3. Special-purpose Breakers
Mag Only, DC, and DSN

Mag Only (Instantaneous tripping circuit breakers)

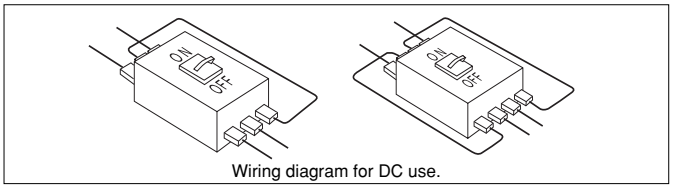
Fixed	NF63-CW/SW/HW	AC, DC	Rated current x10	
	NF125-CW/SW/HW	AC, DC		
	NF160-SW/HW	AC, DC		
	NF250-CW/SW/HW	AC, DC		
	NF400-CW/SW NF630-CW/SW	AC, DC		
Adjustable	NF125-SGW/HGW NF160-SGW/HGW NF250-SGW/HGW	AC, DC	High: Rated current x10 Low: Rated current x4 (AC) High: Rated current x13 Low: Rated current x5.2 (DC)	
	NF800-SEW	AC	High: Rated current x10 Low: Rated current x2	
	NF800-SDW	DC	High: 8000A	Low: 3200A
	NF1000-SEW NF1250-SEW	AC	High: Rated current x10 Low: Rated current x2	
	NF1600-SEW	AC	High: Rated current x10 Low: Rated current x2	
	NF1250-SDW NF1600-SDW	DC	High: 8000A Low: 3200A	

Remark: 1. The size, weight, accessories, etc., are all identical to the same-designation C, S and H series breakers.
2. For more details, contact your dealer.

DC MCCBs and DSN Switches

Breaking is more difficult with direct currents because the current value never reaches zero. While ordinary DC breakers are suitable for low voltages, special-voltage DC breakers are recommended for voltages in excess of 250VDC. Breakers for 550V are all 4-pole models.
The size, shape, drilling plan, accessories, etc., are all identical to the S Series breakers with the same designations.

Wiring diagram for DC-usage.



Wiring diagram for DC use.

Remark: 1. The tripping characteristics will change if the wiring differs from the one shown here.

Type	NF63-SW	NF125-SW		NF160-SW		NF250-SW		NF400-SW		NF630-SW		NF800-SDW		NF1250-SDW		NF1600-SDW	
Number of poles	3	3	4	3	4	3	4	3	4	3	4	3	4	3	4	3	4
Rated voltage (VDC)	400	440	550	440	550	440	550	500	600	500	600	500	600	500	600	500	600
Rated breaking capacity (kA) IEC 60947-2 (Icu/Ics)	2/1	10/5		20/5		20/5		40/40		40/40		40/40		40/20		40/20	

Remark: 1. Time constant: 10ms or below.

●DC side

These breakers are designed as thyristor-Leonard system DC-side breakers. They protect the thyristor from short circuiting when there is a power or communication failure (Mag-Only breakers can also be used for this purpose). Use these breakers in combination with fast fuses for even greater protection.

Type	NF125-SW		NF160-SW		NF250-SW		NF400-SW		NF630-SW		NF800-SDW		NF1250-SDW		NF1600-SDW	
Number of poles	2	3	2	3	2	3	2	3	2	3	2	3	2	3	2	3
Rated voltage (VDC)	250	440	250	440	250	440	250	440	250	440	250	440	250	440	250	440
Rated breaking capacity (kA) IEC 60947-2 (Icu/Ics)	15/8	10/5	15/8	20/5	15/8	20/5	20/20		20/20		20/20		20/20		20/20	
Instantaneous trip current (min.)	3 times rated current		3 times rated current		3 times rated current		900A		1000A		1400A		2500A		3200A	

●DSN switches

These are standard MCCBs without the automatic tripping element. The tripping capacity is about six times the rated current.

The appearance, size, drilling plan and available accessories are all identical to similar standard S and C Series MCCBs.

