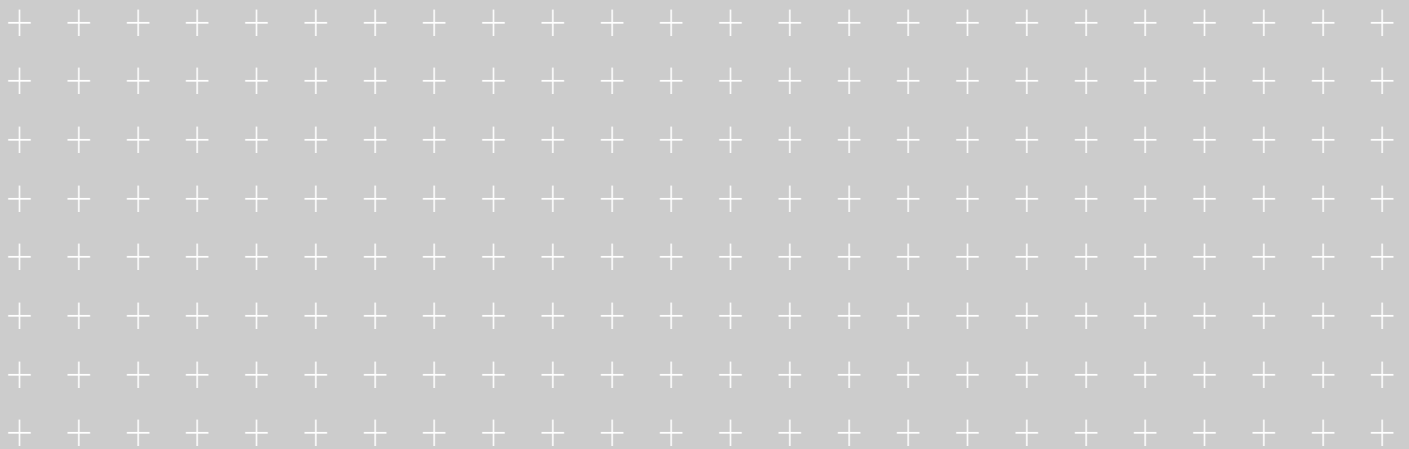


Accessories



# Accessories

## | Signal accessories |

- auxiliary switch
- trip alarm switch
- shunt trip
- under voltage trip

## | Operating accessories |

- operating handle (surface and extended type)
- motor operator
- mechanical interlock
- extension handle

## | Mounting accessories |

- DIN-rail adaptor
- Mounting base for plug-in mounting

## | Terminal accessories |

- terminal bus bar
- cage terminal block
- terminal cover
- interpole barrier

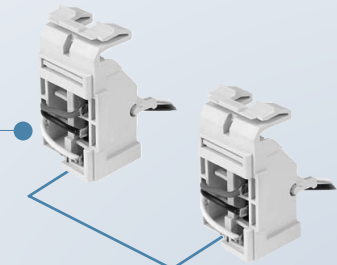
## | Portable test equipment |

- MCCB trip unit tester

## < Accessories for UAB100 >

Auxiliary switch [AUX]

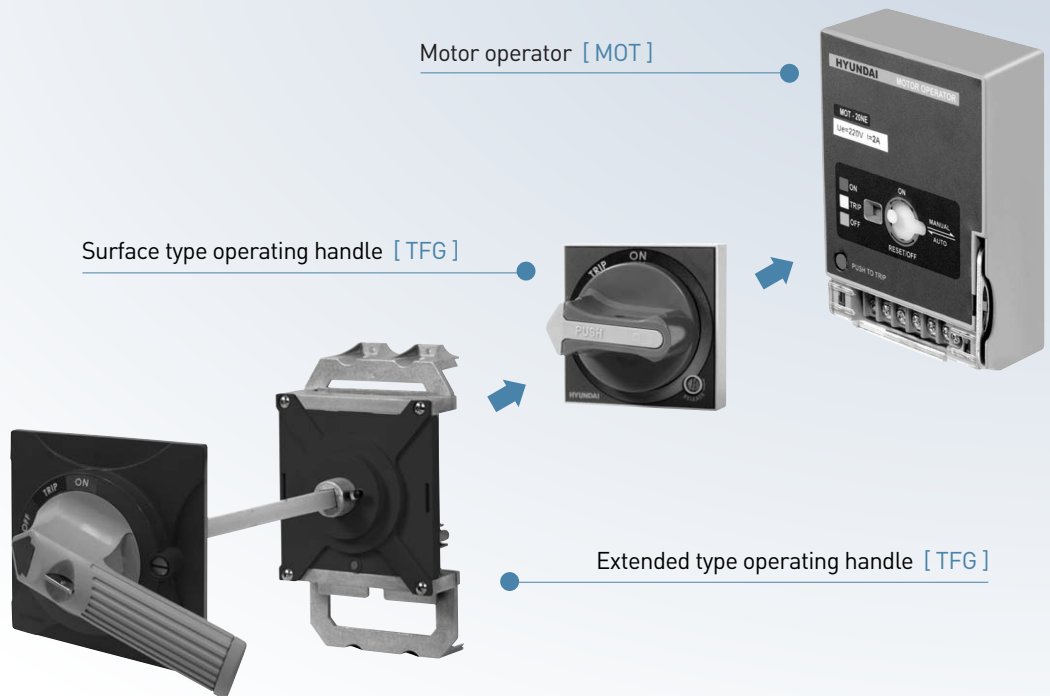
Trip alarm switch [ALT]



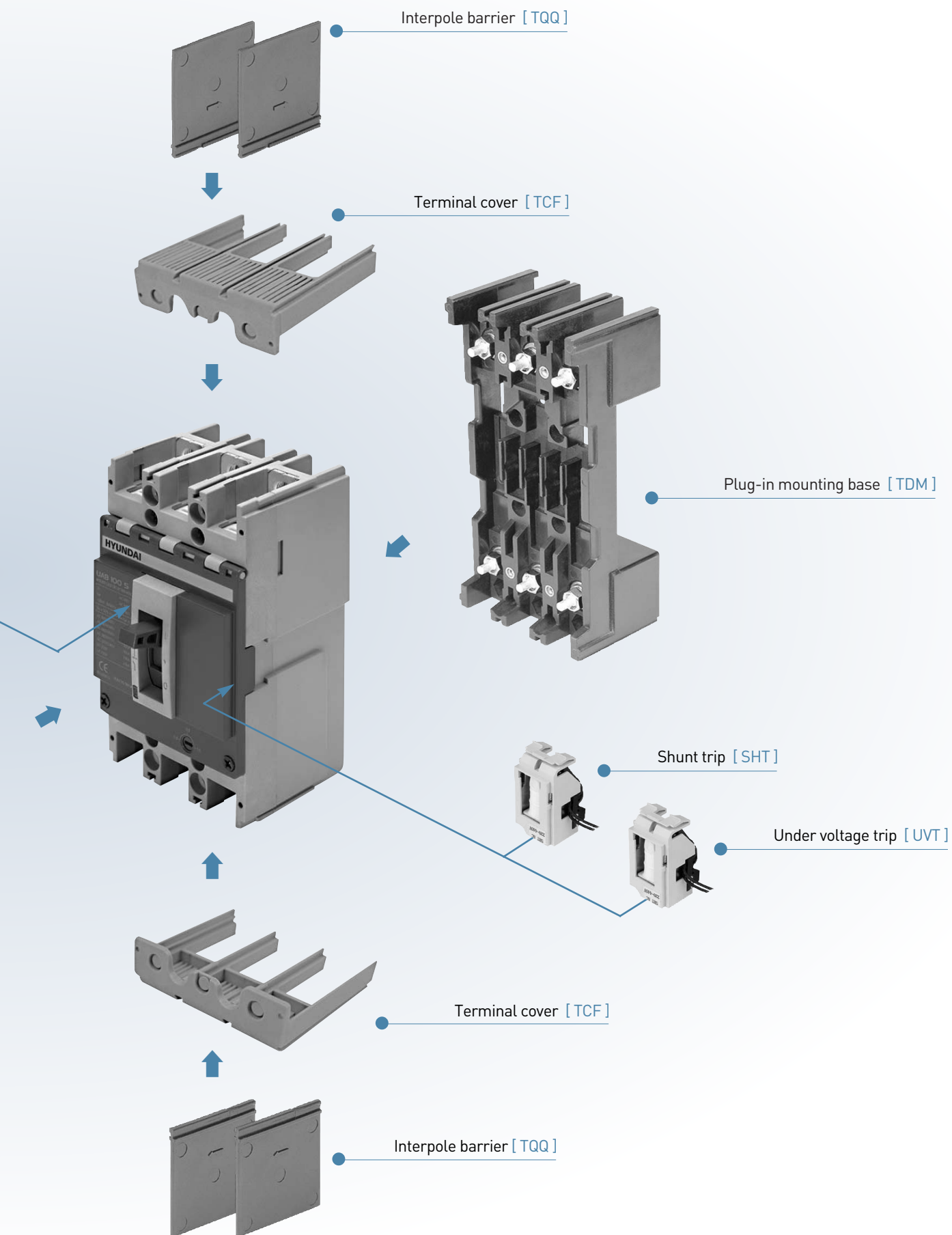
Motor operator [MOT]

Surface type operating handle [TFG]

Extended type operating handle [TFG]

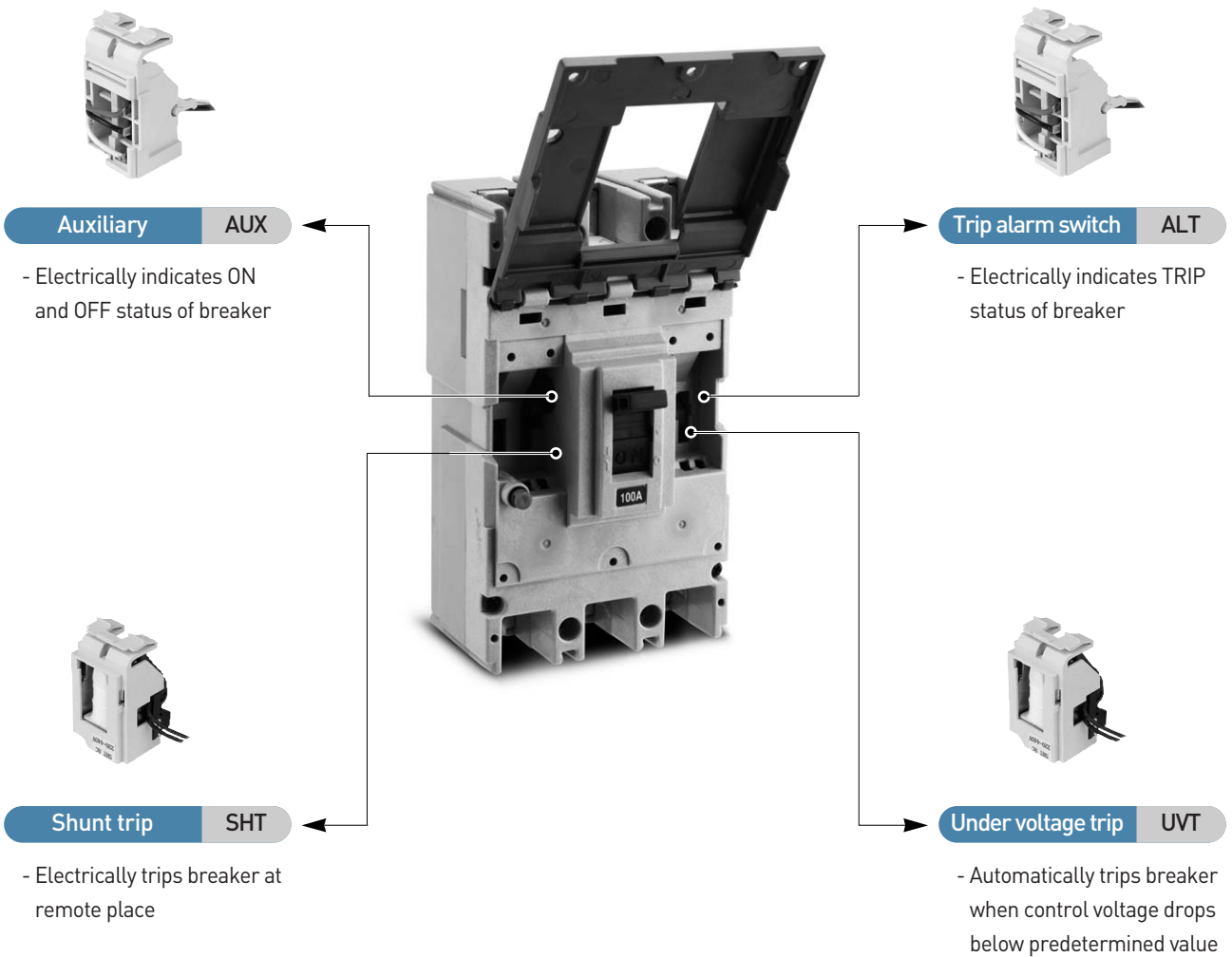


※ The applicable accessories of each MCCB are not same as above. For exact application to each MCCB, please refer to next pages.



## Signal Accessories

- Signal accessories adopts cassette type assembly method, so they can be easily installed and removed.



## Installation and wiring of signal accessories

Item	Installation		Wiring
	3 pole	2 pole	
Auxiliary switch [AUX]			 1EA of 1ab type AUX
			 2EA of 1ab type AUX
			 3EA of 1ab type AUX
			 4EA of 1ab type AUX
Trip alarm switch [ALT]			 Trip
Shunt trip [SHT]			 Limit switch for coil protection for SHT 10A H, SHT 10B H, SHT 10A H
			 2)
Under voltage trip [UVT]			

※ For detail installation to each MCCB model, please refer to page 0 to 0.

1) Common for AC200-480V. Applicable for SHT 10A H, SHT 10B H and SHT 10A H only.

2) The coil is continuously energized, so that limit switch is not required.

## Operation of AUX and ALT

MCCB Status	Auxiliary switch [AUX]	Trip alarm switch [ALT]
ON		
OFF		
TRIP		

# Signal Accessories

## Auxiliary switch (AUX) and trip alarm switch (ALT)

Applicable MCCB	Auxiliary switch (AUX)		Trip alarm switch (ALT)		Category
	Order code	Specification	Order code	Specification	
UAB30C, UAB30R, UAB50C, UAB50R, UAB60C, UAB60R, UAB100C / UAD50C	AUX 10A R1	1ab, Right-hand-side	ALT 10A R1	1ab, Right-hand-side	MCCB MB
	AUX 10A R2	2ab, Right-hand-side			
UAB50S, UAB50H, UAB100R, UAB100S / UAD50S, UAD100R	AUX 10UA R1	1ab, Right-hand-side	ALT 10UA R1	1ab, Right-hand-side	
	AUX 10UA L1	1ab, Left-hand-side	ALT 10UA L1	1ab, Left-hand-side	
UCB50R, UCB100R, UCB100S / UCD100R	AUX 10B L1	1ab, Left-hand-side	ALT 10B L1	1ab, Left-hand-side	
UCB250R, UCB250S, UCB250N / UCD250S	AUX 20C L1	1ab, Left-hand-side	ALT 20C L1	1ab, Left-hand-side	
UCB50H, UCB50L, UCB100H, UCB100L, UCB160H, UCB160L, UCB250H, UCB250L / UCD50H, UCD100H, UCD160H, UCD250H	AUX 12FG R1	1ab, Right-hand-side	ALT 12FG R1	1ab, Right-hand-side	
	AUX 12FG R2	2ab, Right-hand-side	ALT 12FG L1	1ab, Left-hand-side	
UCB400R, UCB400S, UCB400H, UCB400L, UCB630R, UCB630S, UCB630H, UCB630L, UCB800R, UCB800S, UCB800H, UCB800L / UCD400S, UCD630S, UCD800S	AUX 46D L1	1ab, Left-hand-side	ALT 46D L1	1ab, Left-hand-side	
	AUX 80NE R1	1ab, Right-hand-side	ALT 80NE R1	1ab, Right-hand-side	
AUX 80NE R2	2ab, Right-hand-side				
UCB1000S, UCB1000L, UCB1250S, UCB1250L / UCD1000S, UCD1250S	AUX 160NE R1	1ab, Right-hand-side	-	-	
UCB1600S	AUX 160NE R2	2ab, Right-hand-side	-	-	
UPB100S, UPB100H, UPB100L, UPB100X, UPB160S, UPB160H, UPB160L, UPB160X, UPB250S, UPB250H, UPB250L, UPB250X / UPD100S, UPD160S, UPD250S	AUX 12UP R1	1ab, Right-hand-side	ALT 12UP L1	1ab, Left-hand-side	
UPB400S, UPB400H, UPB400L, UPB400X, UPB630S, UPB630H, UPB630L, UPB630X / UPD400S, UPD630S	AUX 46UP L1	1ab, Left-hand-side	ALT 46UP R1	1ab, Right-hand-side	
HBL103U, HBL103UM, HBL203U, HBL203UM, HBL103UQ, HBL103UMQ, HBL203UQ, HBL203UMQ <sup>1)</sup>	AUX 12UP R1	1ab, Right-hand-side	ALT 12UP L1	1ab, Left-hand-side	
UDB30S, UDB30H, UDB50S, UDB50H, UDB100S, UDB100H / UDG30S, UDG30H, UDG50S, UDG50H, UDG100S, UDG100H	AUX 10UD R1	1ab, Right-hand-side	ALT 10UD R1	1ab, Right-hand-side for 2 pole	
			ALT 10UD R2	1ab, Right-hand-side for 3 pole	

※ 1) Signal accessories for HBL type shall be installed in breaker before ex-working.

## Shunt trip (SHT)

Applicable MCCB	Order code / Exciting current (peak value)						Category
	DC24V	DC100-110V	AC100-120V	AC200-230V	AC380-415V	AC440-480V	
UAB30C, UAB30R, UAB50C, UAB50R, UAB60C, UAB60R, UAB100C / UAD50C	SHT 10A A	SHT 10A C	SHT 10A F	SHT 10A H			MCCB MB
	5.2A	1.1A	0.76A	0.28A			
UAB50S, UAB50H, UAB100R, UAB100S / UAD50S, UAD100R	SHT 10UA A	SHT 10UA C	SHT 10UA F	SHT 10UA H	SHT 10UA B	SHT 10UA D	
	5.7A	1.2A	0.88A	0.42A	0.42A	0.42A	
UCB50R, UCB100R, UCB100S / UCD100R	SHT 10B A	SHT 10B C	SHT 10B F	SHT 10B H			
	5.2A	2.2A	0.76A	0.4A			
UCB250R, UCB250S, UCB250N / UCD250S	SHT 20C A	SHT 20C C	SHT 20C F	SHT 20C H			
	5.2A	2.2A	0.76A	0.4A			
UCB50H, UCB50L, UCB100H, UCB100L, UCB160H, UCB160L, UCB250H, UCB250L / UCD50H, UCD100H, UCD160H, UCD250H	SHT 12FG A	SHT 12FG C	SHT 12FG F	SHT 12FG H	SHT 12FG B	SHT 12FG D	
	5.2A	2.2A	0.76A	0.4A	0.4A	0.4A	
UCB400R, UCB400S, UCB400H, UCB400L, UCB630R, UCB630S, UCB630H, UCB630L, UCB800R, UCB800S, UCB800H, UCB800L / UCD400S, UCD630S, UCD800S	SHT 46D A	SHT 46D C	SHT 46D F	SHT 46D H	SHT 46D B	SHT 46D D	
	0.01A	0.01A	0.012A	0.011A	0.01A	0.01A	
UCB1000S, UCB1000L, UCB1250S, UCB1250L / UCD1000S, UCD1250S	SHT 120NE A	SHT 120NE C	SHT 120NE F	SHT 120NE H	SHT 120NE B	SHT 120NE D	
	2A	0.11A	0.24A	0.23A	0.23A	0.23A	
UCB1600S	SHT 160NE A	SHT 160NE C	SHT 160NE F	SHT 160NE H	SHT 160NE B <sup>1)</sup>	-	
	2A	1A	0.76A	0.4A	0.35A	-	
UPB100S, UPB100H, UPB100L, UPB100X, UPB160S, UPB160H, UPB160L, UPB160X, UPB250S, UPB250H, UPB250L, UPB250X / UPD100S, UPD160S, UPD250S	SHT 12UP A	SHT 12UP C	SHT 12UP F	SHT 12UP H	SHT 12UP B	SHT 12UP D	
	0.023A	0.023A	0.023A	0.023A	0.023A	0.023A	
UPB400S, UPB400H, UPB400L, UPB400X, UPB630S, UPB630H, UPB630L, UPB630X / UPD400S, UPD630S	SHT 46UP A	SHT 46UP C	SHT 46UP F	SHT 46UP H	SHT 46UP B	SHT 46UP D	
	0.023A	0.023A	0.023A	0.023A	0.023A	0.023A	
HBL103U, HBL103UM, HBL203U, HBL203UM, HBL103UQ, HBL103UMQ, HBL203UQ, HBL203UMQ <sup>1)</sup>	SHT 12UP A	SHT 12UP C	SHT 12UP F	SHT 12UP H	SHT 12UP B	SHT 12UP D	
	0.023A	0.023A	0.023A	0.023A	0.023A	0.023A	
UDB30S, UDB30H, UDB50S, UDB50H, UDB100S, UDB100H	SHT 10UD A	SHT 10UD C	SHT 10UD F	SHT 10UD H	SHT 10UD B	SHT 10UD D	
	1.65A	0.36A	0.4A	0.2A	0.08A	0.1A	

※ The permissible operating voltage: 85-110% of rated voltage for AC, 75-125% for DC.

1) SHT 160NE B is applicable for AC380V only.

2) Signal accessories for HBL type shall be installed in breaker before ex-working.

