

TEMBREAK 2 MINI MOULDED CASE CIRCUIT BREAKERS

TEMBREAK 2

MOULDED CASE CIRCUIT BREAKERS 16A TO 630A

1. Welcome to TemBreak 2
2. Ratings and Specifications
3. Operating Characteristics
4. Application Data
5. Accessories
6. Installation
7. Dimensions

TEMBREAK 2

MINI MOULDED CASE CIRCUIT BREAKERS 10A TO 100A

8. TemBreak 2 MINI Moulded Case Circuit Breakers

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TEMBREAK

MOULDED CASE CIRCUIT BREAKERS 630A TO 1600A

9. TemBreak Moulded Case Circuit Breakers

10. Item Numbers

TEMBREAK 2 MINI MOULDED CASE CIRCUIT BREAKERS

MINI MOULDED CASE CIRCUIT BREAKERS EASY SELECTION GUIDE

You can save space and money with Terasaki's new compact and economical Mini Moulded Case Circuit Breakers.

The range of products includes:

- Moulded Case Circuit Breakers (MCCBs)
- Switch Disconnectors in the same compact moulded case frame sizes as MCCBs
- A comprehensive range of accessories.



KEY TO MODEL AND TYPE DESIGNATIONS

Model Denoted by E S

Type Denoted by N F

E	Economical
S	Standard

N	Medium breaking capacity
---	--------------------------





E	100	N	F
---	-----	---	---

Frame rating, In (A)

F	Fixed thermal, fixed magnetic
N	No protection

TEMBREAK 2 MINI MOULDED CASE CIRCUIT BREAKERS

EASY SELECTION GUIDE

<div>Frame Ratings (A)</div> <div></div> <div>50</div>		<div></div> <div>100</div>		<div></div> <div>125/250/400/630</div>	<div></div> <div>800/1250/1600</div>												
<div>MCCBs</div>																	
<div><table><tr><td>Model</td><td>Type</td><td>I_{cu} (kA)</td></tr><tr><td>E50</td><td>NF</td><td>10</td></tr></table></div>		Model	Type	I _{cu} (kA)	E50	NF	10	<div><table><tr><td>Model</td><td>Type</td><td>I_{cu} (kA)</td></tr><tr><td>E100</td><td>NF</td><td>10</td></tr></table></div>		Model	Type	I _{cu} (kA)	E100	NF	10	<div>TemBreak 2 Moulded Case Circuit Breakers. Refer to Sections 1 to 7</div>	
Model	Type	I _{cu} (kA)															
E50	NF	10															
Model	Type	I _{cu} (kA)															
E100	NF	10															
<div><div>E</div><div>S</div></div>				<div>TemBreak 2 Moulded Case Circuit Breakers. Refer to Section 9</div>													
<div><div>I_n (A)</div><div><div>50</div><div>10</div></div></div>		<div><div>100</div><div>60</div></div>		<div><div>1600</div><div>630</div></div>													
<div>Switch-Disconnectors</div>				<div><div>630</div><div>16</div></div>													
<div><table><tr><td>Model</td><td>Type</td></tr><tr><td>E50</td><td>NN</td></tr></table></div>		Model	Type	E50	NN	<div><table><tr><td>Model</td><td>Type</td></tr><tr><td>E100</td><td>NN</td></tr></table></div>		Model	Type	E100	NN						
Model	Type																
E50	NN																
Model	Type																
E100	NN																

Note: All breaking capacities are r.m.s. symmetrical at 415V AC

TEMBREAK 2 MINI MOULDED CASE CIRCUIT BREAKERS

RATINGS AND SPECIFICATIONS

Mini MCCB Electrical Characteristics to IEC 60947-2, EN 60947-2, JIS C 8201-2-1 Ann.1, AS/NZS 3947-2, NEMA-AB1

Frame	Quantity	Unit	Condition	50	100
Model				S50	E100
Number of Poles				2, 3	2, 3
Type				NF	NF
Nominal current ratings					
	I_n	(A)	40°C	10, 15, 20, 30 40, 50	60, 75, 100
Electrical characteristics					
Rated operational voltage	U_c	(V)	AC 50/60 Hz DC	600 250	600 250
Rated insulation voltage	U_i	(V)		690	690
Rated impulse withstand voltage	U_{imp}	(kV)		6	6
Ultimate breaking capacity (IEC, JIS, AS/NZS)	I_{cu}	(kA)	600V AC	5	5
			500V AC	7.5	7.5
			380/440V AC	10	10
			220/240V AC	25	25
			250V DC	5	5
Service breaking capacity (IEC, JIS, AS/NZS)	I_{cs}	(kA)	600V AC	3	3
			500V AC	4	4
			380/440V AC	5	5
			220/240V AC	13	13
			250V DC	3	3
Rated breaking capacity (NEMA)		(kA)	480V AC 240VAC	- -	- -
Protection					
Adjustable thermal, adjustable magnetic				■	■
Fixed thermal, fixed magnetic					
Microprocessor					
Utilisation category				A	A
Installation					
Front connection (FC)				■	■
Attached flat bar (FB)				-	-
Solderless terminal (cable clamp) (FW)				-	-
Rear connection (RC)				●	●
Plug-in (PM)				-	-
Draw- out (DR)				-	-
DIN rail mounting (DA)				■	■
Dimensions					
h		(mm)		100	100
w		(mm)	2 pole	50	50
			3 pole	75	75
d		(mm)		60	60
Operation					
Direct Opening Action				-	-
Toggle operation				■	■
Variable depth / direct mount operating handle (HB/HP)				-	-
Motor operator (MC)				-	-

