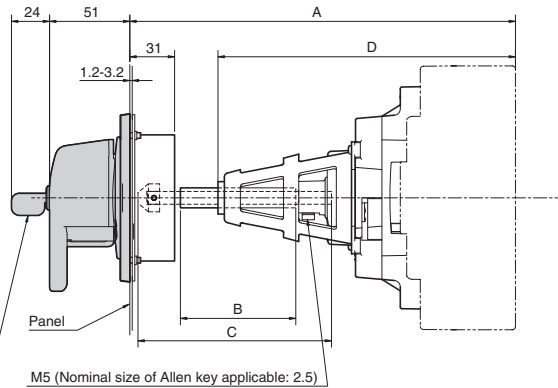
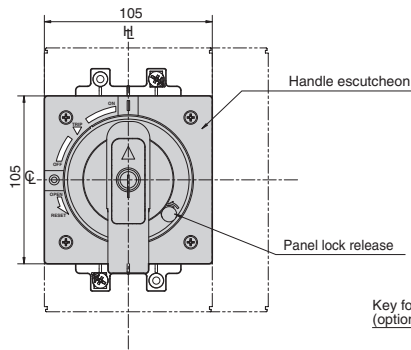
HL: Handle Frame Centre Line

CL: Handle Centre Line

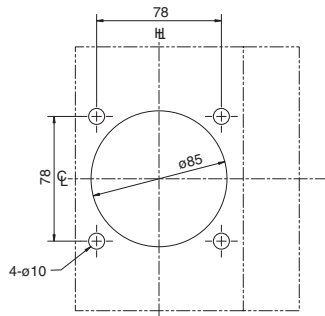
#### Outline dimensions

##### T2HP25L

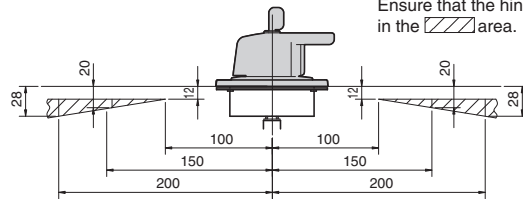
#### Outline dimensions



#### Panel cutout dimensions



• Positions of the hinge and handle as seen from the load side of the breaker. Ensure that the hinge is positioned in the  area.



| Applicable breaker types |         |         | A ①      | B   | C   | D   | Square shaft applicable | Shaft support |
|--------------------------|---------|---------|----------|-----|-----|-----|-------------------------|---------------|
| E250-SF                  | S250-SF | E250-SJ | 229 min. | 56  | 107 | 186 | T2PS251                 | Yes           |
| S250-SJ                  | S250-SN |         | 243 max. | 70  | 121 | 186 |                         | Yes           |
|                          |         |         | 343 max. | 170 | 221 | 186 | T2PS252                 | Yes           |
|                          |         |         | 443 max. | 270 | 321 | 186 | T2PS253                 | Yes           |
|                          |         |         | 543 max. | 370 | 421 | 186 | T2PS254                 |               |

#### Note ①:

"Min (minimum)" means the minimum possible distance from the panel surface to the breaker mounting surface, which can be formed by cutting the square shaft.

"Max (maximum)" means the maximum distance of the same section, which is formed with no cutting of the square shaft.

A: Distance from the panel surface to the breaker mounting surface

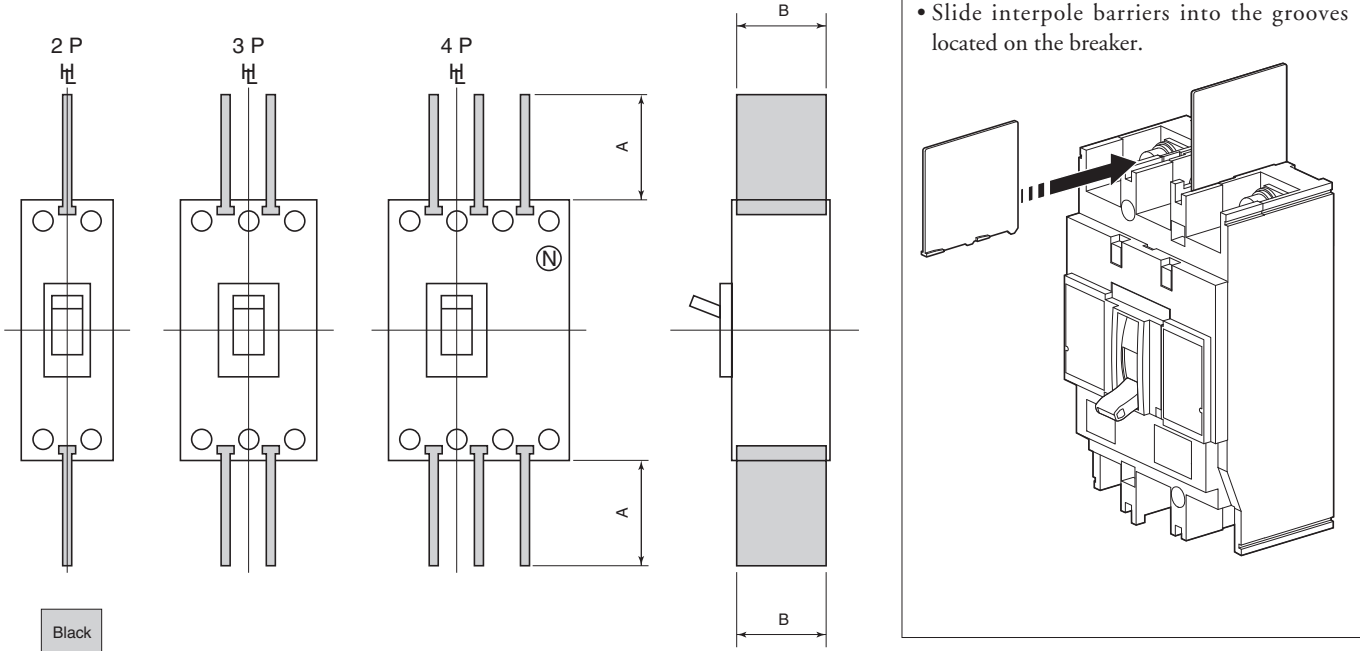
B: Length of the tube used to cover the square shaft

C: Length of the square shaft used

D: Distance from the tip of the shaft support to the breaker mounting surface

# 4. Interpole barriers (BA)

Interpole barriers serve to enhance electrical insulation between poles and prevent short-circuit due to electrically conductive foreign matter. Combined use of interpole barriers and terminal covers (standard type) is not possible.



■ To be stated when ordering  
Please state the type when ordering. One set contains two barriers.  
Caution: Be sure to use the interpole barriers supplied with the breaker in order to prevent accidents.

Types and dimensions of interpole barriers, units in mm

| Types of breakers                               | Interpole barrier |          | A   | B  |
|-------------------------------------------------|-------------------|----------|-----|----|
|                                                 | Type              | Code     |     |    |
| E100-SF                                         | TQQ-2CC           | —        | 36  | 50 |
| S160-SCF, S160-SF, S160-SCJ<br>S160-SJ, S160-SN | T2BA16L3SH        | —        | 50  | 55 |
| E250-SF, S250-SF, E250-SJ<br>S250-SJ, S250-SN   | T2BA25L3SH        | T2BA25LS | 101 | 53 |

Note ①: Line side interpole barriers are supplied as standard for front connected breakers.

# 3

## Accessories

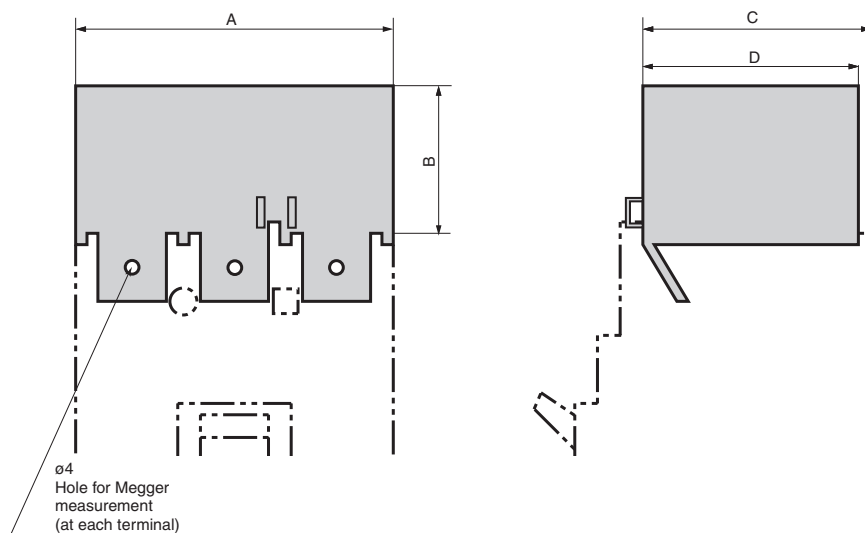
### Molded Case Circuit Breakers

#### 2 Externally mounted accessories

## 5. Terminal covers CF/CR/CS

Terminal covers prevent live parts of the breaker from being exposed to the external environment. There are three types of terminal covers available: CF for front-connected breakers, CR for rear-connected and plug-in breakers, and CS for front-connected breakers with cable clamps. Select appropriate terminal covers depending on the type and application of the breaker.

### (1) CF for front-connected breakers



#### Plug-in mounted version

This version can be mounted simply by being plugged in the breaker body.

■ To be stated when ordering

- Please state the order codes in the table below. One set includes one terminal cover for the ON side and one for the OFF side.

### Types and dimensions of terminal covers, units in mm

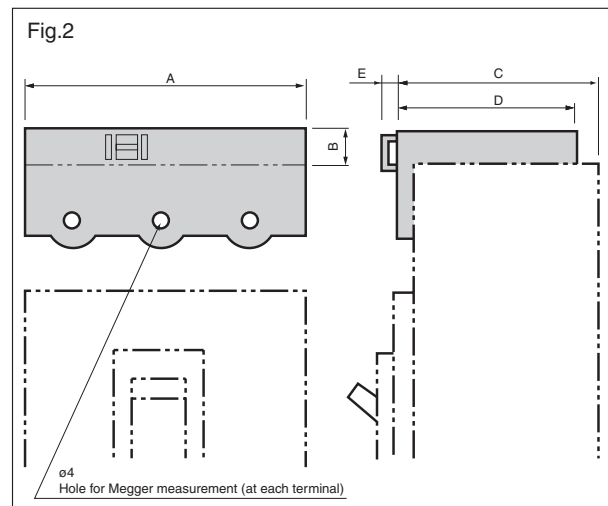
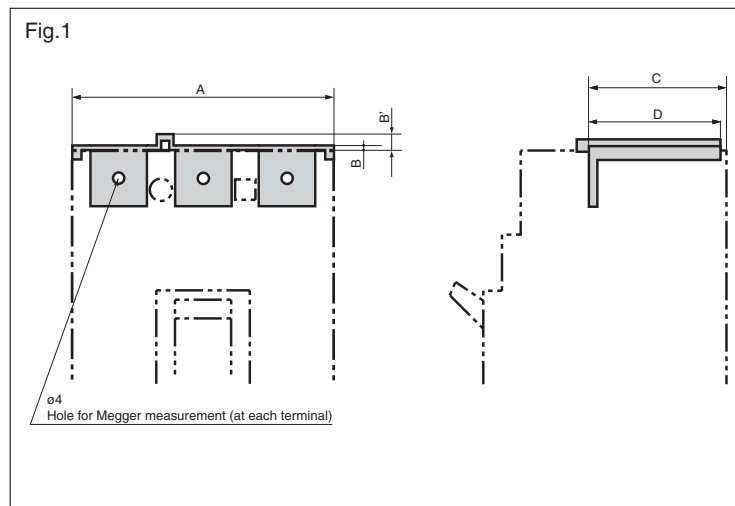
CF for front-connected breakers

| Types of breakers                             | Terminal cover |       |                |               | A       |         |         | B         |         | C         |         | D         |         | Colour of cover<br>G:Gray<br>C':Clear | Mounting version |               |
|-----------------------------------------------|----------------|-------|----------------|---------------|---------|---------|---------|-----------|---------|-----------|---------|-----------|---------|---------------------------------------|------------------|---------------|
|                                               | Size           | Note: | Order codes ①  | Marking codes | 2 poles | 3 poles | 4 poles | 2/3 poles | 4 poles | 2/3 poles | 4 poles | 2/3 poles | 4 poles |                                       | Plug-in mounted  | Screw-mounted |
| E100-SF                                       | Large          |       | XPR1 * G       | —             | 49      | 74      | —       | 30        | —       | 63        | —       | 54        | —       | G                                     | ○                | —             |
|                                               |                |       | XPR1 * C       |               |         |         |         |           |         |           |         |           |         | C'                                    |                  |               |
|                                               | Small          |       | TPT1 * G       | —             | 49      | 74      | —       | 2         | —       | 63        | —       | 54        | —       | G                                     |                  |               |
|                                               |                |       | TPT1 * C       |               |         |         |         |           |         |           |         |           |         | C'                                    |                  |               |
| S160-SF, S160-SCJ<br>S160-SJ, S160-SN         | Large          |       | T2CF16L * SLNG | —             | —       | 75      | 100     | 50        | 50      | 61        | 61      | 60.3      | 60.3    | G                                     | ○                | —             |
|                                               |                |       | T2CF16L * SLNC |               |         |         |         |           |         |           |         |           |         | C'                                    |                  |               |
|                                               | Small          |       | T2CF16L * SSNG | —             | —       | 75      | 100     | 25        | 25      | 61        | 61      | 60.3      | 60.3    | G                                     |                  |               |
|                                               |                |       | T2CF16L * SSNC |               |         |         |         |           |         |           |         |           |         | C'                                    |                  |               |
| S160-SCF                                      | Large          |       | T2CF16L * SLNG | —             | 50      | 75      | 100     | 50        | 50      | 61        | 61      | 60.3      | 60.3    | G                                     | ○                | —             |
|                                               |                |       | T2CF16L * SLNC |               |         |         |         |           |         |           |         |           |         | C'                                    |                  |               |
|                                               | Small          |       | T2CF16L * SSNG | —             | 50      | 75      | 100     | 25        | 25      | 61        | 61      | 60.3      | 60.3    | G                                     |                  |               |
|                                               |                |       | T2CF16L * SSNC |               |         |         |         |           |         |           |         |           |         | C'                                    |                  |               |
| E250-SF, S250-SF<br>E250-SJ, S250-SJ, S250-SN | Small          |       | T2CF25L * SSNG | T2CF25L * SS  | 105     | 105     | 140     | 29        | 29      | 59        | 59      | 57.5      | 57.5    | G                                     | ○                | —             |
|                                               |                |       | T2CF25L * SSNC |               |         |         |         |           |         |           |         |           |         | C'                                    |                  |               |
|                                               | Large ②        |       | T2CF25L * SWNG | T2CF25L * SW  | 147.5   | 147.5   | 196     | 55        | 55      | 59        | 59      | 57.5      | 57.5    | G                                     |                  |               |
|                                               |                |       | T2CF25L * SWNC |               |         |         |         |           |         |           |         |           |         | C'                                    |                  |               |
|                                               | Large          |       | T2CF25L * SLNG | T2CF25L * SL  | 105     | 105     | 140     | 55        | 55      | 59        | 59      | 57.5      | 57.5    | G                                     |                  |               |
|                                               |                |       | T2CF25L * SLNC |               |         |         |         |           |         |           |         |           |         | C'                                    |                  |               |
|                                               | Large          |       | T2CF25L * SLNG | T2CF25L * SL  | 105     | 105     | 140     | 55        | 55      | 59        | 59      | 57.5      | 57.5    | G                                     |                  |               |
|                                               |                |       | T2CF25L * SLNC |               |         |         |         |           |         |           |         |           |         | C'                                    |                  |               |

#### Notes:

- ①. The asterisk indicates the number of poles. Please state the number of poles at the asterisk position when ordering.
- ②. Applicable to 3-pole breakers with spread extension bars.