## | Under voltage trip (UVT) |

Applicable MCCB	Order code						Category
	DC24V	DC100-110V	AC100-120V	AC200-230V	AC380-415V	AC440-480V	
UAB30C, UAB30R, UAB50C, UAB50R, UAB60C, UAB60R, UAB100C / UAD50C	*UVT 10A J	*UVT 10A L	*UVT 10A N	*UVT 10A P	*UVT 10A Q	*UVT 10A R	MCCB MB
UAB50S, UAB50H, UAB100R, UAB100S / UAD50S, UAD100R	UVT 10UA J	UVT 10UA L	UVT 10UA N	UVT 10UA P	UVT 10UA Q	UVT 10UA R	
UCB50R, UCB100R, UCB100S / UCD100R	UVT 10B J	UVT 10B L	UVT 10B N	UVT 10B P	UVT 10B Q	UVT 10B R	
UCB250R, UCB250S, UCB250N / UCD250S	UVT 20C J	UVT 20C L	UVT 20C N	UVT 20C P	UVT 20C Q	UVT 20C R	
UCB50H, UCB50L, UCB100H, UCB100L, UCB160H, UCB160L, UCB250H, UCB250L / UCD50H, UCD100H, UCD160H, UCD250H	UVT 12FG J	UVT 12FG L	UVT 12FG N	UVT 12FG P	UVT 12FG Q	UVT 12FG R	
UCB400R, UCB400S, UCB400H, UCB400L, UCB630R, UCB630S, UCB630H, UCB630L, UCB800R, UCB800S, UCB800H, UCB800L / UCD400S, UCD630S, UCD800S	*UVT 46D J	*UVT 46D L	*UVT 46D N	*UVT 46D P	*UVT 46D Q	*UVT 46D R	
UCB1000S, UCB1000L, UCB1250S, UCB1250L / UCD1000S, UCD1250S	UVT 120NE J	UVT 120NE L	UVT 120NE N	UVT 120NE P	UVT 120NE Q	UVT 120NE R	
UCB1600S	-	-	-	UVT 160NE P	UVT 160NE Q <sup>1)</sup>	-	
UPB100S, UPB100H, UPB100L, UPB100X, UPB160S, UPB160H, UPB160L, UPB160X, UPB250S, UPB250H, UPB250L, UPB250X / UPD100S, UPD160S, UPD250S	*UVT 12UP J	*UVT 12UP L	*UVT 12UP N	*UVT 12UP P	*UVT 12UP Q	*UVT 12UP R	
UPB400S, UPB400H, UPB400L, UPB400X, UPB630S, UPB630H, UPB630L, UPB630X / UPD400S, UPD630S	*UVT 46UP J	*UVT 46UP L	*UVT 46UP N	*UVT 46UP P	*UVT 46UP Q	*UVT 46UP R	
HBL103U, HBL103UM, HBL203U, HBL203UM, HBL103UQ, HBL103UMQ, HBL203UQ, HBL203UMQ <sup>2)</sup>	*UVT 12UP J	*UVT 12UP L	*UVT 12UP N	*UVT 12UP P	*UVT 12UP Q	*UVT 12UP R	

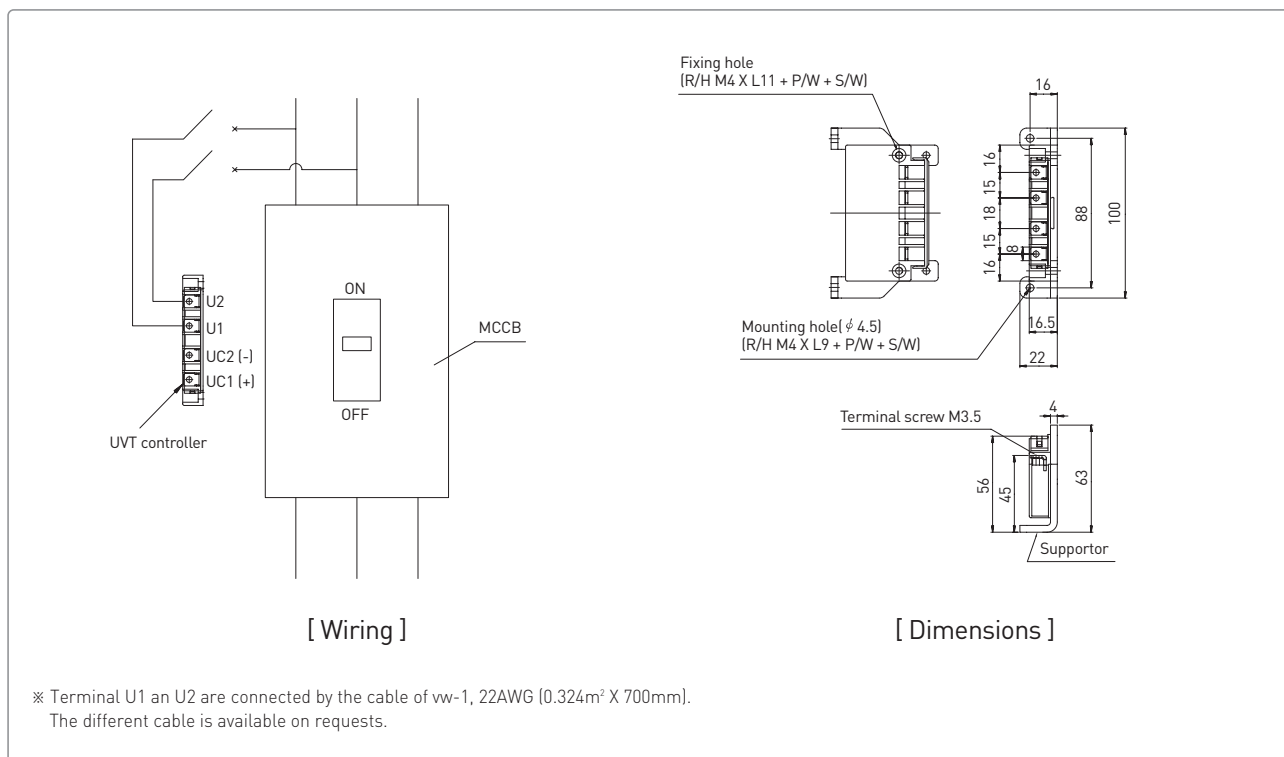
※ The permissible operating voltage: 85-110% of rated voltage for AC, 85-125% for DC. The tripping voltage: 20-70% of rated voltage.

\* Reset is possible without power.

1) UVT 160NE Q is applicable for AC380V only.

2) Signal accessories for HBL type shall be installed in breaker before ex-working.

- UVT controller is supplied as standard for UVT 10A, UVT 10B, UVT 20C, UVT 12FG, UVT 46D J, UVT 12UP and UVT 46UP type.



# Operating Accessories

- Operating accessories offers convenience and safety in operation of breaker.

## Operating handle

- Enables manual operation of breaker without panel door-open
- Offers panel door-lock and reverse interlock function
- Satisfies IP54

### Surface type TFG



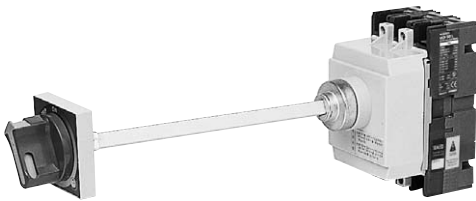
### Motor operator MOT

- Enables automatic remote ON and OFF operation as well as manual operation
- Applied to electric supervision and control system
- Equips an emergency trip button in all range



### Extended type TFH

- Useful in case that panel door is far from breaker
- Mechanism part is installed on front of breaker and connected with operating part by shaft



### Mechanical interlock MIF

- Mechanically prevents simultaneous closing of two breakers

### Extension handle THA

- Reduces strength in operation of breaker





## | Operating handle (TFG/TFH) |

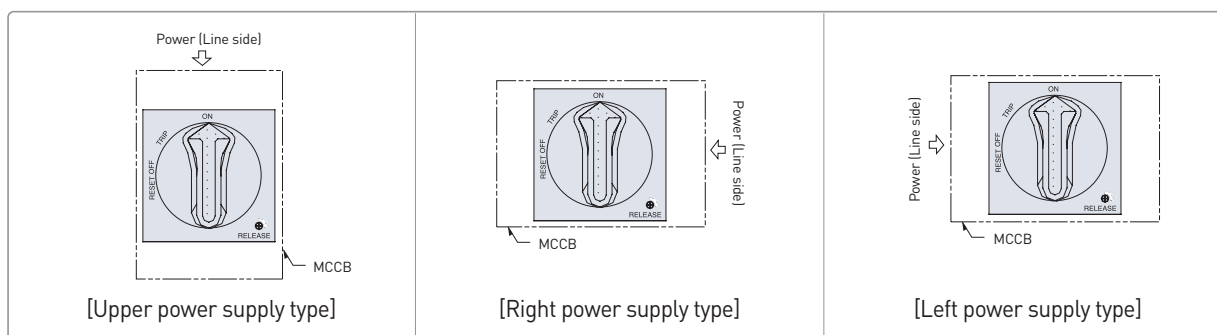
Applicable MCCB	Surface type (TFG)					Extended type (TFH)	
	S type			L type		S type	L type
	Upper <sup>1)</sup> power supply type	Right <sup>1)</sup> power supply type	Left <sup>1)</sup> power supply type	Upper <sup>1)</sup> power supply type	Left <sup>1)</sup> power supply type		
UAB30C, UAB30R, UAB50C, UAB50R, UAB60C, UAB60R, UAB100C / UAD50C	TFG 10AS U4	TFG 10AS R4	TFG 10AS L4	TFG 10AL U4	TFG 10AL L4	TFH 10AS	TFH 10AL
UAB50S, UAB50H, UAB100R, UAB100S / UAD50S, UAD100R	TFG 10UAS U4	TFG 10UAS R4	TFG 10UAS L4	TFG 10UAL U4	TFG 10UAL L4	TFH 10UAS	TFH 10UAL
UCB50R, UCB100R, UCB100S / UCD100R	TFG 10BS U4	TFG 10BS R4	TFG 10BS L4	TFG 10BL U4	TFG 10BL L4	TFH 10BS	TFH 10BL
UCB250R, UCB250S, UCB250N / UCD250S	TFG 20CS U4	TFG 20CS R4	TFG 20CS L4	TFG 20CL U4	TFG 20CL L4	TFH 20CS	TFH 20CL
UCB50H, UCB50L, UCB100H, UCB100L / UCD50H, UCD100H	TFG 10UFS U4	TFG 10UFS R4	TFG 10UFS L4	TFG 10UFL U4	TFG 10UFL L4	TFH 10UFS	TFH 10UFL
UCB160H, UCB160L, UCB250H, UCB250L / UCD160H, UCD250H	TFG 20UGS U4	TFG 20UGS R4	TFG 20UGS L4	TFG 20UGL U4	TFG 20UGL L4	TFH 20UGS	TFH 20UGL
UCB400R, UCB400S, UCB400H, UCB400L, UCB630R, UCB630S, UCB630H, UCB630L, UCB800R, UCB800S, UCB800H, UCB800L / UCD400S, UCD630S, UCD800S UCB1600S	-	-	-	-	-	TFH 46DS	-
UPB100S, UPB100H, UPB100L, UPB100X, UPB160S, UPB160H, UPB160L, UPB160X, UPB250S, UPB250H, UPB250L, UPB250X / UPD100S, UPD160S, UPD250S	TFG 12UPS U4	TFG 12UPS R4	TFG 12UPS L4	TFG 12UPL U4	TFG 12UPL L4	TFH 12UPS	TFH 12UPL
UPB400S, UPB400H, UPB400L, UPB400X, UPB630S, UPB630H, UPB630L, UPB630X / UPD400S, UPD630S	TFG 46UPS U2	TFG 46UPS R2	TFG 46UPS L2	-	-	TFH 46UPS	-
HBL103U, HBL103UM, HBL203U, HBL203UM	-	-	-	TFG 20U U4	TFG 20U L4	-	TFH 20U
HBL103UQ, HBL103UMQ, HBL203UQ, HBL203UMQ	-	-	-	TFG 20UQ U4	TFG 20UQ L4	-	TFH 20UQ

※ In case of surface type (TFG), there are three types for diverse panel door-lock application, above mentioned codes are standard type.  
For detail, please refer to following explanation.

1) Upper, right and left indicates the power supply direction of MCCB.

### ■ Power supply direction of MCCB

- Surface type (TFG) operating handles are divided into three types by power supply direction of MCCB.



### ■ Panel door-lock

- Surface type (TFG) operating handles offer four options in panel door-lock application.
  - OFF OPEN type: Panel door opens when operating handle is in OFF position. Indicating code (last digit of full order code) is 1. ex. TFG 10AS U1
  - OFF OPEN type with reverse interlock: Panel door opens when operating handle is in OFF position. Reverse interlock keeps MCCB not to be "ON" when panel door opens. This is standard type for 400-800AF MCCB and indicating code (last digit of full order code) is 2. ex. TFG 46DS U2
  - RESET OPEN type: Panel door opens when operating handle is in RESET position. Indicating code (last digit of full order code) is 3. ex. TFG 10AS U3
  - RESET OPEN type with reverse interlock: Panel door opens when operating handle is in RESET position. Reverse interlock keeps MCCB not to be "ON" when panel door open. This is standard type for 30-250AF MCCB and indicating code (last digit of full order code) is 2. ex. TFG 46DS U2
- When panel door is required to open in ON position of operating handle, please turn the RELEASE knob to indicated direction and open the panel door.
- For more operating function, please refer to next pages.

# Operating Accessories

## ■ Operation

- Operating direction
  - Turn the handle in a clockwise direction for ON.
  
- Operation in panel door-closed
  - MCCB ON: Turn the handle to ON position. (Fig. 1)
  - MCCB OFF: Turn the handle to OFF position. (Fig. 2)
  - MCCB TRIP: When MCCB trips, handle turns to TRIP position automatically.
  - After MCCB trips, turn the handle to RESET position first and turn to ON position for MCCB ON. (Fig. 3 and Fig. 1)
  - When panel door is required to open in ON position of operating handle, please turn the RELEASE knob to indicated direction and open the panel door. (Fig. 4)
  
- Lock and release of panel door
  - When MCCB is in ON, OFF and TRIP status, both operating handle and panel door are locked.
  - When MCCB is in OFF and TRIP status, panel door can be opened by turning the handle to RESET position. (Fig. 3)
  - Panel door shall be locked automatically when you close the door in MCCB ON status. Please turn the handle to ON position before closing the door.
  
- Lock of operating handle
  - If required, you can lock operating handle in ON or OFF position with padlock ( $\phi$  6-8 for S type,  $\phi$  4-6 for L type). Padlock is not supplied. (Fig. 5)
  - When MCCB trips, handle turns to TRIP position automatically.
  
- Handle position shall be same with MCCB position (ON, OFF, TRIP) before closing the panel door.

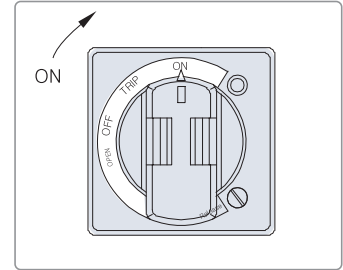


Fig.1

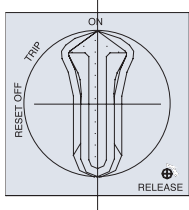


Fig.2

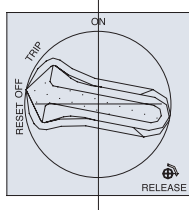


Fig.3

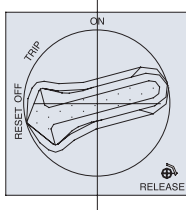


Fig.4

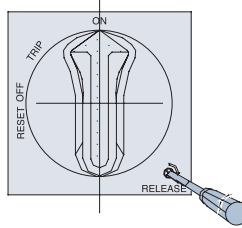
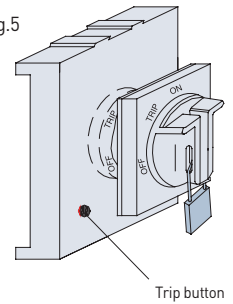


Fig.5



[ S type ]

Fig.1

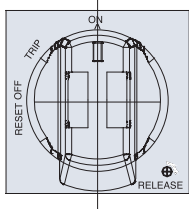


Fig.2

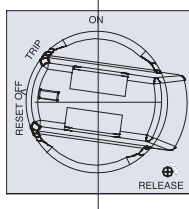


Fig.3

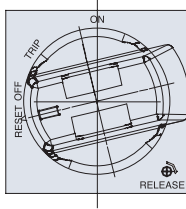


Fig.4

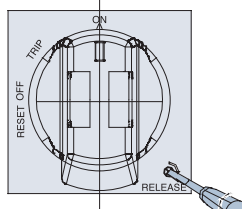
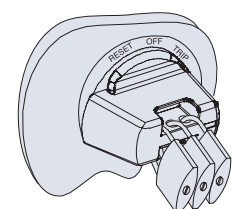


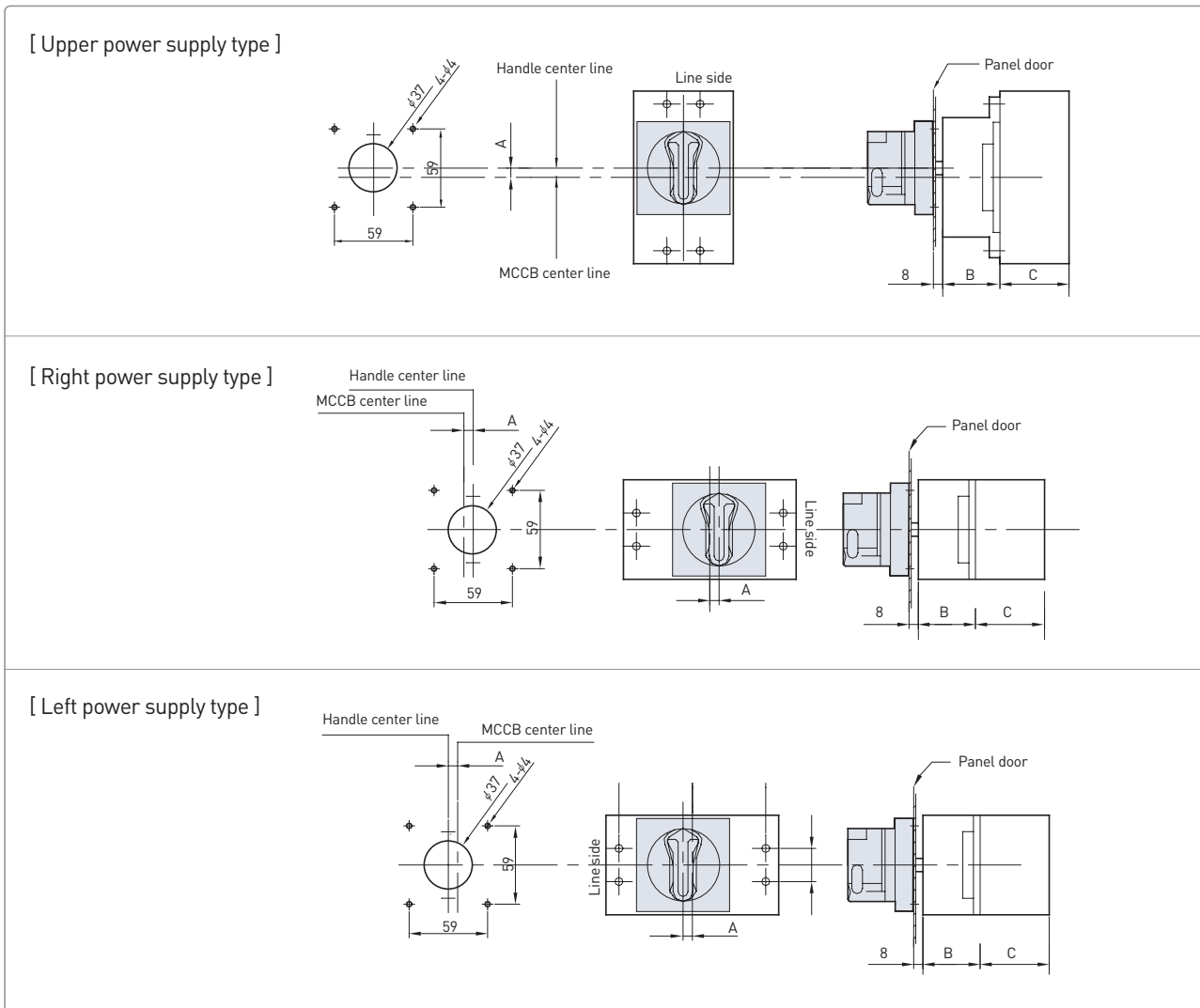
Fig.5



[ L type ]

■ Dimensions and standard order code / Surface type (TFG)

- 30-250AF S type

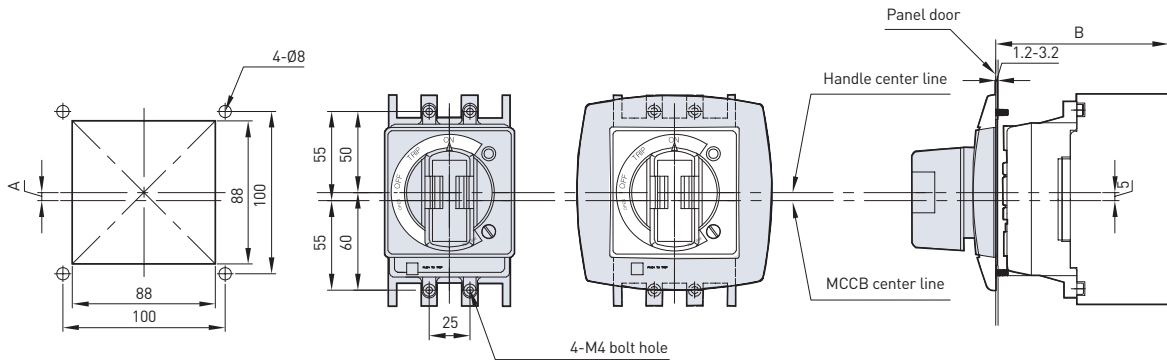


Applicable MCCB	Order code			Dimensions (mm)			Category	
	Upper power supply type	Right power supply type	Left power supply type	A	B	C		
UAB30C, UAB30R, UAB50C, UAB50R, UAB60C, UAB60R, UAB100C / UAD50C	TFG 10AS U4	TFG 10AS R4	TFG 10AS L4	7	43	56	MCCB	MB
UAB50S, UAB50H, UAB100R, UAB100S / UAD50S, UAD100R	TFG 10UAS U4	TFG 10UAS R4	TFG 10UAS L4	0	43	56		
UCB50R, UCB100R, UCB100S / UCD100R	TFG 10BS U4	TFG 10BS R4	TFG 10BS L4	9	47	56		
UCB250R, UCB250S, UCB250N / UCD250S	TFG 20CS U4	TFG 20CS R4	TFG 20CS L4	9	47	56		
UCB50H, UCB50L, UCB100H, UCB100L / UCD50H, UCD100H	TFG 10UFS U4	TFG 10UFS R4	TFG 10UFS L4	9	47	56		
UCB160H, UCB160L, UCB250H, UCB250L / UCD160H, UCD250H	TFG 20UGS U4	TFG 20UGS R4	TFG 20UGS L4	9	47	56		
UPB100S, UPB100H, UPB100L, UPB100X, UPB160S, UPB160H, UPB160L, UPB160X, UPB250S, UPB250H, UPB250L, UPB250X / UPD100S, UPD160S, UPD250S	TFG 12UPS U4	TFG 12UPS R4	TFG 12UPS L4	16.25	41	87		

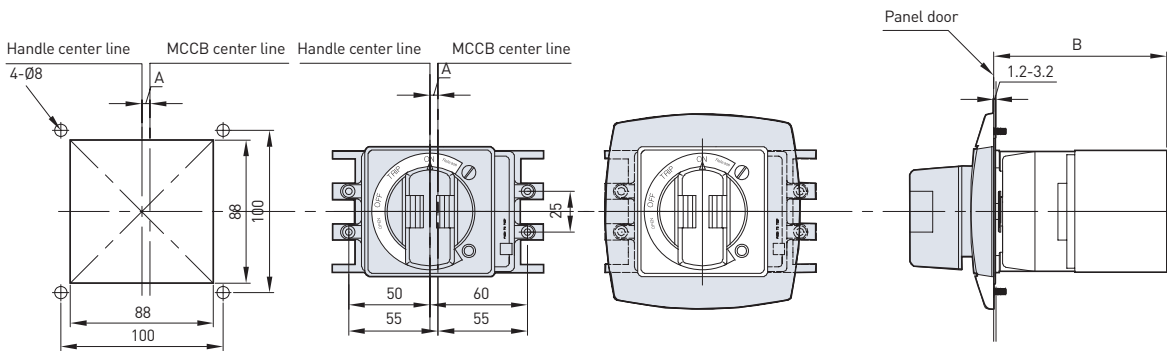
# Operating Accessories

- 30-250AF L type

[ Upper power supply type ]