Type	DSN30-CS		DSN63-CW		DSN125-CW		DSN250-CW		DSN400-CW		DSN630-CW	DSN800-CW
Rated current (A)	30		63		125		250		400		630	800
Number of poles	2	3	2	3	2	3	2	3	2	3	3	3
Rated voltage (AC/DC)	460/—		500/250		500/250		500/250		600/250		600/250	600/250
Max. switching current (AC/DC)	180/—		378/155		750/310		1500/625		2400/1000		3780/1575	4800/2000

Type	DSN32-SW		DSN63-SW		DSN125-SW			DSN125-SGW			DSN160-SGW			DSN250-SW			DSN250-SGW			DSN400-SW			DSN630-SW		DSN800-SW		DSN1000-SW		DSN1250-SW		DSN1600-SW	
Rated current (A)	32		63		125			125			160			250			250			400			630		800		1000		1250		1600	
Number of poles	2	3	2	3	2	3	4	2	3	4	2	3	4	2	3	4	2	3	4	2	3	4	3	4	3	4	3	4	3	4	3	4
Rated voltage (AC/DC)	500/250		500/250		690/250			690/300			690/300			500/250			690/300			690/250			690/250		690/250		690/250		690/250		690/250	
Max. switching current (AC/DC)	192/80		378/155		750/310			750/315			960/400			1500/625			1500/625			2400/1000			3780/1575		4800/2000		6000/2500		7500/3125		9600/4000	

3. Special-purpose Breakers

400Hz, Instantaneous, and Generator Protection

400Hz MCCBs

Standard MCCBs cannot be used in 400Hz circuits. When standard MCCBs are used in high-frequency circuits (eq. 400Hz), the instantaneous characteristics are shifted higher. The 400Hz MCCB is recommended for use in 400Hz circuits.

●Specifications

The appearance, size, rated interrupting capacity, drilling plan, accessories, etc., are all identical to the standard S and H Series breakers of the same designation.

Type		NF125-SW	NF125-HW	NF250-SW	NF250-HW	NF400-SW	NF400-SEW	NF630-SW (∗1)	NF630-SEW	NF800-SEW	NF1250-SEW	NF1600-SEW
Rated current (A)		16, 20, 32, 40, 50, 63, 80,100	16, 20, 32, 40, 50, 63, 80, 100	125, 150 175, 200	125, 150 175, 200	225, 250 300, 350	200~350 adjustable	400, 500	300~500 adjustable	400~600 adjustable	600~800 adjustable	800~1200 adjustable
Number of poles		2 3 4	2 3 4	2 3 4	2 3 4	2 3 4	3 4	3 4	3 4	3 4	3 4	3 4
Rated insulation voltage (V)		690										
Rated breaking capacity (kA) IEC 60947-2 (Icu / Ics)	690V	8/4	10/5	–	5/3	10/10	10/10	10/10	10/10	10/10	25/13	25/13
	500V	18/9	30/15	15/8	30/8	30/30	30/30	30/30	30/30	30/30	65/33	65/33
	440V	25/13	50/25	25/13	50/13	42/42	42/42	42/42	42/42	42/42	85/43	85/43
	400V	30/15	50/25	30/15	50/13	45/45	50/50	50/50	50/50	50/50	85/43	85/43
	230V	50/25	100/50	50/25	100/25	85/85	85/85	85/85	85/85	85/85	125/63	125/63

Note (∗1) Instantaneous trip current : Rated current x 14 (Fix)

Low-Instantaneous MCCBs

●Low-Inst. MCCBs for Discrimination

When a power fuse (PF) is used for high-voltage proection, make sure that the MCCB on the secondary side is compatible.

Type		NF125-CW	NF125-SW	NF250-CW	NF250-SW	NF400-CW
Number of poles		2 3	2 3 4	2 3	2 3 4	2 3
Rated current (A)		50, 63, 80, 100, 125	16, 20, 32, 40 50, 63, 80, 100,125	125, 150, 175 200, 225, 250	125, 150, 175 200, 225, 250	250, 300 350, 400
Instantaneous trip (% of rated current)	600	●	●	●	●	●
	400	—	—	●	●	●

Remark: 1. Ensure compatibility with motor, etc., before use to prevent accidental tripping at start up.
2. Specify rated current and tripping characteristic.
3. There are no short time delay characteristics.

●Specifications

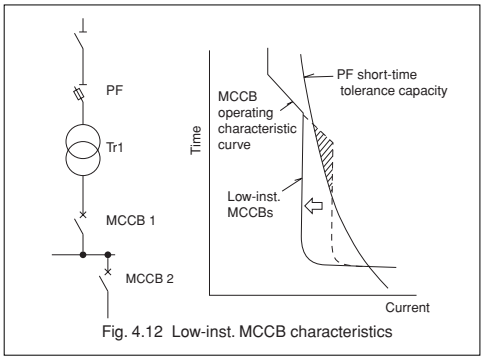


Fig. 4.12 Low-inst. MCCB characteristics

The appearance, size, rated interrupting capacity, accessories, etc., are all identical to the standard instantaneous trip breakers of the same designation.