## (2) CR for rear-connected CS for front-connected breakers with cable clamps



- To be stated when ordering
  - Please state "with CR" if ordering along with the breaker.
  - Please state the order codes in the table below if ordering separately from the breaker.
- One set includes one terminal cover for the ON side and one for the OFF side.

### Plug-in mounted version

This version can be mounted simply by being plugged in the breaker body.

## Types and dimensions of terminal covers, units in mm

### CR for rear-connected

| Types of breakers                             | Terminal cover |               | A       |         |         | B         |         | B'  | C         |         | D         |         | Colour of cover<br>G: Gray | Figure |
|-----------------------------------------------|----------------|---------------|---------|---------|---------|-----------|---------|-----|-----------|---------|-----------|---------|----------------------------|--------|
|                                               | Order codes ①  | Marking codes | 2 poles | 3 poles | 4 poles | 2/3 poles | 4 poles |     | 2/3 poles | 4 poles | 2/3 poles | 4 poles |                            |        |
| S160-SF, S160-SCJ, S160-SJ<br>S160-SN         | T2CR12L * SG   | —             | —       | 75      | 100     | 5.5       | 5       | —   | 61        | 61      | 60.3      | 60.3    | G                          | 1      |
| S160-SCF                                      | T2CR12L * SG   | —             | 50      | 75      | 100     | 5.5       | 5       | —   | 61        | 61      | 60.3      | 60.3    | G                          | 1      |
| E250-SF, S250-SF, E250-SJ<br>S250-SJ, S250-SN | T2CR25L * SG   | T2CR25L       | 105     | 105     | 140     | 2.3       | 2.3     | 5.3 | 58.6      | 58.6    | 57.1      | 57.1    | G                          | 1      |

| Types of breakers | Terminal cover |               | A       |         |         | B         |         | E<br>(To screw head) | C         |         | D         |         | Colour of cover<br>G: Gray | Figure |
|-------------------|----------------|---------------|---------|---------|---------|-----------|---------|----------------------|-----------|---------|-----------|---------|----------------------------|--------|
|                   | Order codes ①  | Marking codes | 2 poles | 3 poles | 4 poles | 2/3 poles | 4 poles |                      | 2/3 poles | 4 poles | 2/3 poles | 4 poles |                            |        |
| F100-SF           | XPS1 * G       | —             | 49      | 74      | —       | 10        | —       | 2.5                  | 63        | —       | 54        | —       | G                          | 2      |

#### Notes:

- ①. The asterisk indicates the number of poles. Please state the number of poles at the asterisk position when ordering.
- One set includes one terminal cover for the ON side and one for the OFF side.

### CS for front-connected breakers with cable clamps

| Types of breakers                                           | Terminal cover |               | A       |         | B   | B'  | C    | D    | Colour of cover<br>G: Gray | Figure |
|-------------------------------------------------------------|----------------|---------------|---------|---------|-----|-----|------|------|----------------------------|--------|
|                                                             | Order codes ①  | Marking codes | 3 poles | 4 poles |     |     |      |      |                            |        |
| <b>S160-SCJ, S160-SJ, S160-SN</b>                           | T2CS12L * SG   | T2CS12L * S   | 75      | 100     | 5.5 | —   | 61   | 60.3 | G                          | 1      |
| <b>E250-SF, S250-SF, E250-SJ</b><br><b>S250-SJ, S250-SN</b> | T2CS25L * SG   | T2CS25L * S   | 105     | 140     | 2.3 | 5.3 | 58.6 | 57.1 | G                          | 1      |

#### Notes:

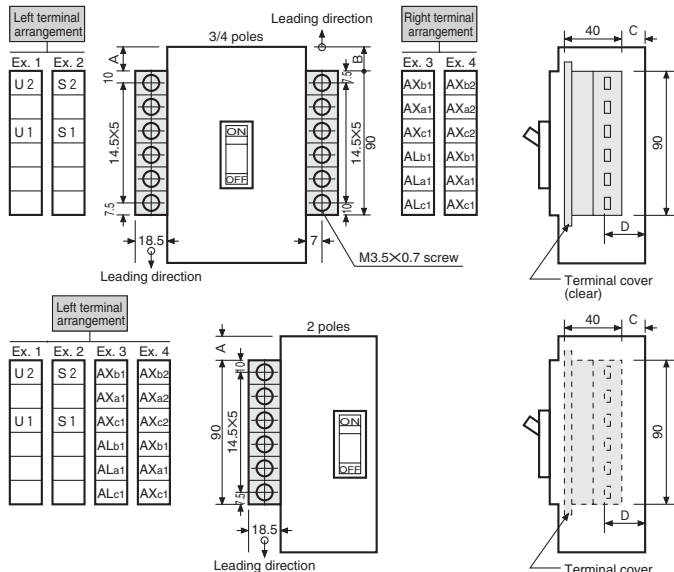
- ①. The asterisk indicates the number of poles. Please state the number of poles at the asterisk position when ordering.
- One set includes one terminal cover for the ON side and one for the OFF side.

## 6. Terminal blocks (TF)

### 6 terminals

#### Vertical leading type with 100A frame

##### Mounting position/typical terminal arrangement



##### Dimensions, mm

| Frame size (A) | Types of breakers | A    | B    | C  | D  |
|----------------|-------------------|------|------|----|----|
| 100            | E100-SF ①         | 16.5 | 16.5 | 21 | 36 |

##### Notes:

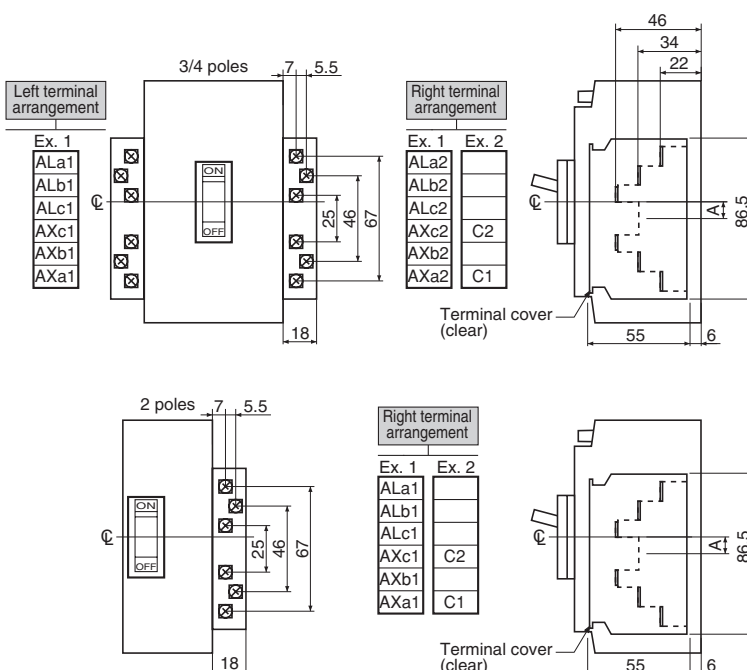
①: Terminal block cannot be mounted on the breaker which is equipped with the motor operator.

- 1) Tightening torque of M3.5 terminal screws: 0.9 – 1.2 N·m
- 2) Applicable wire size: 1.25mm<sup>2</sup> max (Vinyl-coated wire)

### 6 terminals

#### Vertical leading type with 160A frame

##### Mounting position/typical terminal arrangement



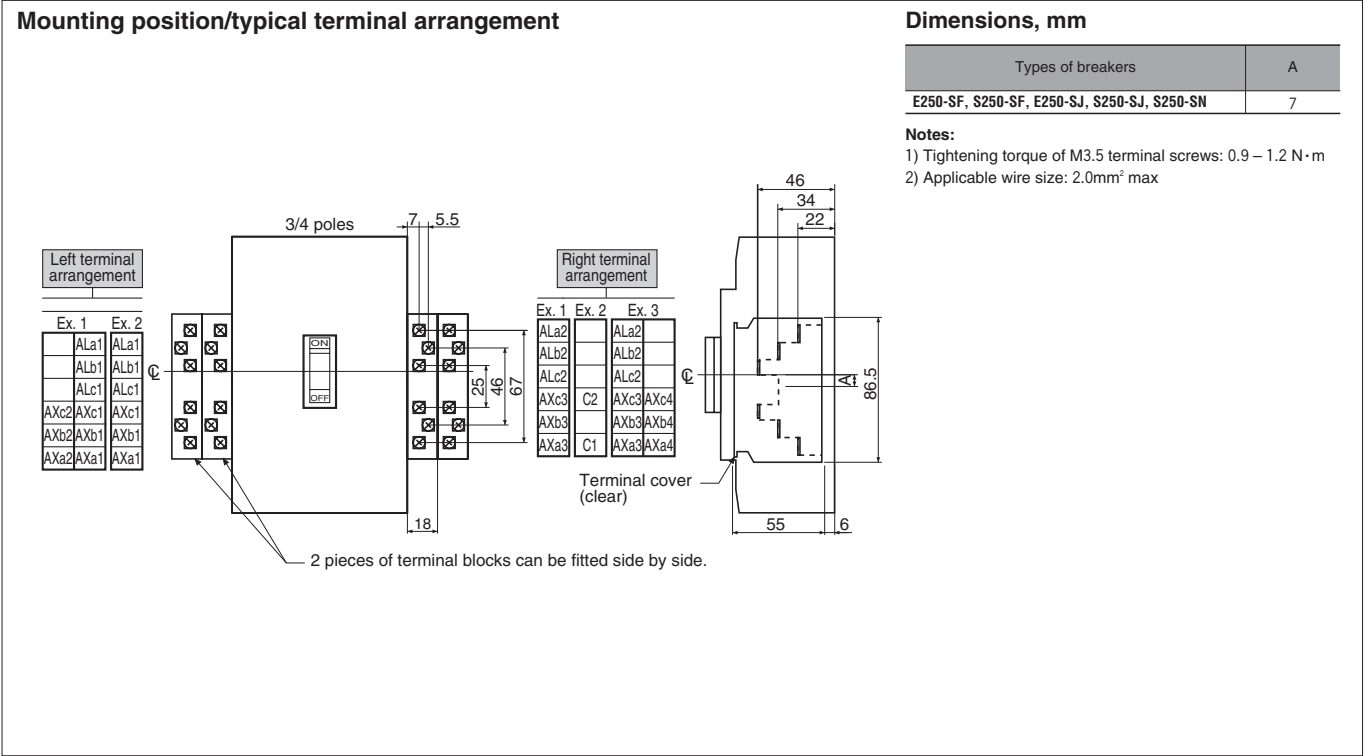
##### Dimensions, mm

| Types of breakers                               | A |
|-------------------------------------------------|---|
| S160-SCF (2/3/4 poles)                          | 9 |
| S160-SF, S160-SCJ, S160-SJ, S160-SN (3/4 poles) | 9 |

##### Notes:

- 1) Tightening torque of M3.5 terminal screws: 0.9 – 1.2 N·m
- 2) Applicable wire size: 2.0mm<sup>2</sup> max

# 6 terminals Vertical leading type with 250A frame



## 7. Mechanical interlock

### Slide interlock (MS)

The slide interlock provides a mechanical interlock between two breakers so that only one of the two can be closed. Moving the slide on the front of the breaker left and right allows activation or deactivation of the interlock.

ASL : Arrangement Standard Line

H : Handle Frame Centre Line

C : Handle Centre Line

#### Dimensions mm

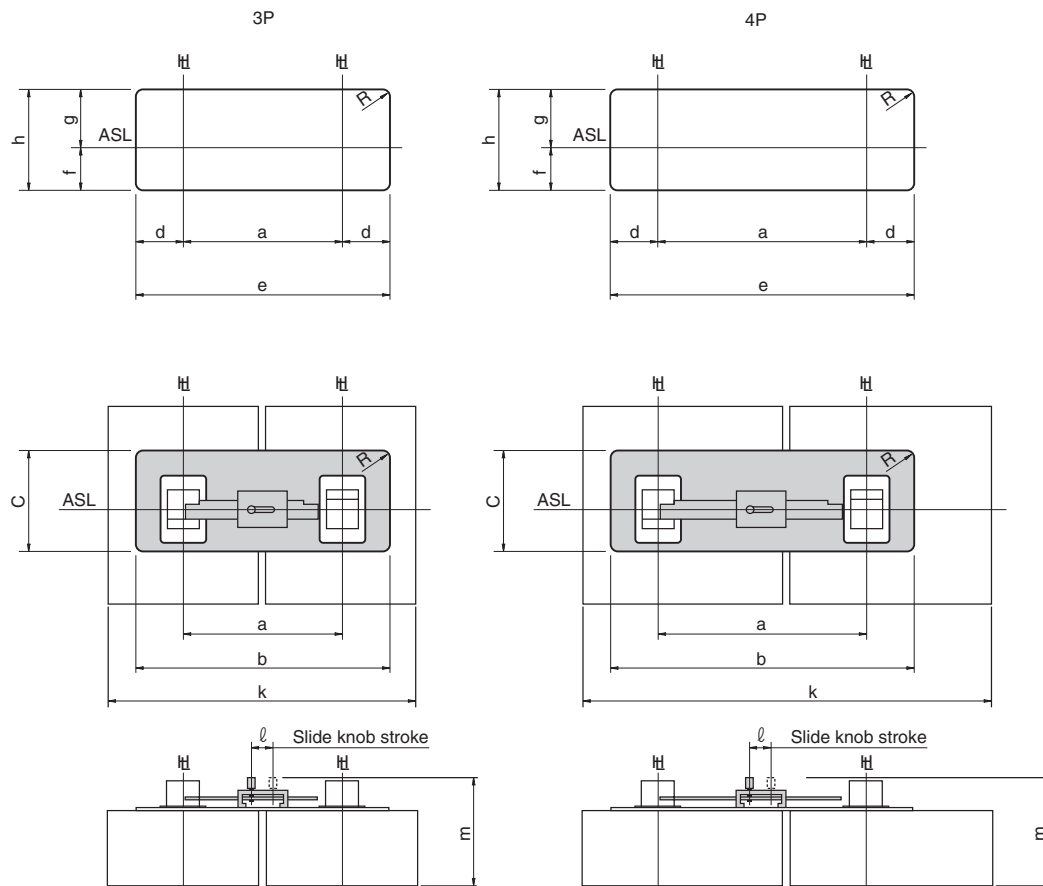
| Types of breakers | Interlock Order codes | Number of poles | a   | b   | c   | d    | e   | f    | g    | h   | k   | m    | ℓ  | R   |
|-------------------|-----------------------|-----------------|-----|-----|-----|------|-----|------|------|-----|-----|------|----|-----|
| E100-SF           | XLFI ①                | 3               | 100 | 150 | 102 | 26.5 | 153 | 52.5 | 52.5 | 105 | 175 | 99.6 | 15 | 8.5 |

#### Notes:

① : Please order with the breakers.