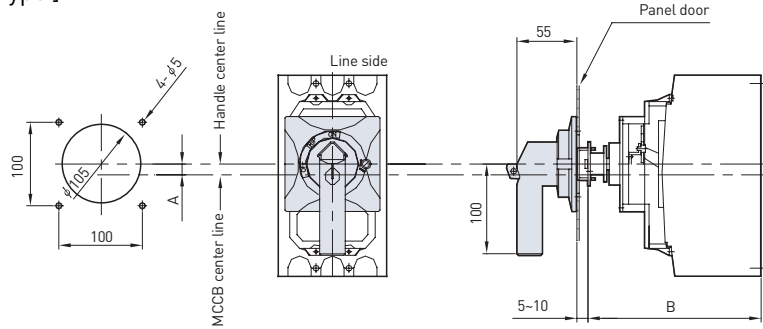
[ Left power supply type ]



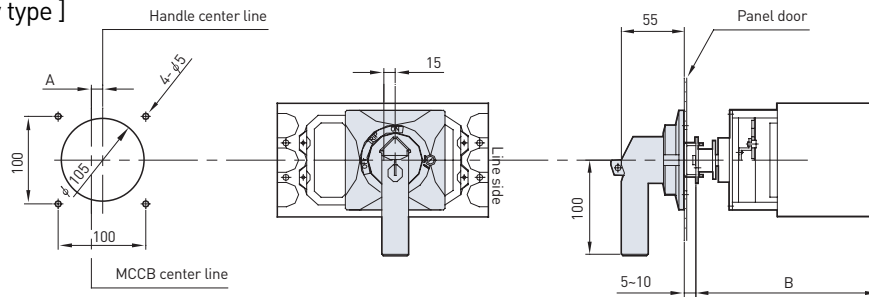
Applicable MCCB	Order code		Dimensions (mm)		Category	
	Upper power supply type	Left power supply type	A	B		
UAB30C, UAB30R, UAB50C, UAB50R, UAB60C, UAB60R, UAB100C / UAD50C	TFG 10AL U4	TFG 10AL L4	5	106-111	MCCB	MB
UAB50S, UAB50H, UAB100R, UAB100S / UAD50S, UAD100R	TFG 10UAL U4	TFG 10UAL L4	5	106-111		
UCB50R, UCB100R, UCB100S / UCD100R	TFG 10BL U4	TFG 10BL L4	9	111-116		
UCB250R, UCB250S, UCB250N / UCD250S	TFG 20CL U4	TFG 20CL L4	9	111-116		
UCB50H, UCB50L, UCB100H, UCB100L / UCD50H, UCD100H	TFG 10UFL U4	TFG 10UFL L4	9	111-116		
UCB160H, UCB160L, UCB250H, UCB250L / UCD160H, UCD250H	TFG 20UGL U4	TFG 20UGL L4	9	111-116		
UPB100S, UPB100H, UPB100L, UPB100X, UPB160S, UPB160H, UPB160L, UPB160X, UPB250S, UPB250H, UPB250L, UPB250X / UPD100S, UPD160S, UPD250S	TFG 12UPL U4	TFG 12UPL L4	14.5	136-140		

• 400-630AF S type

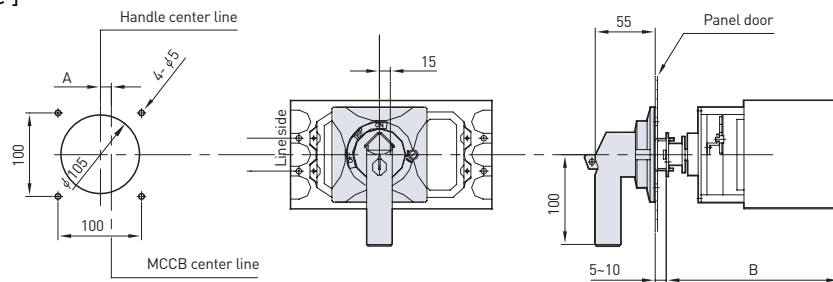
[ Upper power supply type ]



[ Right power supply type ]



[ Left power supply type ]

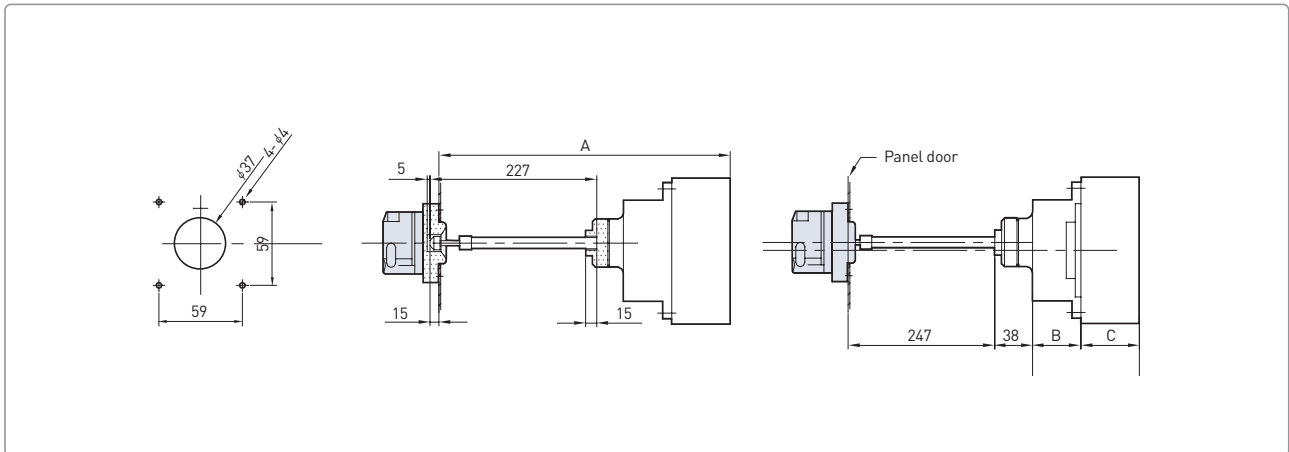


Applicable MCCB	Order code			Dimensions (mm)		Category	
	Upper power supply type	Right power supply type	Left power supply type	A	B		
UCB400R, UCB400S, UCB400H, UCB400L, UCB630R, UCB630S, UCB630H, UCB630L, UCB800R, UCB800S, UCB800H, UCB800L / UCD400S, UCD630S, UCD800S	TFG 46DS U2	TFG 46DS R2	TFG 46DS L2	0	222	MCCB	MB
UPB400S, UPB400H, UPB400L, UPB400X, UPB630S, UPB630H, UPB630L, UPB630X / UPD400S, UPD630S	TFG 46UPS U2	TFG 46UPS R2	TFG 46UPS L2	13	234		

# Operating Accessories

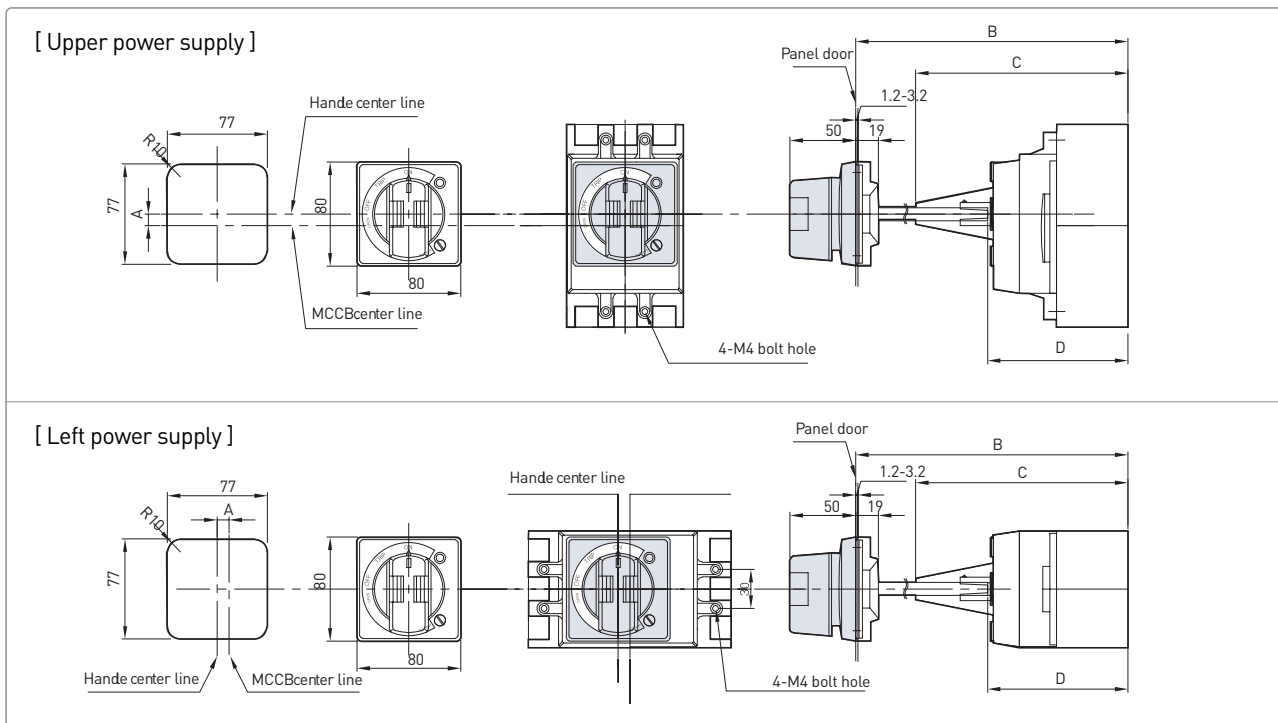
■ **Dimensions and standard order code / Extended type (TFH) |**

- 30-250AF S type



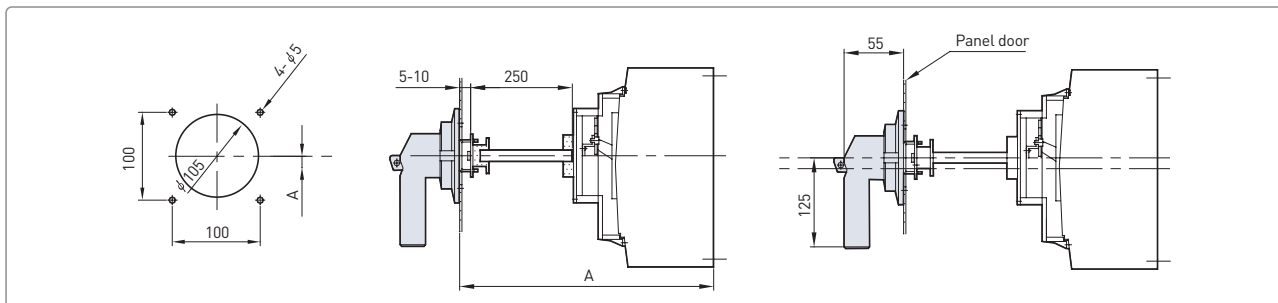
Applicable MCCB	Order code	Dimensions (mm)			Category	
		A	B	C		
UAB30C, UAB30R, UAB50C, UAB50R, UAB60C, UAB60R, UAB100C / UAD50C	TFH 10AS	384-479	43	56	MCCB	MB
UAB50S, UAB50H, UAB100R, UAB100S / UAD50S, UAD100R	TFH 10UAS	384-479	43	56		
UCB50R, UCB100R, UCB100S / UCD100R	TFH 10BS	388-383	47	56		
UCB250R, UCB250S, UCB250N / UCD250S	TFH 20CS	388-383	47	56		
UCB50H, UCB50L, UCB100H, UCB100L / UCD50H, UCD100H	TFH 10UFS	388-383	47	56		
UCB160H, UCB160L, UCB250H, UCB250L / UCD160H, UCD250H	TFH 20UGS	388-383	47	56		
UPB100S, UPB100H, UPB100L, UPB100X, UPB160S, UPB160H, UPB160L, UPB160X, UPB250S, UPB250H, UPB250L, UPB250X / UPD100S, UPD160S, UPD250S	TFH 12UPS	419-414	41	87		

• 30-250AF L type



Applicable MCCB	Order code	Dimensions (mm)				Category	
		A	B	C	D		
UAB30C, UAB30R, UAB50C, UAB50R, UAB60C, UAB60R, UAB100C / UAD50C	TFH 10AL	5	210-360	160	106	MCCB	MB
UAB50S, UAB50H, UAB100R, UAB100S / UAD50S, UAD100R	TFH 10UAL	5	210-360	160	106		
UCB50R, UCB100R, UCB100S / UCD100R	TFH 10BL	9	210-360	164	110		
UCB250R, UCB250S, UCB250N / UCD250S	TFH 20CL	9	210-360	164	110		
UCB50H, UCB50L, UCB100H, UCB100L / UCD50H, UCD100H	TFH 10UFL	9	210-360	164	110		
UCB160H, UCB160L, UCB250H, UCB250L / UCD160H, UCD250H	TFH 20UGL	9	210-360	164	110		
UPB100S, UPB100H, UPB100L, UPB100X, UPB160S, UPB160H, UPB160L, UPB160X, UPB250S, UPB250H, UPB250L, UPB250X / UPD100S, UPD160S, UPD250S	TFH 12UPL	14.5	210-360	186	135		

• 400-630AF S type



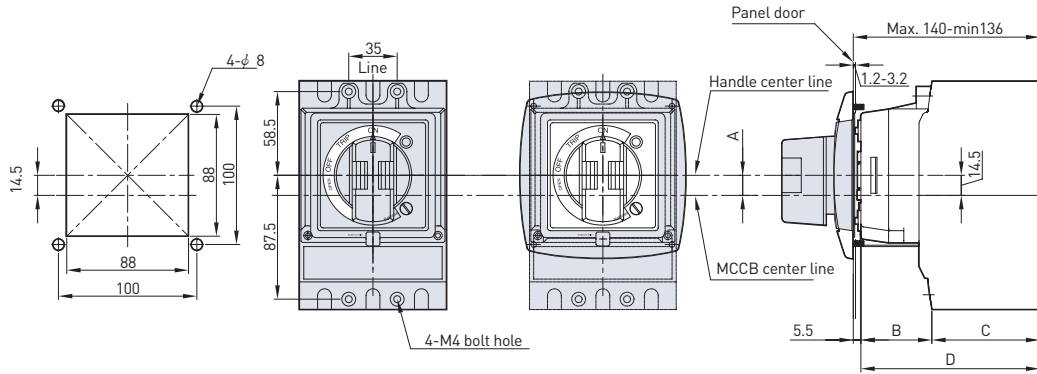
Applicable MCCB	Order code	Dimensions (mm)	Category	
		A		
UCB400R, UCB400S, UCB400H, UCB400L, UCB630R, UCB630S, UCB630H, UCB630L, UCB800R, UCB800S, UCB800H, UCB800L / UCD400S, UCD630S, UCD800S	TFH 46DS	428	MCCB	MB
UPB400S, UPB400H, UPB400L, UPB400X, UPB630S, UPB630H, UPB630L, UPB630X / UPD400S, UPD630S	TFH 46UPS	440		

# Operating Accessories

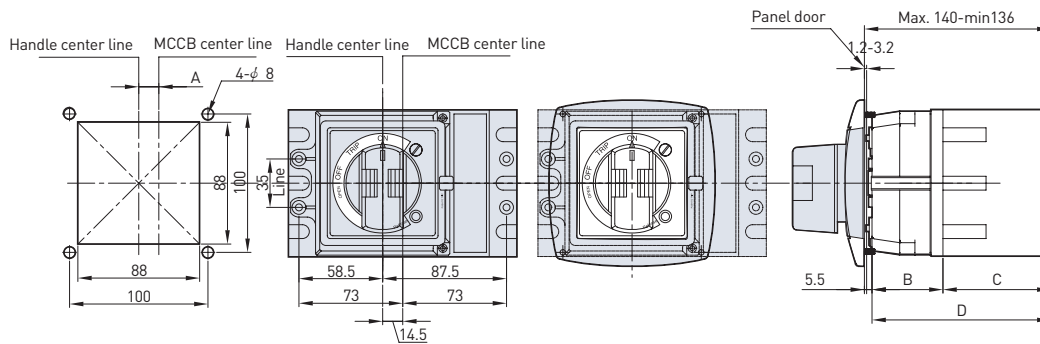
## | Dimensions and standard order code / Q-class (for nuclear power plant application) |

- Surface type (TFG)

[ Upper power supply type ]



[ Left power supply type ]

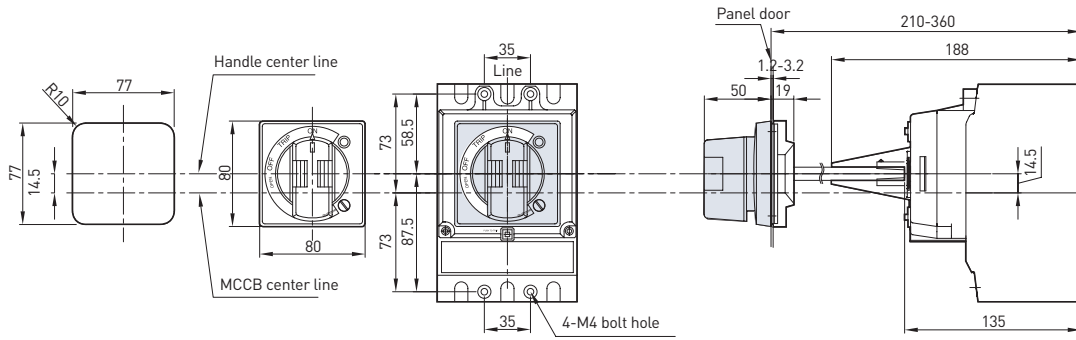


Applicable MCCB	Order code		Dimensions (mm)				Category	
	Upper power supply type	Left power supply type	A	B	C	D		
HBL103U, HBL103UM, HBL203U, HBL203UM	TFG 20U U4	TFG 20U L4	14.5	51.5	78	129.5	MCCB	MB
HBL103UQ, HBL103UMQ, HBL203UQ, HBL203UMQ	TFG 20UQ U4	TFG 20UQ L4	14.5	51.5	78	129.5		

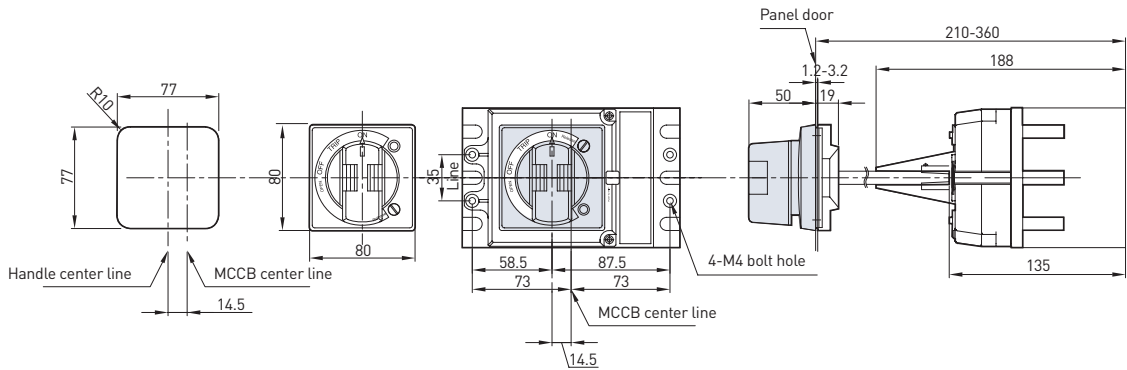


• Extended type (TFH)

[ Upper power supply ]



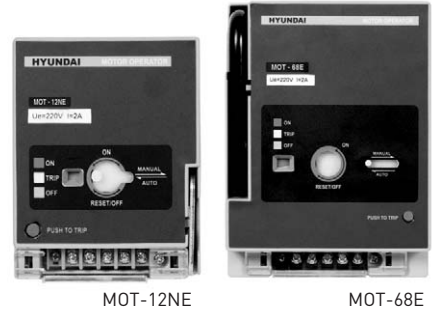
[ Left power supply ]



Applicable MCCB	Order code	Category	
HBL103U, HBL103UM, HBL203U, HBL203UM	TFH 20U	MCCB	MB
HBL103UQ, HBL103UMQ, HBL203UQ, HBL203UMQ	TFH 20UQ		