Generator Protection MCCBs

These breakers are designed for generator protection.

●Specifications

Type			NF125-SGW	NF125-HGW	NF250-SGW	NF250-HGW
Number of poles			3	3	3	3
Rated current (A)			16-32 32-63 63-100 75-125 adjustable	16-32 32-63 63-100 75-125 adjustable	125~250 adjustable	125~250 adjustable
Instantaneous trip (% of rated current)			300 (∗1)			
Operating time at 150% of rated current (s)			18~28 (∗1)			
Rated insulation voltage (V)			690			
Rated breaking capacity (kA)	IEC 60947-2 (Icu/Ics)	AC690V	8/8	20/20	8/8	20/20
		AC500V	30/30	50/50	30/30	50/50
		AC440V	36/36	65/65	36/36	65/65
		AC400V	36/36	75/75	36/36	75/75
		AC230V	85/85	100/100	85/85	100/100

Note (∗1) These MCCBs operating characteristic must be adjusted as follows.
STD ≤ 3 (Is setting)
LTD: minimum setting (T_L = 12s setting)

Measuring Display Unit (MDU) Breakers

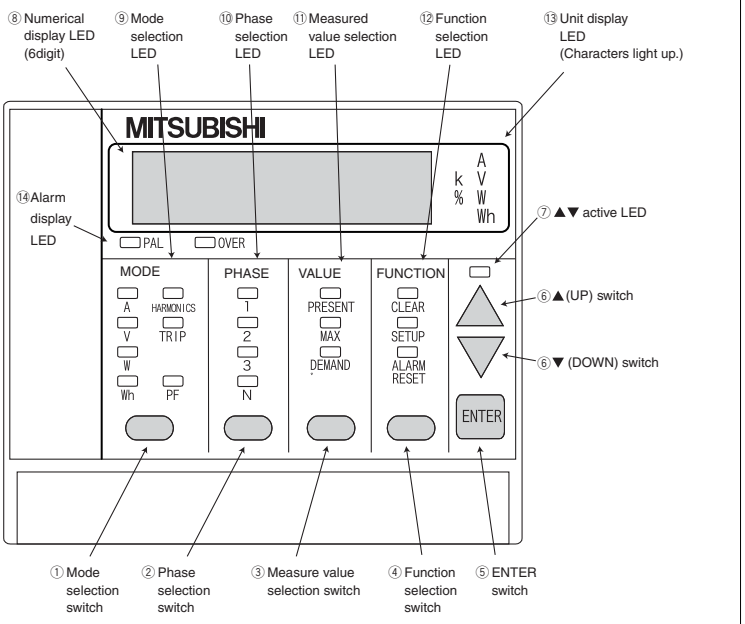
- Energy management is now possible by measuring and displaying load current, line voltage, electric power, electric energy, harmonic current (3rd, 5th, 7th, 9th, 11th, 13th, 15th, 17th, 19th, and total), and power factor.
- Pulse output option displays electric current output.
  CC-link option allows measurement data to be transferred to the CC-link open network.
- When a circuit breaker alarm activates, the LED on the MDU turns on.
  PAL : Pre-alarm
  OVER : Overcurrent
- When the circuit breaker trips, the cause of the fault and fault current are stored in the EEPROM, enabling investigation and restoration of the power line.
- The max. demand values of load current, line voltage, total harmonic current, electric power and current (per hour), are stored in the EEPROM.
  MDUs equipped with the CC-Link option store the time when each item is measured, making it easy to identify peak times of power consumption.

