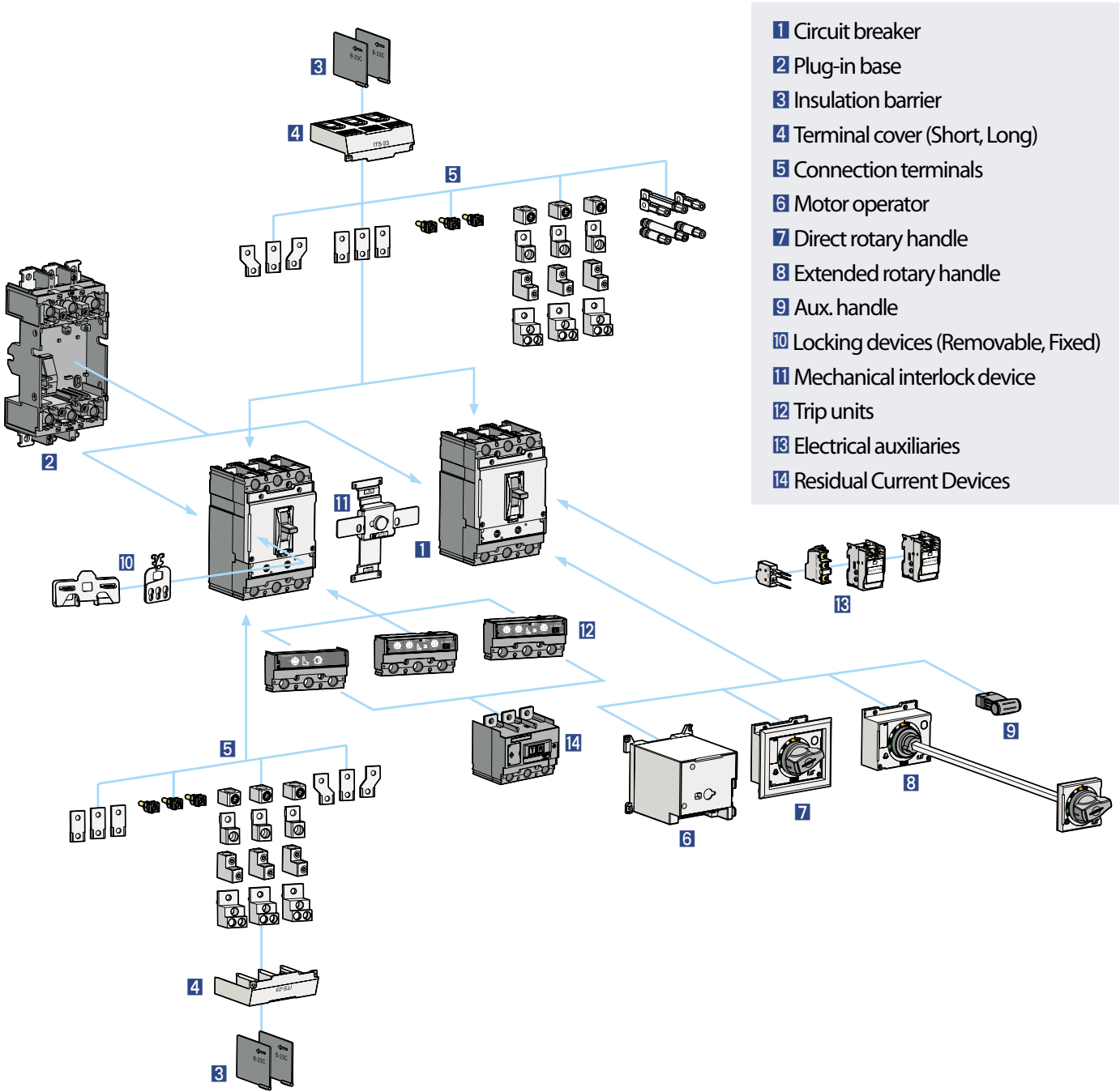


Accessories for TD/TS series up to 800A

Susol

Overview



Accessories for TD/TS series up to 800A

Susol

Electrical auxiliaries

The following devices are installed into all TD & TS circuit breakers regardless of frame size. And, the electrical auxiliaries can be easily installed in the accessory compartment of the circuit breakers which is cassette type.

Undervoltage release, UVT

The undervoltage release automatically opens a circuit breaker when voltage drops to a value ranging between 35% to 70% of the line voltage. The operation is instantaneous, and after tripping, the circuit breaker cannot be re-closed again until the voltage returns to 85% of line voltage.

Continuously energized, the undervoltage release must be operating before the circuit breaker can be closed. The undervoltage release can be easily installed in the left accessory compartment of the Susol TD and TS circuit-breakers.

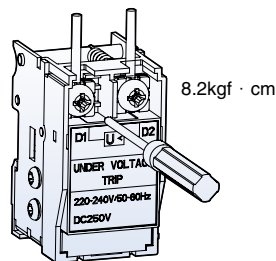
- Range of tripping voltage: $0.35 \sim 0.7V_n$
- MCCB making is possible voltage: $0.85V_n$ (exceed)
- Frequency (only AC): 45Hz ~ 65Hz



UVT

Technical data

	Control voltage (V)	Consumption			Applicable MCCBs
		AC (VA)	DC (W)	mA	
Power consumption	AC/DC 24V	0.64	0.65	27	TD100, TD160, TS100, TS160, TS250, TS400, TS630, TS800
	AC/DC 48V	1.09	1.10	23	
	AC/DC 110~130V	0.73	0.75	5.8	
	AC 200~240V/DC 250V	1.21	1.35	5.4	
	AC 380~440V	1.67	-	3.8	
	AC 440~480V	1.68	-	3.5	
Max. opening time (ms)		50			
Tightening torque of terminal screw		8.2kgf · cm			
Transformer operating voltage (V)					
- Drop (Circuit breaker trips)		0.7~1.35V _n			
- Rise (Circuit breaker can be switched on)		~0.85V _n			



Accessories for TD/TS series up to 800A

Susol

Electrical auxiliaries



SHT

Shunt release, SHT

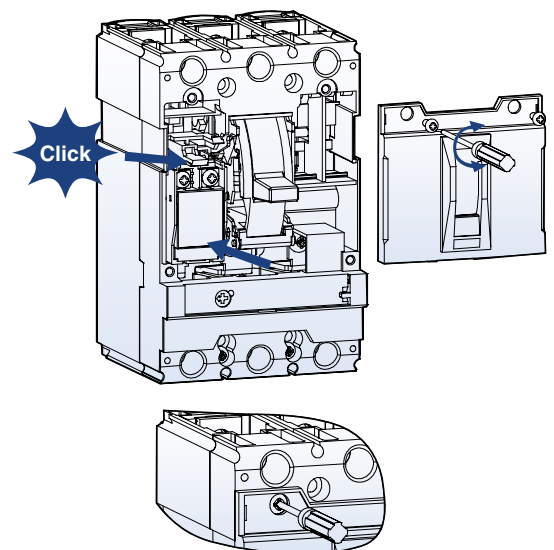
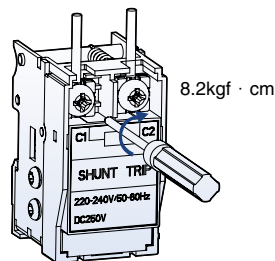
The shunt release opens the mechanism in response to an externally applied voltage signal. The releases include coil clearing contacts that automatically clear the signal circuit when the mechanism has tripped.

The shunt release can be installed in the left accessory compartment of the Susol TD & TS circuit-breakers.

- Range of operational voltage: 0.7 ~ 1.1Vn
- Frequency (only AC): 45Hz ~ 65Hz

Technical data

	Control voltage (V)	Consumption			Applicable MCCBs
		AC (VA)	DC (W)	mA	
Power consumption	DC 12V	-	0.36	30	TD100, TD160, TS100, TS160, TS250, TS400, TS630, TS800
	AC/DC 24V	0.58	0.58	24	
	AC/DC 48V	1.22	1.23	25	
	AC/DC 110~130V	1.36	1.37	10.5	
	AC 220~240V/DC250V	1.80	1.88	7.5	
	AC 380~500V	1.15	-	2.3	
Max. opening time (ms)		50			
Tightening torque of terminal screw		8.2kgf · cm			



Accessories for TD/TS series up to 800A

Susol

Electrical auxiliaries

Auxiliary switch (AX), Alarm switch (AL) and Fault alarm switch (FAL)



AX

Auxiliary switch (AX)

Auxiliary switch is for applications requiring remote “ON” and “OFF” indication. Each switch contains two contacts having a common connection. One is open and the other closed when the circuit breaker is open, and vice-versa.

Alarm switch (AL)

Alarm switches offer provisions for immediate audio or visual indication of a tripped breaker due to overload, short circuit, shunt trip, or undervoltage release conditions.

They are particularly useful in automated plants where operators must be signaled about changes in the electrical distribution system. This switch features a closed contact when the circuit breaker is tripped automatically. In other words, this switch does not function when the breaker is operated manually.

Its contact is open when the circuit breaker is reset.



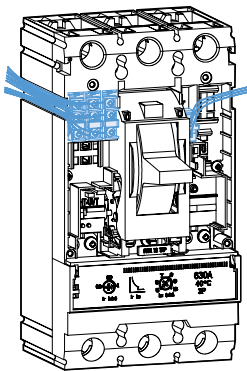
AL

Fault alarm switch (FAL)

FAL Indicates that the breaker has tripped due to overload or short circuit. And, it can be applied to only circuit breakers with electronic trip units.