TEMBREAK 2 MINI MOULDED CASE CIRCUIT BREAKERS

RATINGS AND SPECIFICATIONS

Mini Switch Disconnectors Electrical Characteristics to IEC 60947-3, EN 60947-3, AS/NZS 3947-3

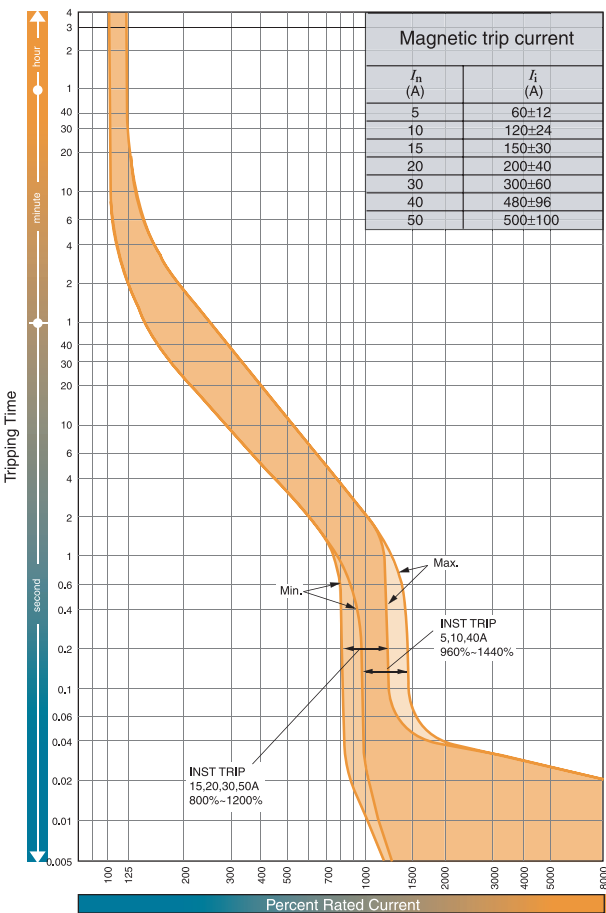
Frame	Quantity	Unit	Condition	50	100
Model				S50	E100
Number of Poles				2, 3	2, 3
Type				NN	NN
Nominal current ratings					
	I_n	(A)		50	100
Electrical characteristics					
Rated operational voltage	U_c	(V)	AC 50/60 Hz DC	550 250	600 250
Rated insulation voltage	U_i	(V)		690	690
Rated impulse withstand voltage	U_{imp}	(kV)		6	6
Rated Short-circuit making capacity	I_{cm}	(kA peak)		1.5	1.5
Rated Short-time withstand current	I_{cw}	(kA rms)	1 Second	1	1.2
Utilisation category			AC DC	AC-22A DC-22A	AC-22A DC22-A
Installation					
Front connection (FC)				■	■
Attached flat bar (FB)				●	●
Solderless terminal (cable clamp) (FW)				-	-
Rear connection (RC)				●	●
Plug-in (PM)				-	-
Draw- out (DR)				-	-
DIN rail mounting (DA)				■	■
Dimensions					
h	(mm)			100	100
w	(mm)	2 pole		50	50
		3 pole		75	75
d	(mm)			60	60
Operation					
Direct Opening Action				-	-
Toggle operation				■	■
Variable depth / direct mount operating handle (HB/HP)				-	-
Motor operator (MC)				-	-