NF400-SEP with MDU

Application type		Molded-Case Circuit Breaker			
Type		NF250-SW with MDU	NF400-SEP NF400-HEP with MDU	NF630-SEP NF630-HEP with MDU	NF800-SEP NF800-HEP with MDU
Frame size		250	400	630	800
Rated current In (Amp.)		125, 150, 175, 200, 225, 250	200-400 adjustable	300-630 adjustable	400-800 adjustable
Measured and displayed value	Load current (Present value, demand value, maximum demand value)	○	○	○	○
	Line voltage (Present value, maximum value)	○	○	○	○
	Harmonic current (Present value, demand value, maximum demand value)	○	○	○	○
	Electric power (Present value, demand value, maximum demand value)	○	○	○	○
	Electric energy, electric energy (hourly value), maximum electric energy (hourly value)	○	○	○	○
	Power factor (Present value)	○	○	○	○
	Rated measuring current	250A	400A	630A	800A
	Accuracy of measuring current (Limit deviation tolerance)	±6.25A	±10A	±15.76A	±20A
	Rated measuring voltage	AC440V			
	Accuracy of measuring voltage (Limit deviation tolerance)	±11V			
	Maximum measuring current (∗1)	500A	800A	1260A	1600A
	Maximum measuring harmonic current (∗1)	250A	400A	630A	800A
	Maximum measuring voltage (∗1)	AC690V			
	Measurement range of power factor	Lead 0.0~100.0~0.0 Lag(%), The value of power factor is reference value if less than 50%.			
Fault current/cause (∗1) (∗2) Overload and short-circuit (∗3)		○ The fault cause: “AL” is displayed. The fault current: It displays it up to 10 times the rated current. (“AL switch for the MDU transmission” (option) is necessary.)	○ The fault cause: Overload “L” and short-circuit “SI” are displayed. The fault current: It displays it up to 16 times the maximum rated current.		
Alarm LED indication		PAL, OVER			
Phasing line		3ϕ3W, 1ϕ3W (3 poles breaker), 3ϕ4W (4 poles breaker)			
Electric energy accumulated pulse output (option) (∗3)		○			
CC-Link transmission (option) (∗3) (∗4)		○			
Control power (Allowable voltage range 85~110%)		AC/DC100-240V 12VA (∗5.)			
MDU installation	Breaker mounting	○			
	Panel mounting (∗7)	○			
Alarm contact output (option) (∗6)	Pre-alarm (PAL) (Power supply AC/DC100-240V required)	○PAL			
	Trip indicator (TI) (Power supply AC/DC100-240V required)	–	○PAL, OAL		

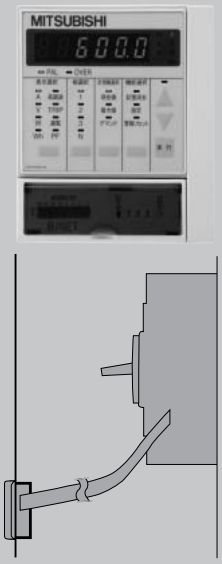
Note (∗1) Maximum measurement values for current, voltage, harmonic current, and fault current are displayed in a flashing format when the input exceeds these values. (When a fault occurs, the cause of the fault and the value for fault current flash despite being less than the maximum measurement value). When electric power exceeds the max. measurement, the value of the current or voltage flashes.
(∗2) Either overload (L) or short-circuit (SI) is displayed. They are not displayed simultaneously.
(∗3) The pulse output option and CC-Link option cannot be attached at the same time.
(∗4) “Ver.1.10” of CC-link is used when the breaker-mounted MDU is installed.
(∗5) When control power is supplied to the MDU, the max. transitional rush current is 2A peak, 1ms (at 240VAC).
(∗6) The pre-alarm (PAL) output function can be set to “Self-holding” or “Auto-reset”. For the alarm contact output (PAL, OAL) to function, the MDU and circuit breaker must be connected, and control power must be supplied to the MDU and alarm contact output module.
(∗7) A set of parts (panel holder plate, screws, nuts, MDU connection cable) is included for panel mounting. The standard length for the MDU connection cable is 2m, but it can be specified to be 0.5m, 3m, or as long as 5m.

Measuring Display Unit



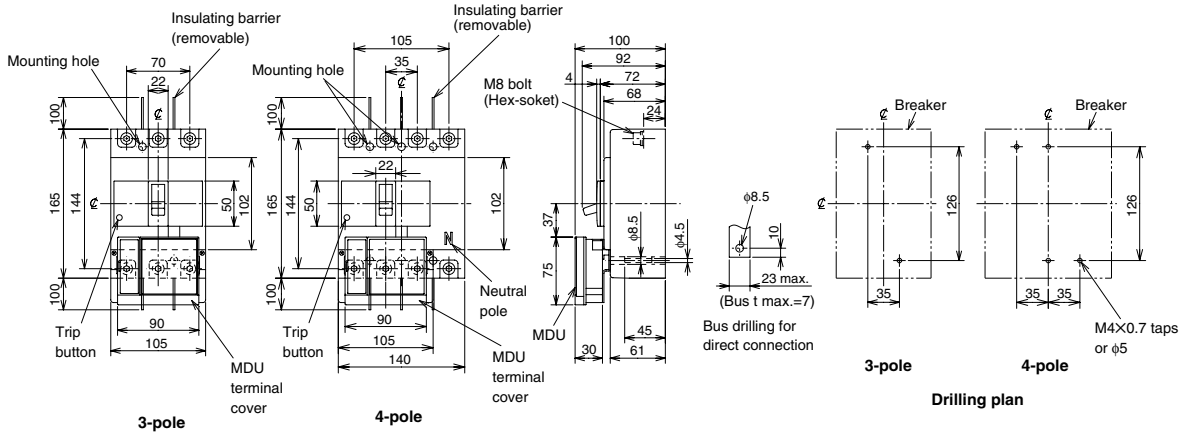
Displayed items and functions are changed by pushing ①~④ switch.
Selected item is shown by LED (below ⑨ - ⑫).
(Ex. Phase selection 1→2→3→N→1…)
▲/▼ switch⑥ is active when adjustment or reset operation is required.
(▲▼ active LED⑦ is turned on)
There may be functions which cannot be operated depending upon the specifications.