Contact operation

MCCB	ON	OFF	TRIP
Position of AX			
Position of AL, FAL			



Technical data

Conventional thermal current I _{th}	5A			TD100 TD160 TS100 TS160 TS250 TS400 TS630 TS800
Rated operational current I _e with rated operational voltage U _e	Voltage	I _e		
		Resistance	Inductance	
- Alternating current 50/60Hz AC	125V	5	3	
	250V	3	2	
	500V	-	-	
- Direct current DC	30V	4	3	
	125V	0.4	0.4	
	250V	0.2	0.2	

Accessories for TD/TS series up to 800A

Susol

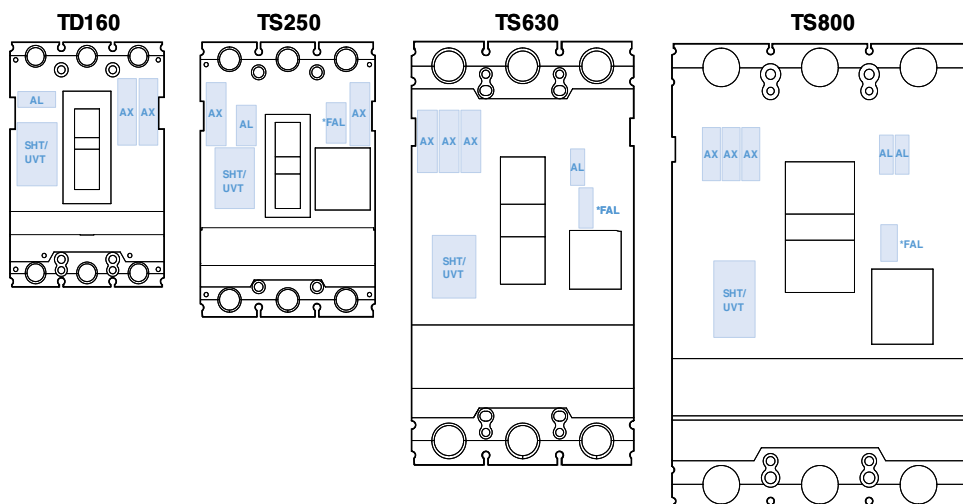
Electrical auxiliaries

Possible configuration of electrical auxiliaries

Maximum possibilities

Phase	Accessory	TD160	TS250	TS630	TS800
R (Left)	AX	-	1	3	3
	AL	1	1	-	-
	SHT or UVT	1	1	1	1
T (Right)	AX	2	1	-	-
	AL	-	-	1	2
	FAL	-	1	1	1

Note) FAL can be applied to only MCCB with electronic trip release.



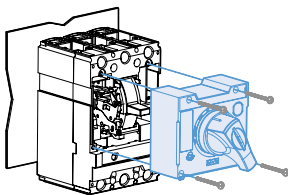
Accessories for TD/TS series up to 800A

Susol

Rotary handles

Rotary handles

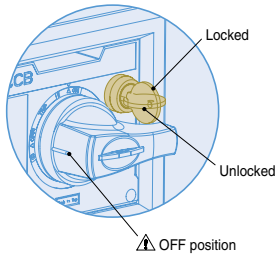
The rotary handle operating mechanism is available in either the direct version or in the extended version on the compartment door. It is always fitted with a compartment door lock and on a request it can be supplied with a key lock in the open position.



Direct rotary handles

Direct rotary handles

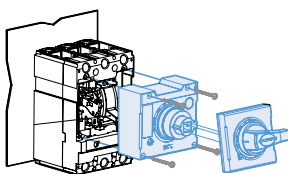
MCCB	Rotary handle
TD100,TD160	DH1
TS100,TS160,TS250	DH2
TS400,TS630	DH3
TS800	DH4



Direct rotary handle with a key lock

Direct rotary handles with a key lock

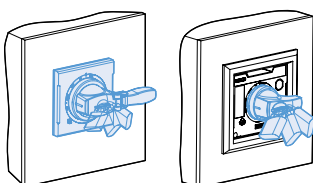
MCCB	Padlockable device	Lock function
TD100, TD160	DHK1	Lock in On or Off position
TS100, TS160, TS250	DHK2	
TS400, TS630	DHK3	
TS800	DHK4	



Extended rotary handles

Extended rotary handles

MCCB	Padlockable device
TD100,TD160	EH1
TS100,TS160,TS250	EH2
TS400,TS630	EH3
TS800	EH4



Padlocks for direct or extended handle

Padlocks can be used to lock the breaker in the ON or OFF position.

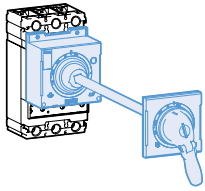
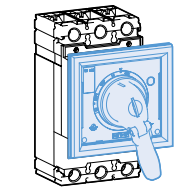
Accessories for TD/TS series up to 800A

Susol

Rotary handles

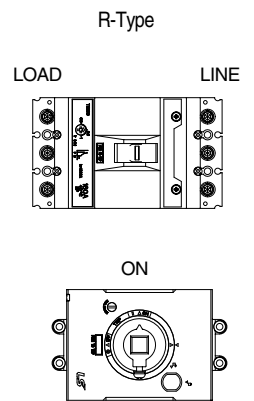
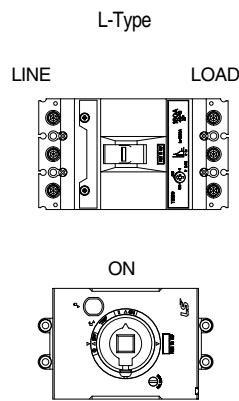
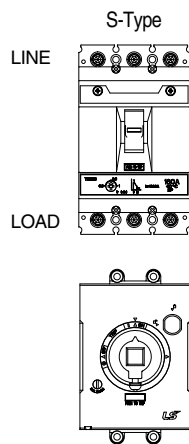
Rotary handles

Degree of protections



Type	Degree of protection	IP
Circuit breaker with cover frame and rotary direct handle	The access probe of 1.0mm diameter shall not penetrate.	IP40
Circuit breaker with cover frame and rotary extended handle	Totally protected against ingress of dust and water jets from any direction	IP65

Type suffix according to the mounting position



Accessories for TD/TS series up to 800A

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Locking devices

Removable locking device

Removable locking device is available for all TD & TS circuit breakers. The locking device is designed to be easily attached to the circuit-breaker.

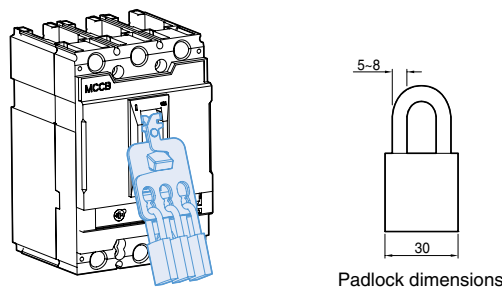
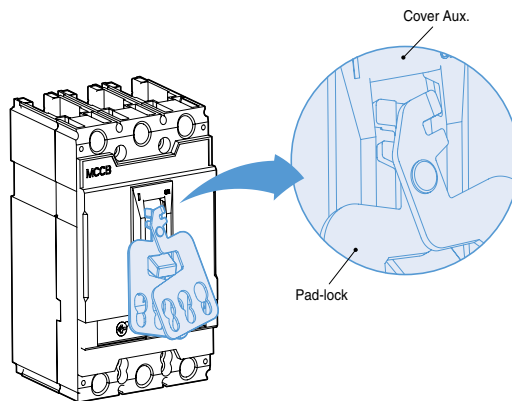
This device allows the handle to be locked in the "OFF" position. Locking in the OFF position guarantee isolation according to IEC 60947-2.

The locking device for the toggle handle can be installed in 3-pole and 4-pole circuit-breakers. Maximum three (3) padlocks with shackle diameters ranging from 5 to 8mm may be used. (Padlocks are not supplied)



Removable locking device

MCCB	Padlockable device	Function
TD100,TD160	PL1	"OFF" position
TS100,TS160,TS250	PL2	
TS400,TS630	PL3	
TS800	PL4	



Accessories for TD/TS series up to 800A

Susol

Locking devices

Fixed locking device

Fixed locking device is available for all TD & TS circuit breakers. This device allows the handle to be locked in the "ON" and "OFF" position. Locking in the OFF position guarantee isolation according to IEC 60947-2.

The locking device for the toggle handle can be installed in 3-pole and 4-pole circuit-breakers. Maximum three (3) padlocks with shackle diameters ranging from 5 to 8mm may be used. (Padlocks are not supplied)



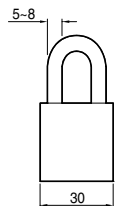
Fixed locking device

MCCB	Padlockable device	Function
TD100,TD160	PHL1	Lock in Off or On position
TS100,TS160,TS250	PHL2	
TS400,TS630	PHL3	
TS800	PHL4	

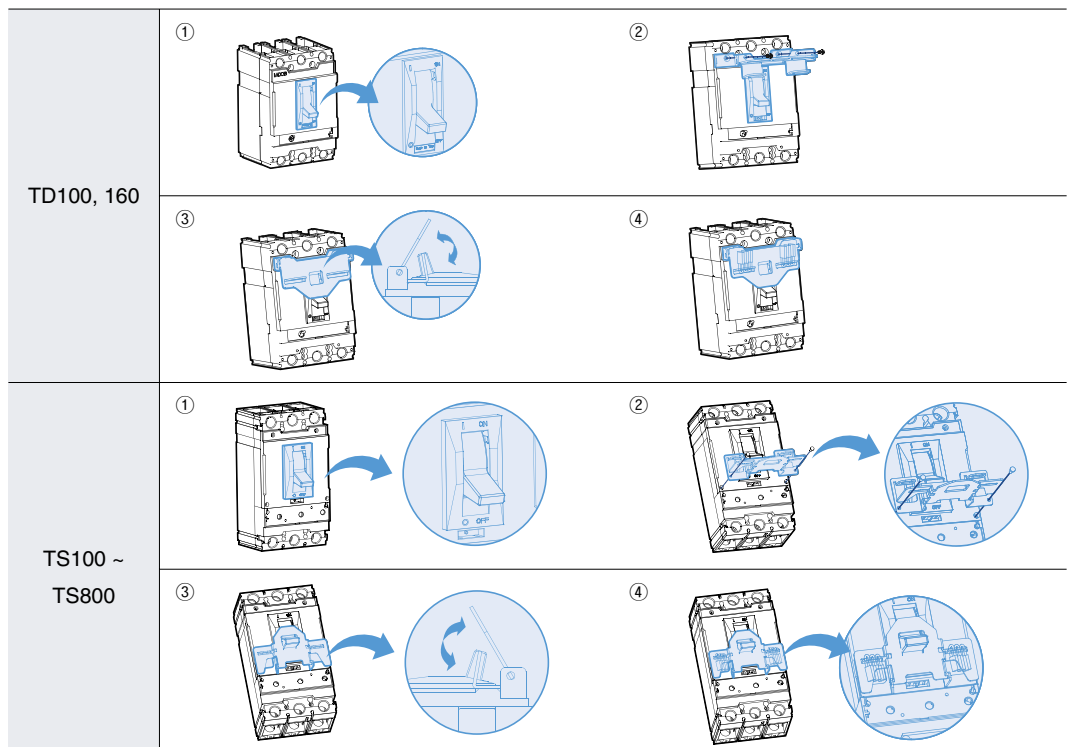
How to use

The locking device for the toggle handle is designed to be easily attached to the front of circuit-breaker.