# Operating Accessories

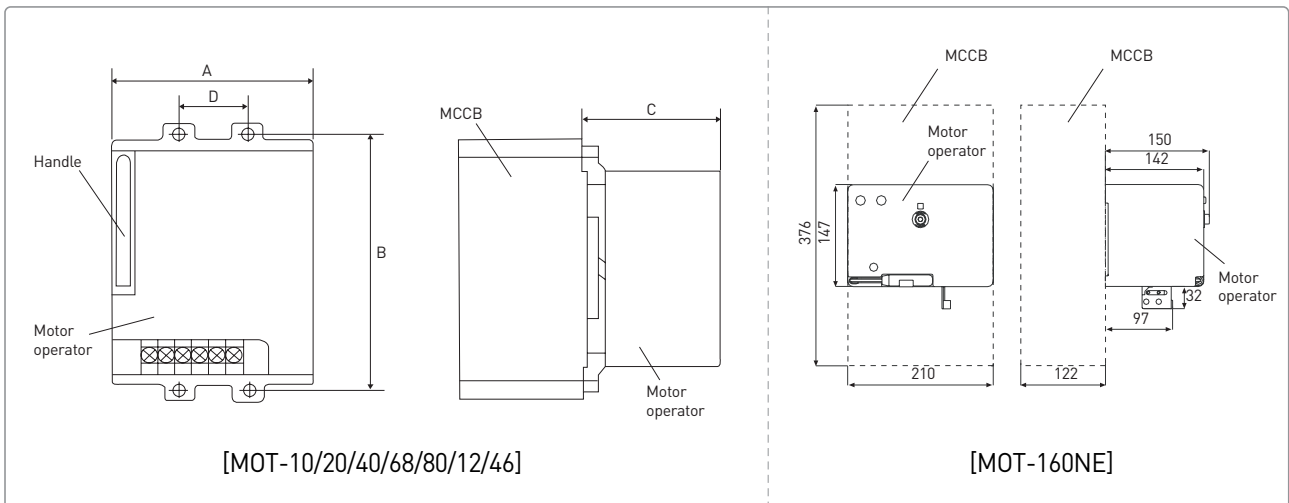
## | Motor operator (MOT) |



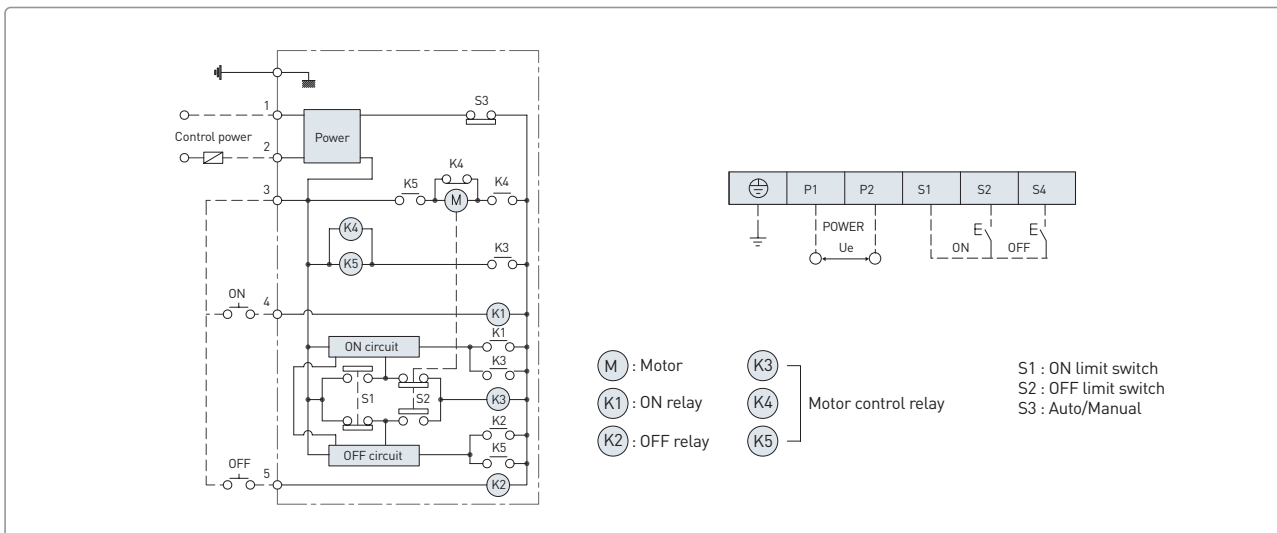
MOT-12NE

MOT-68E

Applicable MCCB	Model	Control voltage (V)	Operational current (A)	Operation time (ms)		Power consumption (W)	Mechanical life (times)	Dimensions (mm)			
				Closing	Opening			A	B	C	D
UAB30C, UAB30R, UAB50C, UAB50R, UAB60C, UAB60R, UAB100C / UAD50C	MOT-10A	DC24V	≤ 2.5	310	200	14	25,000	90	132	93	30
UAB50S, UAB50H, UAB100R, UAB100S / UAD50S, UAD100R	MOT-10UA	AC/DC110V	≤ 0.5								
		AC/DC220V	≤ 0.5								
UCB50R, UCB100R, UCB100S / UCD100R	MOT-10B	DC24V	≤ 2.5	310	200	14	10,000	90	132	93	30
UCB50H, UCB50L, UCB100H, UCB100L / UCD50H, UCD100H	MOT-10F	AC/DC110V	≤ 0.5								
		AC/DC220V	≤ 0.5								
UCB250R, UCB250S, UCB250N / UCD250S	MOT-20C	DC24V	≤ 5.0	350	230	14	8,000	90	126	93	35
UCB160H, UCB160L, UCB250H, UCB250L / UCD160H, UCD250H	MOT-20G	AC/DC110V	≤ 3.0								
		AC/DC220V	≤ 2.0								
UCB400R, UCB400S, UCB400H, UCB400L / UCD400S	MOT-40D	DC24V	≤ 5.0	350	230	14	5,000	90	144	97	35
		AC/DC110V	≤ 3.0								
		AC/DC220V	≤ 2.0								
UCB630R, UCB630S, UCB630H, UCB630L, UCB800R, UCB800S, UCB800H, UCB800L / UCD630S, UCD800S	MOT-68E	DC24V	≤ 5.0	500	350	35	5,000	130	215	150	44
		AC/DC110V	≤ 3.0								
		AC/DC220V	≤ 2.0								
UCB1000S, UCB1000L, UCB1250S, UCB1250L / UCD1000S, UCD1250S	MOT-80NE	DC24V	≤ 5.0	820	500	120	3,000	130	340	150	70
		AC/DC110V	≤ 3.0								
		AC/DC220V	≤ 2.0								
UCB1600S	MOT-160NE	AC 220V	≤ 2.0	820	500	120	3,000	-	-	-	-
UPB100S, UPB100H, UPB100L, UPB100X, UPB160S, UPB160H, UPB160L, UPB160X, UPB250S, UPB250H, UPB250L, UPB250X / UPD100S, UPD160S, UPD250S	MOT-12UP	DC24V	≤ 5.0	700	420	35	10,000	130	130	150	45
		AC/DC110V	≤ 3.0								
		AC/DC220V	≤ 2.0								
UPB400S, UPB400H, UPB400L, UPB400X, UPB630S, UPB630H, UPB630L, UPB630X / UPD400S, UPD630S	MOT-46UP	DC24V	≤ 5.0	700	420	35	5,000	130	243	137	70
		AC/DC110V	≤ 3.0								
		AC/DC220V	≤ 2.0								
HBL103U, HBL103UM, HBL203U, HBL203UM, HBL103UQ, HBL103UMQ, HBL203UQ, HBL203UMQ	MOT-12UP	DC24V	≤ 5.0	700	420	35	10,000	130	130	150	45
		AC/DC110V	≤ 3.0								
		AC/DC220V	≤ 2.0								



■ Control circuit and wiring diagram



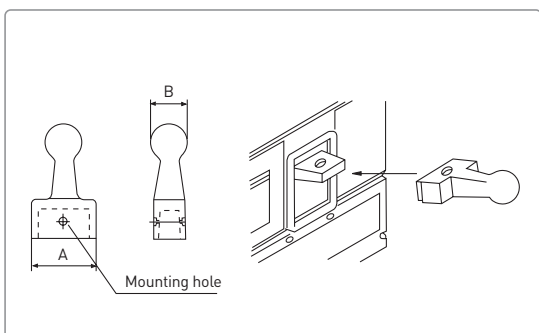
■ Standard order code

Applicable MCCB	Order code			Category
	DC24V	AC/DC110V	AC/DC220V	
UAB30C, UAB30R, UAB50C, UAB50R, UAB60C, UAB60R, UAB100C / UAD50C	MOT 10A DC24	MOT 10A ADC110	MOT 10A ADC220	MCCB MB
UAB50S, UAB50H, UAB100R, UAB100S / UAD50S, UAD100R	MOT 10UA DC24	MOT 10UA ADC110	MOT 10UA ADC220	
UCB50R, UCB100R, UCB100S / UCD100R	MOT 10B DC24	MOT 10B ADC110	MOT 10B ADC220	
UCB50H, UCB50L, UCB100H, UCB100L / UCD50H, UCD100H	MOT 10F DC24	MOT 10F ADC110	MOT 10F ADC220	
UCB250R, UCB250S, UCB250N / UCD250S	MOT 20C DC24	MOT 20C ADC110	MOT 20C ADC220	
UCB160H, UCB160L, UCB250H, UCB250L / UCD160H, UCD250H	MOT 20G DC24	MOT 20G ADC110	MOT 20G ADC220	
UCB400R, UCB400S, UCB400H, UCB400L / UCD400S	MOT 40D DC24	MOT 40D ADC110	MOT 40D ADC220	
UCB630R, UCB630S, UCB630H, UCB630L, UCB800R, UCB800S, UCB800H, UCB800L / UCD630S, UCD800S	MOT 68E DC24	MOT 68E ADC110	MOT 68E ADC220	
UCB1000S, UCB1000L, UCB1250S, UCB1250L / UCD1000S, UCD1250S	MOT 80NE DC24	MOT 80NE ADC110	MOT 80NE ADC220	
UCB1600S	-	-	MOT 160NE AC220 <sup>1)</sup>	
UPB100S, UPB100H, UPB100L, UPB100X, UPB160S, UPB160H, UPB160L, UPB160X, UPB250S, UPB250H, UPB250L, UPB250X / UPD100S, UPD160S, UPD250S	MOT 12UP DC24	MOT 12UP ADC110	MOT 12UP ADC220	
UPB400S, UPB400H, UPB400L, UPB400X, UPB630S, UPB630H, UPB630L, UPB630X / UPD400S, UPD630S	MOT 46UP DC24	MOT 46UP ADC110	MOT 46UP ADC220	
HBL103U, HBL103UM, HBL203U, HBL203UM, HBL103UQ, HBL103UMQ, HBL203UQ, HBL203UMQ	MOT 12UP DC24	MOT 12UP ADC110	MOT 12UP ADC220	

※ Motor operator is not recommended for marine application.

1) MOT 160NE AC220 is not applicable for DC220V.

| Extension handle (THA) |



※ Excessive force in ON and OFF may break the handle of breaker.

Applicable MCCB	Order code	Dimensions (mm)		Category
		A	B	
UCB400R, UCB400S, UCB400H, UCB400L, UCB630R, UCB630S, UCB630H, UCB630L, UCB800R, UCB800S, UCB800H, UCB800L / UCD400S, UCD630S, UCD800S	THA 46D	42	40	MCCB MB
UCB1000S, UCB1000L, UCB1250S, UCB1250L / UCD1000S, UCD1250S	THA 80NE	56	40	
UCB1600S	THA 160NE	60	50	
UPB400S, UPB400H, UPB400L, UPB400X, UPB630S, UPB630H, UPB630L, UPB630X / UPD400S, UPD630S	THA 46UP	42	30	

## Mounting Accessories

- Mounting accessories enable easy installation, maintenances and remove of breakers.

### DIN-rail adaptor DRA

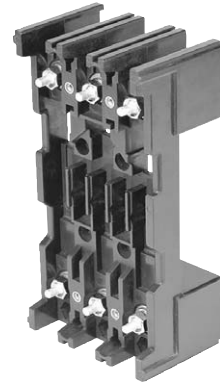
- Mounted on back side of UAB type breaker and enables direct installation on 35mm DIN-rail

### DIN rail adaptor DRA



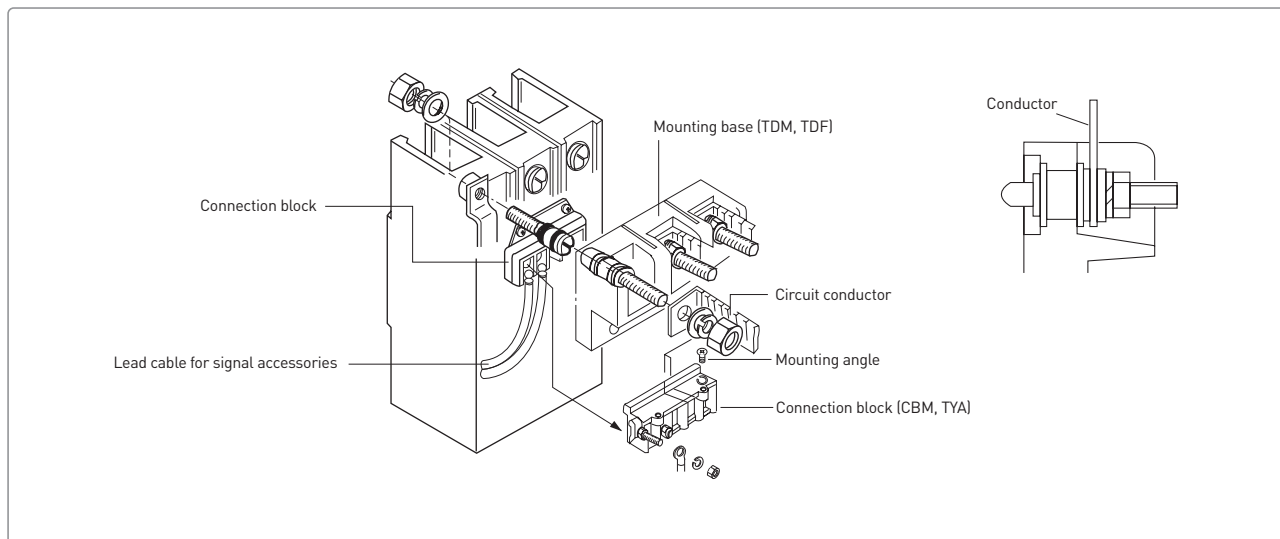
### Mounting base TDM

- Installed on back plate of panel and breaker can be easily replaced or maintained without cable disconnection



## | Mounting base (TDM) and components for plug-in mounting |

- Switchboard application



※ The shape of mounting bases of each MCCB are not same as above. For exact appearances, please refer to "Characteristic Curves & Dimensions" from page \_"

Applicable MCCB	For both line & load side plug-in mounting							For line side only plug-in mounting		Category	
	Mounting base		Connection block <sup>1)</sup>			Conn. block barrier		Mounting base			
	Order code	Required quantity	Order code	Contact	Required quantity	Order code	Required quantity	Order code	Required quantity		
UAB30C, UAB30R, UAB50C, UAB50R, UAB60C, UAB60R, UAB100C / UAD50C	TDM 10AP	1EA	CBM 10AB 2	2C	1EA	CBM BARR	1EA	TDF 10A	1EA	MCCB	MB
UAB50S, UAB50H, UAB100R, UAB100S / UAD50S, UAD100R			CBM 10AB 3	3C	1EA						
UCB50R, UCB100R, UCB100S / UCD100R	TDM 10BP	1EA	CBM 10AB 2	2C	1EA	CBM BARR	1EA	TDF 10B	1EA		
UCB50H, UCB50L, UCB100H, UCB100L / UCD50H, UCD100H			CBM 10AB 3	3C	1EA						
UCB250R, UCB250S, UCB250N / UCD250S	TDM 20CF	2EA	CBM 20C 2	2C	1EA	-	-	TDM 20CF	1EA		
UCB160H, UCB160L, UCB250H, UCB250L / UCD160H, UCD250H			CBM 20C 5	5C	1EA						
UCB400R, UCB400S, UCB400H, UCB400L / UCD400S	TDM 4BA	2EA	TYA 5/2 <sup>2)</sup>	2C	1EA	-	-	TDM 4BA	1EA		
UCB630R, UCB630S, UCB630H, UCB630L, UCB800R, UCB800S, UCB800H, UCB800L / UCD630S, UCD800S			TYA 5/5 <sup>2)</sup>	5C	1EA						
UPB100S, UPB100H, UPB100L, UPB100X, UPB160S, UPB160H, UPB160L, UPB160X, UPB250S, UPB250H, UPB250L, UPB250X / UPD100S, UPD160S, UPD250S	TDM 12NEP	1EA	CBM 26NE 6	6C	1EA	-	-	TDM 12NEF	1EA		
UPB400S, UPB400H, UPB400L, UPB400X, UPB630S, UPB630H, UPB630L, UPB630X / UPD400S, UPD630S			CBM 26NE 12	12C	1EA						
HBL103U, HBL103UM, HBL203U, HBL203UM, HBL103UQ, HBL103UMQ, HBL203UQ, HBL203UMQ	TDM 12NEP	1EA	CBM 26NE 6	6C	1EA	-	-	TDM 12NEF	1EA		
			CBM 26NE 12	12C	1EA						

※ Plug-in mounting is applicable for 3 pole MCCB only.

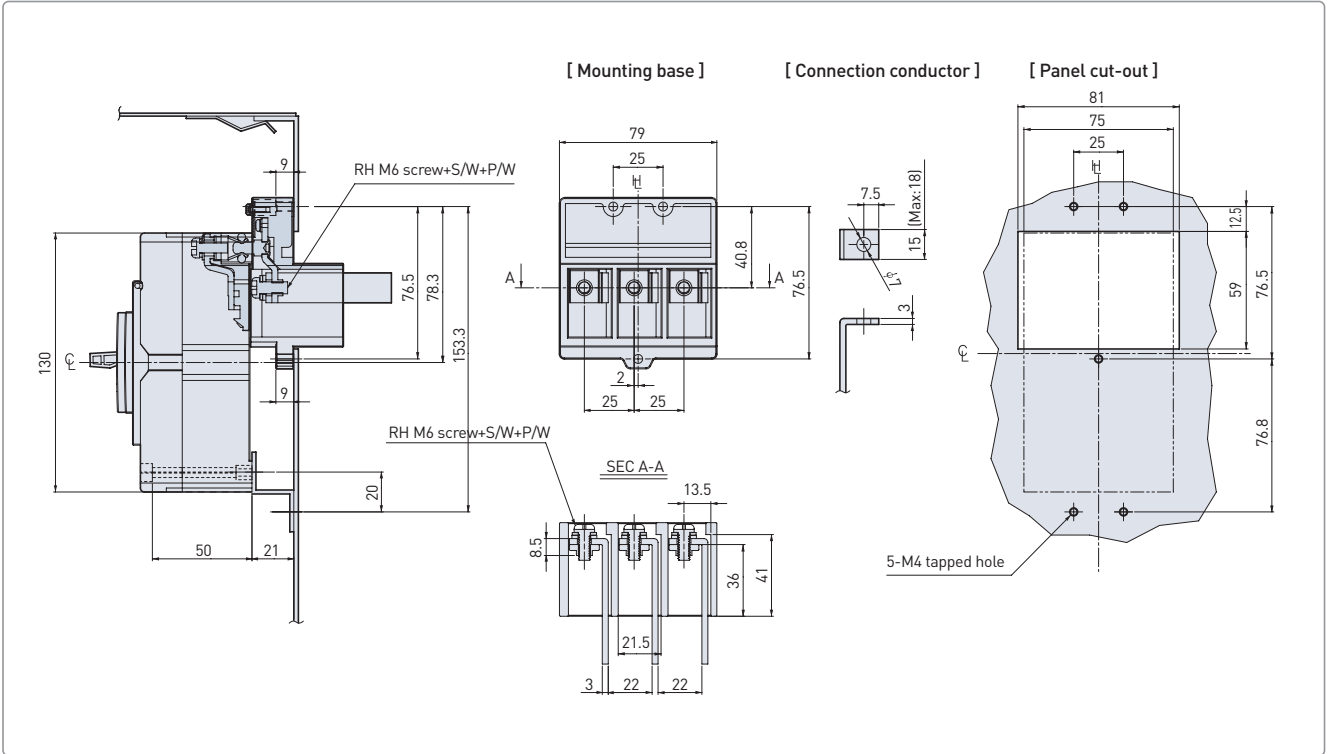
1) Connection blocks are required for internal accessory installation in both line & load side plug-in type 3 pole MCCB.

2) TYA type connection blocks are to be installed with separate mounting angle. Separate mounting angle is not supplied.

# Mounting Accessories

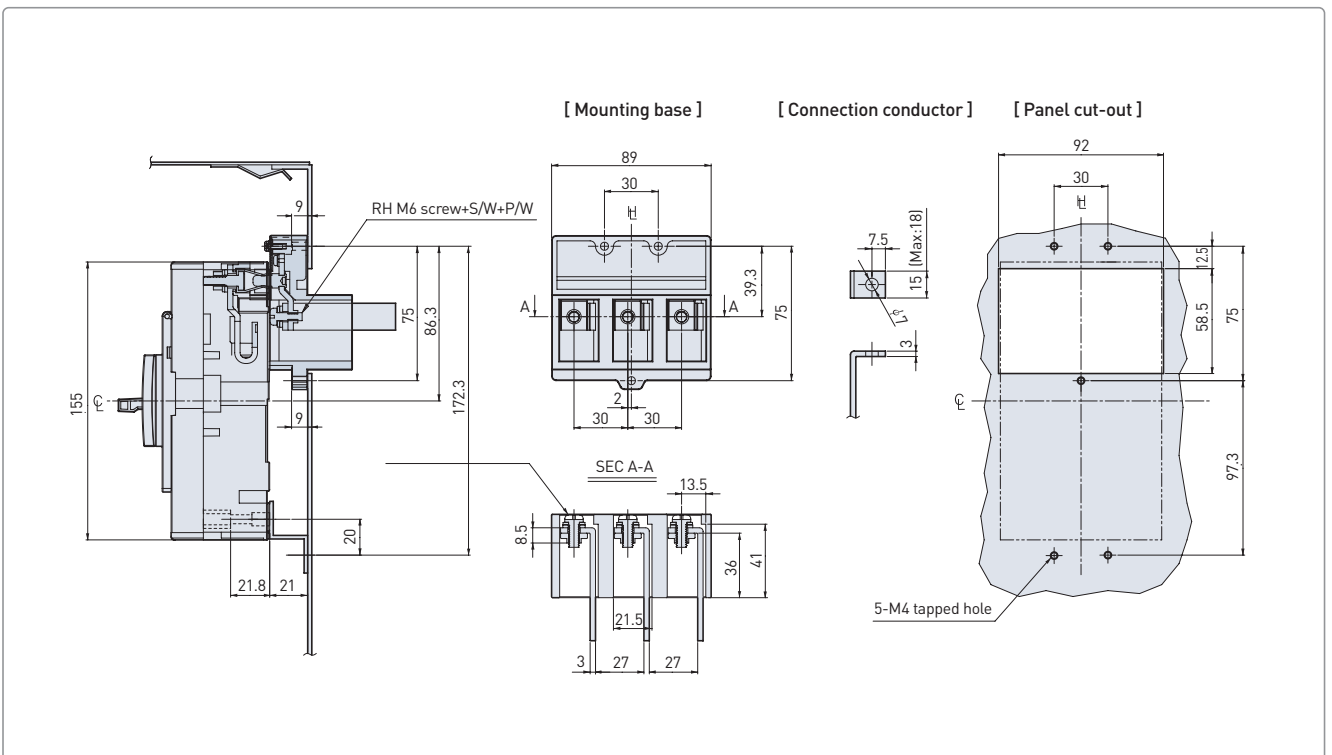
• TDF 10A

(Unit : mm)



• TDF 10B

(Unit : mm)

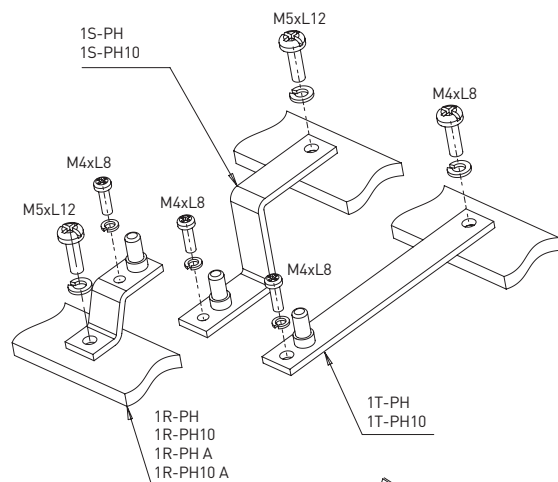
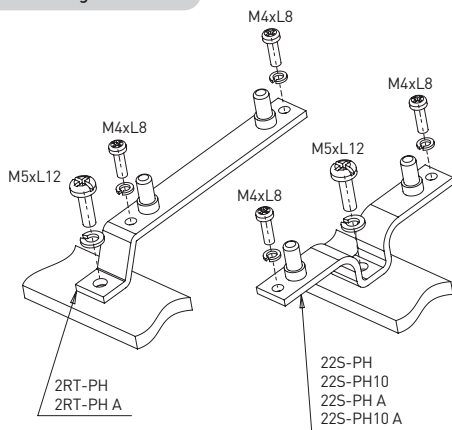


• Distribution board application

Application	Applicable MCCB	Item	Order code	Required quantity	Mounting screw	
Double mounting	UAB50R, UAB50S, UAB50H, UAB60R, UAB100C, UAB100R, UAB100S	Mounting base unit	TDA 10AD ASSY	1EA		
		For component order	Mounting base	TDA 10AS	2EA	M4xL18 4EA for mounting angle
			Branching conductor	2RT-PH A	2EA	M5xL12 1EA for bus bar
				22S-PH10 A	1EA	M4xL8 2EA for brancing conductor
		Arc protection barrier	BRAN-BARR A	2EA		
	Connection plate		CONN-PL A	1EA	M4xL25 4EA	
	UCB50H, UCB50L, UCB100R, UCB100S, UCB100H, UCB100L	Mounting base unit	TDA 10BD ASSY	1EA		
		For component order	Mounting base	TDA 10BS	2EA	M5xL20 4EA for mounting angle
			Branching conductor	2RT-PH	2EA	M5xL12 1EA for bus bar
				22S-PH10	1EA	M4xL8 2EA for brancing conductor
Arc protection barrier		BRAN-BARR	2EA			
Connection plate		CONN-PL	1EA	M4xL25 4EA		
Single mounting	UAB50R, UAB50S, UAB50H, UAB60R, UAB100C, UAB100R, UAB100S	Mounting base	TDA 10AS	1EA	M4xL30 4EA for mounting angle	
		Branching conductor	5-63A	1R-PH A	1EA	
				1S-PH	1EA	
				1T-PH	1EA	M5xL12 1EA for bus bar
			75-125A	1R-PH10 A	1EA	M4xL8 1EA for brancing conductor
				1S-PH10	1EA	
				1T-PH10	1EA	
	UCB50H, UCB50L, UCB100R, UCB100S, UCB100H, UCB100L	Mounting base	TDA 10BS	1EA	M5xL32 4EA for mounting angle	
		Branching conductor	5-63A	1R-PH	1EA	
				1S-PH	1EA	
				1T-PH	1EA	M5xL12 1EA for bus bar
			75-125A	1R-PH10	1EA	M4xL8 1EA for brancing conductor
				1S-PH10	1EA	
				1T-PH10	1EA	

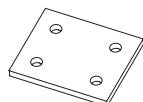
※ Mounting base shall be connected to load side of MCCB.