The invalid function is skipped.

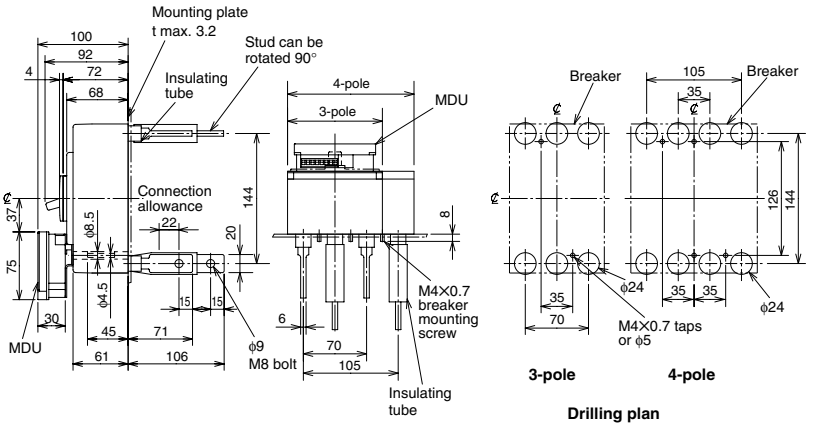
Installed on the circuit breaker	***Installed on the panel***
	

NF250-SW with MDU

Front-Connection



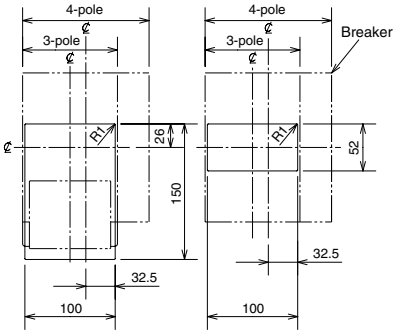
Rear-Connection



Front-plate cutout

1mm clearance on each side of handle.

(Load side of breaker mounting has given the space to pass wires to the terminal.)

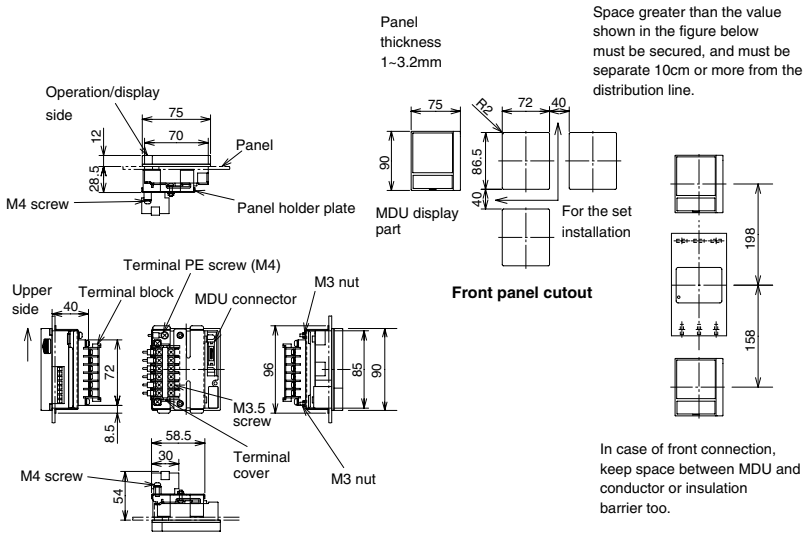


CC-Link ; only MDU panel mounting

NF250-SW with MDU (No transmission, Pulse output)

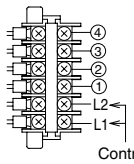
MDU panel mounting

MDU is connected with circuit breaker via MDU connection cable.