- ① Please set the toggle handle in the position of "On" or "Off".
- ② Install the lock device onto the front of auxiliary cover of circuit breaker.
- ③ Folding the wings of lock device as shown in picture 3.
- ④ The padlock to be used shall be that which is commercially available with the nominal dimension. (30mm nominal dimension, 5~8mm diameter)



Padlock dimensions



Accessories for TD/TS series up to 800A

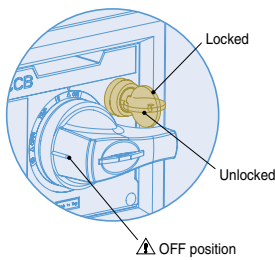
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Locking devices



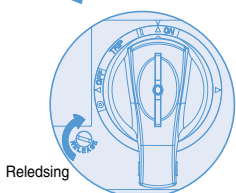
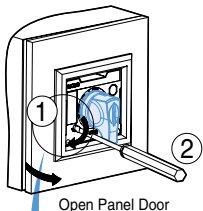
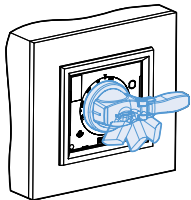
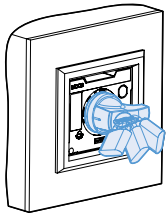
Locking by rotary handle with a key lock

A locking can be done by using the rotary handle which has key lock device. The lock is used to lock the circuit-breaker in the OFF position.



Locking by rotary handle with a key lock

MCCB	Padlockable device	Function
TD100,TD160	DHK1	Lock in Off position
TS100,TS160,TS250	DHK2	
TS400,TS630	DHK3	
TS800	DHK4	



Padlocking by rotary handle

A padlocking can be also done by using the rotary handle. The lock is used to lock the circuit-breaker in the ON and OFF position. Maximum three (3) padlocks with shackle diameters ranging from 5 to 8mm may be used. (Padlocks are not supplied)

Releasing panel door lock at ON position

The panel door can be locked at ON and TRIP position of rotary handle. To open the panel door at ON position, just rotate release screw clockwise.

Accessories for TD/TS series up to 800A

Susol

Terminals

Front connection

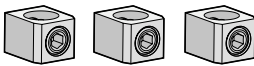
Terminal moulder



- It is supplied with Susol MCCBs as a standard part of circuit breaker.
- Connecting part with terminal for bus bar, cable with lug

MCCB	Type
TD100,TD160	TM1
TS100,TS160,TS250	TM2
TS400,TS630	-
TS800	-

Inner box terminal

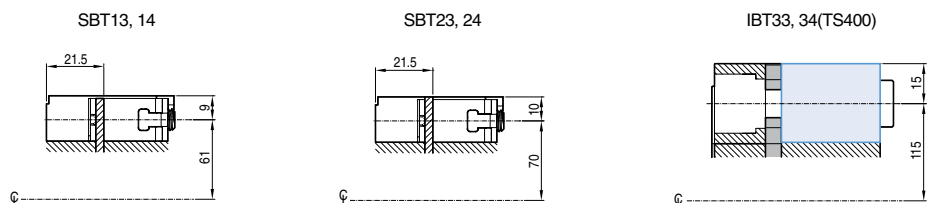


- Bare cable connectors for Susol TD and TS series circuit breakers
- Can be used for both aluminum and copper cables



Applicable to	Type	Pole	Set quantity	Cable connection possibilities	Conductor size
TD100, 160	SBT13	3	1 Set (3EA)	1	L(mm) 21
	SBT14	4	1 Set (4EA)		S(mm ²)Cu/Al 2.5~95
			Tightening torque (kgf · cm) 120~147		
TS100, 160, 250	SBT23	3	1 Set (3EA)	1	L(mm) 21
	SBT24	4	1 Set (4EA)		S(mm ²)Cu/Al 10~150
			Tightening torque (kgf · cm) 120~147		
TS400, 630	^{Note1)} IBT33	3	1 Set (3EA)	1	L(mm) 30
	IBT34	4	1 Set (4EA)		S(mm ²)Cu/Al 70~300
			Tightening torque (kgf · cm) 367~428		
PB12, 13	^{Note2)} IBT13	3	1 Set (3EA)	1	L(mm) 18
			S(mm ²)Cu/Al 2.5~95		
			Tightening torque (kgf · cm) 306		
PB22, 23	^{Note2)} IBT23	3	1 Set (3EA)	1	L(mm) 21
			S(mm ²)Cu/Al 10~150		
			Tightening torque (kgf · cm) 306		

Note) 1. IBT3 for TS630 can be applied in case that rate current is upto 400A.
2. IBT13, 23 are for Plug-in base.



Accessories for TD/TS series up to 800A

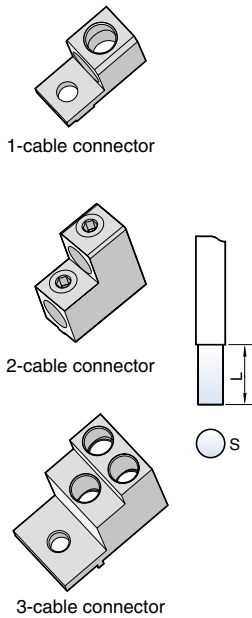
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Terminals

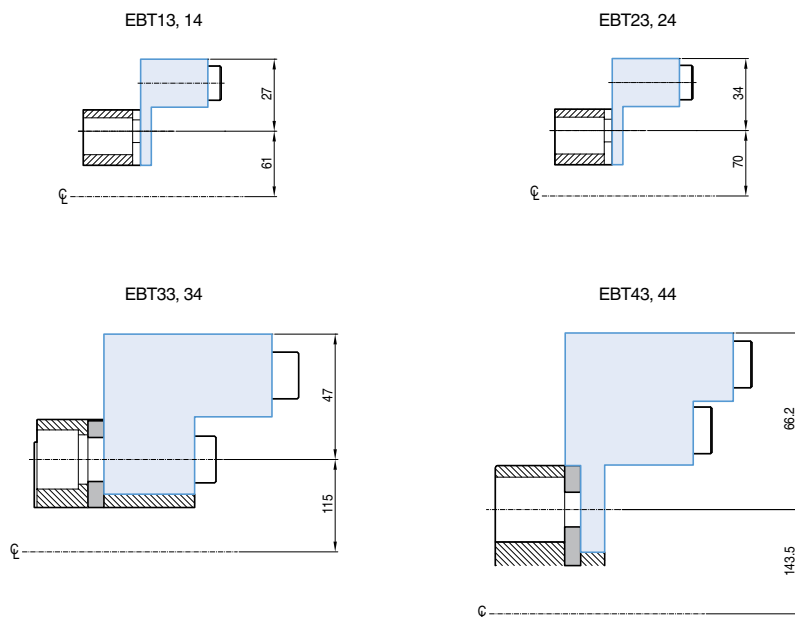
Front connection

Extended box terminals (Copper cables/bars and aluminum cables)

- The extended box terminals for TD and TS circuit breakers can be used for copper cables/bars and aluminum cables. There are four (4) kinds of terminals.
- For TD100, TD160: 1-cable connector (EBT13, EBT14)
- For TS100, TS160, TS250: 1-cable connector (EBT23, EBT24)
- For TS400, TS630: 2-cable connector (EBT33, EBT34)
- For TS800: 3-cable connector (EBT43, EBT44)



Applicable to	Type	Pole	Set quantity	Cable connection possibilities	Conductor size
TD100, 160	EBT13	3	1 Set (3EA)	1	L(mm) 20
	EBT14	4	1 Set (4EA)		S(mm ²)Cu/Al 2.5~95
					Tightening torque (kgf · cm) 306
TS100, 160, 250	EBT23	3	1 Set (3EA)	1	L(mm) 24
	EBT24	4	1 Set (4EA)		S(mm ²)Cu/Al 10~150
					Tightening torque (kgf · cm) 306
TS400, 630	EBT33	3	1 Set (3EA)	2	L(mm) 33 or 62
	EBT34	4	1 Set (4EA)		S(mm ²)Cu/Al 2×85 to 2×240
					Tightening torque (kgf · cm) 367~428
TS800	EBT43	3	1 Set (3EA)	3	L(mm) 25~48
	EBT44	4	1 Set (4EA)		S(mm ²)Cu/Al 3×85 to 3×240
					Tightening torque (kgf · cm) 367~428