Branching conductor



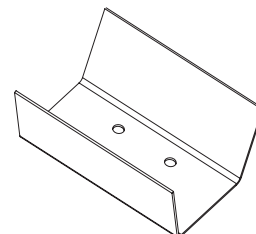
Connection plate

CONN-PL  
CONN-PL A



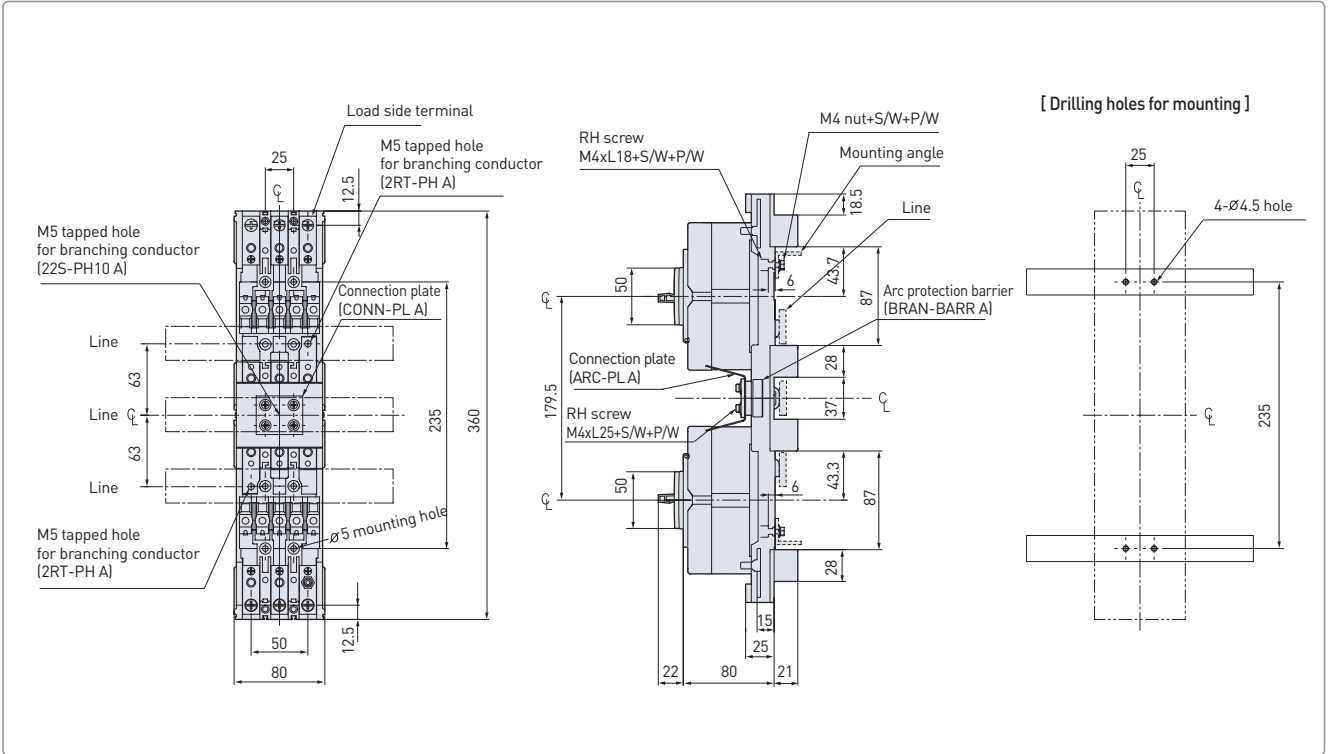
Arc protection barrier

ARC-PL  
ARC-PL A

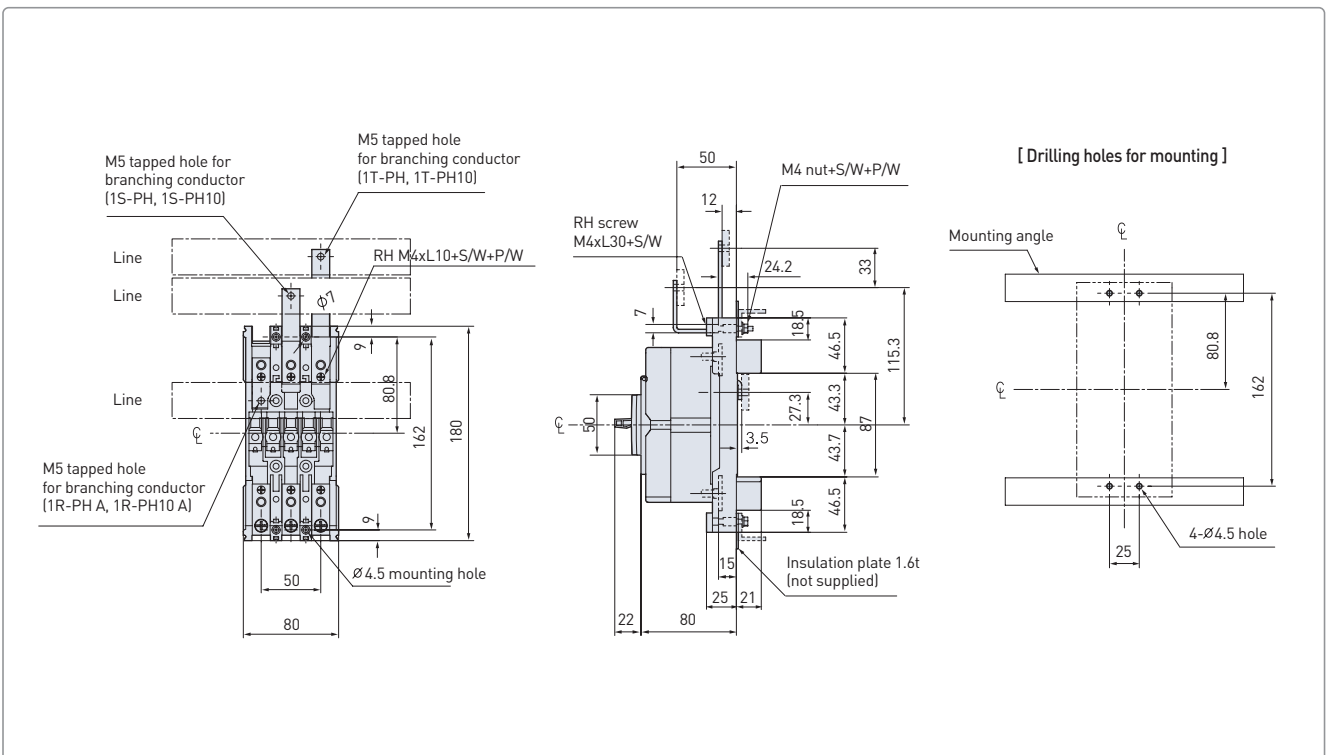


# Mounting Accessories

• TDA 10AD / Double mounting

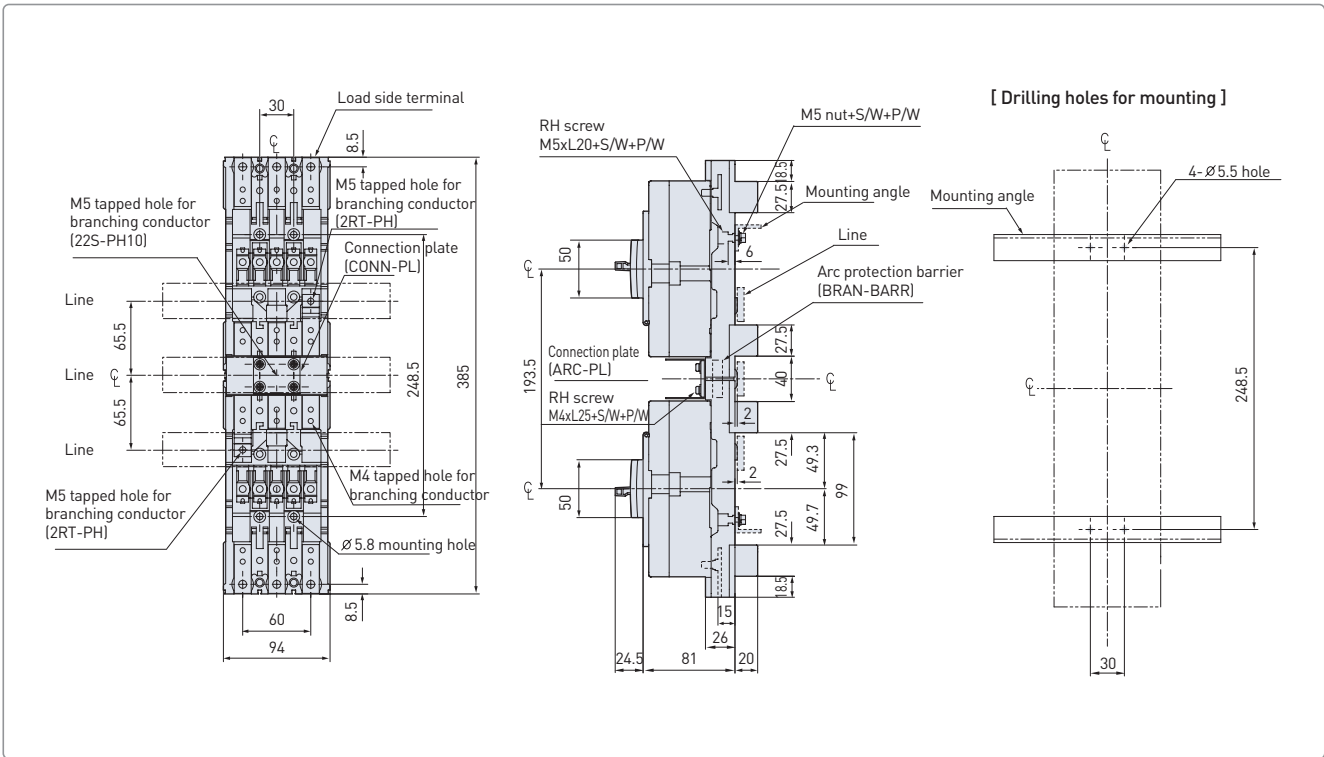


• TDA 10AS / Single mounting

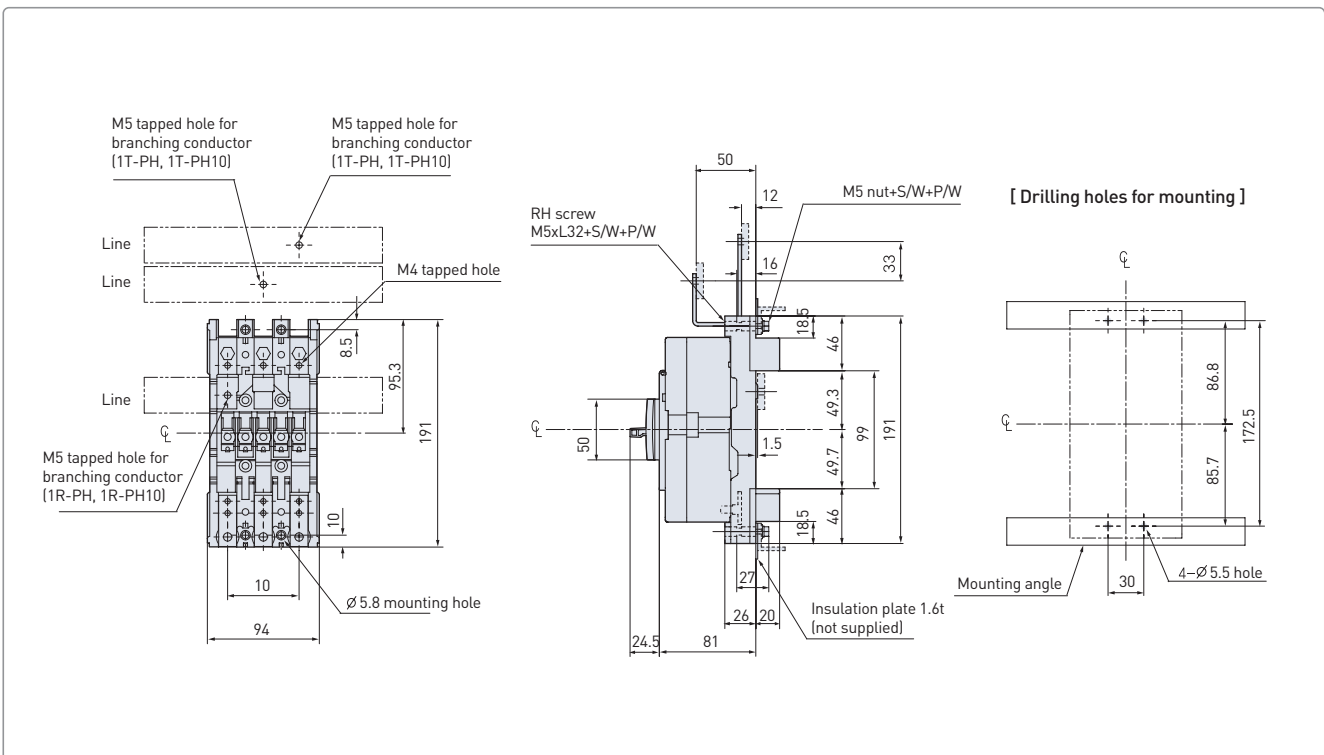




• TDA 10BD / Double mounting



• TDA 10BS / Single mounting



## Terminal Accessories

- Terminal accessories offers convenience of connection, high protection for safety.

### Terminal bus bar TBB

- Increases the distances between terminals

### Terminal cover TCF

- Prevent direct contact to live terminal as well as insertion of external material



### Cage terminal block CTB

- Offers easy and direct connection of cables



### Interpole barrier TQQ

- Increases the insulation between poles

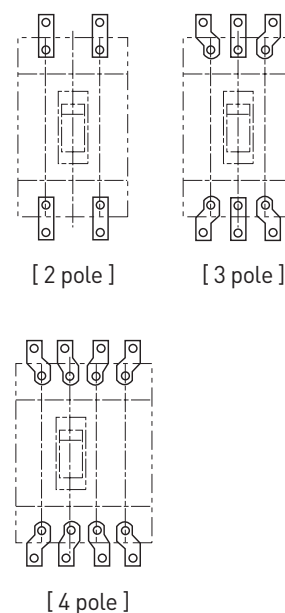


### | Terminal connection screws / standard components |

Type	Size	Applicable MCCB
Clamp screw 	M5	- UAB30C, UAB30R, UAB50C, UAB50R, UAB50S, UAB50H, UAB60C, UAB60R, UAB100C (5-50A), UAB100R (15-50A), UAB100S (15-50A) / UAD50C, UAD50S - UCB50R - UBD30L, UBD30H, UMB30R, UMB30S, UMB30H, UMB50S, UMB50H, UDB30S, UDB30H, UDB50S, UDB50H, UDB100S (15-50A), UDB100H (15-50A), UGD30L, UGD30H, UMG30R, UMG30S, UMG30H, UMG50S, UMG50H, UDG30S, UDG30H, UDG50S, UDG50H, UDG100S (15-50A), UDG100H (15-50A)
Pan head screw 	M8	- UAB100C (60-100A), UAB100R (60-100A), UAB100S (60-100A) / UAD100R - UCB50H, UCB50L, UCB100R, UCB100S, UCB100H, UCB100L, UCB160H, UCB160L, UCB250R, UCB250S, UCB250N, UCB250H, UCB250L / UCD50H, UCD100R, UCD100H, UCD160H, UCD250S, UCD250H - UDB100S (60-100A), UDB100H (60-100A), UDG100S (60-100A), UDG100H (60-100A)
Hexagon socket head screw 	M8	- UPB100S, UPB100H, UPB100L, UPB100X, UPB160S, UPB160H, UPB160L, UPB160X, UPB250S, UPB250H, UPB250L, UPB250X / UPD100S, UPD160S, UPD250S - HBL103U, HBL103UM, HBL203U, HBL203UM, HBL103UQ, HBL103UMQ, HBL203UQ, BL203UMQ
	M10	- UCB400R, UCB400S, UCB400H, UCB400L / UCD400S - UPB400S, UPB400H, UPB400L, UPB400X, UPB630S, UPB630H, UPB630L, UPB630X / UPD400S, UPD630S
	M12	- UCB630R, UCB630S, UCB630H, UCB630L, UCB800R, UCB800S, UCB800H, UCB800L / UCD630S, UCD800S
Hexagon head screw 	M12	UCB1000S, UCB1000L, UCB1250S, UCB1250L / UCD1000S, UCD1250S
	M13	UCB1600S

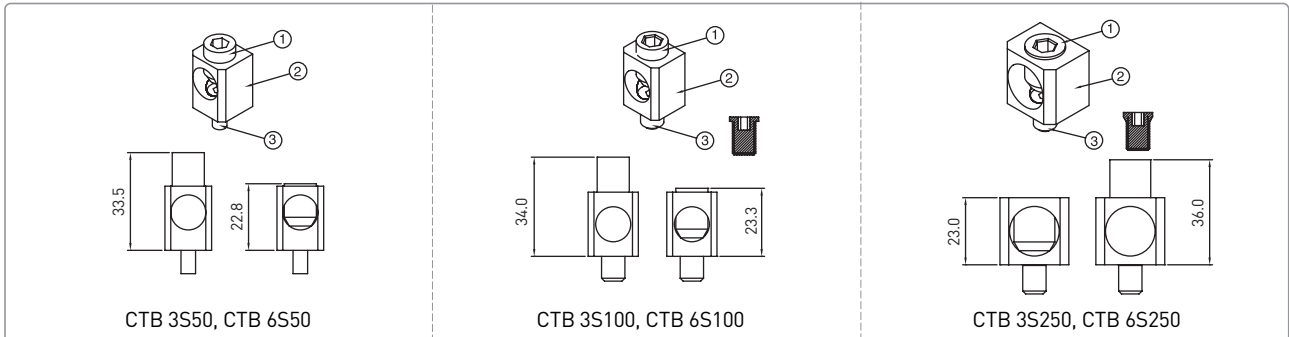
### | Terminal bus bar (TBB) |

Applicable MCCB	Order code			Mounting hole	Category
	2 pole (4EA/SET)	3 pole (6EA/SET)	4 pole (8EA/SET)		
UCB250R, UCB250S, UCB250N / UCD250S UCB160H, UCB160L, UCB250H, UCB250L / UCD160H, UCD250H	TBB 20C 2	TBB 20C 3	TBB 20C 4	∅ 11	MCCB MB
UCB400R, UCB400S, UCB400H, UCB400L / UCD400S	TBB 4S 2	TBB 4S 3	TBB 4S 4	∅ 13	
UCB630R, UCB630S, UCB630H, UCB630L / UCD630S	TBB 6S 2	TBB 6S 3	TBB 6S 4	∅ 13	
UCB800R, UCB800S, UCB800H, UCB800L / UCD800S	TBB 8S 2	TBB 8S 3	TBB 8S 4	∅ 13	
UPB160S, UPB160H, UPB160L, UPB160X, UPB250S, UPB250H, UPB250L, UPB250X / UPD160S, UPD250S	-	TBB 12NE 3	TBB 12NE 4	∅ 11	
UPB400S, UPB400H, UPB400L, UPB400X / UPD400S	-	TBB 40NE 3	TBB 40NE 4	∅ 13	
UPB630S, UPB630H, UPB630L, UPB630X / UPD630S	-	TBB 60NE 3	TBB 60NE 4	∅ 13	
HBL203U, HBL203UM, HBL203UQ, HBL203UMQ	-	TBB 12NE 3	-	∅ 11	

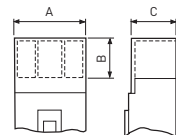


# Terminal Accessories

## | Cage terminal block (CTB) |



Applicable MCCB	Order code		Connection							Category	
	3EA/SET	6EA/SET	Fix bolt		Upper bolt		Wire size (mm <sup>2</sup> )	Tightening torque (kgf-cm)	Cable connection		
			Screw	Tool	Screw	Tool					
UAB30C, UAB30R, UAB50C, UAB50R, UAB60C, UAB60R, UAB100C / UAD50C / UAD50S, UAB50H, UAB100R, UAB100S / UAD50S, UAD100R	CTB 3S50	CTB 6S50	M5 X 0.8	5/32 inch wrench	M11 X 0.75	7/32 inch wrench	1 X 5.5-50	60	Single	MCCB	MB
UCB50R, UCB100R, UCB100S / UCD100R / UCD50H, UCB50L, UCB100H, UCB100L / UCD50H, UCD100H	CTB 3S100	CTB 6S100	M8 X 1.25	5/32 inch wrench	M11 X 0.75	7/32 inch wrench	1 X 8-50	60	Single		
UCB250R, UCB250S, UCB250N / UCD250S / UCD160H, UCD250H	CTB 3S250	CTB 6S250	M8 X 1.25	5/32 inch wrench	M14 X 1.5	1/4 inch wrench	1 X 14-120	140	Single		
UPB100S, UPB100H, UPB100L, UPB100X / UPD100S / UPD160S, UPB160H, UPB160L, UPB160X, UPB250S, UPB250H, UPB250L, UPB250X / UPD160S, UPD250S											
UPB400S, UPB400H, UPB400L, UPB400X / UPD400S / UPB630S, UPB630H, UPB630L, UPB630X / UPD630S											
HBL103U, HBL103UM, HBL203U, HBL203UM											
HBL203U, HBL203UM, HBL203UQ, HBL203UMQ											