TEMBREAK 2 MINI MOULDED CASE CIRCUIT BREAKERS

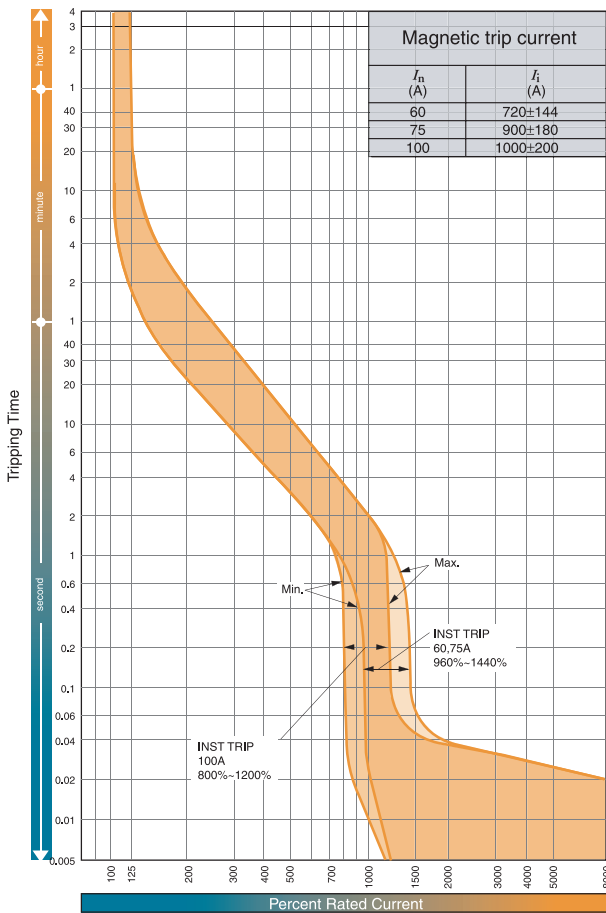
OPERATING CHARACTERISTICS

50A and 100A Frame

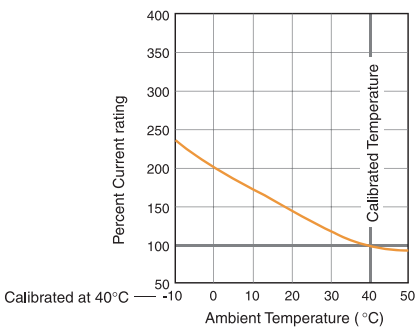
Time/current characteristic curves
S50-NF



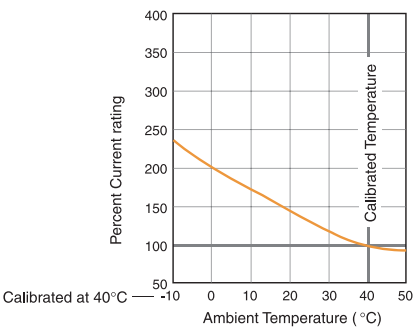
Time/current characteristic curves
E100-NF



Ambient compensating curves

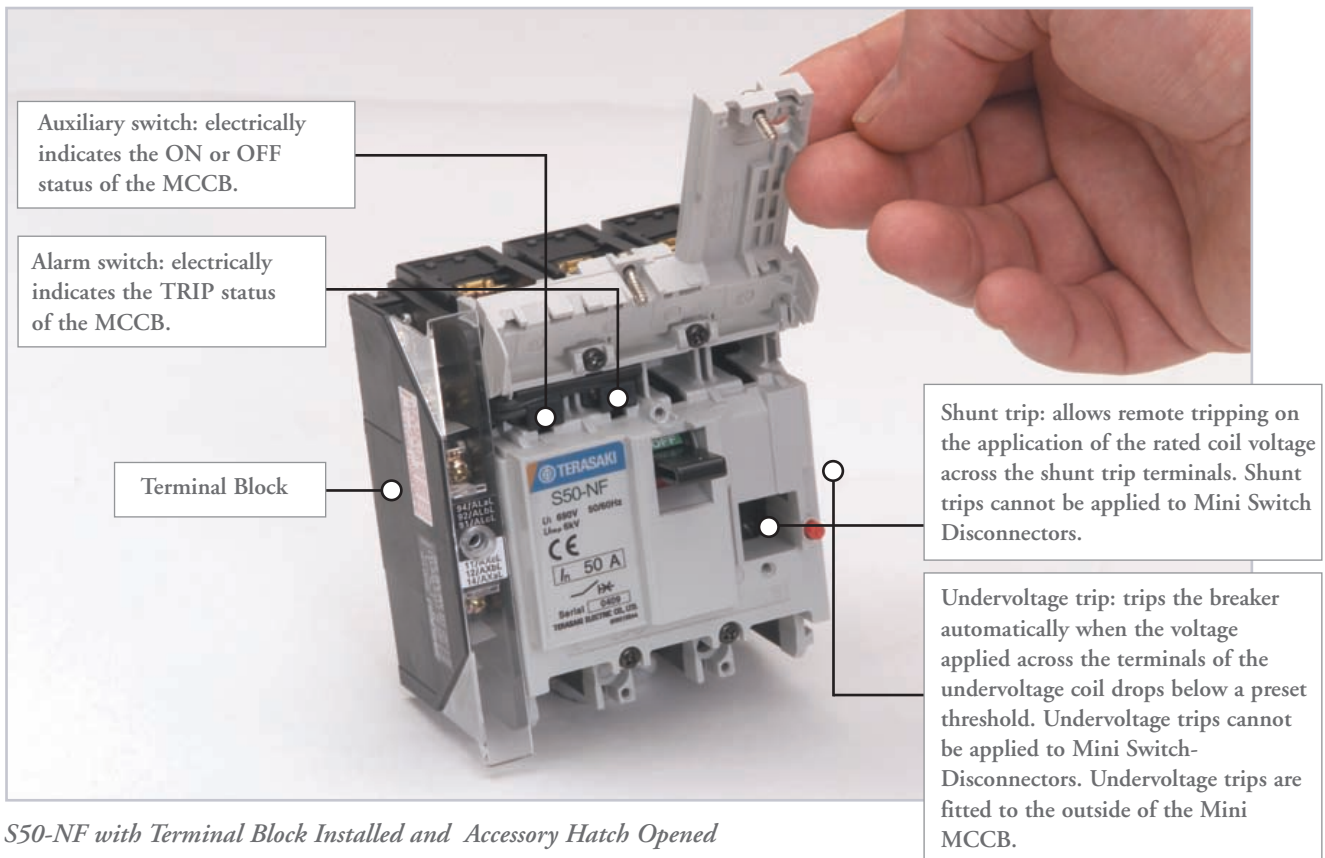


Ambient compensating curves



TEMBREAK 2 MINI MOULDED CASE CIRCUIT BREAKERS

ELECTRICAL CONTROL ACCESSORIES

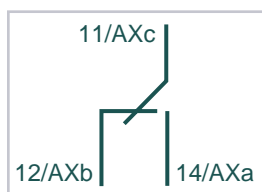


Maximum Permitted Combinations of Electrical Control Accessories

1. Left-hand side internal accessory location: 1 auxiliary switch AND 1 alarm switch.
2. Right-hand side internal accessory location: (1 auxiliary switch AND 1 alarm switch) OR 1 shunt trip.
3. Right-hand side external accessory location: 1 undervoltage trip. The undervoltage trip cannot be used in the same Mini MCCB as a shunt trip. The undervoltage trip is compatible with 1 auxiliary and 1 alarm switch installed in the right-hand side internal accessory location.