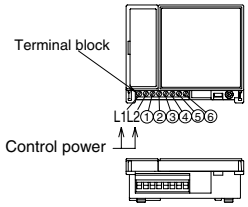
MDU Terminal

<Panel mounting>



	①	②	③	④
No transmission	—	—	—	—
Pulse output	—	—	113	114

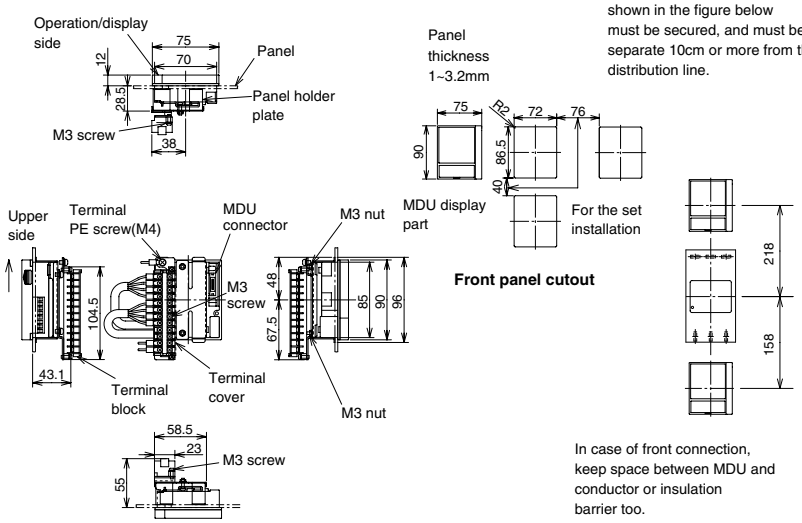
<Breaker mounting>



	①	②	③	④	⑤	⑥
No transmission	—	FG	—	—	—	—
Pulse output	—	FG	—	—	113	114

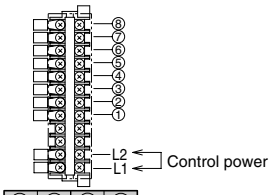
NF250-SW with MDU (CC-Link)

MDU panel mounting
MDU is connected with circuit breaker via MDU connection cable.



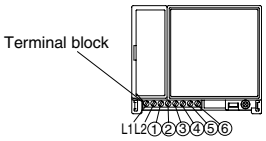
MDU Terminal
Figure of the breaker mounting is removed the terminal cover.