Accessories for TD/TS series up to 800A

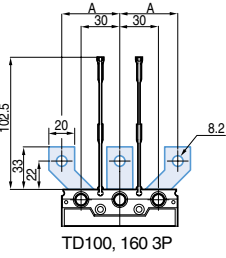
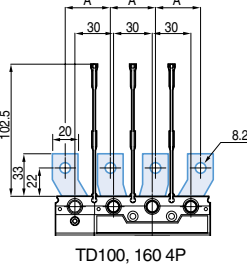
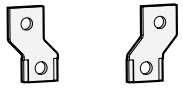
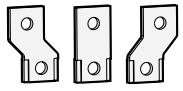
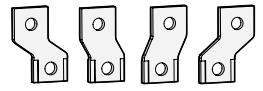
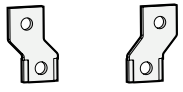
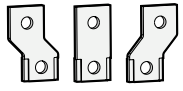
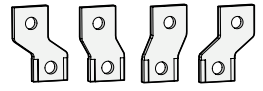
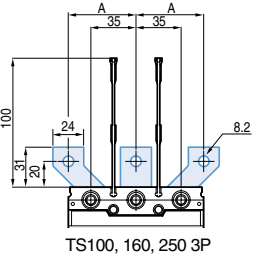
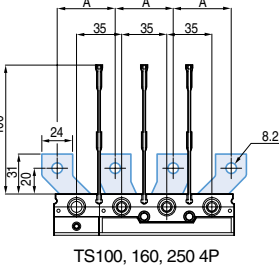
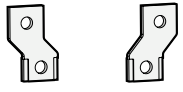
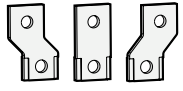
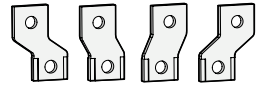
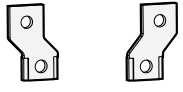
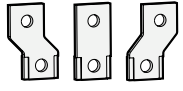
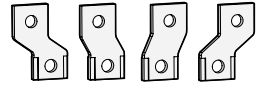
Susol

Terminals

Front connection

Spreaders

- As an optional part of circuit breaker
- Can increase the pitch of the terminals

MCCB	Pole	Type	Size A (mm)	Feature		
 <p>TD100, 160 3P</p>  <p>TD100, 160 4P</p>	TD100, TD160	2P	SP12a	35		
		3P	SP13a			
		4P	SP14a			
			2P	SP12b	45	
			3P	SP13b		
			4P	SP14b		
 <p>TS100, 160, 250 3P</p>  <p>TS100, 160, 250 4P</p>	TS100, TS160, TS250	2P	SP22a	45		
		3P	SP23a			
		4P	SP24a			
			2P	SP22b	52.5	
			3P	SP23b		
			4P	SP24b		

Accessories for TD/TS series up to 800A

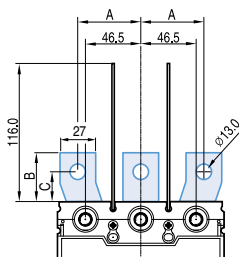
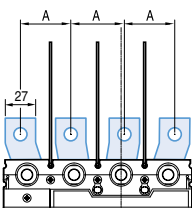

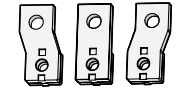
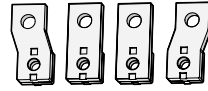

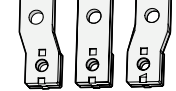
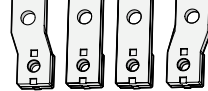
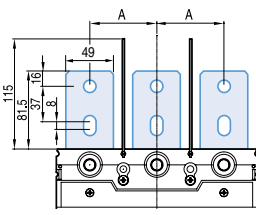
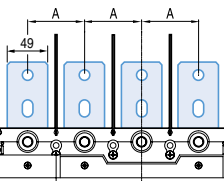
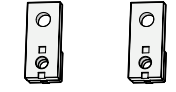
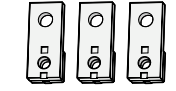
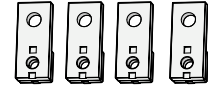
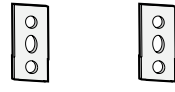
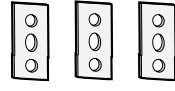
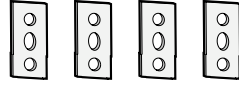
Susol

Terminals

Front connection

Spreaders

- As an optional part of circuit breaker
- Can increase the pitch of the terminals

MCCB	Pole	Type	Size(mm)			Feature	
			A	B	C		
 <p>TS400, 630 3P</p>  <p>TS400, 630 4P</p>	2P	SP32a	52.5	41	25		
	3P	SP33a					
	4P	SP34a					
	TS400, TS630	2P	SP32b	70	54	38	
		3P	SP33b				
		4P	SP34b				
 <p>TS800 3P</p>  <p>TS800 4P</p>	2P	SPS32	46.5	41	25		
	3P	SPS33					
	4P	SPS34					
TS800	2P	SPS42	70	81.5			
	3P	SPS43					
	4P	SPS44					

Accessories for TD/TS series up to 800A

Susol

Terminals

Rear connection

Rear connection terminals are used to adapt Susol TD and TS circuit breakers to switchboards or other applications that require rear connection.

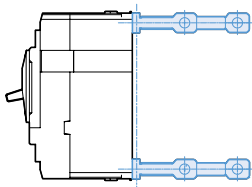
These can be connected directly to circuit breakers without any modification

There are two kinds of rear connection terminals.

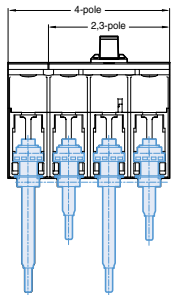
- Flat type
- Round type

Flat type

Flat vertical terminals



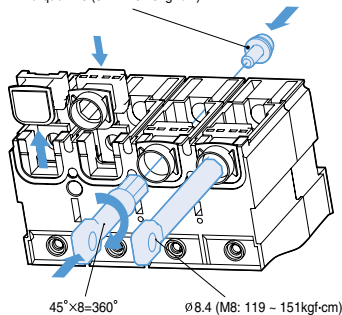
MCCB	2-pole	3-pole	4-pole
TD100,TD160	RTB12	RTB13	RTB14
TS100,TS160,TS250	RTB22	RTB23	RTB24
TS400,TS630	RTB32	RTB33	RTB34
TS800	RTB42	RTB43	RTB44



Flat type

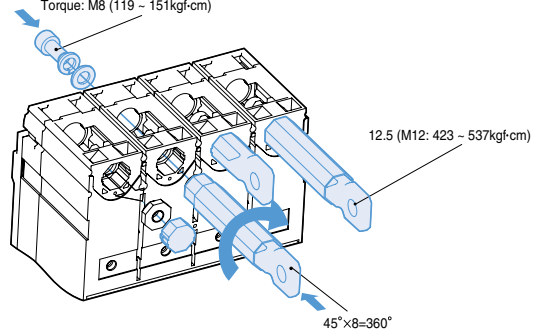
TD160,TS250

BOLT, HEX, SOCKET, P.S/W, M6, L15
Torque: M6 (51.1 – 64.9kgf-cm)



TS630

BOLT, HEX, SOCKET, P.S/W, M8, L20
WASHER SPRONG LOCK D10
WASHER PLAIN D10
Torque: M8 (119 – 151kgf-cm)

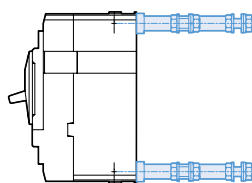


TS800

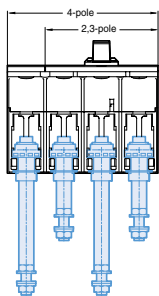
BOLT, HEX, SOCKET, P.S/W, M12, L35
Torque: M12 (423 – 537kgf-cm)

Round type

Round threaded terminals



MCCB	2-pole	3-pole	4-pole
TD100,TD160	RTR12	RTR13	RTR14
TS100,TS160,TS250	RTR22	RTR23	RTR24
TS400,TS630	-	-	-
TS800	-	-	-



Round type

Accessories for TD/TS series up to 800A

Susol

Insulation

Insulation by terminal cover

Insulation terminal cover

The terminal covers are applied to the circuit-breaker to prevent accidental contact with live parts and thereby guarantee protection against direct contacts.

Two types by length are available:

Short type covers, ITS

- IP40 degree of protection
- For fixed circuit-breakers with rear terminals and for moving parts of plug-in

Long type covers, ITL

- IP40 degree of protection
- For fixed circuit-breakers with front, front extended, front for cables terminals.



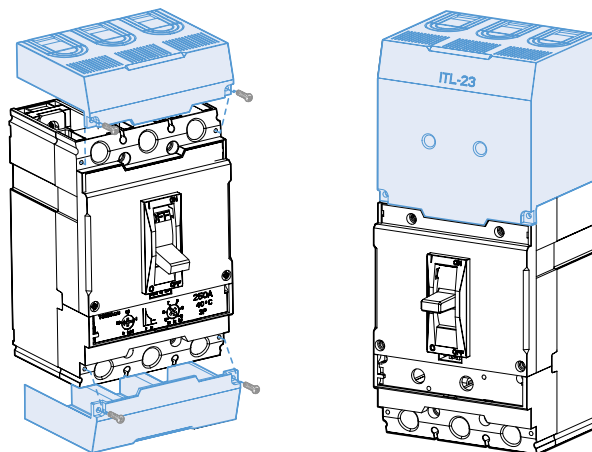
Short type covers



Long type covers

MCCB		Terminal cover	
Frame type	Pole	Long type	Short type
TD100,TD160	2P ⁽¹⁾ , 3-pole	ITL13	ITS13
	4-pole	ITL14	ITS14
TS100,TS160,TS250	2P ⁽¹⁾ , 3-pole	ITL23	ITS23
	4-pole	ITL24	ITS24
TS400,TS630	2P ⁽¹⁾ , 3-pole	ITL33	ITS33
	4-pole	ITL34	ITS34
TS800	2P ⁽¹⁾ , 3-pole	ITL43	ITS43
	4-pole	ITL44	ITS44

Note) (1) 2P in 3pole mold case



Accessories for TD/TS series up to 800A

Susol

Insulation

Insulation by barrier

These allow the insulation characteristics between the phases at the connections to be increased. They are mounted from the front, even with the circuit-breaker already installed, inserting them into the corresponding slots.