TEMBREAK 2 MINI MOULDED CASE CIRCUIT BREAKERS

ELECTRICAL CONTROL ACCESSORIES

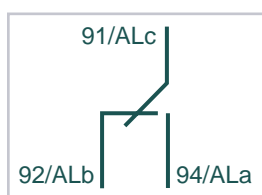


*Terminal Designations
and Function of Mini
Auxiliary Switch*

Mini Auxiliary Switch (AX)

An auxiliary switch electrically indicates the ON or OFF status of the MCCB. The Mini type is a changeover switch with 3 terminals.

A microcurrent version is available for switching currents as low as 1mA.



*Terminal Designations
and Function of Mini
Alarm Switch*

Mini Alarm Switch (AL)

An alarm switch electrically indicates the TRIP status of the MCCB. The Mini type is a changeover switch with 3 terminals.

A microcurrent version is available for switching currents as low as 1mA.

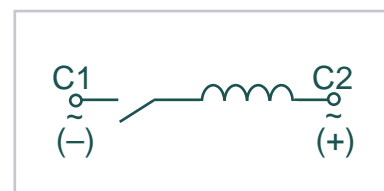
Ratings of Auxiliary and Alarm Switches

Auxiliaries and Alarm Switch ratings						
AC			DC			Minimum Load
Volts (V)	Amperes (A)		Volts (V)	Amperes (A)		
	Resistive Load	Inductive Load		Resistive Load	Inductive Load	
480	-	-	250	0.3	0.3	160mA at 5V DC. 30mA at 30V DC.
250	5	5	125	0.6	0.6	
125	5	5	30	3	3	

Microcurrent versions		
DC		Minimum Load
Volts (V)	Amperes (A)	
	Resistive Load	
30	0.1	1mA at 5V DC to 30V DC.

Ratings of Shunt Trip

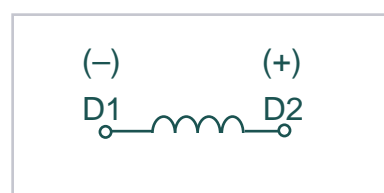
Excitation current (A) peak value (value at maximum voltage)				
Rated Voltage (V)	Voltage (AC)			Voltage (DC)
	100-120	200-240	380-450	100-110
Excitation Current (A)	1.5	0.75	0.53	1.5



*Terminal Designations
of Shunt Trips*

Ratings of Undervoltage Trip

Power supply capacity (VA)				Excitation current (mA)
Rated Voltage (V)	Voltage (AC)			Voltage (DC)
	100	200	400	100-110
Power supply capacity (VA)	2.8	3.4	4.4	28.6



*Terminal Designations
of Undervoltage Trips*

TEMBREAK 2 MINI MOULDED CASE CIRCUIT BREAKERS

TERMINATION OF CONTROL WIRING



Terminal Block

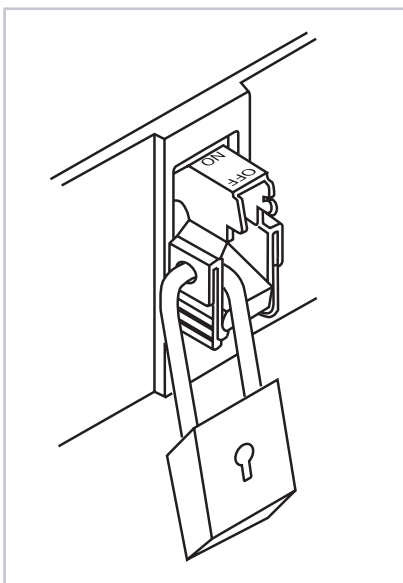


Mini MCCB with Terminal Block Installed

A terminal block facilitates convenient and accessible control wiring to electrical accessories. The terminal block allows the use of control cables with cross-sectional area of up to 2mm². Tightening torque for the terminal screws is 0.9 to 1.2Nm.

HANDLE LOCK

A handle lock is an optional accessory which enables the user to padlock the handle of the Mini MCCB in either the OFF or ON position. The Mini MCCB has a trip-free mechanism meaning that the contacts will open to clear an overcurrent even if the handle is locked ON.



Handle Lock

TEMBREAK 2 MINI MOULDED CASE CIRCUIT BREAKERS

INSULATION ACCESSORIES



Terminal Covers for S50 and E100

Terminal Covers are used to prevent direct contact with live Mini MCCB terminations. They also provide additional insulation that reduces the possibility of a short circuit between phases or to earth.

Terminal covers are available for Mini MCCBs with front and rear connection terminals.

Earth barriers are available which insulate the rear of the MCCB from the surface on which it is mounted.