<Panel mounting>



①	②	③	④
SLD	DG	DB	DA
⑤	⑥	⑦	⑧
SLD	DG	DB	DA

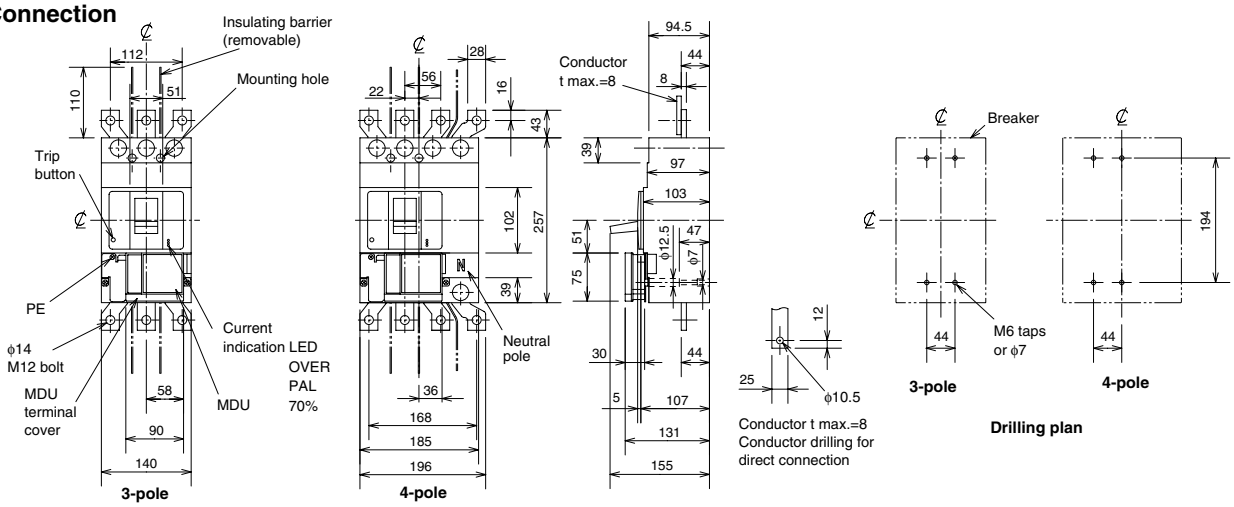
<Breaker mounting>



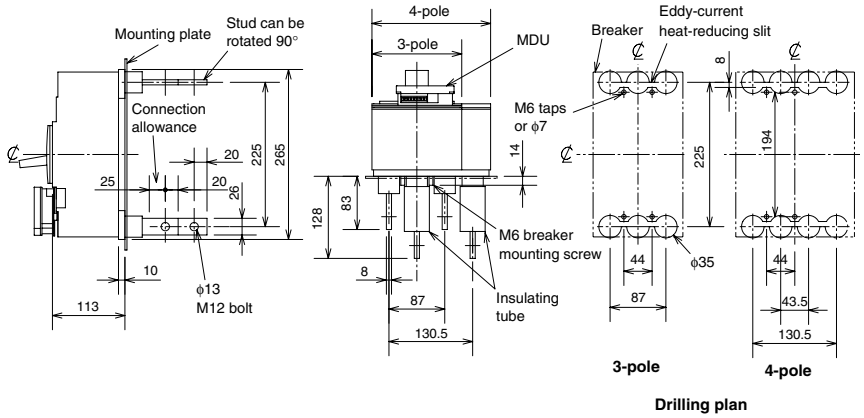
①	②	③	④	⑤	⑥
—	FG	SLD	DG	DB	DA

NF400-SEP, NF400-HEP with MDU

Front-Connection



Rear-Connection

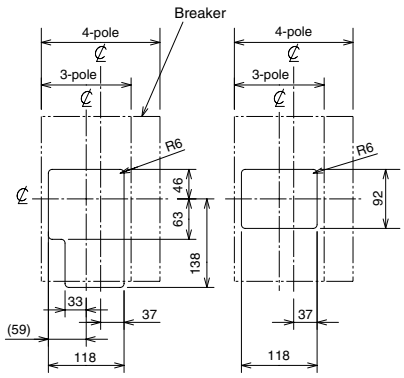


Note:The drilling plan is different if insulating barriers are installed.

Front-plate cutout

1mm clearance on each side of handle.

(Load side of breaker mounting has given the space to pass wires to the terminal.)

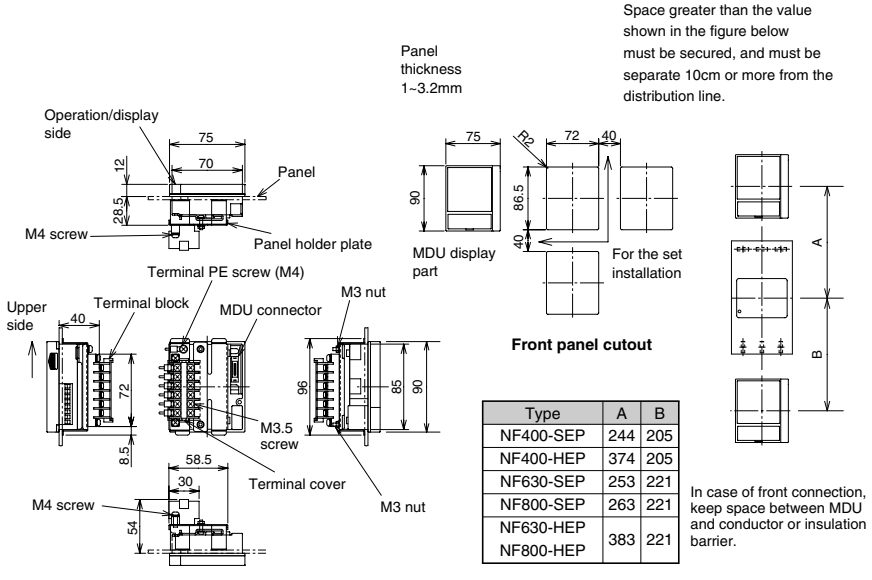


CC-Link ; only MDU panel mounting

NF400-SEP, NF400-HEP, NF630-SEP, NF630-HEP, NF800-SEP, NF800-HEP with MDU (No transmission, Pulse output)

MDU panel mounting

MDU is connected with circuit breaker via MDU connection cable.



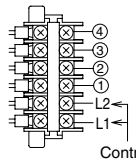
Type	A	B
NF400-SEP	244	205
NF400-HEP	374	205
NF630-SEP	253	221
NF800-SEP	263	221
NF630-HEP NF800-HEP	383	221

In case of front connection, keep space between MDU and conductor or insulation barrier.