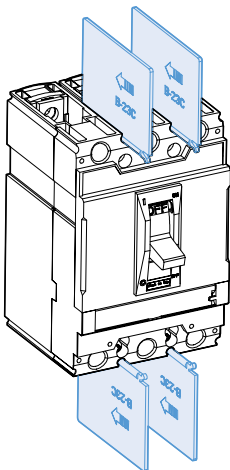
They are incompatible with both the insulating terminal covers.

It is possible to mount the phase separating partitions between two circuit-breakers side by side.



Insulation barriers

Type	Applied MCCB	Set quantity
B-23C	TD100, TD160	4pcs
	TS100, TS160, TS250	4pcs
B-33C	TS400, TS630	4pcs
B-43C	TS800	4pcs



Accessories for TD/TS series up to 800A

Susol

Interlock



Mechanical Interlock
(Padlocks are not supplied)

Mechanical interlocking device

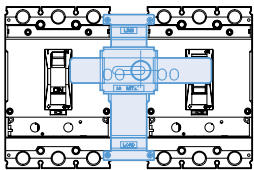
The mechanical interlock (MIT) can be applied on the front of two breakers mounted side by side, in either the 3-pole or 4-pole version and prevents simultaneous closing of the two breakers.

Fixing is carried out directly on the cover of the breakers.

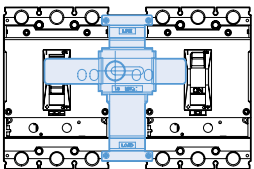
The front interlocking plate allows installation of a padlock in order to fix the position. (possibility of locking in the O-O position as well)

This mechanical interlocking device is very useful and simple for consisting of manual source-changeover system.

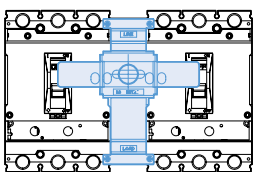
Operation



Left MCCB: ON/OFF is possible
Right MCCB: Off lock

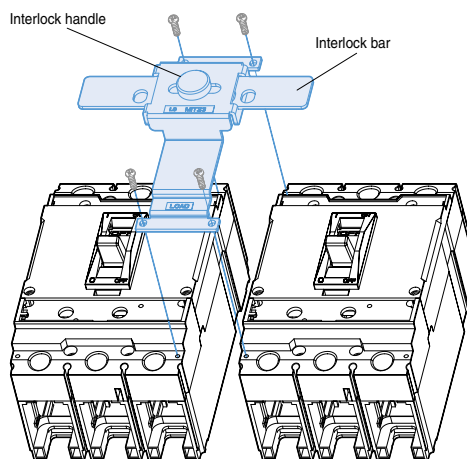


Left MCCB: Off lock
Right MCCB: ON/OFF is possible



Both MCCBs are of locked

MCCB		Interlock
Frame type	Pole	
TD100,TD160	3-pole	MIT13
	4-pole	MIT14
TS100,TS160,TS250	3-pole	MIT23
	4-pole	MIT24
TS400,TS630	3-pole	MIT33
	4-pole	MIT34
TS800	3-pole	MIT43
	4-pole	MIT44



Accessories for TD/TS series up to 800A

Susol

Plug-in device

Plug-in device

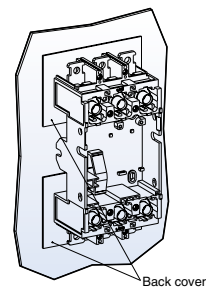
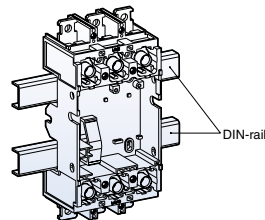
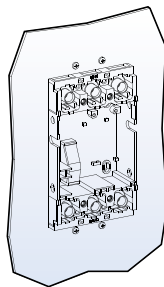
The plug-in base is the fixed part of the plug-in version of the circuit-breaker. It will be installed directly on the back plate of panel.

The circuit-breaker is racked out by unscrewing the top and bottom fixing screws. Plug-in base makes it possible to extract and/or rapidly replace the circuit breaker without having to touch connections for ship and important installations.

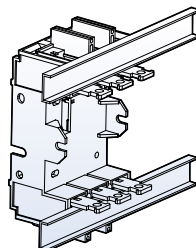
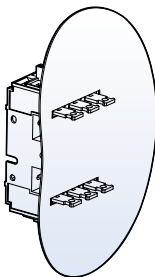


MCCB	Pole	Arrangement	Type	Means
TD100, TD160	2	Single line	PB12	
	3	Single line	PB13	
	2	Double line	PB12D2	For distribution board
	3	Double line	PB13D2	For distribution board
TS100, TS160, TS250	2	Single line	PB22	
	3	Single line	PB23	
TS400, TS600	2	Single line	PB32	
	3	Single line	PB33	
TS800	2	Single line	PB42	
	3	Single line	PB43	