Interpole Barriers for S50 and E100

Interpole barriers provide maximum insulation between phases at the terminals of the Mini MCCB.

TEMBREAK 2 MINI MOULDED CASE CIRCUIT BREAKERS

MECHANICAL INTERLOCKS

Interlocks for TemBreak 2 Mini MCCBs are manually operated toggle locking devices which can be installed between two adjacent MCCBs. Depending on the position of the slide, one or other of the MCCBs is prevented from being switched ON.

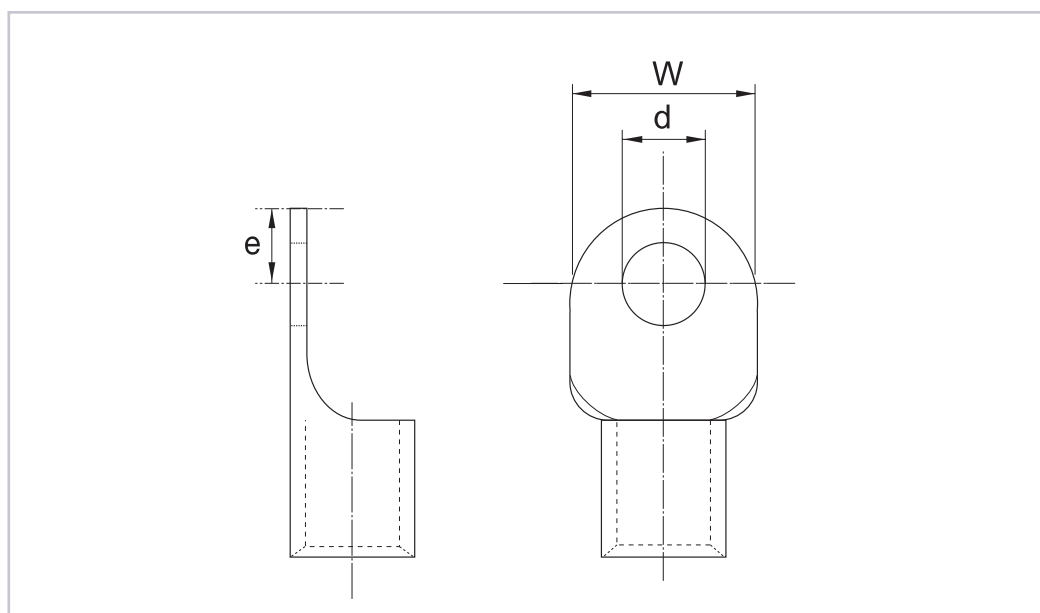
Mechanical interlocks can be used between any two Mini MCCBs.

Mechanical interlocks can be installed in the field and are padlockable in both positions.

INSTALLATION

Connection of Busbars and Terminated Cables

This connection method is standard for all front connected (FC) Mini MCCBs. Solid conductors or cables terminated with compression terminals can be used.



Maximum Dimensions of Compression Terminals		
Frame Size (A)	50	100
Width, w (mm)	15	15
Diameter, d (mm)	5.5	9
Hole distance, h (mm)	7	7

TEMBREAK 2 MINI MOULDED CASE CIRCUIT BREAKERS

INSTALLATION

Mounting on DIN Rail



S50 and E100 Mounted on 35mm DIN Rail

TemBreak 2 Mini MCCBs can be clip mounted to 35mm DIN rail. The DIN rail clips are built-in to the MCCB as standard.

Termination in a Separate Compartment



S50 Fitted with Rear Connections



Rear Connections for Field Installation

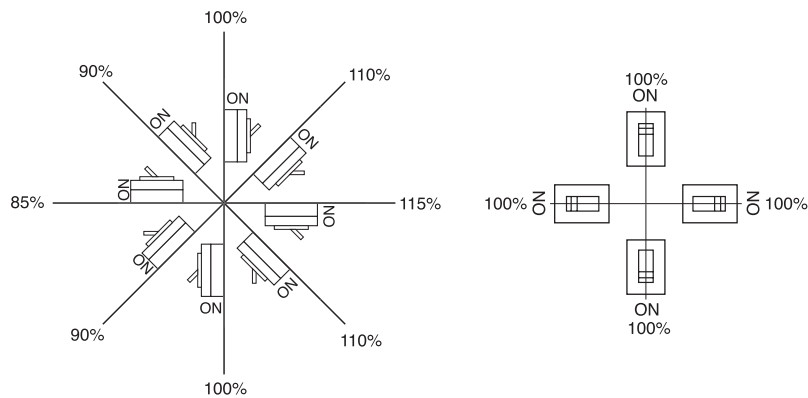
Rear connections allow termination of conductors in a different switchboard compartment to the MCCB body.

The terminal bars can be rotated in steps of 90 degrees in the field.