(1) The interlock cannot be applied to breakers equipped with a terminal block, UVT controller or OCR controller.

(2) See the outline dimensions of the breaker for the drilling plan.

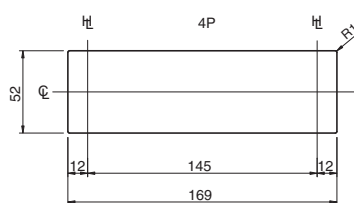
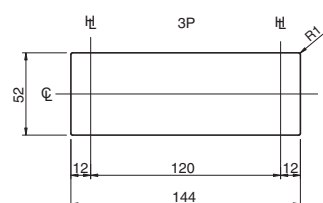


ASL: Arrangement Standard Line  
 HL: Handle Frame Centre Line  
 CL: Handle Centre Line

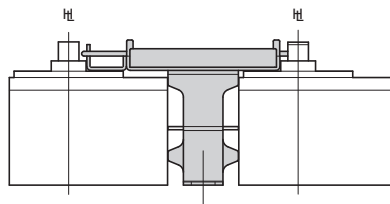
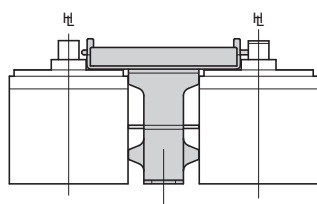
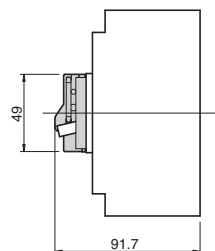
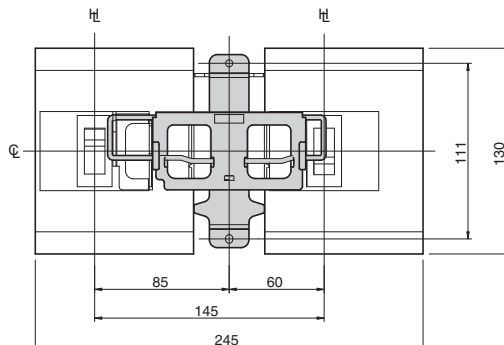
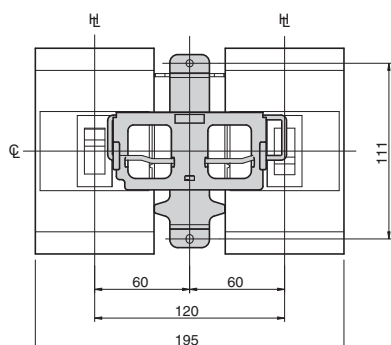
## Dimensions mm

| Types of breakers                               | Number of poles | Breaker connection method | Interlock Order codes |
|-------------------------------------------------|-----------------|---------------------------|-----------------------|
| S160-SCF, S160-SF, S160-SCJ<br>S160-SJ, S160-SN | 3               | FC,RC                     | T2MS16L3SF            |
|                                                 | 4               | FC,RC                     | T2MS16L4SF            |

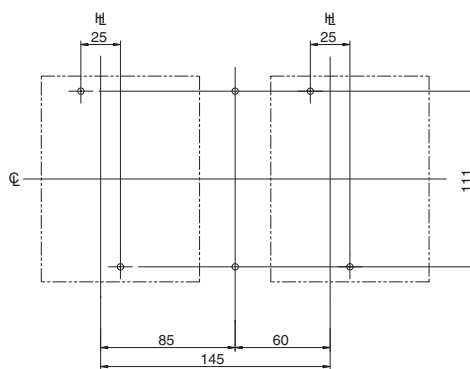
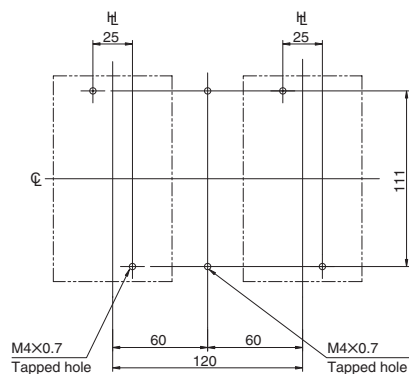
## Panel cutout (front view)



The cutout dimensions allow for a side clearance of 1.0 mm from the bank of the breaker.



## Drilling plan (front view)



# 3

## Accessories

### Molded Case Circuit Breakers

#### 2 Externally mounted accessories

## 7. Mechanical interlock

ASL: Arrangement Standard Line

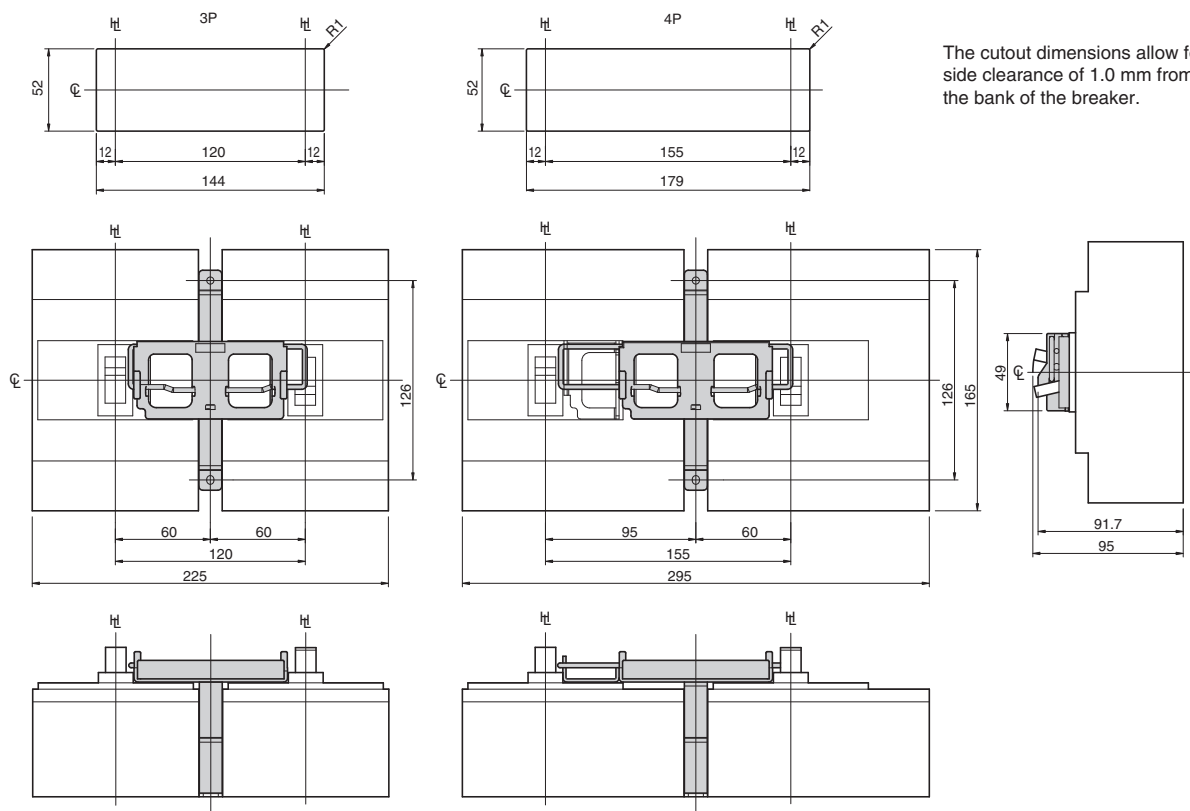
HL: Handle Frame Centre Line

CL: Handle Centre Line

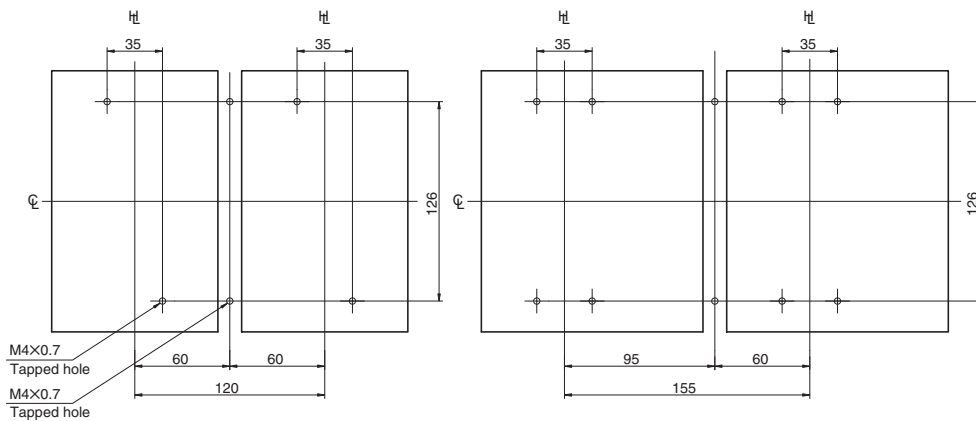
#### Dimensions mm

| Types of breakers                             | Number of poles | Breaker connection method | Interlock Order codes |
|-----------------------------------------------|-----------------|---------------------------|-----------------------|
| E250-SF, S250-SF, E250-SJ<br>S250-SJ, S250-SN | 3               | FC,RC                     | T2MS25L3SF            |
|                                               | 4               | FC,RC                     | T2MS25L4SF            |

#### Panel cutout (front view)

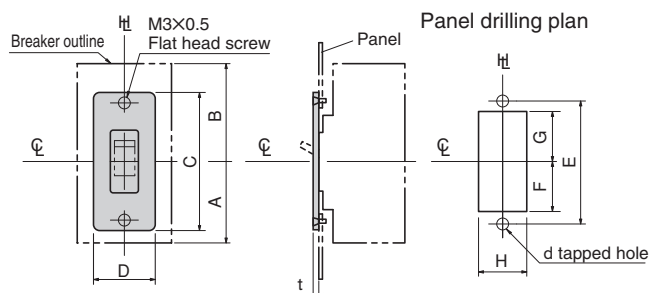


#### Drilling plan (front view)



## 8. Door Flange (D.F)

Door flanges are recommended to be used to cover the cutout of a switchboard panel.



### Dimensions mm

| Types of breakers                               | Order codes | A    | B    | C   | D  | E  | F   |     | G   |     | H   |     | d      | t |
|-------------------------------------------------|-------------|------|------|-----|----|----|-----|-----|-----|-----|-----|-----|--------|---|
|                                                 |             |      |      |     |    |    | Min | Max | Min | Max | Min | Max |        |   |
| E100-SF                                         | XAA1        | 65   | 65   | 105 | 50 | 92 | 37  | 42  | 37  | 42  | 32  | 45  | M3×0.5 | 3 |
| S160-SCF, S160-SF, S160-SCJ<br>S160-SJ, S160-SN | T2DF25      | 65   | 65   | 105 | 50 | 92 | 37  | 42  | 37  | 42  | 32  | 45  | M3×0.5 | 2 |
| E250-SF, S250-SF,<br>E250-SJ, S250-SJ, S250-SN  | T2DF25      | 82.5 | 82.5 | 105 | 50 | 92 | 37  | 42  | 37  | 42  | 32  | 45  | M3×0.5 | 2 |



# 4

## Characteristics and Outline Dimensions

### Molded Case Circuit Breakers

|                           |      |
|---------------------------|------|
| ● E100-SF .....           | 4-2  |
| ● E160-SF .....           | 4-4  |
| ● S160-SCF, S160-SF ..... | 4-6  |
| ● E250-SF, S250-SF .....  | 4-8  |
| ● S160-SCJ, S160-SJ ..... | 4-10 |
| ● E250-SJ, S250-SJ .....  | 4-12 |
| ● S160-SN .....           | 4-14 |
| ● S250-SN .....           | 4-16 |



# 4

## Characteristics and Outline Dimensions *TemBreak2*

### Molded Case Circuit Breakers

(100A Frame)