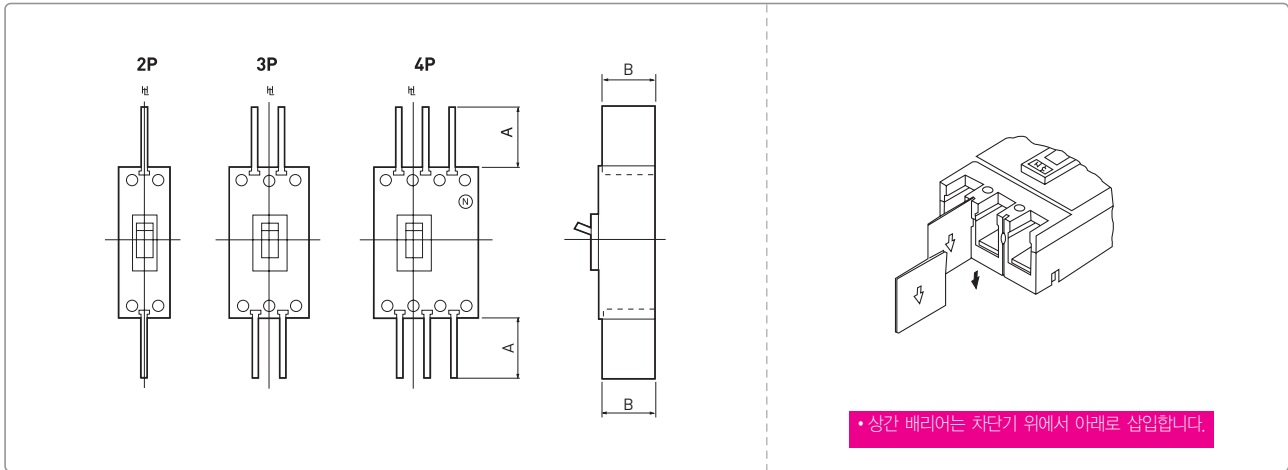


## | Terminal cover (TCF) |

Applicable MCCB	2 pole			3 pole			4 pole			Category				
	Order code	Dimensions			Order code	Dimensions			Order code			Dimensions		
		A	B	C		A	B	C				A	B	C
UAB30C, UAB30R, UAB50C, UAB50R, UAB60C, UAB60R, UAB100C / UAD50C / UAD50S, UAB50H, UAB100R, UAB100S / UAD50S, UAD100R	TCF 10AP 2	50	59	58.5	TCF 10AP 3	75	59	58.5	TCF 10AP 4	100	59	58.5	MCCB	MB
UCB50R, UCB100R, UCB100S / UCD100R / UCD50H, UCB50L, UCB100H, UCB100L / UCD50H, UCD100H	TCF 10BP 2	57	28.5	58.5	TCF 10BP 3	87	28.5	58.5	TCF 10BP 4	117	28.5	58.5		
UCB250R, UCB250S, UCB250N / UCD250S / UCD160H, UCD250H	TCF 20CP 3	102	32.5	58.5	TCF 20CP 3	102	32.5	58.5	TCF 20CP 4	137	32.5	58.5		
UCB160H, UCB160L, UCB250H, UCB250L / UCD160H, UCD250H	TCF 10FP 3	90	10	59	TCF 10FP 3	90	10	59	TCF 10FP 4	120	10	59		
UCB160S	TCF 20GP 3	105	10	59	TCF 20GP 3	105	10	59	TCF 20GP 4	140	10	59		
UPB100S, UPB100H, UPB100L, UPB100X, UPB160S, UPB160H, UPB160L, UPB160X, UPB250S, UPB250H, UPB250L, UPB250X / UPD100S, UPD160S, UPD250S	-	-	-	-	TCF 160NE 3	210	51	151	-	-	-	-		
UPB400S, UPB400H, UPB400L, UPB400X, UPB630S, UPB630H, UPB630L, UPB630X / UPD400S, UPD630S	-	-	-	-	TCF 12UP 3	105	29.5	82.5	TCF 12UP 4	140	29.5	82.5		
HBL103U, HBL103UM, HBL203U, HBL203UM, HBL103UQ, HBL103UMQ, HBL203UQ, HBL203UMQ	-	-	-	-	TCF 46UP 3	140	35	106.5	TCF 46UP 4	185	35	106.5		
UDB30S, UDB30H, UDB50S, UDB50H, UDB100S, UDB100H, UDG30S, UDG30H, UDG50S, UDG50H, UDG100S, UDG100H	-	-	-	-	TCF 12UP 3	105	29.5	82.5	-	-	-	-		

※ For both line and load side of MCCB, 2EA shall be ordered.

| Interpole barrier (TQQ) |



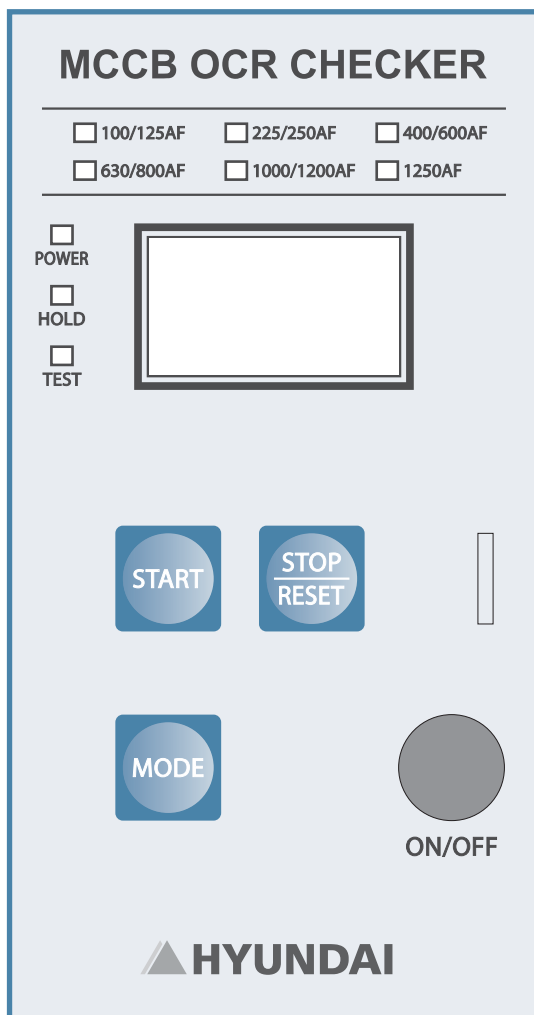
Applicable MCCB	Order code	Description (Quantity supplied as standard components of MCCB)	Required quantity for both line and load side of MCCB			Dimensions		Category
			2 pole	3 pole	4 pole	A	B	
UAB30C, UAB30R, UAB50C, UAB50R, UAB60C, UAB60R, UAB100C / UAD50C UAB50S, UAB50H, UAB100R, UAB100S / UAD50S, UAD100R	TQQ 10A	2EA/SET	2	4	6	50	53	MCCB MB
UCB50R, UCB100R, UCB100S / UCD100R	TQQ 10B	2EA/SET	2	4	6	50	53	
UCB250R, UCB250S, UCB250N / UCD250S	TQQ 20C	2EA/SET	4	4	6	50	53	
UCB50H, UCB50L, UCB100H, UCB100L, UCB160H, UCB160L, UCB250H, UCB250L / UCD50H, UCD100H, UCD160H, UCD250H	TQQ 12FG	2EA/SET	4	4	6	51	53	
UCB400R, UCB400S, UCB400H, UCB400L / UCD400S	TQQ 4BA	2EA/SET	4	4	6	120	97	
UCB630R, UCB630S, UCB630H, UCB630L, UCB800R, UCB800S, UCB800H, UCB800L / UCD630S, UCD800S	TQQ 5BA	2EA/SET	4	4	6	110	95	
UCB1000S, UCB1000L, UCB1250S, UCB1250L / UCD1000S, UCD1250S	TQQ 80NE	4EA/SET	-	4	6	125	92	
UCB1600S	TQQ 160NE	4EA/SET	-	4	-	102	68	
UPB100S, UPB100H, UPB100L, UPB100X, UPB160S, UPB160H, UPB160L, UPB160X, UPB250S, UPB250H, UPB250L, UPB250X / UPD100S, UPD160S, UPD250S	TQQ 12NE	4EA/SET	-	4	6	71	54.5	
UPB400S, UPB400H, UPB400L, UPB400X, UPB630S, UPB630H, UPB630L, UPB630X / UPD400S, UPD630S	TQQ 46NE	4EA/SET	-	4	6	122	103	
HBL103U, HBL103UM, HBL203U, HBL203UM, HBL103UQ, HBL103UMQ, HBL203UQ, HBL203UMQ	TQQ 12NE	4EA/SET	-	4	-	71	54.5	
UDB30S, UDB30H, UDB50S, UDB50H, UDB100S, UDB100H, UDG30S, UDG30H, UDG50S, UDG50H, UDG100S, UDG100H	TQQ 10A	2EA/SET	2	4	-	50	53	

## Portable Test Equipment

### | MCCB trip unit tester |

- MCCB trip unit tester (MCCB OCR CHECKER) can test LTD and STD (below 600%) function of trip unit in the field

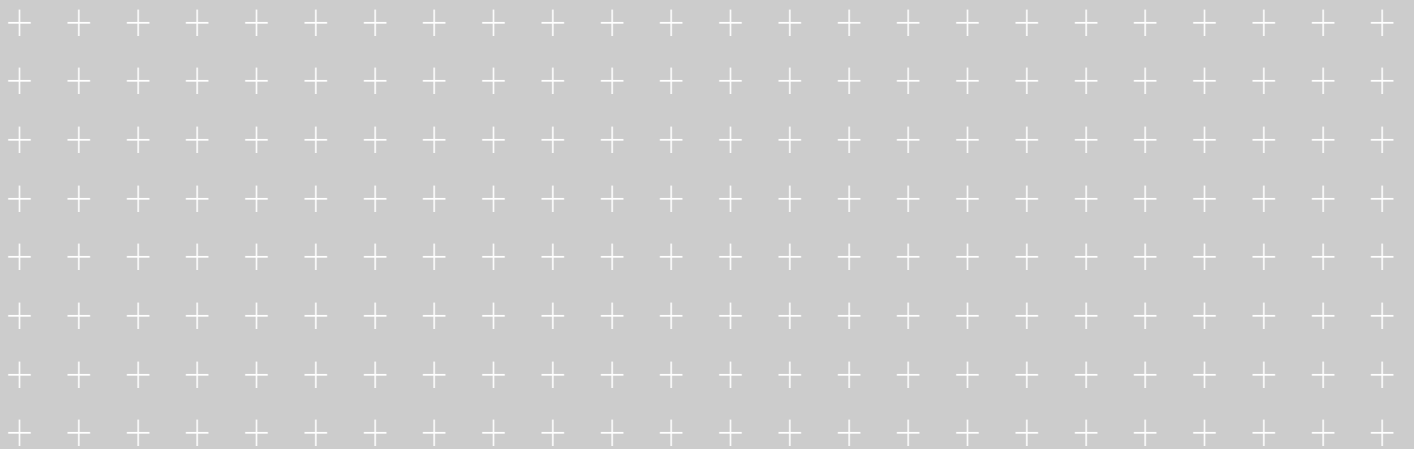
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Order code		MCCB OCR CHECKER
Rated voltage	input	AC100-230V
	output	DC 9V
Dimension		
Weight		
Standard kit		Tester, DC9V adaptor, connector



Technical Information



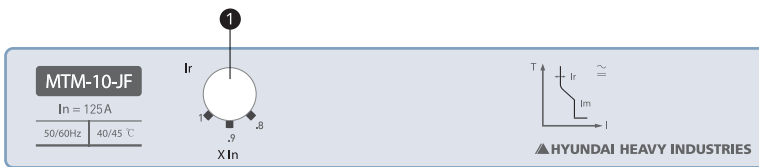
# Current Setting for UPB type and UCB 1000-1600 type

## | UPB100, UPB160, UPB250 / Thermal magnetic type |

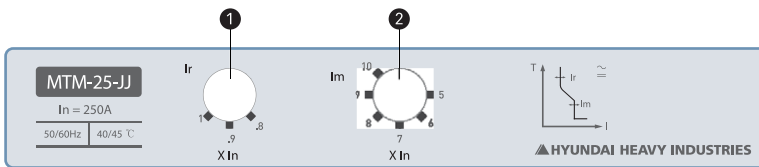
- Protection characteristics and current setting

Rated current [In] (A)		15	16	20	25	30	32	40	50	63	80	100	125	150	160	175	200	225	250	
LTD	① Rated setting current [Ir] (A)	In x 0.63	12		16		24		32	40	50	64	80	100	120		140	160	180	200
		In x 0.8	14		18		27		36	45	57	72	90	113	135		158	180	203	225
		In x 1.0	15	16	20	25	30	32	40	50	63	80	100	125	150	160	175	200	225	250
INST	② Rated instantaneous short-time current [Ii] (A)	Fixed (In x 10)	150	160	200	250	300	320	400	500	630	800	1000	1250	1500	1600	1750	2000	2250	2500
		Tolerance	± 20%																	
		Trip unit	UPB100: MTM-10-JF, UPB160: MTM-16-JF, UPB250: MTM-25-JF																	
		Adjustable <sup>1)</sup>	-												In x 5-6-7-8-9-10					
		Tolerance	-												In x 5-9: +30%, -20%			In x 10: ±20%		
Trip unit	-												UPB160: MTM-16-JJ, UPB250: MTM-25-JJ							

※ - 1) Adjustable instantaneous is available for UPB160 and UPB250.



- ① LTD current [Ir] setting knob
- ② INST current [Ii] setting knob

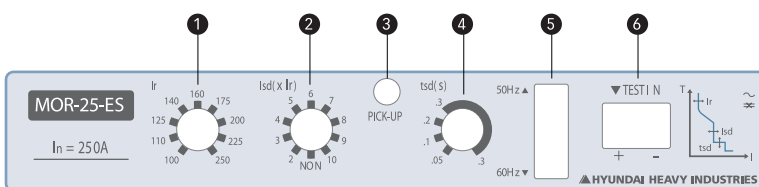


## | UPB100, UPB160, UPB250 / Electronic type |

- Protection characteristics and current setting

Model	UPB100	UPB160	UPB250	
Trip unit	MOR-10-ES	MOR-16-ES	MOR-25-ES	
Rated (CT) current [In] (A)	125	160	250	
LTD	① Rated setting current [Ir] (A)	50, 55, 63, 70, 80, 90, 100, 115, 125	63, 70, 80, 90, 100, 110, 125, 140, 160	100, 110, 125, 140, 160, 175, 200, 225, 250
	Tripping time [tr]	6.25 sec. at Ir x 600%		Tolerance ± 20%
STD	② Short time pick-up current [Isd] (A)	Ir x NON-2-3-4-5-6-7-8-9-10		Tolerance
	④ Tripping time [tsd]	0.05-0.1-0.2- <u>0.3</u> sec. at definite time-limit section		Tolerance +50ms, -20ms
INST	Rated instantaneous short-time current [Ii] (A)	In x 1100%		Tolerance ± 20%
PTA	Pre-trip alarm current [Ip] (A)	_____		Tolerance
	Alarm time [tp]	_____		Tolerance

※ The default values are underlined. Please check and adjust the setting condition of each characteristics before use.



- ① LTD current [Ir] setting knob
- ② STD current [Isd] setting knob
- ③ Pick-up LED
- ④ STD time [tsd] setting knob
- ⑤ Frequency selection switch
- ⑥ Tester connection port



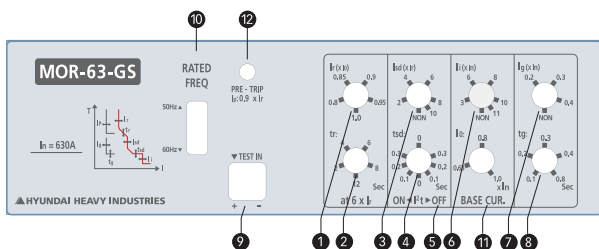
## UPB400, UPB630 / Electronic type I

- Protection characteristics and current setting

Model		UPB400						UPB630					
Trip unit		MOR-40-ES <sup>1)</sup> / MOR-40-GS						MOR-63-ES <sup>1)</sup> / MOR-63-GS					
Rated (CT) current [In] (A)		400						630					
LTD	① Rated setting current [Ir] (A)	<u>Io</u> / Ir	0.8	0.85	0.9	0.95	1.0	<u>Io</u> / Ir	0.8	0.85	0.9	0.95	1.0
		0.63	200	215	225	240	250	0.63	320	340	360	380	400
		0.8	255	270	290	300	320	0.8	400	430	450	480	500
		1.0	320	340	360	380	400	1.0	500	540	570	600	630
	② Tripping time [tr]	2-4-6-8-12 sec. at Ir x 600%						Tolerance ±20%					
STD <sup>1)</sup>	③ Short time pick-up current [I <sub>sd</sub> ] (A)	Ir x NON-2-4-6-8-10						Tolerance ±15%					
	④ Tripping time [tsd]	0-0.1-0.2-0.3 sec. at definite time-limit section						Tolerance +50ms, -20ms					
INST	⑥ Rated instantaneous short-time current [I <sub>i</sub> ] (A)	In x NON-3-6-8-10-11						Tolerance ±20%					
GFT <sup>2)</sup>	⑦ Ground fault current [I <sub>g</sub> ] (A)	In x NON-0.2-0.3-0.4						Tolerance ±15%					
	⑧ Tripping time [tg]	0.1-0.2-0.3-0.4-0.8 sec. at definite time-limit section						Tolerance +50ms, -20ms					
PTA	⑫ Pre-trip alarm current [I <sub>p</sub> ] (A)	Ir x 0.9						Tolerance ±10%					
	Alarm time [tp]							Tolerance ±10%					

※ The default values are underlined. Please check and adjust the setting condition of each characteristics before use.

- 1) I<sub>t</sub> characteristic can be ON or OFF by adjusting the [tsd] knob ④.
- 2) GFT protection is option and not applicable for MOR-40-ES and MOR-63-ES trip unit.



- ① LTD current [Ir] setting knob
- ② LTD time [tr] setting knob
- ③ STD current [I<sub>sd</sub>] setting knob
- ④ STD time [tsd] setting knob
- ⑤ I<sub>t</sub> ON-OFF indication
- ⑥ INST current [I<sub>i</sub>] setting knob
- ⑦ GFT current [I<sub>g</sub>] setting knob
- ⑧ GFT time [tg] setting knob
- ⑨ Tester connection port
- ⑩ Frequency selection switch
- ⑪ Base current [Io] setting knob
- ⑫ PTA [I<sub>p</sub>] LED

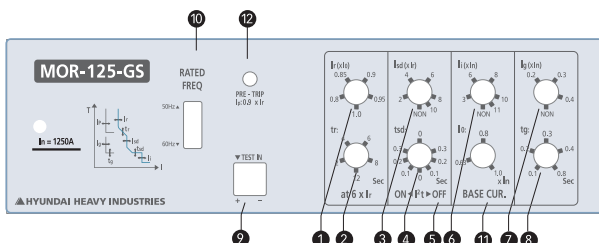
## UCB1000, UCB1250 / Electronic type I

- Protection characteristics and current setting

MCCB		UCB1000						UCB1250					
Trip unit		MOR-100-ES <sup>1)</sup> / MOR-100-GS						MOR-125-ES <sup>1)</sup> / MOR-125-GS					
Rated (CT) current [In] (A)		1000						1250					
LTD	① Rated setting current [Ir] (A)	<u>Io</u> / Ir	0.8	0.85	0.9	0.95	1.0	<u>Io</u> / Ir	0.8	0.85	0.9	0.95	1.0
		0.63	505	535	565	600	630	0.63	630	670	710	750	790
		0.8	640	680	720	760	800	0.8	800	850	900	950	1000
		1.0	800	850	900	950	1000	1.0	1000	1060	1125	1190	1250
	② Tripping time [tr]	2-4-6-8-12 sec. at Ir x 600%						Tolerance ±20%					
STD <sup>1)</sup>	③ Short time pick-up current [I <sub>sd</sub> ] (A)	Ir x NON-2-4-6-8-10						Tolerance ±15%					
	④ Tripping time [tsd]	0-0.1-0.2-0.3 sec. at definite time-limit section						Tolerance +50ms, -20ms					
INST	⑥ Rated instantaneous short-time current [I <sub>i</sub> ] (A)	In x NON-3-6-8-10-11						Tolerance ±20%					
GFT <sup>2)</sup>	⑦ Ground fault current [I <sub>g</sub> ] (A)	In x NON-0.2-0.3-0.4						Tolerance ±15%					
	⑧ Tripping time [tg]	0.1-0.2-0.3-0.4-0.8 sec. at definite time-limit section						Tolerance +50ms, -20ms					
PTA	⑫ Pre-trip alarm current [I <sub>p</sub> ] (A)	Ir x 0.9						Tolerance ±10%					
	Alarm time [tp]							Tolerance ±10%					

※ The default values are underlined. Please check and adjust the setting condition of each characteristics before use.

- 1) I<sub>t</sub> characteristic can be activate by adjusting [tsd] knob ④.
- 2) GFT protection is option and not applicable for MOR-100-ES and MOR-125-ES trip unit.