Front connection



Rear connection



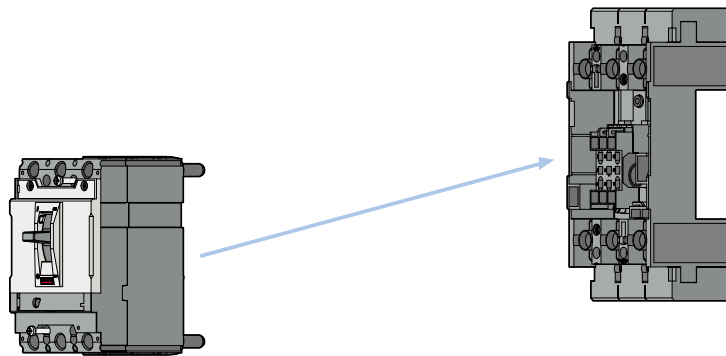
Accessories for TD/TS series up to 800A

Susol

Plug-in system

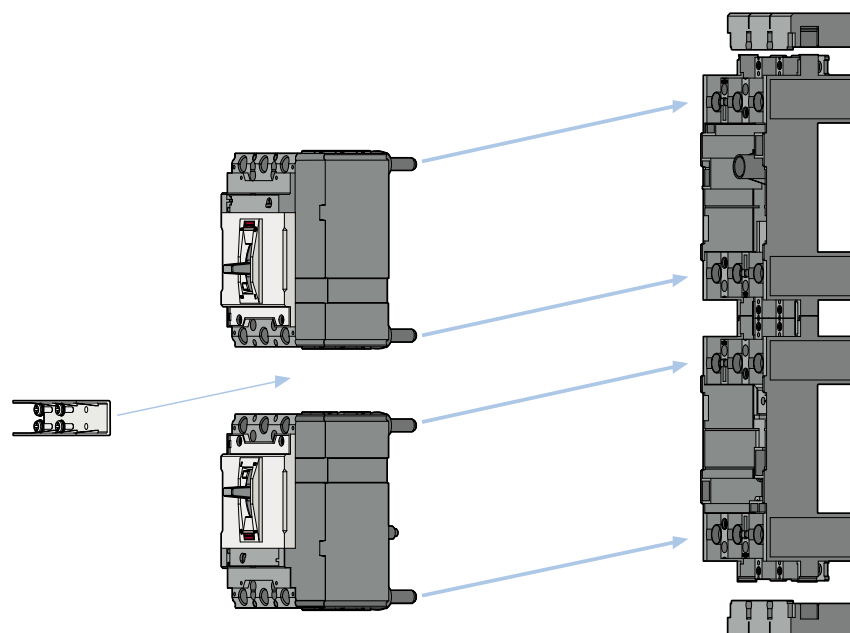
Normal type Plug-in MCCB: PB□ type

- MCCB rating: TD100~TS800
- generally used in switchgears



Double-row type Plug-in MCCB: PB□ D2 type

- MCCB rating: TD100, 160
- generally used in branch circuits



Accessories for TD/TS series up to 800A

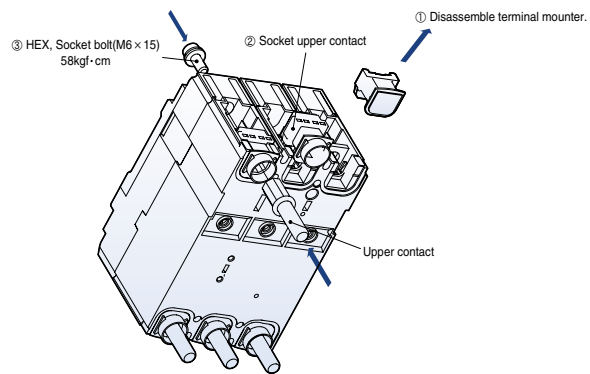
Susol

Plug-in device

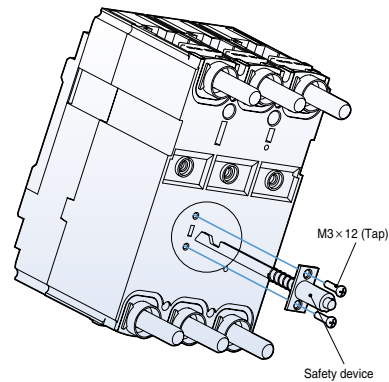
Assembling procedure

TD100, TD160

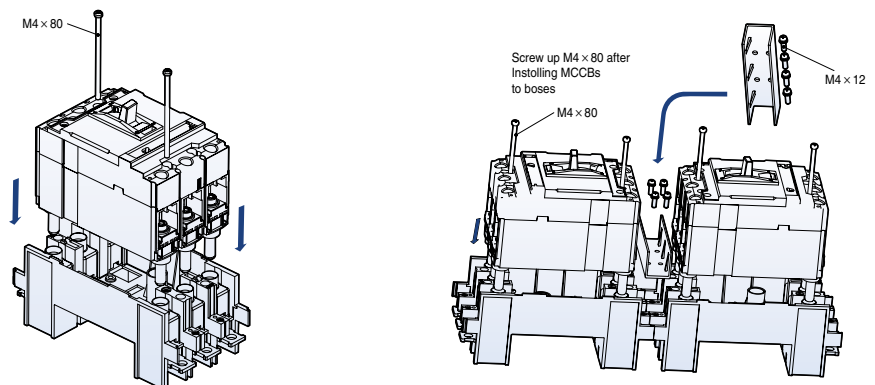
1. Conversion to Plug-in MCCB



2. Assembling safety device



3. Assembling MCCB and plug-in device



Accessories for TD/TS series up to 800A

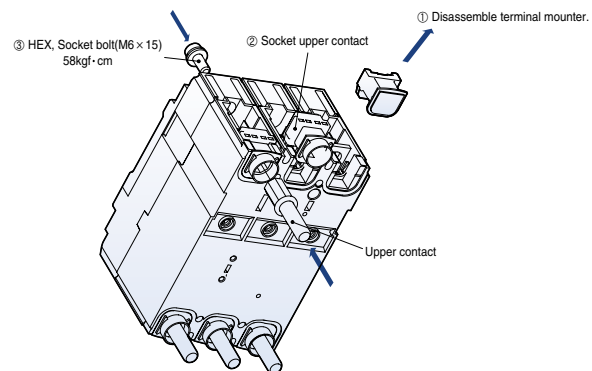
Susol

Plug-in device

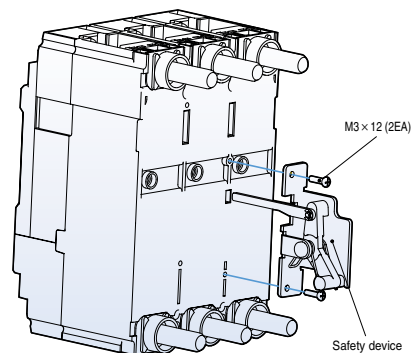
Assembling procedure

TS100, TS160, TS250

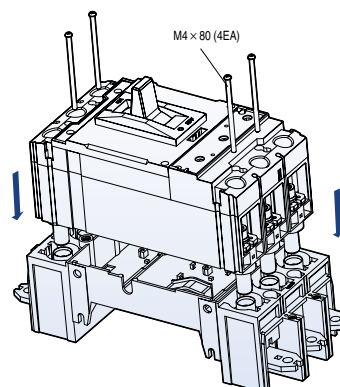
1. Conversion to Plug-in MCCB



2. Assembling safety device



3. Assembling MCCB and plug-in device



Accessories for TD/TS series up to 800A

Susol

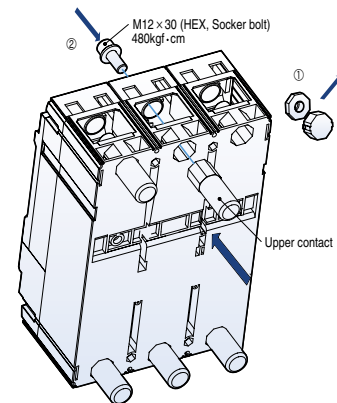
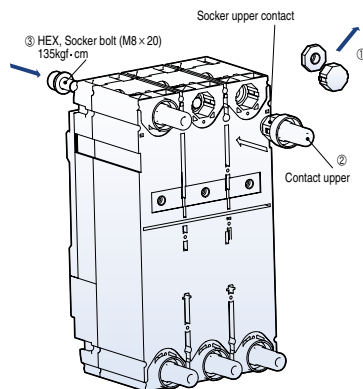
Plug-in device

Assembling procedure

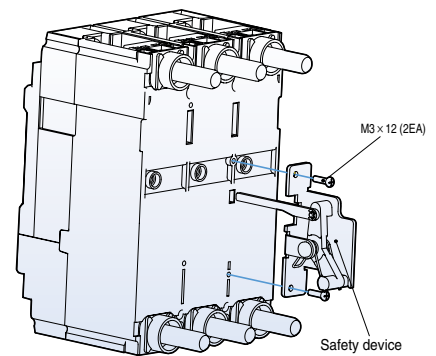
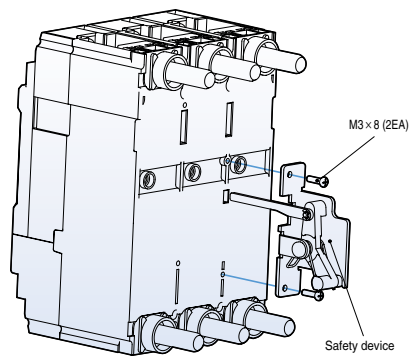
TS400, TS630

TS800

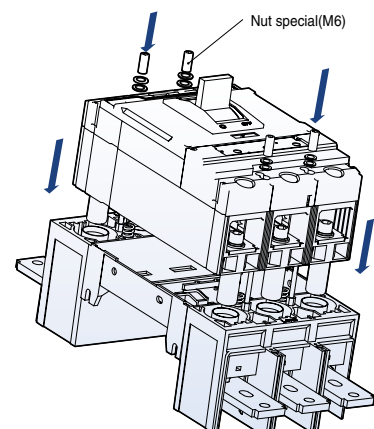
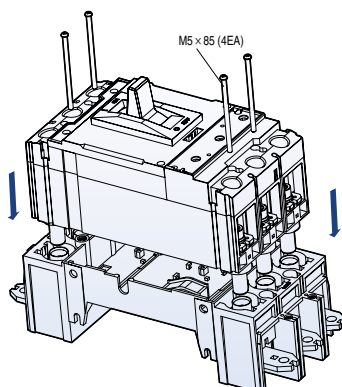
1. Conversion to Plug-in MCCB



2. Assembling safety device



3. Assembling MCCB and plug-in device



Accessories for TD/TS series up to 800A

Susol

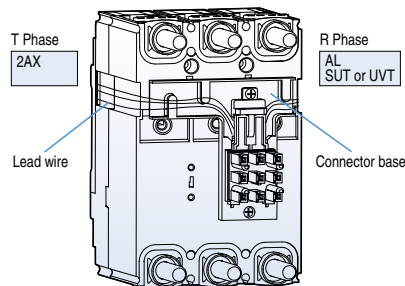
Connector KIT

Electric auxiliary circuit (AX, AL, SHT, UVT) from Breaker via one to three connector KIT (nine wires each). These are made of moving part on Breaker and fixed part on plug-in base up to 800AF.

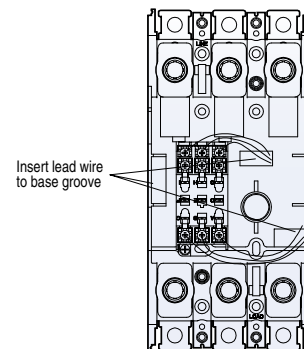
Breaker Max.	Q'ty	Fixed part	Moving part
TD160	1	SPARE PART ASS'Y, CONNECTOR KIT,TD160	SPARE PART ASS'Y, BASE CONNECTOR,TD160
TS250	2	SPARE PART ASS'Y, CONNECTOR KIT,TS250	SPARE PART ASS'Y, BASE CONNECTOR,TS250
TS400/630	3	SPARE PART ASS'Y, CONNECTOR KIT,TS400/630	SPARE PART ASS'Y, BASE CONNECTOR,TS630
TS800	3	SPARE PART ASS'Y, CONNECTOR KIT,TS800	SPARE PART ASS'Y, BASE CONNECTOR,TS800