### E100-SF

#### Ratings and Specifications

| Type                                             | E100-SF                                          |                                    |         |      |  |  |
|--------------------------------------------------|--------------------------------------------------|------------------------------------|---------|------|--|--|
| Number of poles                                  | 2                                                | 3                                  |         |      |  |  |
| ■ Ratings                                        |                                                  |                                    |         |      |  |  |
| Rated current, A                                 | 10                                               | 50                                 |         |      |  |  |
| Calibrated at 40°C                               | 15                                               | 60                                 |         |      |  |  |
|                                                  | 20                                               | 75                                 |         |      |  |  |
|                                                  | 30                                               | 100                                |         |      |  |  |
|                                                  | 40                                               |                                    |         |      |  |  |
|                                                  |                                                  |                                    |         |      |  |  |
| Rated insulation voltage [ $U_i$ ] V             |                                                  |                                    | 690     |      |  |  |
| Rated impulse withstand voltage [ $U_{imp}$ ] kV |                                                  |                                    | 6       |      |  |  |
| Utilization Category                             |                                                  |                                    | A       |      |  |  |
| ■ Rated breaking capacity, kA                    |                                                  |                                    |         |      |  |  |
| IEC60947-2                                       | AC                                               | 690V                               | —       |      |  |  |
| $I_{cu}/I_{cs}(sym)$                             |                                                  | 500V                               | 7.5/3.8 |      |  |  |
|                                                  |                                                  | 440V                               | 10/5    |      |  |  |
|                                                  |                                                  | 415V                               | 10/5    |      |  |  |
|                                                  |                                                  | 380V                               | 16/8    |      |  |  |
|                                                  |                                                  | 240V                               | 25/13   |      |  |  |
| ① DC                                             |                                                  | 250V                               | 7.5/3.8 |      |  |  |
|                                                  |                                                  | 125V                               | 15/7.5  |      |  |  |
| ■ Rated short time withstand current, kA         |                                                  |                                    | —       |      |  |  |
| Weight (● marked standard type) kg               |                                                  |                                    | 0.48    | 0.74 |  |  |
| ■ Connections and Mountings                      |                                                  |                                    |         |      |  |  |
| Front-connected (FC)                             | Terminal screws                                  | ●                                  |         |      |  |  |
|                                                  | With straight extension bars                     | —                                  |         |      |  |  |
|                                                  | With spread extension bars                       | —                                  |         |      |  |  |
|                                                  | Cable clamps                                     | ○                                  |         |      |  |  |
| Rear-connected (RC)                              | Bolt studs                                       | ○                                  |         |      |  |  |
|                                                  | Flat bar studs                                   | —                                  |         |      |  |  |
| Plug-in (PM)                                     | For switchboards Standard (PMC)                  | —                                  |         |      |  |  |
|                                                  | High-performance (PMB)                           | —                                  |         |      |  |  |
|                                                  | For distribution boards (PMC)                    | —                                  |         |      |  |  |
| Draw-out type (DR)                               |                                                  | —                                  |         |      |  |  |
| TemPlug70 (PG)                                   |                                                  | —                                  |         |      |  |  |
| TemPlug45B (PG4)                                 |                                                  | —                                  |         |      |  |  |
| DIN rail mount                                   |                                                  | —                                  |         |      |  |  |
| Clip-in chassis mount                            |                                                  | —                                  |         |      |  |  |
| ■ Accessories (optional)                         | Symbol                                           |                                    |         |      |  |  |
| Externally mounted                               | Motor operator                                   | M C                                | —       | ●    |  |  |
|                                                  | External operating handle                        | Breaker-mounted H B                | —       | ●    |  |  |
|                                                  | Door-mounted (variable depth) H P                | —                                  | ●       |      |  |  |
|                                                  | Toggle extension                                 | H A                                | —       |      |  |  |
|                                                  | Mechanical interlock Slide type                  | M S                                | —       | ●    |  |  |
|                                                  | Toggle holder                                    | H H                                | ●       |      |  |  |
|                                                  | Toggle lock                                      | H L                                | ●       |      |  |  |
|                                                  | Terminal cover                                   | For front-connected C F            | ●       |      |  |  |
|                                                  |                                                  | For rear-connected and plug-in C R | ●       |      |  |  |
|                                                  |                                                  | For cable clamps C S               | —       |      |  |  |
|                                                  | Interpole barrier                                | B A                                | ●       |      |  |  |
|                                                  | Terminal block for lead                          | T F                                | ●       |      |  |  |
|                                                  | Door flange                                      | D F                                | ●       |      |  |  |
|                                                  | ■ Standard specifications                        |                                    |         |      |  |  |
|                                                  | Overcurrent trip mechanism                       | Thermal-magnetic⑦                  |         |      |  |  |
|                                                  | Trip button (color)                              | Yes (Red)                          |         |      |  |  |
|                                                  | Handle position indication (ON: Red, OFF: Green) | Yes                                |         |      |  |  |
|                                                  | Suitability for isolation                        | Non                                |         |      |  |  |
|                                                  | CE marking                                       | Non                                |         |      |  |  |

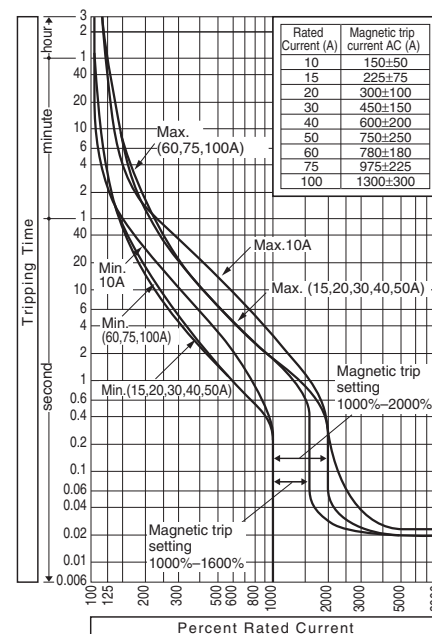
#### Notes:

● : Standard. This configuration used unless otherwise specified. ○ : Optional standard. Specify when ordering.

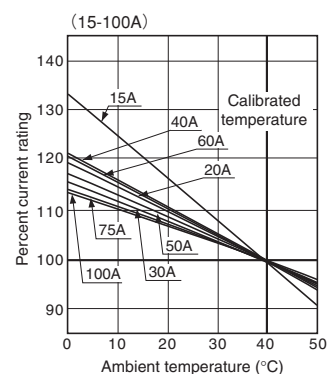
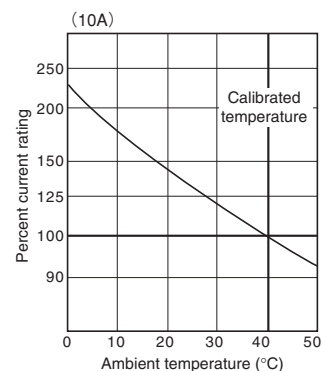
● : "yes" or "available". — : "no" or "not available". ① : DC rating available on request.

⑦ : Hydraulic-magnetic type for below 10A rating.

#### Time/Current characteristic curves



#### Ambient Compensating Curves



#### Combinations of Internally Mounted Accessories (Optional)

| Poles | AX               | AL           | SH            | UV                    | AX | AX | AX | AL | AL | AX | AX |
|-------|------------------|--------------|---------------|-----------------------|----|----|----|----|----|----|----|
|       | Auxiliary switch | Alarm switch | Shunt trip #1 | Under voltage trip #2 | AX | SH | UV | SH | UV | AX | UV |
| 3     |                  |              |               |                       |    |    |    |    |    |    |    |
|       | Left pole        | Right pole   |               |                       |    |    |    |    |    |    |    |

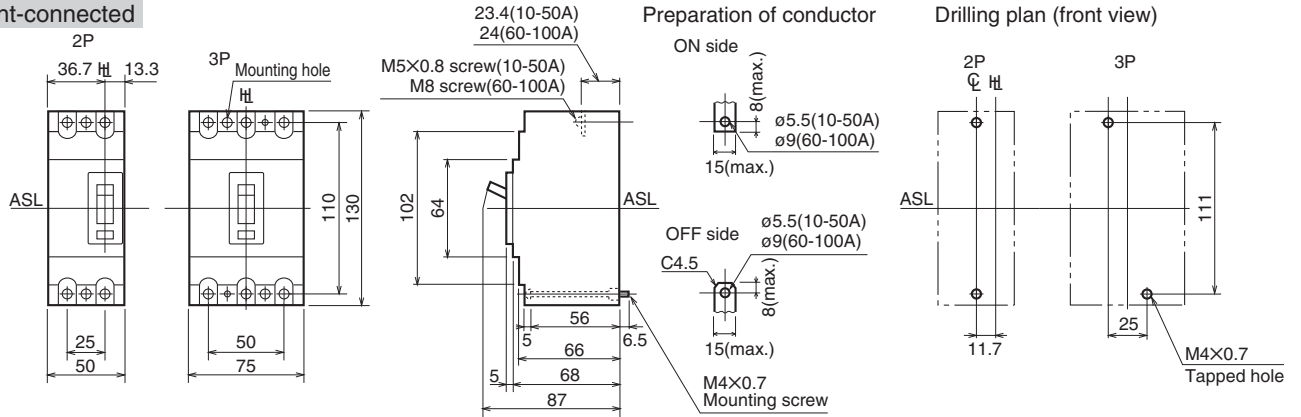
NOTE: 2-pole type breaker may incorporate only one combination of [AX (max.2C)], [AL], [SH], [UV], [AX-AL] into the left pole.

NOTE: #1 Shunt trip is provided with anti-burnout switch.

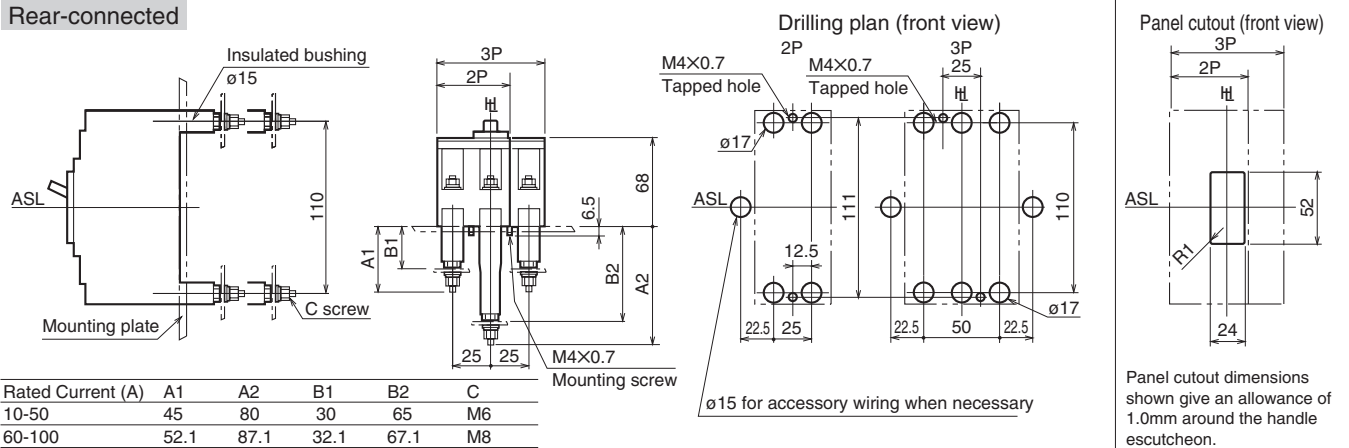
NOTE: #2 The UV Controller is installed externally when provided with AC UV.

## Outline dimensions (mm)

### Front-connected



### Rear-connected





# 4

## Characteristics and Outline Dimensions *TemBreak2*

### Molded Case Circuit Breakers

(160A Frame)

### E160-SF

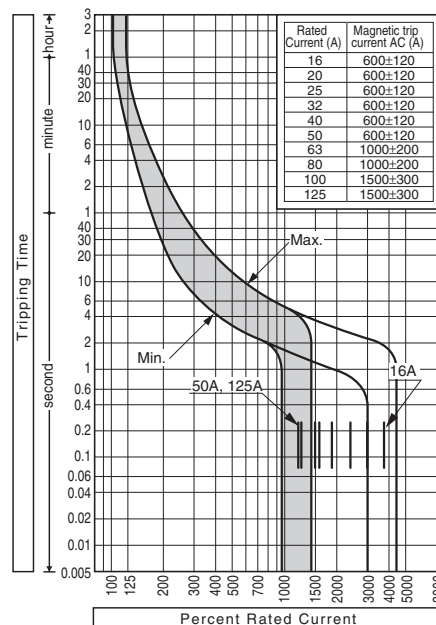
#### Ratings and Specifications

| Type                                             | E160-SF                         |                                |       |   |  |
|--------------------------------------------------|---------------------------------|--------------------------------|-------|---|--|
| Number of poles                                  | 1                               |                                |       |   |  |
| ■ Ratings                                        |                                 |                                |       |   |  |
| Rated current, A                                 | 16                              | 63                             |       |   |  |
| Calibrated at 45°C                               | 20                              | 80                             |       |   |  |
|                                                  | 25                              | 100                            |       |   |  |
|                                                  | 32                              | 125                            |       |   |  |
|                                                  | 40                              |                                |       |   |  |
|                                                  | 50                              |                                |       |   |  |
|                                                  |                                 |                                |       |   |  |
| Rated insulation voltage $[U_i]$ V               | 690                             |                                |       |   |  |
| Rated impulse withstand voltage $[U_{imp}]$ kV   | 8                               |                                |       |   |  |
| Utilization Category                             | A                               |                                |       |   |  |
| ■ Rated breaking capacity, kA                    |                                 |                                |       |   |  |
| IEC60947-2                                       | AC                              | 690V                           |       |   |  |
| $I_{cu}/I_{cs}(sym)$                             |                                 | 500V                           |       |   |  |
|                                                  |                                 | 440V                           |       |   |  |
|                                                  |                                 | 415V                           |       |   |  |
|                                                  |                                 | 380V                           |       |   |  |
|                                                  |                                 | 240V                           | 25/13 |   |  |
|                                                  | ① DC                            | 250V                           |       |   |  |
|                                                  |                                 | 125V                           | 10/5  |   |  |
| ■ Rated short time withstand current, kA         |                                 |                                |       |   |  |
| Weight (● marked standard type) kg               | 0.3                             |                                |       |   |  |
| ■ Connections and Mountings                      |                                 |                                |       |   |  |
| Front-connected (FC)                             | Terminal screws                 | ●                              |       |   |  |
|                                                  | With straight extension bars    | ○                              |       |   |  |
|                                                  | With spread extension bars      |                                |       |   |  |
|                                                  | Cable clamps                    | ○                              |       |   |  |
| Rear-connected (RC)                              | Bolt studs                      | —                              |       |   |  |
|                                                  | Flat bar studs                  | —                              |       |   |  |
| Plug-in (PM)                                     | For switchboards Standard (PMC) | —                              |       |   |  |
|                                                  | High-performance (PMB)          | —                              |       |   |  |
|                                                  | For distribution boards (PMC)   | —                              |       |   |  |
| Draw-out type (DR)                               |                                 | —                              |       |   |  |
| TemPlug70 (PG)                                   |                                 | —                              |       |   |  |
| TemPlug45B (PG4)                                 |                                 | —                              |       |   |  |
| DIN rail mount                                   |                                 | —                              |       |   |  |
| Clip-in chassis mount                            |                                 |                                |       |   |  |
| ■ Accessories (optional)                         |                                 | Symbol                         |       |   |  |
| Externally mounted                               | Motor operator                  | M C                            |       |   |  |
|                                                  | External operating handle       | H B                            |       |   |  |
|                                                  | Door-mounted (variable depth)   | H P                            |       |   |  |
|                                                  | Toggle extension                | H A                            |       |   |  |
|                                                  | Mechanical interlock Slide type | M S                            |       |   |  |
|                                                  | Toggle holder                   | H H                            | ●     |   |  |
|                                                  | Toggle lock                     | H L                            | ●     |   |  |
|                                                  | Terminal cover                  | For front-connected            | C F   | ● |  |
|                                                  |                                 | For rear-connected and plug-in | C R   | — |  |
|                                                  |                                 | For cable clamps               | C S   | — |  |
|                                                  | Interpole barrier               | B A                            | —     |   |  |
|                                                  | Terminal block for lead         | T F                            | —     |   |  |
|                                                  | Door flange                     | D F                            | ●     |   |  |
|                                                  | ■ Standard specifications       |                                |       |   |  |
|                                                  | Overcurrent trip mechanism      | Thermal-magnetic               |       |   |  |
| Trip button (color)                              | Yes (Red)                       |                                |       |   |  |
| Handle position indication (ON: Red, OFF: Green) | Yes                             |                                |       |   |  |
| Suitability for isolation                        | Yes                             |                                |       |   |  |
| CE marking                                       | Yes                             |                                |       |   |  |

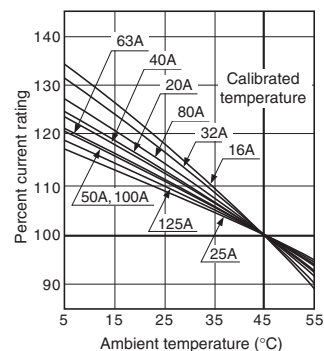
#### Notes:

- : Standard. This configuration used unless otherwise specified. ○ : Optional standard. Specify when ordering.  
 ● : "yes" or "available". — : "no" or "not available". ① : DC rating available on request.