- ① LTD current [Ir] setting knob
- ② LTD time [tr] setting knob
- ③ STD current [I<sub>sd</sub>] setting knob
- ④ STD time [tsd] setting knob
- ⑤ I<sub>t</sub> ON-OFF indication
- ⑥ INST current [I<sub>i</sub>] setting knob
- ⑦ GFT current [I<sub>g</sub>] setting knob
- ⑧ GFT time [tg] setting knob
- ⑨ Tester connection port
- ⑩ Frequency selection switch
- ⑪ Base current [Io] setting knob
- ⑫ PTA [I<sub>p</sub>] LED

# Current Setting for UPB type and UCB 1000-1600 type

## Current setting procedure / Electronic type 400-1250A

In	400A				
lo	① 0.63	0.8	1.0		
lr	① 0.8	0.85	0.9	0.95	1.0
LTD = 400 x 0.9 x 1.0 = 360A					
l <sub>sd</sub>	③ 2	4	6	8	10
STD = 6 x lr = 2160A					
li	⑥ 3	6	8	10	11
INST = 8 x In = 3200A					
lg	⑦ 0.2	0.3	0.4		
GFT = 0.3 x In = 120A					

In	630A				
lo	0.63	0.8	1.0		
lr	0.8	0.85	0.9	0.95	1.0
LTD = 630 x 0.9 x 1.0 = 570A					
l <sub>sd</sub>	2	4	6	8	10
STD = 6 x lr = 3420A					
li	3	6	8	10	11
INST = 8 x In = 5040A					
lg	0.2	0.3	0.4		
GFT = 0.3 x In = 190A					

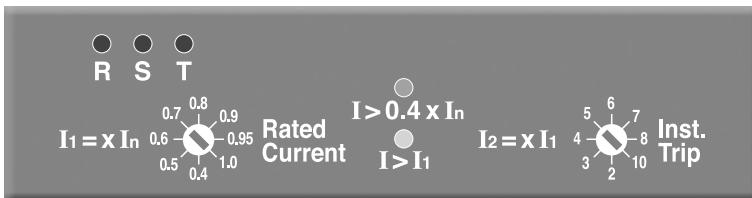
In	1000A				
lo	① 0.63	0.8	1.0		
lr	① 0.8	0.85	0.9	0.95	1.0
LTD = 1000 x 0.9 x 1.0 = 900A					
l <sub>sd</sub>	③ 2	4	6	8	10
STD = 6 x lr = 5400A					
li	⑥ 3	6	8	10	11
INST = 8 x In = 8000A					
lg	⑦ 0.2	0.3	0.4		
GFT = 0.3 x In = 300A					

In	1250A				
lo	0.63	0.8	1.0		
lr	0.8	0.85	0.9	0.95	1.0
LTD = 1200 x 0.9 x 1.0 = 1125A					
l <sub>sd</sub>	2	4	6	8	10
STD = 6 x lr = 6750A					
li	3	6	8	10	11
INST = 8 x In = 10000A					
lg	0.2	0.3	0.4		
GFT = 0.3 x In = 375A					

## UCB1600 / Electronic type

- Protection characteristics and current setting

Rated (CT) current [In] (A)		1600								
LTD	Rated setting current [I <sub>l</sub> ] (A)	In x	0.4	0.5	0.6	0.7	0.8	0.9	0.95	1.0
INST	Rated instantaneous short-time current [I <sub>i</sub> ] (A)	I <sub>i</sub> x 2-3-4-5-6-7-8-10								
LED indication	Red light	I > 0A								
	Green light	I > 0.4 x In								
	Yellow light	I > I <sub>l</sub>								



# Selection By Application

## | Model selection for transformer |

• AC220V

Capacity of transformer (kVA)	Three phase	≤30	≤50	70-100	150-300	500-750		≤1500		≤2000			
	Single phase	≤16	≤30	≤50	≤150	≤300							
Breaking capacity of MCCB (kA)(Sym)		2.5	5	10	25	35	42	50	65	85	100	125	
MCCB	UAB30C				UAB30R								
	UAB50C				UAB50R	UAB50H, UCB50R		UCB50H		UCB50L			
	UAB60C				UAB60R								
	UAB100C				UAB100S, UCB100R		UCB100S	UCB100H	UCB100L	UPB100H, UPB100L			
	UCB250R				UCB250S	UCB250N	UCB250H	UCB250L	UPB250H, UPB250L				
	UCB400R				UCB400S	UCB400H	UCB400L		UPB400S, UPB400H, UPB400L, UPB400X				
	UCB630R								UCB630S, UCB630H		UPB630S, UPB630H, UPB630L, UPB630X		
	UCB800R								UCB800S, UCB800H		UCB800L		
UCB1000S, UCB1250S										UCB1000L, UCB1250L			

• AC460V

Capacity of transformer (kVA)	≤50	75-200	≤300	≤750		≤1500		≤2000		≤3000			
	1.5	5	10	18	25	35	42	50	65	75	85	100	
Breaking capacity of MCCB (kA)(Sym)													
MCCB	UAB30C			UAB30R									
	UAB50C			UAB50R	UAB50H, UCB50R		UCB50H		UCB50L				
	UAB60C			UAB60R									
	UAB100C			UAB100S, UCB100R		UCB100S	UCB100H	UCB100L	UPB100H		UPB100L		
	UCB250R			UCB250S	UCB250N	UCB250H	UCB250L	UPB250H		UPB250L			
	UCB400R			UCB400S	UCB400H		UCB400L		UPB400L, UPB400X				
	UCB630R							UCB630S	UCB630H	UCB630L	UPB630L, UPB630X		
	UCB800R							UCB800S	UCB800H	UCB800L			
UCB1000S, UCB1250S										UCB1000L, UCB1250L			

## | Rated current selection for condenser |

Capacity of condenser (kVAR)	Rated current of MCCB (A)							
	Single phase (1 pole)				Three phase (3 pole)			
	AC220V		AC440V		AC220V		AC440V	
	50Hz	60Hz	50Hz	60Hz	50Hz	60Hz	50Hz	60Hz
5	60	50	30	30	40	50	30	20
10	75	60	40	40	50	50	30	30
15	100	100	60	50	60	60	40	40
20	175	175	75	60	100	75	50	40
25	200	200	100	100	100	100	50	50
30	225	225	100	100	175	150	60	60
40	400	400	150	125	200	200	100	75
50	400	400	175	175	225	225	100	100
75	600	500	300	300	400	400	150	150
100	800	800	400	400	400	400	225	225
150	1000	1000	600	500	600	600	300	300
200	-	1200	800	800	800	800	400	400
300	-	-	1000	1000	-	-	600	600
400	-	-	-	-	-	-	-	800

※ -The start-up inrush current is about 10 times of rated current.  
 -The mentioned value can be applied to maximum rated current of MCCB.  
 -The rated current of MCCB is recommended to be 150% of rated current of condenser.

# Selection By Application

## | Model selection for lighting and heater |

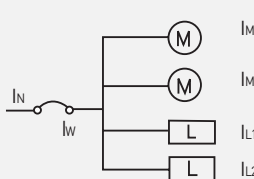
- The maximum operational current shall not exceed 80% of MCCB rated current.

Maximum operational current (A)	Rated current of MCCB (A)	Breaking capacity (kA)										
		sym	2.5	5	10	25	35	50	65	85	100	125
12	15	UAB30C		UAB30R	UAB50H UCB50R		UCB50H		UCB50L			
16	20	UAB30C		UAB30R	UAB50H UCB50R		UCB50H		UCB50L			
24	30	UAB30C		UAB30R	UAB50H UCB50R		UCB50H		UCB50L			
32	40	UAB50C		UAB50R	UAB50H UCB50R		UCB50H		UCB50L			
40	50	UAB50C		UAB50R	UAB50H UCB50R		UCB50H		UCB50L			
48	60	UAB60C		UAB60R	UAB100S, UCB100R		UCB100S	UCB100H	UCB100L	UPB100H, UPB100L		
60	75	UAB100C			UAB100S, UCB100R		UCB100S	UCB100H	UCB100L	UPB100H, UPB100L		
80	100	UAB100C			UAB100S, UCB100R		UCB100S	UCB100H	UCB100L	UPB100H, UPB100L		
100	125	UCB250R				UCB250S	UCB250N	UCB250H	UCB250L	UPB250H, UPB250L		
120	150	UCB250R				UCB250S	UCB250N	UCB250H	UCB250L	UPB250H, UPB250L		
140	175	UCB250R				UCB250S	UCB250N	UCB250H	UCB250L	UPB250H, UPB250L		
160	200	UCB250R				UCB250S	UCB250N	UCB250H	UCB250L	UPB250H, UPB250L		
180	225	UCB250R				UCB250S	UCB250N	UCB250H	UCB250L	UPB250H, UPB250L		
200	250	UCB400R				UCB400S	UCB400H	UCB400L		UPB400S, UPB400H, UPB400L, UPB400X		
240	300	UCB400R				UCB400S	UCB400H	UCB400L		UPB400S, UPB400H, UPB400L, UPB400X		
280	350	UCB400R				UCB400S	UCB400H	UCB400L		UPB400S, UPB400H, UPB400L, UPB400X		
320	400	UCB400R				UCB400S	UCB400H	UCB400L		UPB400S, UPB400H, UPB400L, UPB400X		
400	500	UCB630R					UCB630S, UCB630H			UPB630S, UPB630H, UPB630L, UPB630X		
500	630	UCB630R					UCB630S, UCB630H			UPB630S, UPB630H, UPB630L, UPB630X		
560	700	UCB800R					UCB800S, UCB800H			UCB800L		
640	800	UCB800R					UCB800S, UCB800H			UCB800L		
800	1000	UCB1000S									UCB1000L	
1000	1250	UCB1250S									UCB1250L	

- AC460V

Maximum operational current (A)	Rated current of MCCB (A)	Breaking capacity (kA)												
		sym	1.5	5	10	18	25	35	42	50	65	75	85	100
12	15	UAB30C		UAB30R	UAB50H UCB50R		UCB50H		UCB50L					
16	20	UAB30C		UAB30R	UAB50H UCB50R		UCB50H		UCB50L					
24	30	UAB30C		UAB30R	UAB50H UCB50R		UCB50H		UCB50L					
32	40	UAB50C		UAB50R	UAB50H UCB50R		UCB50H		UCB50L					
40	50	UAB50C		UAB50R	UAB50H UCB50R		UCB50H		UCB50L					
48	60	UAB60C		UAB60R	UAB100S, UAB100R		UCB100S	UCB100H	UCB100L	UPB100H	UPB100L			
60	75	UAB100C			UAB100S, UAB100R		UCB100S	UCB100H	UCB100L	UPB100H	UPB100L			
80	100	UAB100C			UAB100S, UAB100R		UCB100S	UCB100H	UCB100L	UPB100H	UPB100L			
100	125	UCB250R				UCB250S	UCB250N	UCB250H	UCB250L	UPB250H	UPB250L			
120	150	UCB250R				UCB250S	UCB250N	UCB250H	UCB250L	UPB250H	UPB250L			
140	175	UCB250R				UCB250S	UCB250N	UCB250H	UCB250L	UPB250H	UPB250L			
160	200	UCB250R				UCB250S	UCB250N	UCB250H	UCB250L	UPB250H	UPB250L			
180	225	UCB250R				UCB250S	UCB250N	UCB250H	UCB250L	UPB250H	UPB250L			
200	250	UCB400R				UCB400S	UCB400H		UCB400L		UPB400L, UPB400X			
240	300	UCB400R				UCB400S	UCB400H		UCB400L		UPB400L, UPB400X			
280	350	UCB400R				UCB400S	UCB400H		UCB400L		UPB400L, UPB400X			
320	400	UCB400R				UCB400S	UCB400H		UCB400L		UPB400L, UPB400X			
400	500	UCB630R					UCB630S		UCB630H	UCB630L	UPB630L, UPB630X			
500	630	UCB630R					UCB630S		UCB630H	UCB630L	UPB630L, UPB630X			
560	700	UCB800R					UCB800S		UCB800H	UCB800L				
640	800	UCB800R					UCB800S		UCB800H	UCB800L				
800	1000	UCB1000S									UCB1000L			
1000	1250	UCB1250S									UCB1250L			

## | Rated current selection for motor and other loads |

Circuit diagram	Condition	Permissible current of cable1) [Iw]	Rated current of MCCB [In]
 <p>Im : Load current of motor Il : Load current of other loads</p>	$\sum I_M \leq \sum I_L$	$I_w \geq \sum I_M + \sum I_L$	Less value among $I_n \leq 3 \sum I_M + \sum I_L$ or $I_n \leq 2.5 I_w$ . In case of $I_w > 100A$ , when calculated value is not matched with the rated current of MCCB, it is recommended to select the right above value.
	$50A \geq \sum I_M \rightarrow \sum I_L$	$I_w \geq 1.25 \sum I_M + \sum I_L$	
	$50A < \sum I_M > \sum I_L$	$I_w \geq 1.1 \sum I_M + \sum I_L$	

### ■ Permissible current of copper cable

Cable size (mm <sup>2</sup> )	Permissible current (A)								
	30°C	40°C	50°C	30°C	40°C	50°C	30°C	40°C	50°C
(1.2)*	19	15	11	11	9	6	13	10	7
(1.6)*	29	22	15	16	13	9	19	15	11
(2.0)*	50	28	20	21	17	12	24	20	14
(2.6)*	48	39	27	29	23	16	33	27	19
3.5	37	30	21	22	18	12	26	21	15
5.5	49	40	28	29	24	17	34	28	19
8	61	49	35	36	30	21	42	35	24
14	88	71	51	53	43	30	61	50	35
22	115	93	66	69	56	39	80	65	46
30	139	113	80	83	68	48	97	80	46
38	162	132	93	97	79	56	113	92	65
50	190	155	110	114	93	65	133	108	76
60	217	177	125	130	106	75	152	124	87
100	298	243	172	179	146	130	208	170	120
125	344	280	199	206	168	119	241	197	139
150	395	322	228	237	193	136	276	226	160
200	469	382	271	281	230	162	328	268	189
250	98	454	322	333	272	192	389	318	224
325	650	530	376	390	318	225	455	372	262
400	745	607	430	447	365	258	521	426	301
500	842	687	486	505	412	291	589	462	340

# Selection By Application

## Rated current of MCCB for AC220V three phase induction motor

Total capacity of motors (below kW)	Maximum operational current (below A)	Capacity of the biggest motor										Capacity of motor (kW)/ Full load current (A)							
		0.75/ 4.8	1.5/ 8	2.2/ 11.1	3.7/ 17.4	5.5/ 26	7.5/ 34	11/ 48	15/ 65	18.5/ 79	22/ 93	30/ 125	37/ 160	45/ 190	5/ 230	75/ 310	90/ 360	110/ 440	132/ 500
3	15	20	30	30															
4.5	20	30	30	30	50														
6.3	30	40	40	40	50	60													
8.2	40	50	50	50	50	50	100												
12	50	60	60	60	60	75	100												
15.7	75	100	100	100	100	100	100	125	150										
19.5	90	100	100	100	100	100	100	125	150	175									
23.2	100	125	125	125	125	125	125	125	150	175	200								
30	125	150	150	150	150	150	150	150	150	175	225								
37.5	150	175	175	175	175	175	175	175	175	200	225	300							
45	175	200	200	200	200	200	200	200	200	200	225	300	400						
52.5	100	225	225	225	225	225	225	225	225	225	225	300	400	500					
63.7	150	300	300	300	300	300	300	300	300	300	300	300	400	500	500				
75	300	350	350	350	350	350	350	350	350	350	350	350	400	500	500				
86.2	350	400	400	400	400	400	400	400	400	400	400	400	400	500	500	600			
97.5	400	500	500	500	500	500	500	500	500	500	500	500	500	500	500	600	700		
112.5	450	500	500	500	500	500	500	500	500	500	500	500	500	500	500	700	700		
125	500	600	600	600	600	600	600	600	600	600	600	600	600	600	600	700	700	1000	
150	600	700	700	700	700	700	700	700	700	700	700	700	700	700	700	700	800	1000	1000
175	700	800	800	800	800	800	800	800	800	800	800	800	800	800	800	800	800	1000	1000
220	800	900	900	900	900	900	900	900	900	900	900	900	900	900	900	900	900	900	1000

※ -The rated currents are for MCCBs.

-The mentioned values are applicable when MCCB trips within 10 sec. at 600% of full load current and the start-up inrush current is within 1700% of full load current.

-Above selection is also applied in case that several loads starts up at same time.

## Rated current of MCCB for AC440V three phase induction motor

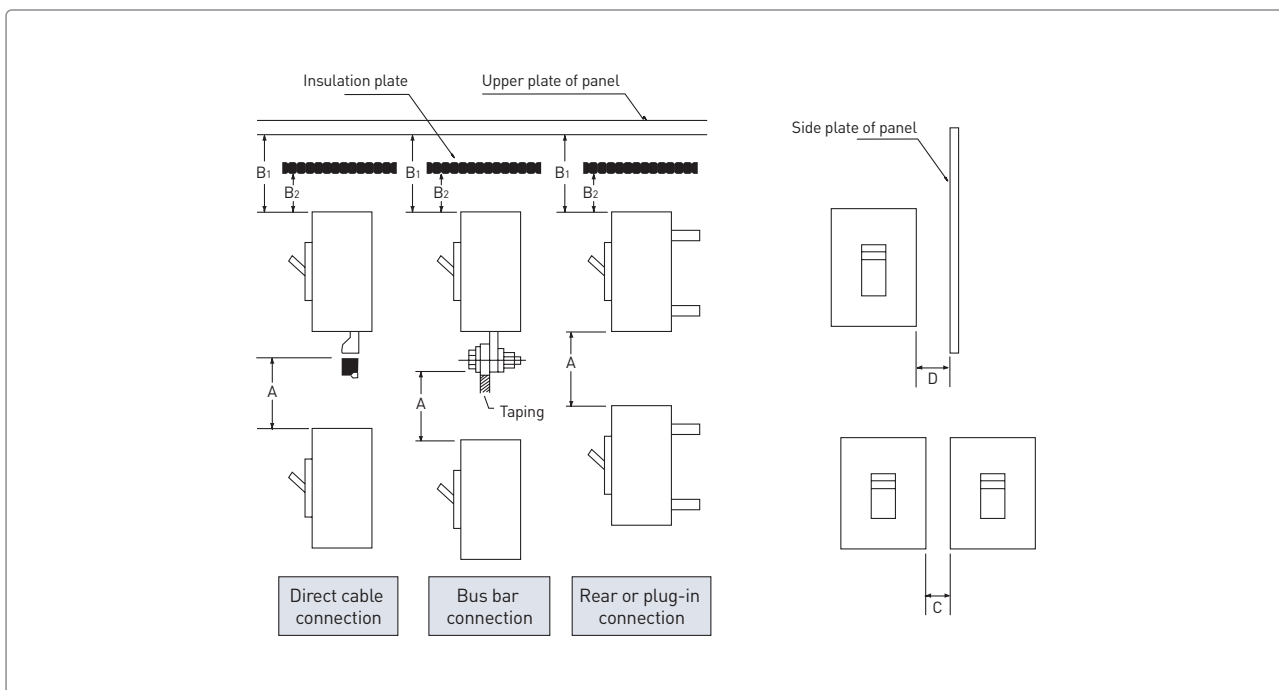
Total capacity of motors (below kW)	Maximum operational current (below A)	Capacity of the biggest motor										Capacity of motor (kW)/ Full load current (A)							
		0.75/ 2.4	1.5/ 4	2.2/ 5.5	3.7/ 8.7	5.5/ 13	7.5/ 17	11/ 24	15/ 32	18.5/ 39	22/ 46	30/ 62	37/ 80	45/ 95	55/ 115	75/ 155	90/ 180	110/ 220	132/ 250
3	7.5	15	15	15															
4.5	10	15	15	15	30														
6.3	15	20	20	20	30	40													
8.2	20	30	30	30	30	40	50												
12	25	30	30	30	30	40	50												
15.7	38	50	50	50	50	50	50	60	75										
19.5	45	50	50	50	50	50	50	60	75	100									
23.2	50	60	60	60	60	60	60	60	75	100	125								
30	63	75	75	75	75	75	75	75	75	100	100	125							
37.5	75	100	100	100	100	100	100	100	100	100	125	150							
45	88	100	100	100	100	100	100	100	100	100	125	150	175						
52.5	100	125	125	125	125	125	125	125	125	125	125	150	175	225					
63.7	125	150	150	150	150	150	150	150	150	150	150	150	175	225	250				
75	150	175	175	175	175	175	175	175	175	175	175	175	200	225	250				
86.2	175	200	200	200	200	200	200	200	200	200	200	200	200	225	300	350			
97.5	200	225	225	225	225	225	225	225	225	225	225	225	225	225	300	350	400		
112.5	225	250	250	250	250	250	250	250	250	250	250	250	250	250	300	350	400		
125	250	300	300	300	300	300	300	300	300	300	300	300	300	300	300	350	400	500	
150	300	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	400	500	500
175	350	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	500	500
200	400	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500
250	500	600	600	600	600	600	600	600	600	600	600	600	600	600	600	600	600	600	600
300	600	700	700	700	700	700	700	700	700	700	700	700	700	700	700	700	700	700	700
350	700	800	800	800	800	800	800	800	800	800	800	800	800	800	800	800	800	800	800
400	700	800	800	800	800	800	800	800	800	800	800	800	800	800	800	800	800	800	800
450	900	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
500	1000	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200

※ -The rated currents are for MCCBs.

-The mentioned values are applicable when MCCB trips within 10 sec. at 600% of full load current and the start-up inrush current is within 1700% of full load current.

-Above selection is also applied in case that several loads starts up at same time.

# Insulation distance



Applicable MCCB	Distances				
	A	B1	B2	C	D
UAB30C, UAB30R, UAB50C, UAB50R, UAB50S, UAB50H, UAB60C, UAB60R, UAB100C, UAB100R, UAB100S / UAD50C, UAD50S, UAD100R	75	50	30	from 0	25
UCB50R, UCB50H, UCB50L, UCB100R, UCB100S, UCB100H, UCB100L / UCD50H, UCD100R, UCD100H	80	50	30	from 0	25
UCB250R	80	60	50	from 0	25 (?)
UCB160H, UCB160L, UCB250S, UCB250N, UCB250H, UCB250L / UCD160H, UCD250S, UCD250H	80	60	50	from 0	40
UCB400R, UCB400S, UCB400H, UCB400L, UCB630R, UCB630S, UCB630H, UCB630L, UCB800R, UCB800S, UCB800H, UCB800L / UCD400S, UCD630S, UCD800S	100	100	80	from 0	80
UCB1000S, UCB1000L, UCB1250S, UCB1250L, UCB1600S / UCD1000S, UCD1250S	50	120	80	from 0	80
UPB100S, UPB100H, UPB100L, UPB100X / UPD100S	80	50	30	from 0	10
UPB160S, UPB160H, UPB160L, UPB160X, UPB250S, UPB250H, UPB250L, UPB250X / UPD160S, UPD250S	100	100	70	from 0	10
UPB400S, UPB400H, UPB400L, UPB400X, UPB630S, UPB630H, UPB630L, UPB630X / UPD400S, UPD630S	120	100	80	from 0	80
HBL103U, HBL103UM, HBL103UQ, HBL103UMQ	80	50	30	from 0	10
HBL203U, HBL203UM, HBL203UQ, HBL203UMQ	100	100	70	from 0	10

# Cascading Table

## AC240V |

Upstream

Downstream	Recognition category	Model	Rated current (A)	Breaking capacity [Icu] (kA r.m.s)	UAB-C		UAB-R			UAB/UCB-S				
					UAB100C	UCB250R	UCB400R	UCB630R	UCB800R	UAB100S	UCB250S	UCB400S	UCB630S	UCB800S
					5-100	125-250	250-400	500,630	700,800	15-100	125-250	250-400	500,630	700,800
UAB-C	UAB30C	3-30	10	25	30	30				35	35	35		
	UAB50C	5-50	10	25	30	30				35	35	35		
	UAB60C	5-60	10	25	30	30				35	35	35		
	UAB100C	5-100	25		35	35	42	42		42	42	65	65	
UAB/UCB-R	UAB30R	5-30	25		35	35	42	42	42	42	42	65	65	
	UAB50R	5-50	25		35	35	42	42	42	42	42	65	65	
	UAB60R	5-60	25		35	35	42	42	42	42	42	65	65	
	UAB100R	15-100	42				50	50		50	50	75	75	
	UCB50R	15-50	50									85	85	
	UCB100R	15-100	50									85	85	
	UCB250R	125-250	35				50	50			50	65	65	
	UCB400R	250-400	35					50					65	
UAB/UCB-S	UAB50S	15-50	42				50	50	50	50	50	75	75	
	UAB100S	15-100	50									85	85	
	UCB100S	15-100	65									85	85	
	UCB250S	125-250	50									85	85	
	UCB400S	250-400	50										85	
UAB/UCB-H	UAB50H	15-50	50											
	UCB50H	15-50	85									100	100	
	UCB100H	15-125	85									100	100	
	UCB250H	125-250	85									100	100	
	UCB400H	250-400	85										100	
UCB-L	UCB50L	15-50	100											
	UCB100L	15-125	100											
	UCB250L	125-250	100											
	UCB400L	250-400	125											
UPB-H	UPB100H	15-125	130											
	UPB250H	100-250	130											
UPB-L	UPB100L	15-125	150											
	UPB250L	100-250	150											