TD160

Moving part

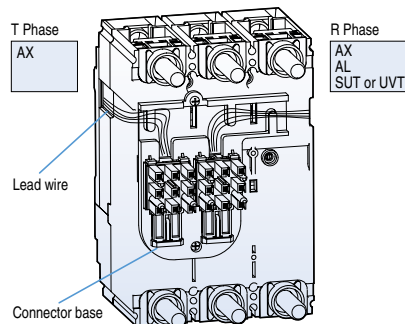


Fixed part

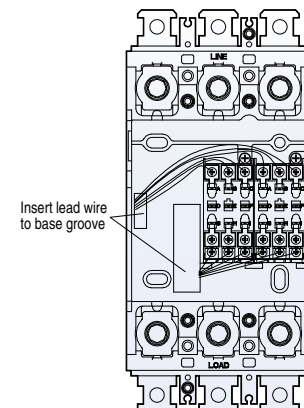


TS250

Moving part



Fixed part



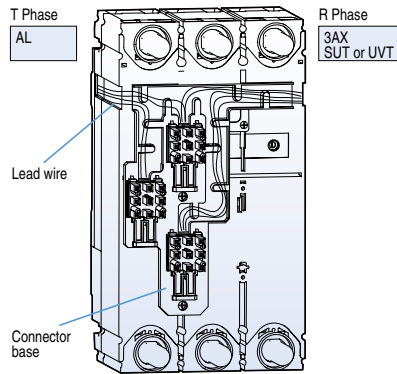
Accessories for TD/TS series up to 800A

Susol

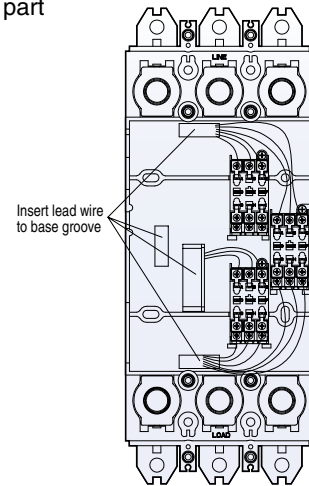
Connector KIT

TS400/630

Moving part

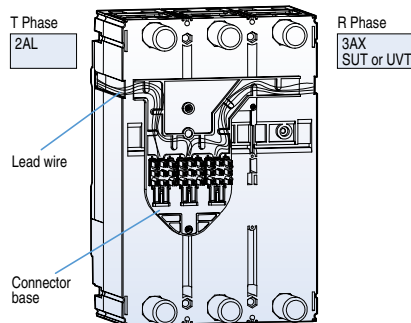


Fixed part

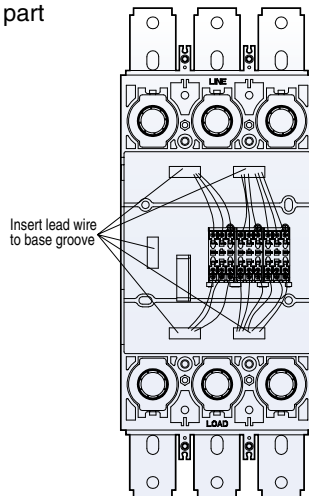


TS800

Moving part

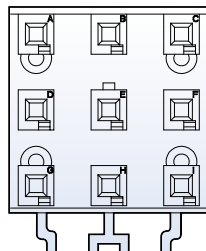


Fixed part



Read wire color

Moving part

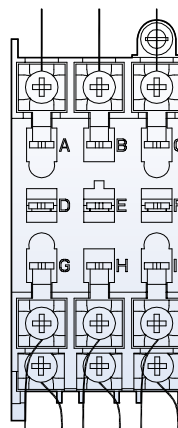


Lead wire color

A: Black	B: White	C: Red
D: Green	E: Yellow	F: Blue
G: Brown	H: Orange	I: Gray

Note) Useless lead wires should be ended for Preventing an electric accident.

Fixed part

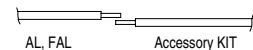


Lead wire color

A: Black	B: White	C: Red
D: Green	E: Yellow	F: Blue
G: Brown	H: Orange	I: Gray

Note) Useless lead wires should be ended for Preventing an electric accident.

- To connent AL and FAL solder the wire and insulates the wire



Accessories for TD/TS series up to 800A

Susol

Remote operation

Motor operator

Motor operators can also be operated by manual. The motor drives a mechanism which switches TD & TS toggle handle to the "ON" and "OFF/RESET" positions.

- The manual actuator handle is located on the front of the cover.
- Manual or Automatic operation can be selected.
- Applicable to 2, 3 and 4-pole breakers.



TS250 + MOP2

The motor operator is an essential device for constructing a remote operated automatic source-changeover system to ensure a continuous supply of electrical power at following certain installations:

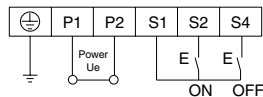
- Commercial sector: Hospital, Tall building, Bank, Insurance companies, Shopping centers
- Industry: Ships, Assembly lines at plant, Military sites, Port and Railway installation

MCCB	Type	Control voltage	Actuation current (A)	Response time (ms)		Consumption (W)	Mechanical service life (operations)	No. of operations per hour
				Closing	Opening			
TD100, TD160	MOP1	① DC 24V ② AC 100~240V/ DC 100~220V	≤2.5A (DC 24V) ≤0.5A (AC)	310	200	14	25,000	120
TS100, TS160, TS250	MOP2	① DC 24V ② AC 100~110V/	≤5A (DC 24V)	350	230	14	25,000	120
TS400, TS 630	MOP3	DC 110V ③ AC 230/	≤2A (AC)	500	350	35	20,000	60
TS800	MOP4	DC 220V		700	420	35	10,000	20

Wiring connection

Standard connection

Circuit breaker On and Off controlled by remote operation and manual operation

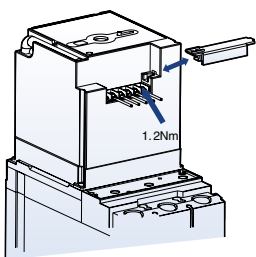
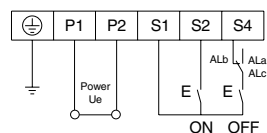


Connection with alarm switch (AL)

- 1) The below connection diagram is the method of using a alarm switch (AL) without shunt or undervoltage trip.
- 2) After clearing the fault surely, manual reset is mandatory in case of tripping due to an electrical fault.

Connection with FAL (only for the breakers with electronic trip unit ETS or ETM)

- 1) The below connection diagram is the method of using a FAL for circuit breakers with electronic trip unit.
- 2) After clearing the fault surely, manual reset is mandatory in case of tripping due to an electrical fault.



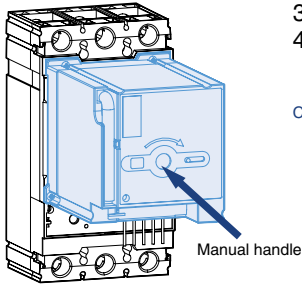
Accessories for TD/TS series up to 800A

Susol

Remote operation

Manual operation

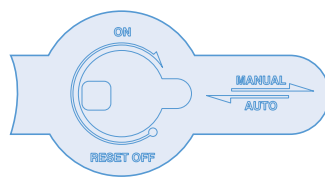
- 1) Insert the manual handle into the slot of Motor Operator surface and rotate it clockwise.
- 2) It must be rotated just 180° clockwise for safe operation of micro switch in the motor operator.
- 3) Return the manual handle after the manual operation
- 4) Turn the slide switch back to the position of AUTO.



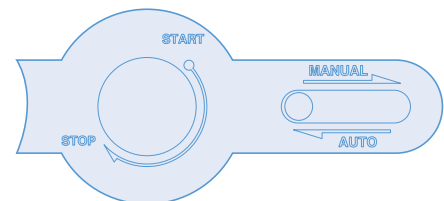
CAUTION: When the circuit breaker is tripped by trip button in the OFF status, it is impossible to operate motor operator automatically. It must be reset by manual operation.

Automatic operation

- 1) Set the slide switch to AUTO, then internal power is closed automatically.
- 2) Operating frequency should be less than these below regulated values.
TD 160N/H/L, TS250N/H/L: 180 operations per hour
- 3) Use the ON/OFF switch in the range of regulated values.
- 4) It may interfere near communication equipments because of internal switching power supply.
It's recommended that a noise filter be installed to power supply.
- 5) Please do not input ON/OFF signals at the same time during the automatic operation.
- 6) If the circuit breaker has a UVT attached inside, charge a UVT on the rated voltage before performing MOTOR OPERATOR.



[TD100, 160, TS100, 160, 250]



[TS400, 630, 800]

Accessories for TD/TS series up to 800A

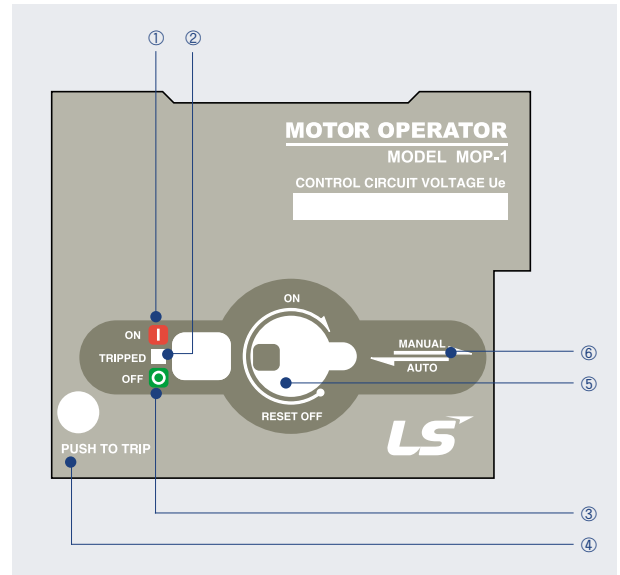
Susol

Remote operation

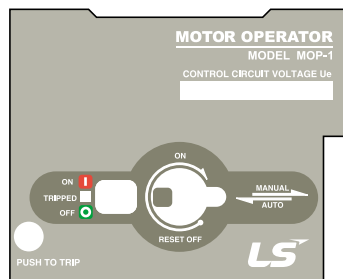
Motor operator

Feature

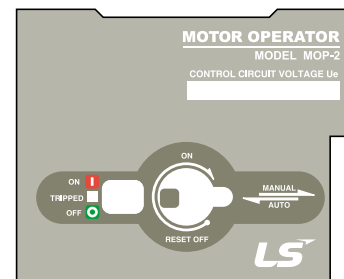
- ① On position indication (Red color)
- ② Trip position indication (White color)
- ③ Off position indication (Green color)
- ④ Button for push to trip
- ⑤ On/Off/Reset selection lever
- ⑥ Manual/Auto selection lever



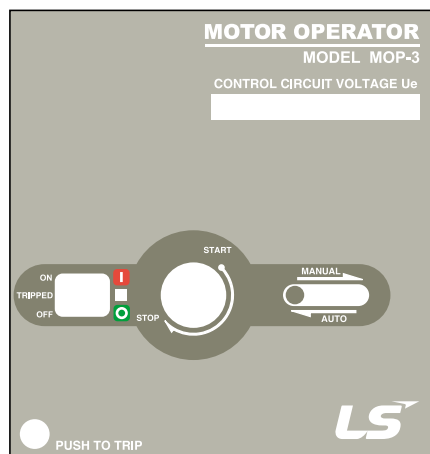
TD160 MOP-1



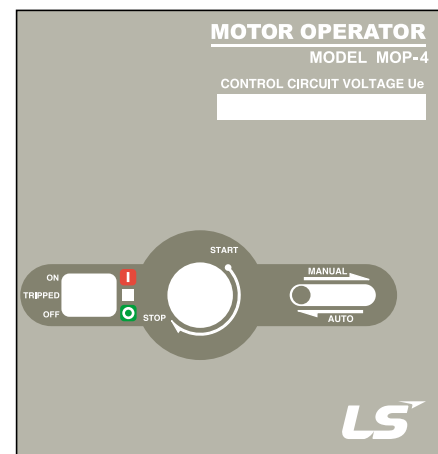
TS250 MOP-2



TS630.... MOP-3



TS800 MOP-4



Accessories for TD/TS series up to 800A

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Residual Current Devices (RCD)



The Susol circuit breaker can offer protection against earth leakage currents by using an add-on residual current device (RCD). In particular, the TS100, TS160 and TS250 circuit breakers can be combined with the RTU23 of residual current device, the TS400 and TS600 circuit breakers can be combined with the RTU33 of residual current device and the TS800 circuit breaker can be combined with the RTU43 of residual current device. In all cases the RCD unit interfaces directly below the circuit breaker trip unit area without the use of any secondary wiring or connections.