#### Time/Current characteristic curves

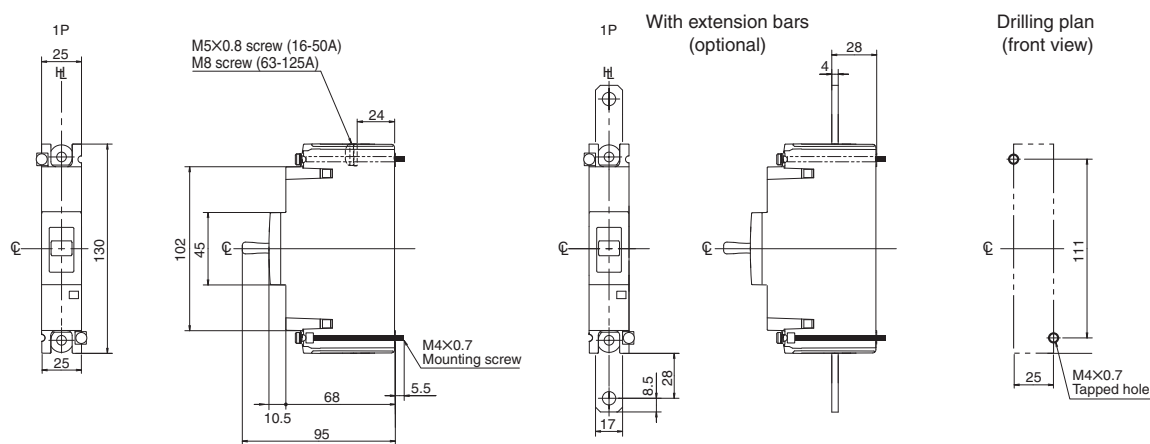


#### Ambient Compensating Curves



**Outline dimensions (mm)** **E160-SF**

**Front-connected**





# 4

## Characteristics and Outline Dimensions *TemBreak2*

### Molded Case Circuit Breakers

(160A Frame)

### S160-SCF, S160-SF

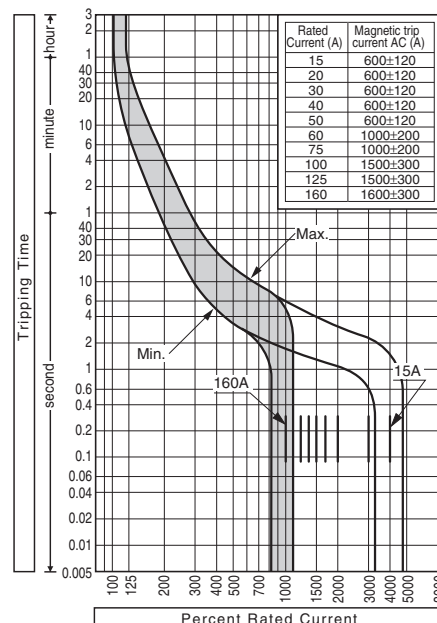
#### Ratings and Specifications

| Type                                             | S160-SCF                                         | S160-SF                                                     |                  |  |
|--------------------------------------------------|--------------------------------------------------|-------------------------------------------------------------|------------------|--|
| Number of poles                                  | 2 3 4                                            | 3 4                                                         |                  |  |
| <b>■ Ratings</b>                                 |                                                  |                                                             |                  |  |
| Rated current, A                                 | 15 75 20 100 30 125 40 160 50 60                 | 15 75 20 100 30 125 40 160 50 60                            |                  |  |
| Calibrated at 40°C                               |                                                  |                                                             |                  |  |
| Rated insulation voltage [ $U_i$ ] V             | 690                                              | 690                                                         |                  |  |
| Rated impulse withstand voltage [ $U_{imp}$ ] kV | 8                                                | 8                                                           |                  |  |
| Utilization Category                             | A                                                | A                                                           |                  |  |
| <b>■ Rated breaking capacity, kA</b>             |                                                  |                                                             |                  |  |
| IEC60947-2 AC                                    | 690V 500V 440V 415V 380V 240V ① DC 250V 125V     | 6/3 7.5/4 10/7.5 15/7.5 25/13 40/20 40/20 50/25 25/13 40/20 |                  |  |
| $I_{cu}/I_{cs}$ (sym)                            |                                                  |                                                             |                  |  |
| <b>■ Rated short time withstand current, kA</b>  |                                                  |                                                             |                  |  |
| Weight (● marked standard type) kg               | 0.6 0.8 1.0                                      | 0.8 1.0                                                     |                  |  |
| <b>■ Connections and Mountings</b>               |                                                  |                                                             |                  |  |
| Front-connected (FC)                             | Terminal screws                                  | ●                                                           |                  |  |
|                                                  | With straight extension bars                     | ○                                                           |                  |  |
|                                                  | With spread extension bars                       | — ○                                                         |                  |  |
|                                                  | Cable clamps                                     | —                                                           |                  |  |
| Rear-connected (RC)                              | Bolt studs                                       | —                                                           |                  |  |
|                                                  | Flat bar studs                                   | ○                                                           |                  |  |
| Plug-in (PM)                                     | For switchboards Standard (PMC)                  | —                                                           |                  |  |
|                                                  | High-performance (PMB)                           | —                                                           |                  |  |
|                                                  | For distribution boards (PMC)                    | —                                                           |                  |  |
| Draw-out type (DR)                               | —                                                | —                                                           |                  |  |
| TemPlug70 (PG)                                   | —                                                | —                                                           |                  |  |
| TemPlug45B (PG4)                                 | —                                                | —                                                           |                  |  |
| DIN rail mount                                   | — ○ ①                                            | ○ ①                                                         |                  |  |
| Clip-in chassis mount                            | —                                                | —                                                           |                  |  |
| <b>■ Accessories (optional)</b>                  |                                                  |                                                             |                  |  |
| Externally mounted                               | Motor operator                                   | M C                                                         | —                |  |
|                                                  | External operating handle                        | Breaker-mounted H B                                         | — ●              |  |
|                                                  |                                                  | Door-mounted (variable depth) H P                           | — ●              |  |
|                                                  | Toggle extension                                 | H A                                                         | —                |  |
|                                                  | Mechanical interlock Slide type                  | M S                                                         | — ●              |  |
|                                                  | Toggle holder                                    | H H                                                         | — ●              |  |
|                                                  | Toggle lock                                      | H L                                                         | — ●              |  |
|                                                  | Terminal cover For front-connected               | C F                                                         | — ●              |  |
|                                                  | For rear-connected and plug-in                   | C R                                                         | — ●              |  |
|                                                  | For cable clamps                                 | C S                                                         | —                |  |
|                                                  | Interpole barrier                                | B A                                                         | — ● ③            |  |
|                                                  | Terminal block for lead                          | T F                                                         | — ●              |  |
|                                                  | Door flange                                      | D F                                                         | — ●              |  |
|                                                  | <b>■ Standard specifications</b>                 |                                                             |                  |  |
|                                                  | Overcurrent trip mechanism                       | Thermal-magnetic                                            | Thermal-magnetic |  |
|                                                  | Trip button (color)                              | Yes (Red)                                                   | Yes (Red)        |  |
|                                                  | Handle position indication (ON: Red, OFF: Green) | Yes                                                         | Yes              |  |
|                                                  | Suitability for isolation                        | Yes                                                         | Yes              |  |
|                                                  | CE marking                                       | Yes                                                         | Yes              |  |

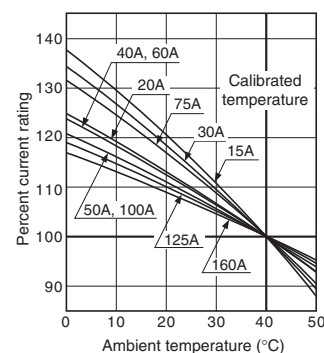
#### Notes:

- : Standard. This configuration used unless otherwise specified. ○ : Optional standard. Specify when ordering.  
 ● : "yes" or "available". — : "no" or "not available". ① : DC rating available on request.  
 ③ : Line side interpole barriers are supplied as standard. (Front connection only) ①① : Provided with DIN rail adaptor.

#### Time/Current characteristic curves



#### Ambient Compensating Curves

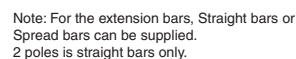


#### Combinations of Internally Mounted Accessories (Optional)

| Poles  | AX               | AL           | SH         | UV                 | AX         | AX         | AX         | AL         | AL         | AX         | AX         |
|--------|------------------|--------------|------------|--------------------|------------|------------|------------|------------|------------|------------|------------|
|        | Auxiliary switch | Alarm switch | Shunt trip | Under voltage trip | AX         | SH         | UV         | SH         | UV         | AX         | UV         |
| 4-pole | □ □ □ □          | □ □ □ □      | □ □ □ □    | □ □ □ □            | □ □ □ □    | □ □ □ □    | □ □ □ □    | □ □ □ □    | □ □ □ □    | □ □ □ □    | □ □ □ □    |
|        | Left pole        | Left pole    | Left pole  | Left pole          | Left pole  | Left pole  | Left pole  | Left pole  | Left pole  | Left pole  | Left pole  |
|        | Toggle           | Toggle       | Toggle     | Toggle             | Toggle     | Toggle     | Toggle     | Toggle     | Toggle     | Toggle     | Toggle     |
|        | Right pole       | Right pole   | Right pole | Right pole         | Right pole | Right pole | Right pole | Right pole | Right pole | Right pole | Right pole |

## S160-SCF, S160-SF

### Preparation of conductor



Detail of  
connecting part



| Rated current (A) | A    | B   | C | D  | E  | F |
|-------------------|------|-----|---|----|----|---|
| 15-50             | 10.5 | 6.5 | 4 | 13 | 16 | 4 |
| 60-160            | 12.5 | 8.5 | 4 | 13 | 16 | 5 |

Panel cutout dimensions shown give an allowance of 1.0mm around the handle escutcheon.



## Molded Case Circuit Breakers

## E250-SF, S250-SF

### Time/Current characteristic curves

The graph illustrates the tripping characteristics of a 250A circuit breaker. The Y-axis represents Tripping Time, ranging from 0.005 to 3 hours on a logarithmic scale. The X-axis represents Percent Rated Current, ranging from 100 to 8000 on a logarithmic scale. Two curves are plotted: a 'Max.' curve (upper) and a 'Min.' curve (lower). The area between these curves is shaded, representing the range of possible tripping times. Annotations indicate the magnetic trip settings for the curves: 880%–1320% for the Max. curve and 1040%–1560% for the Min. curve.

| Percent Rated Current | Max. Tripping Time (hours) | Min. Tripping Time (hours) |
|-----------------------|----------------------------|----------------------------|
| 100                   | > 3                        | > 3                        |
| 125                   | ~1.5                       | ~0.5                       |
| 200                   | ~0.5                       | ~0.15                      |
| 400                   | ~0.15                      | ~0.05                      |
| 700                   | ~0.08                      | ~0.02                      |
| 1000                  | ~0.05                      | ~0.01                      |
| 1500                  | ~0.02                      | ~0.005                     |
| 2000                  | ~0.02                      | ~0.005                     |
| 4000                  | ~0.02                      | ~0.005                     |
| 8000                  | ~0.02                      | ~0.005                     |

Figure 1 is a line graph showing the relationship between Percent current rating (Y-axis, 90 to 140) and Ambient temperature (°C) (X-axis, 5 to 55) for a Calibrated temperature. The graph displays six curves representing different current ratings: 125A, 175A, 225A, 250A, 200A, and 150A. The curves show that the percent current rating decreases as the ambient temperature increases, with the rate of decrease being more pronounced at higher temperatures. The curves for 125A and 175A are the highest, while the curves for 200A and 150A are the lowest.