UCB-H					UCB-L					UPB-H		UPB-L	
UCB100H	UCB250H	UCB400H	UCB630H	UCB800H	UCB100L	UCB250L	UCB400L	UCB630L	UCB800L	UPB100H	UPB250H	UPB100L	UPB250L
15-125	125-250	250-400	500,630	700,800	15-125	125-250	250-400	500,630	700.800	15-125	100-250	15-125	100-250
85	85	85	100	100	100	100	1215	125	125	130	130	150	150
50	50	50			50	50	65						
50	50	50			50	50	65						
50	50	50			50	50	65						
	65	65	65	65		65	85	85	85				
65	65	65	65	65	65	65	85	85	85	85	85	100	100
65	65	65	65	65	65	65	85	85	85	85	85	100	100
65	65	65	65	65	65	65	85	85	85	85	85	100	100
	75	75	75	75		75	100	100	100		100		130
85	85	85	85	85	100	100	100	100	100	100	100	130	130
	85	85	85	85		100	100	100	100		100		130
		65	65	65			100	100	100				
				65					100				
	85	85	75	75	100	100	100	100	100	100	100	130	130
	85	85	85	85		100	125	125	125		100		130
	85	85	85	85		100	125	125	125		100		130
		85	85	85			125	125	125				
				85					125				
										130	130	130	130
			100	100	100	100	125	125	125	130	130	150	150
			100	100			125	125	125		130		150
			100	100			125	125	125				
									125				
							125	125	125	130	130	150	150
							125	125	125		130		150
							125	125	125				
												150	150
													150

# Cascading Table

## AC415V

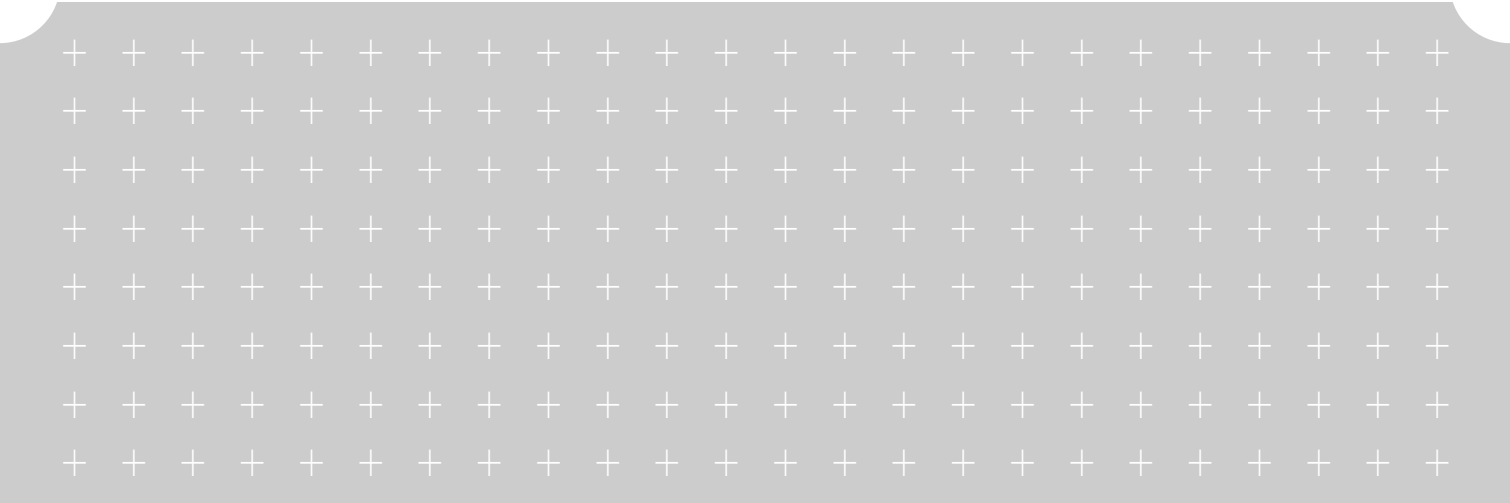
Upstream

Recognition category	Model			UAB-C	UAB-R					UAB/UCB-S				
		Rated current (A)	Breaking capacity [Icu] (kA r.m.s)	UAB100C	UCB250R	UCB400R	UCB630R	UCB800R	UAB100S	UCB250S	UCB400S	UCB630S	UCB800S	
				5-100	125-250	250-400	500,630	700,800	15-100	125-250	250-400	500,630	700,800	
UAB-C	UAB30C	3-30	10	10	7.5	10				10	10			
	UAB50C	5-50	10	10	7.5	10				10	10			
	UAB60C	5-60	10	10	7.5	10				10	10			
	UAB100C	5-100	25		14	14	14	14		18	18	30	30	
UAB/UCB-R	UAB30R	5-30	25		14	14	14	14		18	18	18	30	30
	UAB50R	5-50	25		14	14	14	14		18	18	18	30	30
	UAB60R	5-60	25		140	14	14	14		18	18	18	30	30
	UAB100R	15-100	42			30	35	35				35	42	42
	UCB50R	15-50	50			30	35	35	30			35	42	42
	UCB100R	15-100	50			30	35	35				35	42	42
	UCB250R	125-250	35			30	35	35				30	35	35
	UCB400R	250-400	35					35						50
UAB/UCB-S	UAB50S	15-50	42			30	35	35	30			35	42	42
	UAB100S	15-100	50				35	35				35	42	42
	UCB100S	15-100	65				45	45				42	50	50
	UCB250S	125-250	50			30	35	35				35	42	42
	UCB400S	250-400	50					45						65
UAB/UCB-H	UAB50H	15-50	50				35	35				42	42	42
	UCB50H	15-50	85				45	45					50	50
	UCB100H	15-125	85				45	45					50	50
	UCB250H	125-250	85				45	45					50	50
	UCB400H	250-400	85											
UCB-L	UCB50L	15-50	100										65	65
	UCB100L	15-125	100										65	65
	UCB250L	125-250	100										65	65
	UCB400L	250-400	125											
UPB-H	UPB100H	15-125	130											
	UPB250H	100-250	130											
UPB-L	UPB100L	15-125	150											
	UPB250L	100-250	150											

UCB-H					UCB-L					UPB-H		UPB-L	
UCB100H	UCB250H	UCB400H	UCB630H	UCB800H	UCB100L	UCB250L	UCB400L	UCB630L	UCB800L	UPB100H	UPB250H	UPB100L	UPB250L
15-125	125-250	250-400	500,630	700,800	15-125	125-250	250-400	500,630	700.800	15-125	100-250	15-125	100-250
42	42	65	85	85	50	50	100	100	100	100	100	130	130
14	14	18			25	25	25						
14	14	18			25	25	25						
14	14	18			25	25	25						
	18	30	30	30		30	35	35	35				
18	18	30	30	30	30	30	35	35	35	35	35	42	42
18	18	30	30	30	30	30	35	35	35	35	35	42	42
18	18	30	30	30	30	30	35	35	35	35	35	42	42
	35	42	50	50		35	50	50	50		50		50
35	35	42	50	50	42	42	50	50	50	50	50	50	50
	35	42	50	50		42	50	50	50		50		50
		35	42	42			42	42	42				
				50					50				
35	35	42	50	50	42	42	50	50	50	50	50	50	50
	42	45	50	50		50	65	65	65		50		65
	42	50	65	65		50	75	75	75		65		65
		42	50	50			50	50	50				
				75					85				
42	42	45	50	50	50	50	65	65	65	50	50	65	65
		60	75	75	50	50	85	85	85	85	85	85	85
		60	75	75		50	85	85	85		85		85
		60	75	75			85	85	85				
				85					100				
		65	85	85			100	100	100	100	100	100	100
		65	85	85			100	100	100		100		100
		65	85	85			100	100	100				
												130	130
													130



# Handling Instruction | Inspection and Maintenance



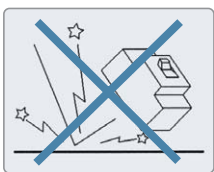
# Handling Instruction

## | Storage |

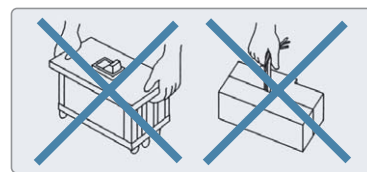
- Do not expose to corrosive gases.
- Do not expose to harmful gases including sulfur, ammonia and so on.
- Do not expose to high humidity for a long period.
- Do not expose to direct sunlight for a long period.
- Store at -20°C to +60°C without dust and humidity.
- Keep the handle in OFF position.

## | Transportation |

- Do not drop or apply shock during transportation, these can occur malfunction of breaker.



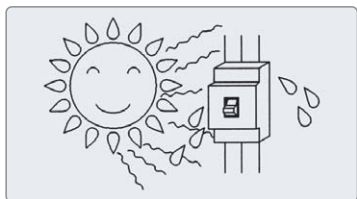
- Hold the breaker body for transportation. Do not hold terminal bus bar or external lead cable of accessories.



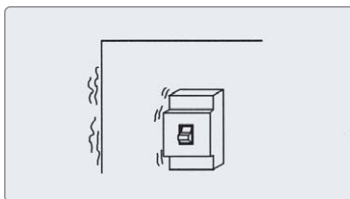
## | Standard operating condition for normal performance |

Ambient temperature	-5°C - +40°C, the average temperature for 24 hours shall not exceed 35°C
Relative humidity	45-85%
Vibration & shock	without excessive vibration and shock
Altitude	up to 2,000m
Surrounding	without excessive water vapor, oil vapor, smokes, dusts, salts and corrosive materials

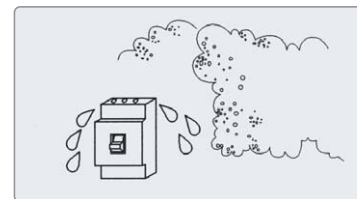
## | Installation and connection |



- **Keep away from direct sunlight.**  
Temperature rising can occur malfunction.



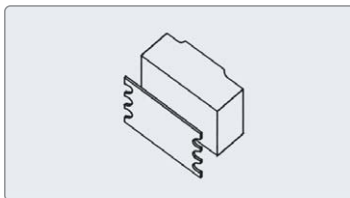
- **Avoid any vibration or shock.**  
If vibration or shock is expected install breaker with shock absorber.



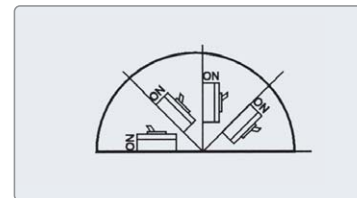
- **Keep away from dusts or metal pieces.**  
When any work that accompanies dusts or metal cutting is required, please cover the breaker first.



- **Do not cover the terminal part completely for arc exhaust.**  
Otherwise the breaking capacity may be decreased.



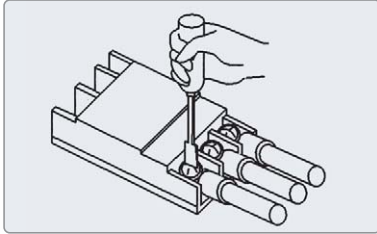
- **Do not take off the black insulation plate in back side of breaker.**  
Otherwise insulation shall be decreased or not secured.



원고없음

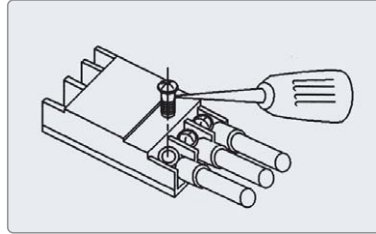
# Handling Instruction

## | Installation and connection |



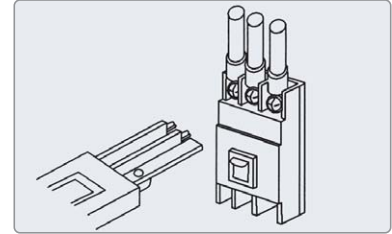
- **Tighten the terminal screws to proper torque specified in manual.**

The loose connection may occur overheating, and excessive torque may damage screws and terminal parts.



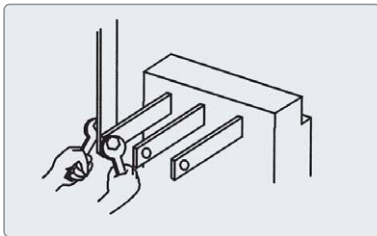
- **Do not apply lubricant on terminal parts.**

The lubricant lets screws loose and overheating occurs.



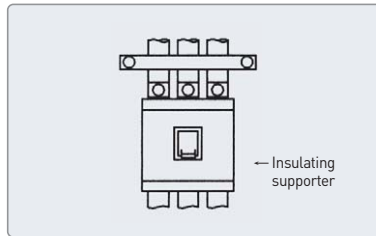
- **Insulate exposed conductors.**

To prevent short-circuit, be sure to insulate exposed conductors by interpole barrier, terminal cover, insulating tube, insulating tape and so on.



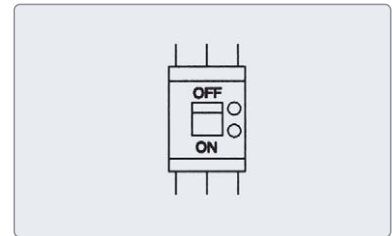
- **Do not modify the shape of stud or terminal accessories.**

Excessive force to stud and terminal accessories are also not allowed.



- **Fix each conductor in parallel.**

Short-circuit current can occur electromagnetic force between conductors, so each conductor is required to fixed firmly in parallel.



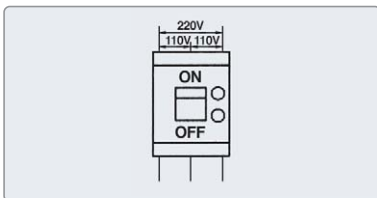
- **Reverse feeding of earth leakage circuit breaker is not allowed.**

In case of reverse feeding, power is supplied to circuit even the breaker trips, and it shall damage trip coil.

[Electromagnetic force per 1m conductor at 3 phase short-circuit] (Unit : N [kgf])

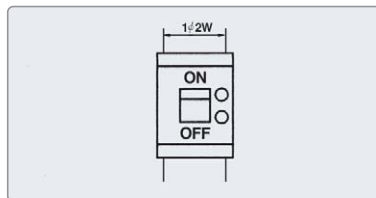
Short -circuit current / Internal power factor (kA)	Distance between conductors	
	10cm	20cm
10/0.4	490/50	245/25
18/0.3	1863/190	932/95
25/0.2	4412/450	2206/225
35/0.23	8630/880	4315/440
42/0.2	12455/1270	6277/635
50/0.2	17652/1800	8826/900
65/0.2	29910/3050	14955/1525
85/0.2	51190/5220	25595/2510
100/0.2	70804/7220	35402/3610
125/0.2	110815/11300	55408/5650

## | Connection of earth leakage circuit breaker |



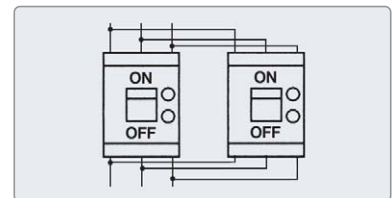
- **Single phase three lines circuit**

Power line shall be connected to both side poles of breaker, and neutral line to middle pole.



- **Single phase two line circuit.**

Circuit shall be connected to both side poles of breaker, and middle pole shall not be connected.



- **Parallel connection is not allowed.**

Parallel connection causes current unbalance, malfunction and trip coil damage.

# Inspection and Maintenance

## | Initial inspection |

- Please check the followings prior to breaker operation.

Check point
Terminal part shall be clean from dusts, metal pieces and so on.
Breaker shall not have any crack or damage.
There should be no condensation on terminal parts.
Insulation resistance should be more than 5M $\Omega$
Terminal screws shall be tightened with specified torque.

## | Dielectric test |

- The test shall be done in below condition.

Main circuit		Secondary and control circuit	
Rated insulation voltage (Ui)	Test voltage	Rated insulation voltage (Uis)	Test voltage
$U_i \leq AC300V$	AC2000V	$U_{is} \leq AC60V$	AC1000V
$AC300V < U_i \leq AC600V$	AC2500V	$AC60V < U_{is} \leq AC60V$	$2U_{is} + AC1000V$ (Max. AC1500V)

- Test for earth leakage circuit breaker

Measuring parts	Test	Insulation resistance test		Dielectric test	
		Handle position		Handle position	
		ON	OFF	ON	OFF
Charging parts and earth		○	○	○	○
R and S phase, S and T phase		○	○	○	○
R and T phase	Line side	×	○	×	○
	Load side	×	×	×	×
Power and line side terminal		-	○	-	○

- Insulation resistance test
  - Please use AC500V insulation resistance tester.
  - Do not measure between R and T phase. Measuring does not cause damage unless AC1000V is applied.
  - The measured resistance value shall be almost 0 $\Omega$
- Dielectric test
  - Do not apply test voltage, if test voltage is applied by mistake, the breaker are not allowed to use.

## Inspection and Maintenance

### | Periodic inspection |

- In order to maintain the performance of breaker and prevent the unpredicted accident, the inspection shall be accompanied after installation and operation.
- Once after one month of operation, there after as below table.

Circumstance		Inspection cycle after installation
Normal	Clean air, no humidity	within 10 years : once 2-3 year more than 10 years : once a year more than 15 years : once 6 month
	Dust but no corrosive gas	within 10 years : once a year more than 10 years : once 6 month more than 15 years : once a month
Bad	Sulfurous gases, salinity, vapor	within 5 years : once 6 year more than 5 years : once a month
	Excessive corrosive gas	once a month

### | Inspection and processing after breaking of fault current |

- In case that there is no pollution in arc exhaust parts and no other abnormality, the breaker can be re-used.
- When carbonizing symptom is found around arc exhaust parts, please measure insulation resistance. If the resistance value is more than  $5M\Omega$ , no dielectric breakdown at withstand test voltage and no excessive temperature rise of terminal parts, then the breaker can be re-used.
- If the handle part is carbonized or there is metallic melting in internal of breaker, please replace it by new one.



## | Troubleshooting |

- In case of any abnormality during breaker operation, please handle it according to below instruction.
- For the case not mentioned in below, please ask to us.

### ■ Molded case circuit breaker

Symptom and possible cause		Troubleshooting
Overheating	<ul style="list-style-type: none"> <li>• High temperature of terminal part</li> <li>• Damage in insulation part of terminal</li> </ul>	<ul style="list-style-type: none"> <li>• Loose connection between terminal and conductor</li> <li>• Heating by resistance increase of conductor</li> <li>• Heating from connection part between terminal bus bar and breaker</li> </ul>
	<ul style="list-style-type: none"> <li>• High temperature of breaker body</li> </ul>	<ul style="list-style-type: none"> <li>• Heating by resistance increase of conductor</li> <li>• Loose internal assembly screws</li> <li>• Increase of current density from cable disconnection</li> </ul>
Inferior dielectric	<ul style="list-style-type: none"> <li>• Abnormal voltage of load side</li> </ul>	<ul style="list-style-type: none"> <li>• Excessive contact abrasion</li> <li>• Foreign substances on contact</li> <li>• Corrosion of conductor by excessive ON-OFF or corrosive gas</li> </ul>
Inability of operation	<ul style="list-style-type: none"> <li>• Inability of ON and RESET</li> </ul>	<ul style="list-style-type: none"> <li>• Inability of reset after trip</li> <li>• Non-energized UVT</li> <li>• Insufficient cooling of trip unit</li> </ul>
		<ul style="list-style-type: none"> <li>• Corrosion, damage or deformation of bimetal</li> <li>• Abnormality or damage in mechanism</li> <li>• Exhaustion of durability</li> <li>• Contact melting by excessive high breaking current</li> </ul>
Frequent trip	<ul style="list-style-type: none"> <li>• Trip at under rated current</li> </ul>	<ul style="list-style-type: none"> <li>• High ambient temperature</li> <li>• Heating by loose terminal screw connection</li> <li>• Heating from inside of breaker</li> </ul>
		<ul style="list-style-type: none"> <li>• Less size connection conductor than specified size</li> </ul>
	<ul style="list-style-type: none"> <li>• Trip at operational current</li> </ul>	<ul style="list-style-type: none"> <li>• Trip at start-up inrush current</li> <li>• Trip at change-over in star-delta operation</li> <li>• Instantaneous trip at reverse feeding</li> </ul>
		<ul style="list-style-type: none"> <li>• Instantaneous trip at high start-up inrush current</li> <li>• Instantaneous trip at long start-up inrush current</li> <li>• Short-circuit between motors</li> <li>• Misconnection of SHT, UVT control circuit</li> </ul>
Malfunction	<ul style="list-style-type: none"> <li>• Non trip at the current higher than specified</li> </ul>	<ul style="list-style-type: none"> <li>• Current breaking by line side fuse or low coordination with primary breaker</li> <li>• Extremely low ambient temperature</li> <li>• Out-of-rated frequency</li> </ul>
		<ul style="list-style-type: none"> <li>• Redesign the coordination between equipments</li> <li>• Adjust the current according to temperature derating curve</li> </ul>
		<ul style="list-style-type: none"> <li>• Apply the rated frequency or adjust breaker frequency knob</li> </ul>

## Inspection and Maintenance

### ■ Earth leakage circuit breaker

Symptom and possible cause		Troubleshooting	
Malfunction	<ul style="list-style-type: none"> <li>• Earth leakage test button is projected as soon as the breaker is ON</li> </ul>	<ul style="list-style-type: none"> <li>• Earth leakage current higher than trip current since increase of earth interruption capacity depending on wire length</li> </ul>	<ul style="list-style-type: none"> <li>• Adjust the residual current</li> <li>• Install the breaker near to the load</li> </ul>
		<ul style="list-style-type: none"> <li>• Parallel connection</li> <li>• Mis-connection or disconnection of neutral line</li> </ul>	<ul style="list-style-type: none"> <li>• Inspect the connection and wiring</li> </ul>
	<ul style="list-style-type: none"> <li>• Trip during normal operation</li> </ul>	<ul style="list-style-type: none"> <li>• Excessive surge</li> <li>• Induction noise by high current generating line</li> <li>• Noise of electromagnetic waves</li> </ul>	<ul style="list-style-type: none"> <li>• Remove or keep away the causes</li> </ul>

### ■ Accessories

Symptom and possible cause		Troubleshooting	
Inability of operation or malfunction	<ul style="list-style-type: none"> <li>• Shunt trip (SHT)</li> </ul>	<ul style="list-style-type: none"> <li>• Voltage drop of control circuit</li> </ul>	<ul style="list-style-type: none"> <li>• Adjust voltage to rated level</li> </ul>
		<ul style="list-style-type: none"> <li>• Coil damage by different voltage and malfunction of coil protection limit switch</li> </ul>	<ul style="list-style-type: none"> <li>• Replace by new breaker</li> </ul>
	<ul style="list-style-type: none"> <li>• Under voltage trip (UVT)</li> </ul>	<ul style="list-style-type: none"> <li>• Inferior mechanism</li> </ul>	<ul style="list-style-type: none"> <li>• Replace by new breaker</li> </ul>
		<ul style="list-style-type: none"> <li>• Different rated operational voltage</li> </ul>	<ul style="list-style-type: none"> <li>• Apply the rated voltage to UVT</li> </ul>
	<ul style="list-style-type: none"> <li>• Auxiliary switch (AUX) and trip alarm switch (ALT)</li> </ul>	<ul style="list-style-type: none"> <li>• Damage in contact or contact operation at the current higher than rated current</li> </ul>	<ul style="list-style-type: none"> <li>• Repair or replace by new breaker</li> </ul>
		<ul style="list-style-type: none"> <li>• Inferior mechanism</li> </ul>	<ul style="list-style-type: none"> <li>• Replace by new breaker</li> </ul>

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