The Susol circuit breaker and an RCD unit combination can be connected like any stand-alone breaker and are available as fixed or plug-in devices. The main connection interface of the RCD is an exact replacement of the breaker connection area, thus allowing the use of all standard breaker terminals.

Overview

Apart from the protection against overloads typical of automatic circuit breakers, the residual current circuit breaker derived from them also guarantee protection of people against earth leakage currents, thereby ensuring protection against direct contacts, indirect contacts and fire hazards.- (ELCB)

The RCD unit has numerous current and time settings and an override blocking the time settings when set to 30mA. The earth leakage test button tests the electrical and mechanical operation of the device. In order to allow for a dielectric test of the breaker and RCD combination without damaging the electronics, the dielectric plug is placed within the setting area. The RCD unit may be equipped with an alarm switch (FAL) to remotely indicate tripping due to an earth leakage current.

Compliance with standards :

- IEC 60947-2 (industrial), Appendix B
- IEC 61009 (residential)
- IEC 60755, class A, immunity to DC components up to 6mA
- VDE664, operation down to -25°C

Remote indications :

RCD unit may be equipped with an alarm contact (FAL-fault alarm switch) to remotely indicate tripping due to an earth leakage current.

Power supply :

RCD unit are self-supplied internally by the distribution-system voltage and therefore do not require any external source. They continue to function even when supplied by only two phases.

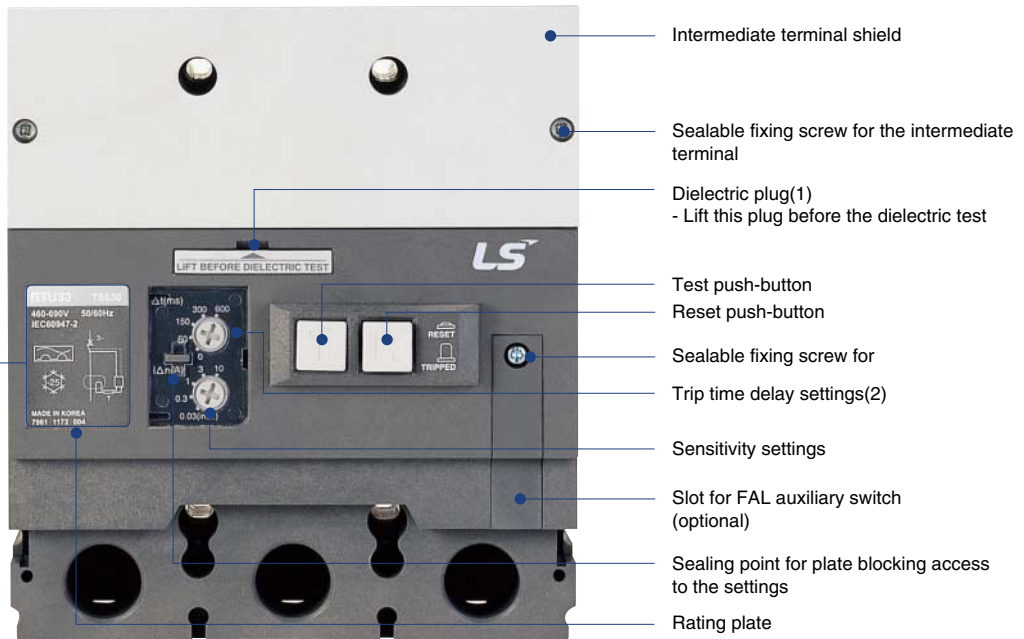


Accessories for TD/TS series up to 800A

Susol

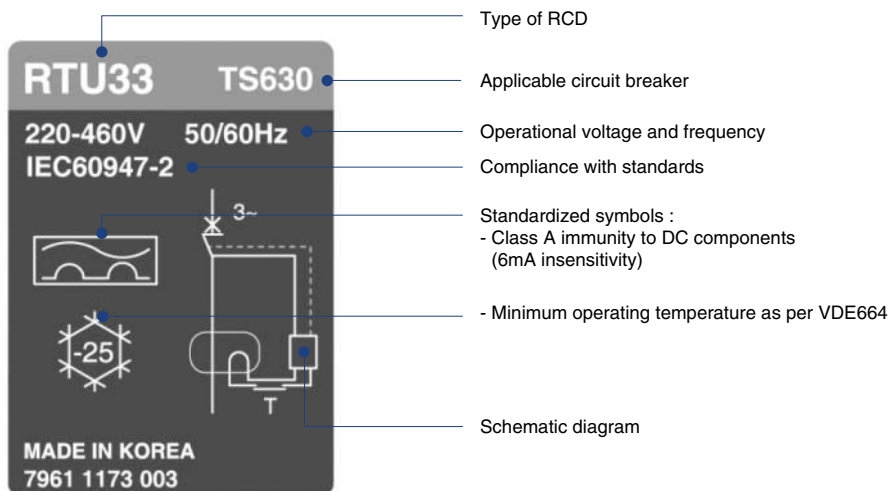
Residual Current Devices (RCD)

Configuration



- If the sensitivity is set to 30 mA, there is no time delay. Whatever the time-delay setting.

Detail of Rating plate



Accessories for TD/TS series up to 800A

Susol

Residual Current Devices (RCD)

Ratings and Selection



RCD type		RTU23	RTU33	RTU43
Number of poles		3*	3*	3*
Applicable circuit breaker	TS100	■		
	TS160	■		
	TS250	■		
	TS400		■	
	TS630		■	
	TS800			■
Protection characteristics				
Sensitivity	$I_{\Delta n}(A)$	(adjustable) 0.03-0.3-1-3-10	(adjustable) 0.03-0.3-1-3-10	(adjustable) 0.03-0.3-1-3-10
Time delay **	Intentional time delay(ms)	(adjustable) 0-60-150-300-600	(adjustable) 0-60-150-300-600	(adjustable) 0-60-150-300-600
	Max. breaking time(ms)	(adjustable) 40-140-240-450-880	(adjustable) 40-140-240-450-880	(adjustable) 40-140-240-450-880
Rated voltage	AC 50/60 Hz	220~460V / 460~690V	220~460V / 460~690V	220~460V / 460~690V

Note) RTU can not be applied to 63A or less MTU Type MCCB.

* 3P modules may also be used on 2P circuit breakers.

** If the sensitivity is set to 30mA, the time delay setting is reduced to zero.

Trip time delay settings
0-60-150-300-600ms

Sensitivity settings, $I_{\Delta n}$
0.03-0.3-1-3-10A



Accessories for TD/TS series up to 800A

Susol

Residual Current Devices (RCD)

Combination

The addition of the RCD unit does not affect circuit breaker characteristics.

- Conformity with standards
- Protection degrees, class II insulation front face
- Suitability for isolation as defined by IEC 60947-2
- Electrical characteristics
- Trip unit characteristics
- Installation and connection methods
- Indication, measurement and control accessories
- Installation and connection accessories

		RTU23	RTU33	RTU43
MCCB	L × H × D(mm)	105 × 160 × 86	140 × 260 × 110	210 × 320 × 135
MCCB+RCD		105 × 240 × 86	140 × 370 × 110	210 × 450 × 135
RCD		105 × 80 × 86	140 × 110 × 110	210 × 130 × 135
MCCB+RCD	Weight(kg)	2.7	8.08	16.28
RCD		0.96	2.52	4.6
Type	Bottom			
Accessory	FAL(fault alarm switch)			



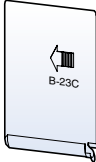


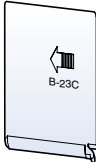




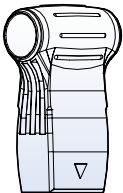
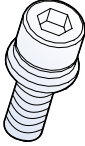
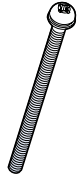


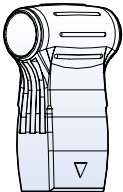


Accessories for TD/TS series up to 800A

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Standard accessories

The following accessories for mounting, connection, insulation, handle operation are standard items and are packed with Susol TD & TS series circuit breakers.

TD100N/H/L TD160N/H/L	 M8 × 20 1P: 2pcs 3P: 6pcs 4P: 8pcs	 M3 × 75(1P) M4 × 75 1P: 2pcs 3P: 2pcs 4P: 4pcs	 3P: 4pcs 4P: 6pcs		
TS100N/H/L TS160N/H/L TS250N/H/L	 M8 × 20 3P: 6pcs 4P: 8pcs	 M4 × 75 3P: 2pcs 4P: 4pcs	 3P: 4pcs 4P: 6pcs		
TS400N/H/L TS630N/H/L	 M10 × 30 3P: 6pcs 4P: 8pcs	 M5 × 85 3P: 4pcs 4P: 4pcs	 M5 3P: 4pcs 4P: 4pcs	 3P: 4pcs 4P: 6pcs	 "1pc*"
TS800N/H/L	 M12 × 35 3P: 6pcs 4P: 8pcs	 M6 × 100 3P: 4pcs 4P: 4pcs	 M6 3P: 4pcs 4P: 4pcs	 3P: 4pcs 4P: 6pcs	 "1pc*"

* Auxiliary operating handel : TS400, TS630, TS800N/H/L Only