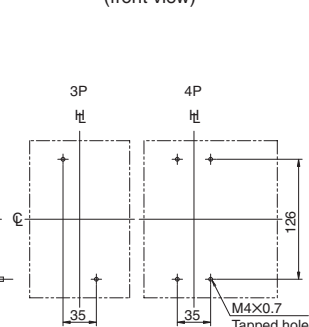
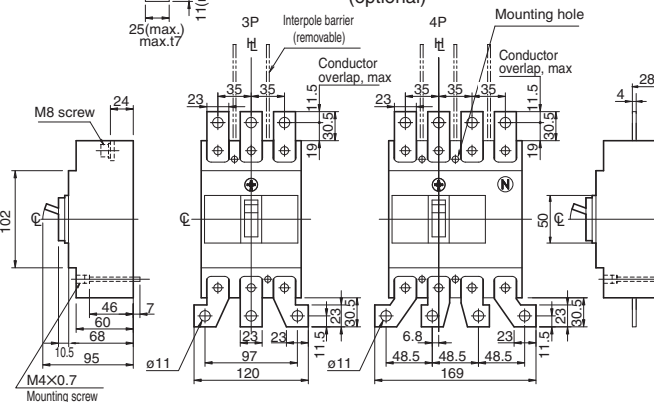
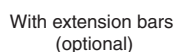
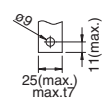
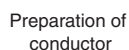
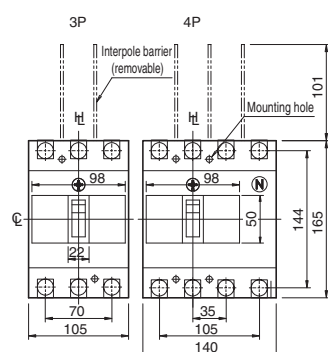
| Ambient temperature (°C) | 125A (%) | 175A (%) | 225A (%) | 250A (%) | 200A (%) | 150A (%) |
|--------------------------|----------|----------|----------|----------|----------|----------|
| 5                        | 125      | 122      | 120      | 118      | 115      | 112      |
| 15                       | 122      | 119      | 117      | 115      | 112      | 109      |
| 25                       | 119      | 116      | 114      | 112      | 109      | 106      |
| 35                       | 116      | 113      | 111      | 109      | 106      | 103      |
| 45                       | 113      | 110      | 108      | 106      | 103      | 100      |
| 55                       | 110      | 107      | 105      | 103      | 100      | 97       |

### Combinations of Internally Mounted Accessories (Optional)

4-8

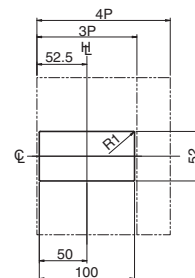
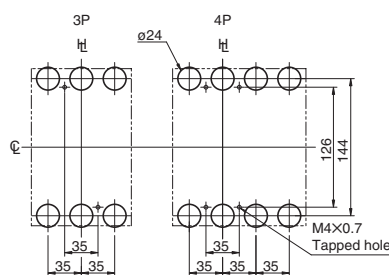
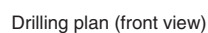
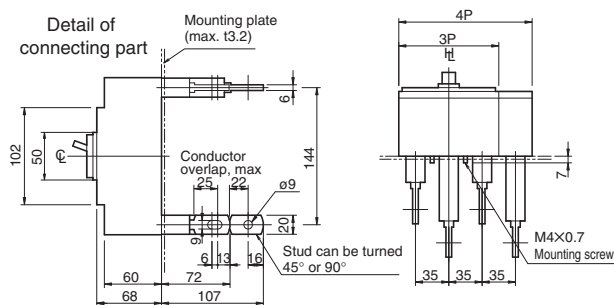
## E250-SF, S250-SF

## Front-connected



Note: For the extension bars, Straight bars or Spread bars can be supplied.

## Rear-connected



Panel cutout dimensions shown give an allowance of 1.0mm around the handle escutcheon.



# 4

## Characteristics and Outline Dimensions *TemBreak2*

### Molded Case Circuit Breakers

(160A Frame)

### S160-SCJ, S160-SJ

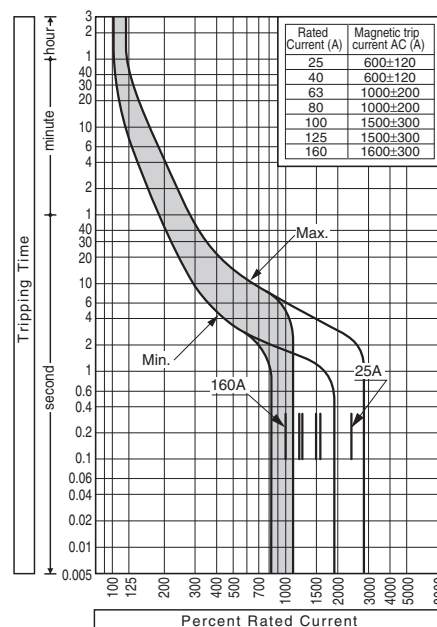
#### Ratings and Specifications

| Type                                             | S160-SCJ                                         | S160-SJ                            |                  |        |
|--------------------------------------------------|--------------------------------------------------|------------------------------------|------------------|--------|
| Number of poles                                  | 3 4                                              | 3 4                                |                  |        |
| <b>■ Ratings</b>                                 |                                                  |                                    |                  |        |
| Rated current, A                                 | 25                                               | 25                                 |                  |        |
| Calibrated at 45°C                               | 40                                               | 40                                 |                  |        |
|                                                  | 63                                               | 63                                 |                  |        |
|                                                  | 80                                               | 80                                 |                  |        |
|                                                  | 100                                              | 100                                |                  |        |
|                                                  | 125                                              | 125                                |                  |        |
|                                                  | 160                                              | 160                                |                  |        |
|                                                  | 690                                              | 690                                |                  |        |
| Rated insulation voltage [ $U_i$ ] V             | 8                                                | 8                                  |                  |        |
| Rated impulse withstand voltage [ $U_{imp}$ ] kV | A                                                | A                                  |                  |        |
| Utilization Category                             |                                                  |                                    |                  |        |
| <b>■ Rated breaking capacity, kA</b>             |                                                  |                                    |                  |        |
| IEC60947-2                                       | AC                                               | 690V                               | —                | 6/3    |
| $I_{cu}/I_{cs}(\text{sym})$                      |                                                  | 500V                               | 7.5/4            | 10/7.5 |
|                                                  |                                                  | 440V                               | 15/7.5           | 25/13  |
|                                                  |                                                  | 415V                               | 25/13            | 40/20  |
|                                                  |                                                  | 380V                               | 25/13            | 40/20  |
|                                                  |                                                  | 240V                               | 35/18            | 50/25  |
|                                                  | ① DC                                             | 250V                               | 20/10            | 25/13  |
|                                                  |                                                  | 125V                               | 30/15            | 40/20  |
| <b>■ Rated short time withstand current, kA</b>  |                                                  |                                    |                  |        |
| Weight (● marked standard type) kg               | 0.8                                              | 1.0                                | 0.8              | 1.0    |
| <b>■ Connections and Mountings</b>               |                                                  |                                    |                  |        |
| Front-connected (FC)                             | Terminal screws                                  | ●                                  | ●                |        |
|                                                  | With straight extension bars                     | ○                                  | ○                |        |
|                                                  | With spread extension bars                       | ○                                  | ○                |        |
|                                                  | Cable clamps                                     | ○                                  | ○                |        |
| Rear-connected (RC)                              | Bolt studs                                       | —                                  | —                |        |
|                                                  | Flat bar studs                                   | ○                                  | ○                |        |
| Plug-in (PM)                                     | For switchboards Standard (PMC)                  | —                                  | —                |        |
|                                                  | High-performance (PMB)                           | —                                  | —                |        |
|                                                  | For distribution boards (PMC)                    | —                                  | —                |        |
| Draw-out type (DR)                               | —                                                | —                                  | —                |        |
| TemPlug70 (PG)                                   | —                                                | —                                  | —                |        |
| TemPlug45B (PG4)                                 | —                                                | —                                  | —                |        |
| DIN rail mount                                   | ○ ①                                              | ○ ①                                |                  |        |
| Clip-in chassis mount                            | —                                                | —                                  |                  |        |
| <b>■ Accessories (optional)</b>                  |                                                  |                                    |                  |        |
| Externally mounted                               | Motor operator                                   | M C                                | —                | —      |
|                                                  | External operating handle                        | Breaker-mounted H B                | ●                | ●      |
|                                                  |                                                  | Door-mounted (variable depth) H P  | ●                | ●      |
|                                                  | Toggle extension                                 | H A                                | —                | —      |
|                                                  | Mechanical interlock Slide type                  | M S                                | ●                | ●      |
|                                                  | Toggle holder                                    | H H                                | ●                | ●      |
|                                                  | Toggle lock                                      | H L                                | ●                | ●      |
|                                                  | Terminal cover                                   | For front-connected C F            | ●                | ●      |
|                                                  |                                                  | For rear-connected and plug-in C R | ●                | ●      |
|                                                  |                                                  | For cable clamps C S               | ●                | ●      |
|                                                  | Interpole barrier                                | B A                                | ● ③              | ● ③    |
|                                                  | Terminal block for lead                          | T F                                | ●                | ●      |
|                                                  | Door flange                                      | D F                                | ●                | ●      |
|                                                  | <b>■ Standard specifications</b>                 |                                    |                  |        |
|                                                  | Overcurrent trip mechanism                       | Thermal-magnetic                   | Thermal-magnetic |        |
|                                                  | Trip button (color)                              | Yes (Red)                          | Yes (Red)        |        |
|                                                  | Handle position indication (ON: Red, OFF: Green) | Yes                                | Yes              |        |
|                                                  | Suitability for isolation                        | Yes                                | Yes              |        |
|                                                  | CE marking                                       | Yes                                | Yes              |        |

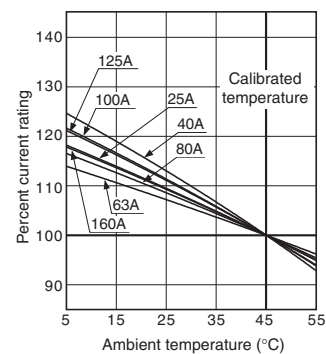
#### Notes:

- : Standard. This configuration used unless otherwise specified. ○ : Optional standard. Specify when ordering.  
● : "yes" or "available". — : "no" or "not available". ① : DC rating available on request.  
③ : Line side interpole barriers are supplied as standard. (Front connection only) ①① : Provided with DIN rail adaptor.

#### Time/Current characteristic curves



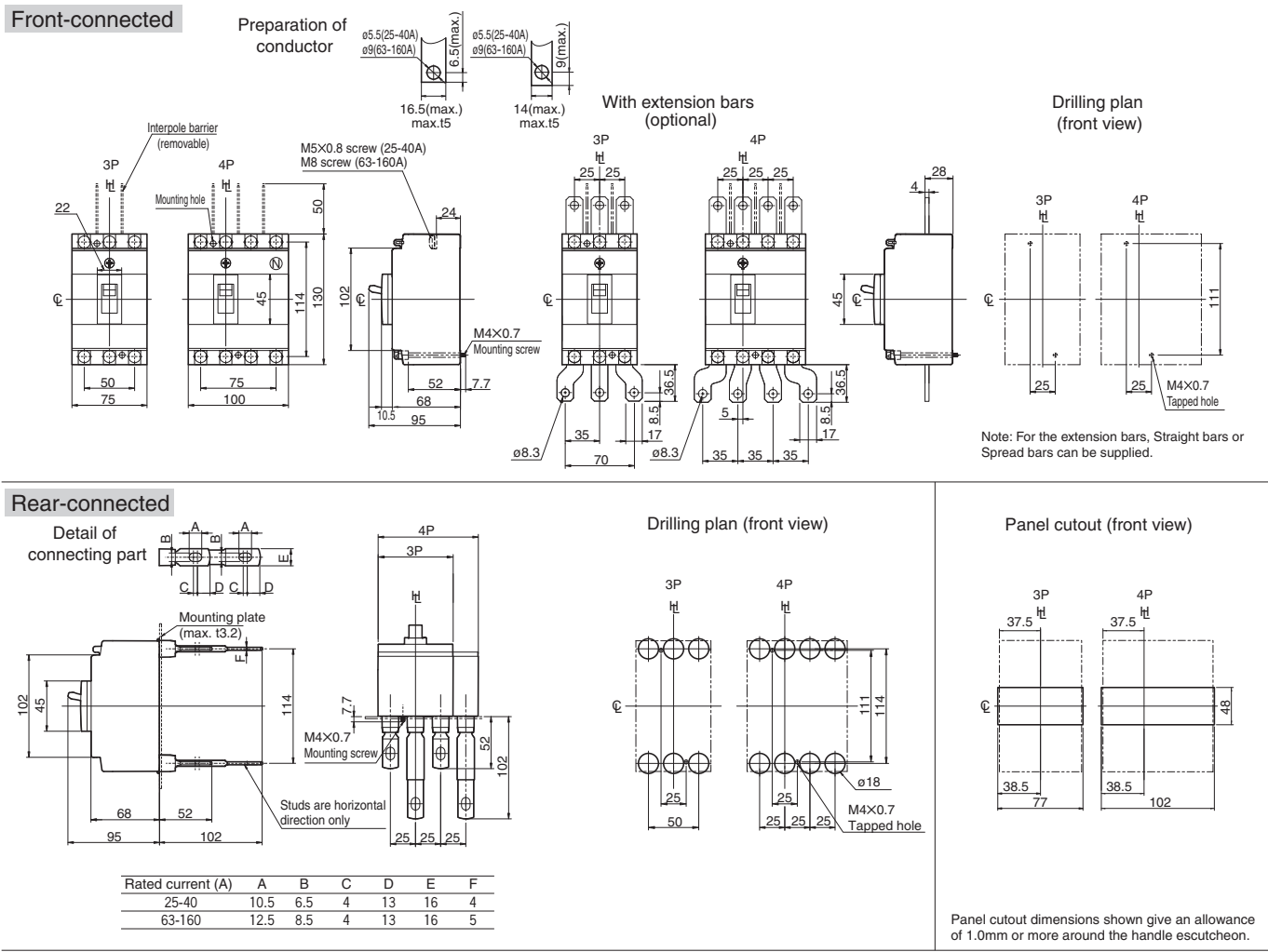
#### Ambient Compensating Curves



#### Combinations of Internally Mounted Accessories (Optional)

| Poles  | AX               | AL           | SH         | UV                 | AX | AX | AX | AL | AL | AX | AX |
|--------|------------------|--------------|------------|--------------------|----|----|----|----|----|----|----|
|        | Auxiliary switch | Alarm switch | Shunt trip | Under voltage trip | AX | SH | UV | SH | UV | AX | UV |
| 4-pole | AX               | AL           | SH         | UV                 | AX | SH | UV | SH | UV | AX | UV |
| Toggle | Left pole        | Right pole   |            |                    |    |    |    |    |    |    |    |