TEMBREAK 2 MINI MOULDED CASE CIRCUIT BREAKERS

INSTALLATION

Mounting Angle

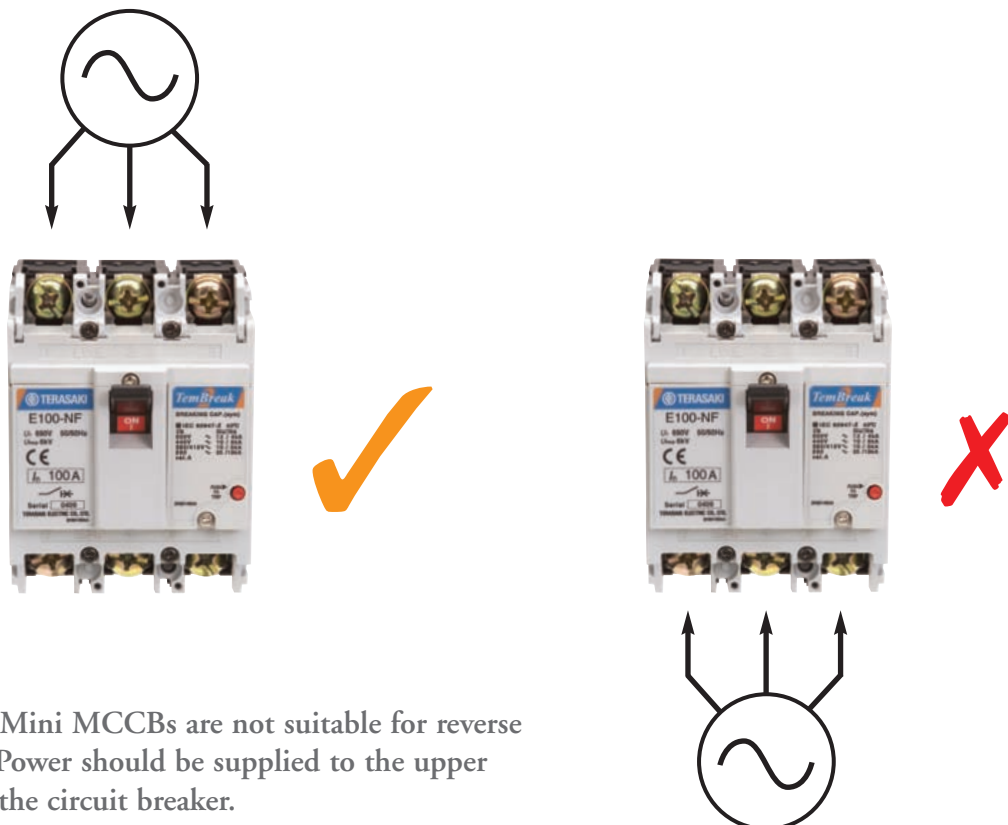


Percentage Change in Rated Current, I_R , According to Mounting Angle

Overload protection of TemBreak 2 Mini MCCBs is provided by magnetic-hydraulic elements. The overload tripping characteristics vary depending upon the mounting angle due to the effect of gravitational force that the iron core in the oil dashpot receives.

It is recommended that the breakers be oriented vertically where possible.

Direction of Power Supply



TemBreak 2 Mini MCCBs are not suitable for reverse connection. Power should be supplied to the upper terminals of the circuit breaker.

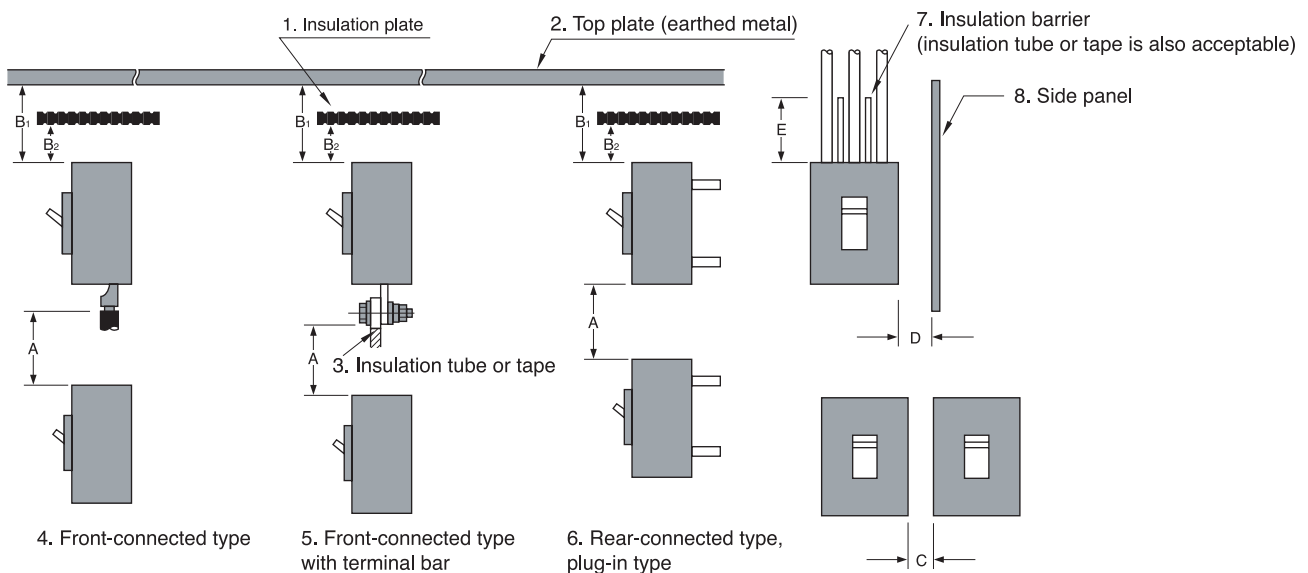
TEMBREAK 2 MINI MOULDED CASE CIRCUIT BREAKERS

INSULATION DISTANCES

The insulation distances between the MCCB and earthed metal parts and insulators shown in this section must be maintained to prevent arcing faults occurring due to conductive ionised gas. In cases where other specifications require different insulation distances to those shown here, the greater distance must be maintained. In cases where two different models are installed one above the other, the insulation distance between the two models should be as for the lower model.