**Outline dimensions (mm)** **S160-SCJ, S160-SJ**



## Characteristics and Outline Dimensions *TemBreak2*

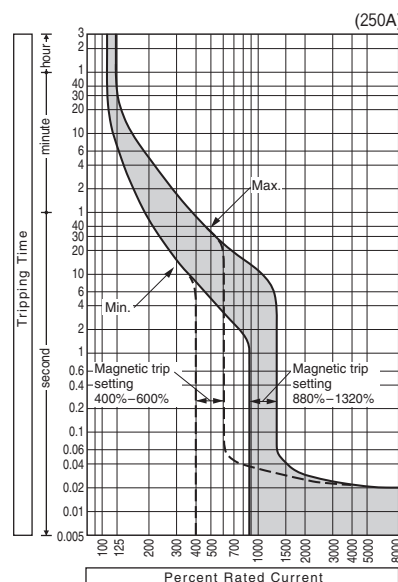
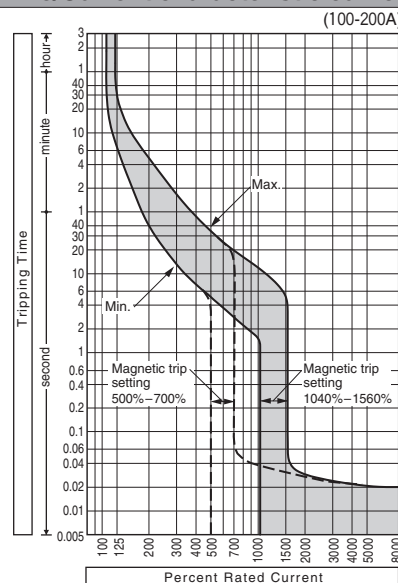
## Molded Case Circuit Breakers

## E250-SJ, S250-SJ

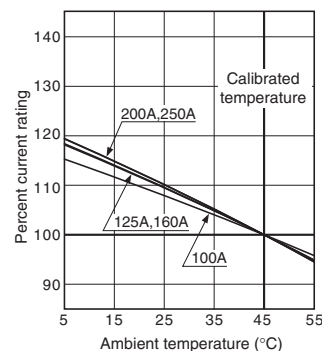
## Ratings and Specifications

| Type                                                   | E250-SJ                                |        | S250-SJ          |     |        |  |
|--------------------------------------------------------|----------------------------------------|--------|------------------|-----|--------|--|
| Number of poles                                        | 3                                      | 4      | 3                | 4   |        |  |
| ■ Ratings                                              |                                        |        |                  |     |        |  |
| Rated current, A                                       | 100                                    |        | 160              |     |        |  |
| Calibrated at 45°C                                     | 125                                    |        | 200              |     |        |  |
|                                                        | 160                                    |        | 250              |     |        |  |
|                                                        | 200                                    |        |                  |     |        |  |
|                                                        | 250                                    |        |                  |     |        |  |
|                                                        |                                        |        |                  |     |        |  |
| Rated insulation voltage [U <sub>i</sub> ] V           | 800                                    |        | 800              |     |        |  |
| Rated impulse withstand voltage [U <sub>imp</sub> ] kV | 8                                      |        | 8                |     |        |  |
| Utilization Category                                   | A                                      |        | A                |     |        |  |
| ■ Rated breaking capacity, kA                          |                                        |        |                  |     |        |  |
| IEC60947-2                                             | AC                                     | 690V   | —                |     | 4/4    |  |
| I <sub>cu</sub> /I <sub>cs</sub> (sym)                 |                                        | 500V   | 7.5/6            |     | 10/7.5 |  |
|                                                        |                                        | 440V   | 15/12            |     | 30/15  |  |
|                                                        |                                        | 415V   | 25/19            |     | 40/20  |  |
|                                                        |                                        | 380V   | 25/19            |     | 40/20  |  |
|                                                        |                                        | 240V   | 35/27            |     | 85/43  |  |
| ① DC                                                   |                                        | 250V   | 15/12            |     | 25/13  |  |
|                                                        |                                        | 125V   | 25/19            |     | 40/20  |  |
| ■ Rated short time withstand current, kA               |                                        |        |                  |     |        |  |
| Weight (● marked standard type) kg                     | 1.5                                    |        | 1.9              | 1.5 | 1.9    |  |
| ■ Connections and Mountings                            |                                        |        |                  |     |        |  |
| Front-connected (FC)                                   | Terminal screws                        | ●      | ●                |     |        |  |
|                                                        | With straight extension bars           | ○      | ○                |     |        |  |
|                                                        | With spread extension bars             | ○      | ○                |     |        |  |
|                                                        | Cable clamps                           | ○      | ○                |     |        |  |
| Rear-connected (RC)                                    | Bolt studs                             | —      | —                |     |        |  |
|                                                        | Flat bar studs                         | ○      | ○                |     |        |  |
| Plug-in (PM)                                           | For switchboards                       | —      | —                |     |        |  |
|                                                        | Standard (PMC)                         | —      | —                |     |        |  |
|                                                        | High-performance (PMB)                 | —      | —                |     |        |  |
|                                                        | For distribution boards (PMC)          | —      | —                |     |        |  |
| Draw-out type (DR)                                     |                                        | —      | —                |     |        |  |
| TemPlug70 (PG)                                         |                                        | —      | —                |     |        |  |
| TemPlug45B (PG4)                                       |                                        | —      | —                |     |        |  |
| DIN rail mount                                         |                                        | —      | —                |     |        |  |
| Clip-in chassis mount                                  |                                        | —      | —                |     |        |  |
| ■ Accessories (optional)                               |                                        | Symbol |                  |     |        |  |
| Motor operator                                         | M C                                    | ●      | ●                |     |        |  |
| External operating handle                              | Breaker-mounted H B                    | ●      | ●                |     |        |  |
|                                                        | Door-mounted (variable depth) H P      | ●      | ●                |     |        |  |
| Externally mounted                                     | Toggle extension H A                   | —      | —                |     |        |  |
|                                                        | Mechanical interlock Slide type M S    | ●      | ●                |     |        |  |
|                                                        | Toggle holder H H                      | ●      | ●                |     |        |  |
|                                                        | Toggle lock H L                        | ●      | ●                |     |        |  |
|                                                        | Terminal cover For front-connected C F | ●      | ●                |     |        |  |
|                                                        | For rear-connected and plug-in C R     | ●      | ●                |     |        |  |
|                                                        | For cable clamps C S                   | ●      | ●                |     |        |  |
|                                                        | Interpole barrier B A                  | ● ③    | ● ③              |     |        |  |
|                                                        | Terminal block for lead T F            | ●      | ●                |     |        |  |
|                                                        | Door flange D F                        | ●      | ●                |     |        |  |
| ■ Standard specifications                              |                                        |        |                  |     |        |  |
| Overcurrent trip mechanism                             | Thermal-magnetic                       |        | Thermal-magnetic |     |        |  |
| Trip button (color)                                    | Yes (Red)                              |        | Yes (Red)        |     |        |  |
| Handle position indication (ON: Red, OFF: Green)       | Yes                                    |        | Yes              |     |        |  |
| Suitability for isolation                              | Yes                                    |        | Yes              |     |        |  |
| CE marking                                             | Yes                                    |        | Yes              |     |        |  |

### Time/Current characteristic curves



## Ambient Compensating Curves



### Combinations of Internally Mounted Accessories (Optional)

| Poles            | AX | AL | SH | UV | AX | AX | AX | AL | AL | AX<br>AL<br>SH | AX<br>AL<br>UV |
|------------------|----|----|----|----|----|----|----|----|----|----------------|----------------|
| Auxiliary switch |    |    |    |    |    |    |    |    |    |                |                |
| 4-w              |    |    |    |    |    |    |    |    |    |                |                |

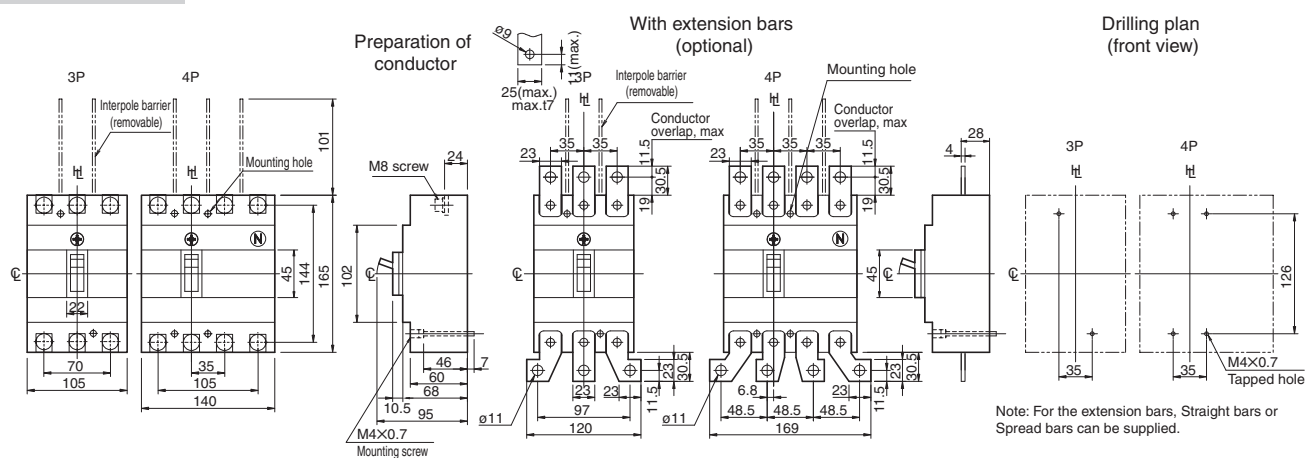
Toggle

Left pole

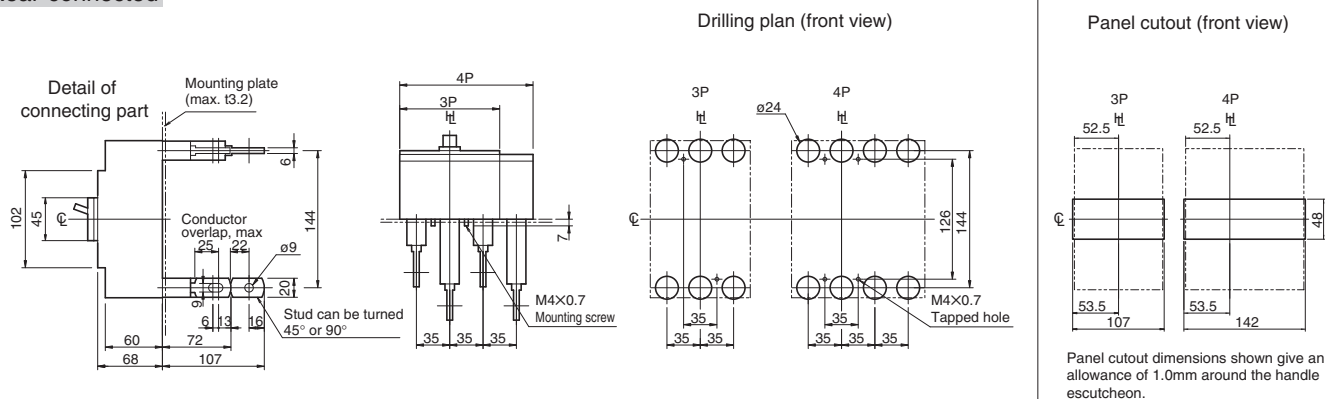
Right pole

## E250-SJ, S250-SJ

## Front-connected



## Rear-connected



## 4

Characteristics and Outline Dimensions *TemBreak2*

## Molded Case Circuit Breakers

(160A Frame)

## S160-SN

## Ratings and Specifications

| Type                                             |                                 | S160-SN                        |     |   |  |  |
|--------------------------------------------------|---------------------------------|--------------------------------|-----|---|--|--|
| Number of poles                                  |                                 | 3                              | 4   |   |  |  |
| ■ Ratings                                        |                                 |                                |     |   |  |  |
| Rated current, A                                 |                                 | 160                            |     |   |  |  |
| Rated insulation voltage [ $U_i$ ] V             |                                 | 690                            |     |   |  |  |
| Rated operational voltage V                      | AC                              | 690                            |     |   |  |  |
|                                                  | DC                              | 250                            |     |   |  |  |
| Rated short circuit making capacity, kA peak     |                                 | 2.8                            |     |   |  |  |
| Rated short time withstand current, kA           |                                 | 2 (0.3sec)                     |     |   |  |  |
| Rated impulse withstand voltage [ $U_{imp}$ ] kV |                                 | 8                              |     |   |  |  |
| ■ Performance                                    |                                 |                                |     |   |  |  |
| Utilization category                             | AC 690V                         | AC-23A                         |     |   |  |  |
| IEC 60947-3                                      | DC 250V                         | DC-22A                         |     |   |  |  |
| Upstream breaker (OCPD) ②                        |                                 | S160-SF                        |     |   |  |  |
| Weight (● marked standard type) kg               |                                 | 0.7                            | 0.9 |   |  |  |
| ■ Connections and Mountings                      |                                 |                                |     |   |  |  |
| Front-connected (FC)                             | Terminal screws                 | ●                              |     |   |  |  |
|                                                  | With straight extension bars    | ○                              |     |   |  |  |
|                                                  | With spread extension bars      | ○                              |     |   |  |  |
|                                                  | Cable clamps                    | ○                              |     |   |  |  |
| Rear-connected (RC)                              | Bolt studs                      | —                              |     |   |  |  |
|                                                  | Flat bar studs                  | ○                              |     |   |  |  |
| Plug-in (PM)                                     | For switchboards Standard (PMC) | —                              |     |   |  |  |
|                                                  | High-performance (PMB)          | —                              |     |   |  |  |
|                                                  | For distribution boards (PMC)   | —                              |     |   |  |  |
| Draw-out type (DR)                               |                                 | —                              |     |   |  |  |
| TemPlug70 (PG)                                   |                                 | —                              |     |   |  |  |
| TemPlug45B (PG4)                                 |                                 | —                              |     |   |  |  |
| DIN rail mount                                   |                                 | ○ ①                            |     |   |  |  |
| Clip-in chassis mount                            |                                 | —                              |     |   |  |  |
| ■ Accessories (optional)                         |                                 | Symbol                         |     |   |  |  |
| Externally mounted                               | Motor operator                  | M C                            |     |   |  |  |
|                                                  | External operating handle       | H B                            | ●   |   |  |  |
|                                                  | Door-mounted (variable depth)   | H P                            | ●   |   |  |  |
|                                                  | Toggle extension                | H A                            | —   |   |  |  |
|                                                  | Mechanical interlock Slide type | M S                            | ●   |   |  |  |
|                                                  | Toggle holder                   | H H                            | ●   |   |  |  |
|                                                  | Toggle lock                     | H L                            | ●   |   |  |  |
|                                                  | Terminal cover                  | For front-connected            | C F | ● |  |  |
|                                                  |                                 | For rear-connected and plug-in | C R | ● |  |  |
|                                                  |                                 | For cable clamps               | C S | ● |  |  |
|                                                  | Interpole barrier               | B A                            | ● ③ |   |  |  |
|                                                  | Terminal block for lead         | T F                            | ●   |   |  |  |
|                                                  | Door flange                     | D F                            | ●   |   |  |  |
|                                                  |                                 |                                |     |   |  |  |
| ■ Standard specifications                        |                                 |                                |     |   |  |  |
| Trip button (color)                              |                                 | Yes (Red)                      |     |   |  |  |
| Handle position indication (ON: Red, OFF: Green) |                                 | Yes                            |     |   |  |  |
| Suitability for isolation                        |                                 | Yes                            |     |   |  |  |
| CE marking                                       |                                 | Yes                            |     |   |  |  |

## Notes:

● : Standard. This configuration used unless otherwise specified.

○ : Optional standard. Specify when ordering.

● : "yes" or "available".

— : "no" or "not available".

③ : Line side interpole barriers are supplied as standard. (Front connection only)

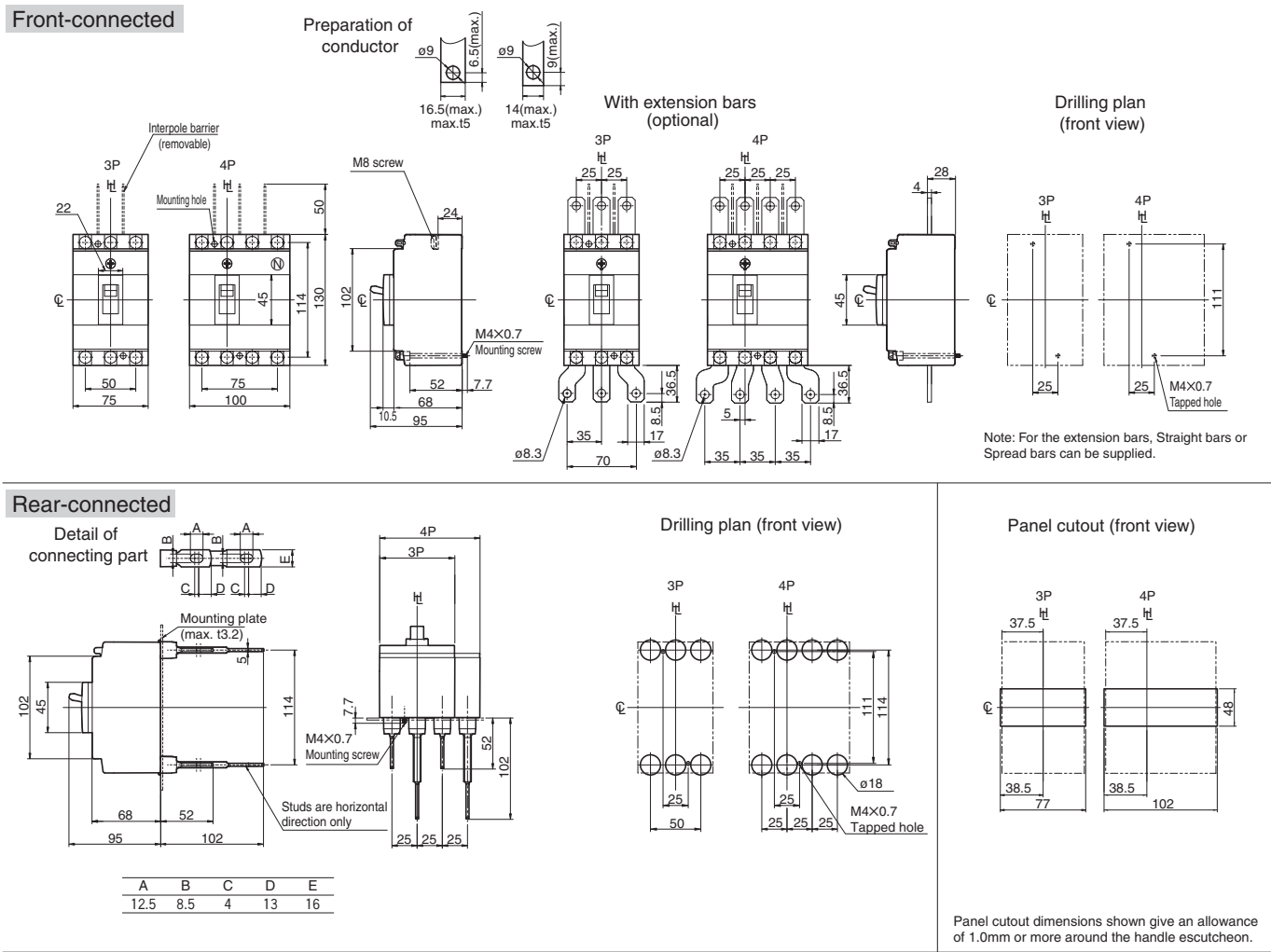
① : Provided with DIN rail adaptor.

② : Required for overcurrent protection. Rated conditional short-circuit current [ $I_{cc}$ ] will be the same as Rated short-circuit breaking capacity of upstream breaker.

## Combinations of Internally Mounted Accessories (Optional)

| Poles | AX               | AL                      | SH         | UV                 | AX | AX | AX | AL | AL | AX | AX |
|-------|------------------|-------------------------|------------|--------------------|----|----|----|----|----|----|----|
|       | Auxiliary switch | Alarm switch            | Shunt trip | Under voltage trip | AX | SH | UV | SH | UV | AL | UV |
| 4     |                  |                         |            |                    |    |    |    |    |    |    |    |
|       |                  | Left pole<br>Right pole |            |                    |    |    |    |    |    |    |    |

**Outline dimensions (mm)** **S160-SN**



## 4

Characteristics and Outline Dimensions *TemBreak2*

## Molded Case Circuit Breakers

(250A Frame)

## S250-SN

## Ratings and Specifications

| Type                                             |                                 | S250-SN                        |     |   |  |  |
|--------------------------------------------------|---------------------------------|--------------------------------|-----|---|--|--|
| Number of poles                                  |                                 | 3                              | 4   |   |  |  |
| ■ Ratings                                        |                                 |                                |     |   |  |  |
| Rated current, A                                 |                                 | 250                            |     |   |  |  |
| Rated insulation voltage [ $U_i$ ] V             |                                 | 800                            |     |   |  |  |
| Rated operational voltage V                      | AC                              | 690                            |     |   |  |  |
|                                                  | DC                              | 250                            |     |   |  |  |
| Rated short circuit making capacity, kA peak     |                                 | 6                              |     |   |  |  |
| Rated short time withstand current, kA           |                                 | 3 (0.3sec)                     |     |   |  |  |
| Rated impulse withstand voltage [ $U_{imp}$ ] kV |                                 | 8                              |     |   |  |  |
| ■ Performance                                    |                                 |                                |     |   |  |  |
| Utilization category                             | AC 690V                         | AC-23A                         |     |   |  |  |
| IEC 60947-3                                      | DC 250V                         | DC-22A                         |     |   |  |  |
| Upstream breaker (OCPD) ②                        |                                 | S250-SF                        |     |   |  |  |
| Weight (● marked standard type) kg               |                                 | 1.5                            | 1.9 |   |  |  |
| ■ Connections and Mountings                      |                                 |                                |     |   |  |  |
| Front-connected (FC)                             | Terminal screws                 | ●                              |     |   |  |  |
|                                                  | With straight extension bars    | ○                              |     |   |  |  |
|                                                  | With spread extension bars      | ○                              |     |   |  |  |
|                                                  | Cable clamps                    | ○                              |     |   |  |  |
| Rear-connected (RC)                              | Bolt studs                      | —                              |     |   |  |  |
|                                                  | Flat bar studs                  | ○                              |     |   |  |  |
| Plug-in (PM)                                     | For switchboards Standard (PMC) | —                              |     |   |  |  |
|                                                  | High-performance (PMB)          | —                              |     |   |  |  |
|                                                  | For distribution boards (PMC)   | —                              |     |   |  |  |
| Draw-out type (DR)                               |                                 | —                              |     |   |  |  |
| TemPlug70 (PG)                                   |                                 | —                              |     |   |  |  |
| TemPlug45B (PG4)                                 |                                 | —                              |     |   |  |  |
| DIN rail mount                                   |                                 | —                              |     |   |  |  |
| Clip-in chassis mount                            |                                 | —                              |     |   |  |  |
| ■ Accessories (optional)                         |                                 | Symbol                         |     |   |  |  |
| Externally mounted                               | Motor operator                  | M C                            | ●   |   |  |  |
|                                                  | External operating handle       | H B                            | ●   |   |  |  |
|                                                  | Door-mounted (variable depth)   | H P                            | ●   |   |  |  |
|                                                  | Toggle extension                | H A                            | —   |   |  |  |
|                                                  | Mechanical interlock Slide type | M S                            | ●   |   |  |  |
|                                                  | Toggle holder                   | H H                            | ●   |   |  |  |
|                                                  | Toggle lock                     | H L                            | ●   |   |  |  |
|                                                  | Terminal cover                  | For front-connected            | C F | ● |  |  |
|                                                  |                                 | For rear-connected and plug-in | C R | ● |  |  |
|                                                  |                                 | For cable clamps               | C S | ● |  |  |
|                                                  | Interpole barrier               | B A                            | ● ③ |   |  |  |
|                                                  | Terminal block for lead         | T F                            | ●   |   |  |  |
|                                                  | Door flange                     | D F                            | ●   |   |  |  |
| ■ Standard specifications                        |                                 |                                |     |   |  |  |
| Trip button (color)                              |                                 | Yes (Red)                      |     |   |  |  |
| Handle position indication (ON: Red, OFF: Green) |                                 | Yes                            |     |   |  |  |
| Suitability for isolation                        |                                 | Yes                            |     |   |  |  |
| CE marking                                       |                                 | Yes                            |     |   |  |  |

## Notes:

● : Standard. This configuration used unless otherwise specified.

○ : Optional standard. Specify when ordering.

● : "yes" or "available".

— : "no" or "not available".

③ : Line side interpole barriers are supplied as standard. (Front connection only)

② : Required for overcurrent protection. Rated conditional short-circuit current [ $I_{cc}$ ] will be the same as Rated short-circuit breaking capacity of upstream breaker.

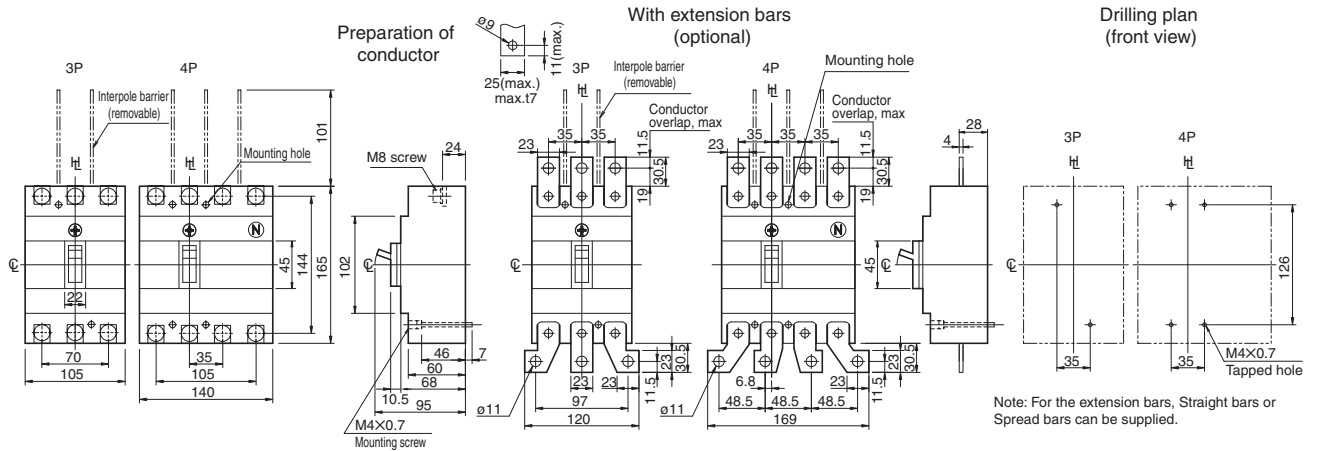
## Combinations of Internally Mounted Accessories (Optional)

| Poles | AX               | AL           | SH         | UV                 | AX | AX | AX | AL | AL | AX | AX |
|-------|------------------|--------------|------------|--------------------|----|----|----|----|----|----|----|
|       | Auxiliary switch | Alarm switch | Shunt trip | Under voltage trip | AX | SH | UV | SH | UV | AX | AL |
| 4     |                  |              |            |                    |    |    |    |    |    |    |    |
| 3     |                  |              |            |                    |    |    |    |    |    |    |    |
| 2     |                  |              |            |                    |    |    |    |    |    |    |    |
| 1     |                  |              |            |                    |    |    |    |    |    |    |    |
|       |                  |              |            |                    |    |    |    |    |    |    |    |

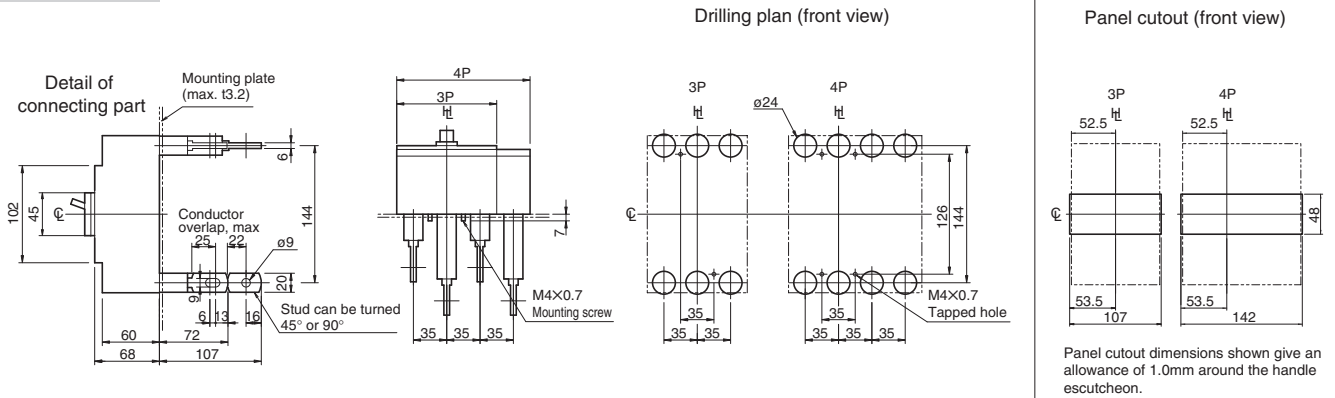
# Outline dimensions (mm)

**S250-SN**

## Front-connected



## Rear-connected





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## **Safety Notice**

Carefully read instruction manual to ensure proper installation, connection, operation, handling and maintenance of the product.

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