ATTENTION

Exposed conductors must be insulated up to the breaker terminals. Interpole barriers or optional terminal covers are recommended. If optional terminal covers are used, insulate the exposed conductor until it overlaps the terminal cover.



A. Distance from lower breaker to exposed live part of upper breaker terminal (front-connected type) or distance from lower breaker to end face of upper breaker (rear-connected type or plug-in type).

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 panel (earthed metal).

E. Dimensions of insulation over exposed conductors.

TEMBREAK 2 MINI MOULDED CASE CIRCUIT BREAKERS

INSULATION DISTANCE IN mm (AT 440V AC MAXIMUM)

Model	Type	A	B1	B2	C	D	E
S50	NF	50	50	50	0	25	*(1)
E100	NF	50	50	50	0	25	*(1)

1. Insulate the exposed conductor until it overlaps the moulded case at the terminal, or the terminal cover.

TEMBREAK 2 MINI MOULDED CASE CIRCUIT BREAKERS

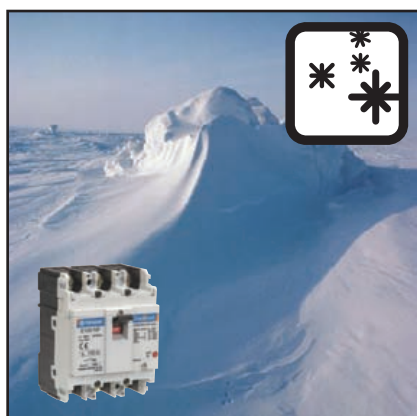
STANDARD INSTALLATION ENVIRONMENT AND SPECIAL TREATMENTS

TemBreak 2 Mini MCCBs are intended for installation in the following conditions as standard:

- Operating ambient temperature -5 degrees C to 40 degrees C.
- Relative humidity of up to 85%.
- Altitude up to 2000m.
- Atmospheres free from dust, smoke, corrosive gases, inflammable gases, moisture and salt.

For installation in conditions more onerous than those described above, contact Terasaki for details.

The following special treatments have been developed for installation in specific environmental conditions:



- **Low temperature treatment.**
For installation at temperatures down to -40 degrees C for storage and -20 degrees C for operation. The environment must be free from rapid changes in temperature that result in the formation of condensation.



- **Tropicalisation treatment.**
For installation at temperatures up to 60 degrees C and relative humidity of up to 95%. The environment must be free from rapid changes in temperature.

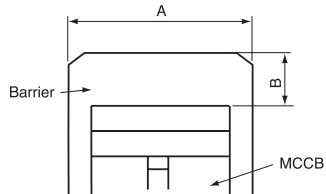


- **Anti-corrosion treatment.**
MCCB is surface treated to increase resistance to corrosion.
If the MCCB is to be installed in atmosphere that contains excessive volumes of corrosive gases or moisture, it should be house in an airtight enclosure.

TEMBREAK 2 MINI MOULDED CASE CIRCUIT BREAKERS

DIMENSIONS

Earth Barriers



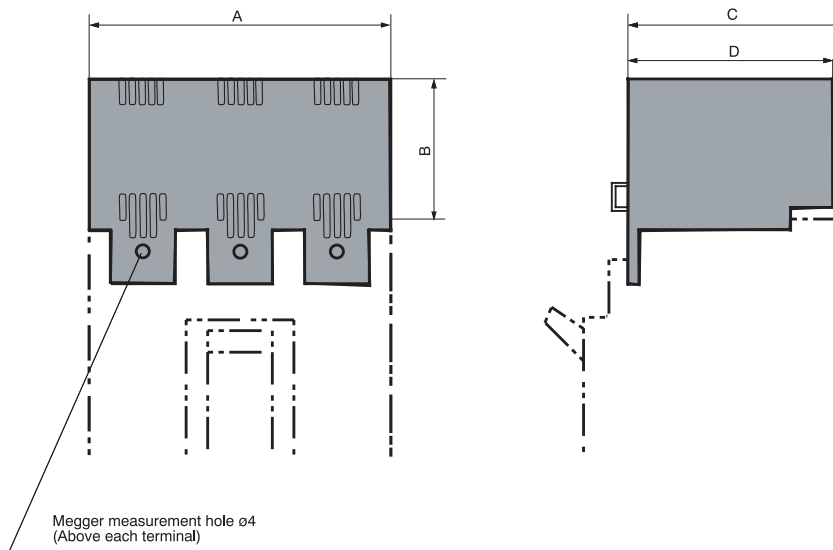
MCCB type	Connection	A (1)	B (2)
S50, E100	Front conn.	125	43

Notes:

(1): Possible to cut to 75mm or 100mm

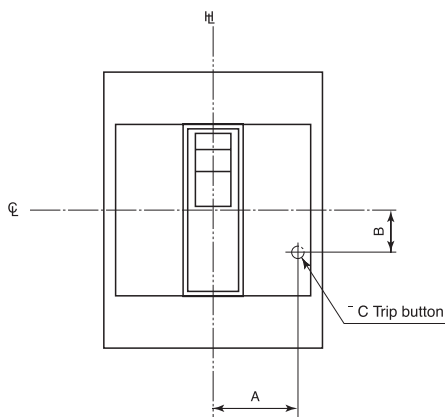
(2): Possible to cut to 35mm

Terminal Covers



MCCB type	Connection	A(2P)	A(3P)	B	C	D	colour
S50, E100	Front conn.	50	75	40	53	53	Black

Position of Trip Button

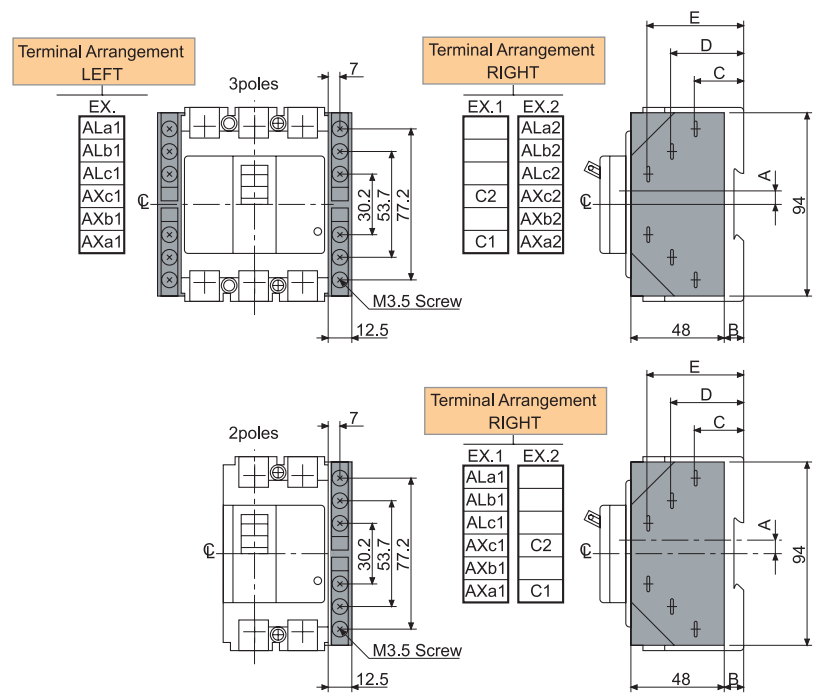


MCCB type	A	B	C
S50, E100, 2P	20.2	13.5	4
S50, E100, 3P	32.7	13.5	4

TEMBREAK 2 MINI MOULDED CASE CIRCUIT BREAKERS

DIMENSIONS

Terminal Block



MCCB type	A	B	C	D	E
S50, E100	0	10.5	23.6	36	48.3

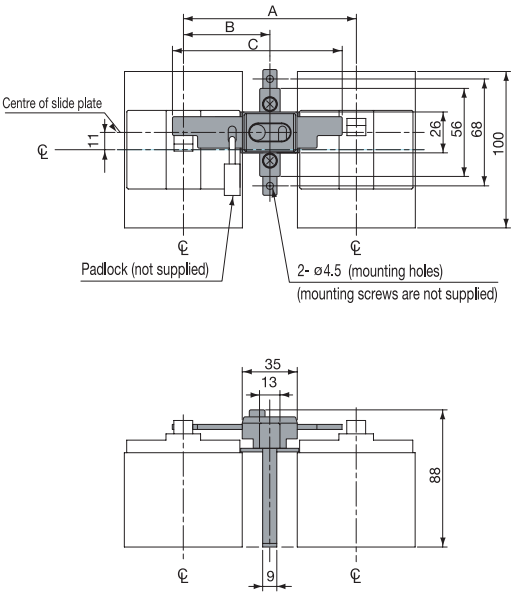
TEMBREAK 2 MINI MOULDED CASE CIRCUIT BREAKERS

DIMENSIONS

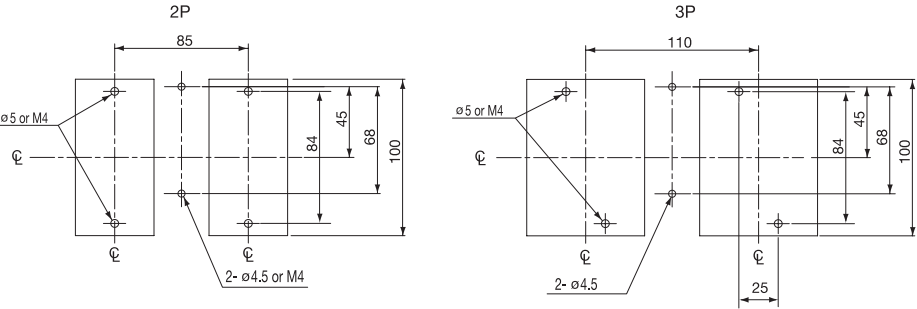
Mechanical Interlock

ASL: Arrangement Standard Line
 H: Handle Frame Centre Line

Mechanical Interlocks slide type (MS) For 50A, 100A frame size



Drilling plan



MCCB type	Pole	A	B	C	Colour
S50, E100	2	85	42.5	83	Black
	3	110	55	108	Black

MINI MOULDED CASE CIRCUIT BREAKERS

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The range of products includes:

- Moulded Case Circuit Breakers (MCCBs)
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