MDU Terminal

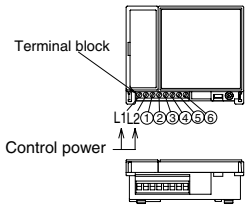
Figure of the breaker mounting is removed the terminal cover.

<Panel mounting>



	①	②	③	④
No transmission	—	—	—	—
Pulse output	—	—	113	114

<Breaker mounting>

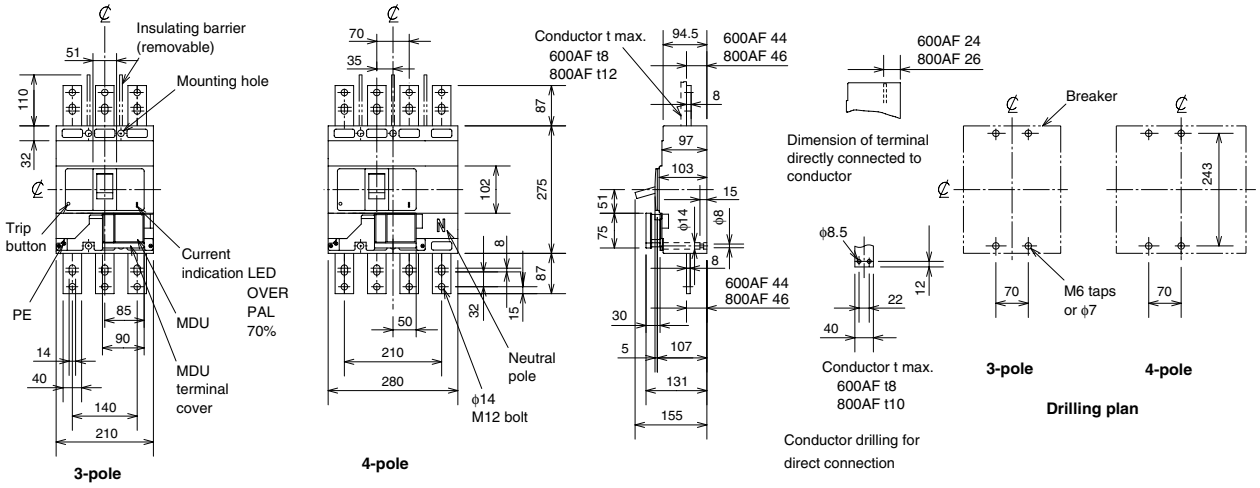


	①	②	③	④	⑤	⑥
No transmission	—	FG	—	—	—	—
Pulse output	—	FG	—	—	113	114

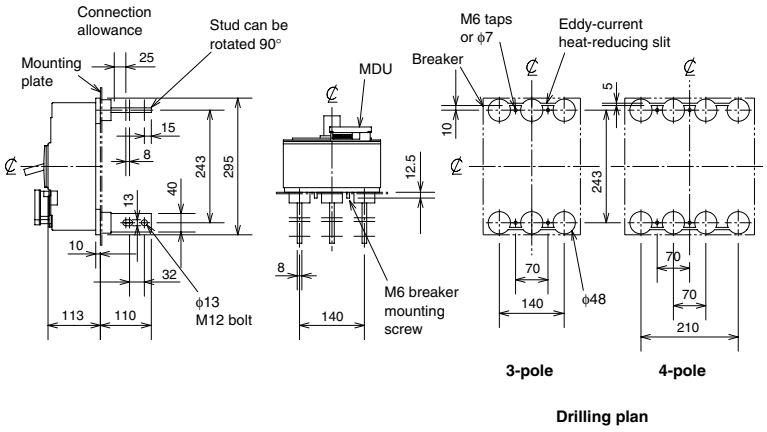
3. Special-purpose Breakers
MDU Breakers

NF630-SEP, NF630-HEP, NF800-SEP, NF800-HEP with MDU

Front-Connection



Rear-Connection

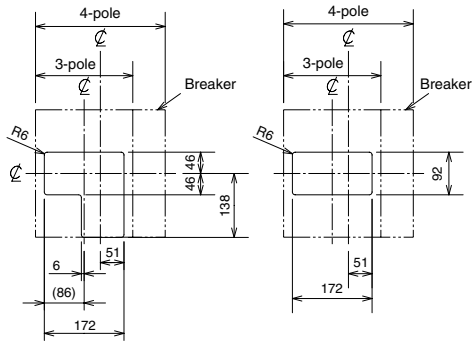


Note:The drilling plan is different if insulating barriers are installed.

Front-plate cutout

1mm clearance on each side of handle.

(Load side of breaker mounting has given the space to pass wires to the terminal.)

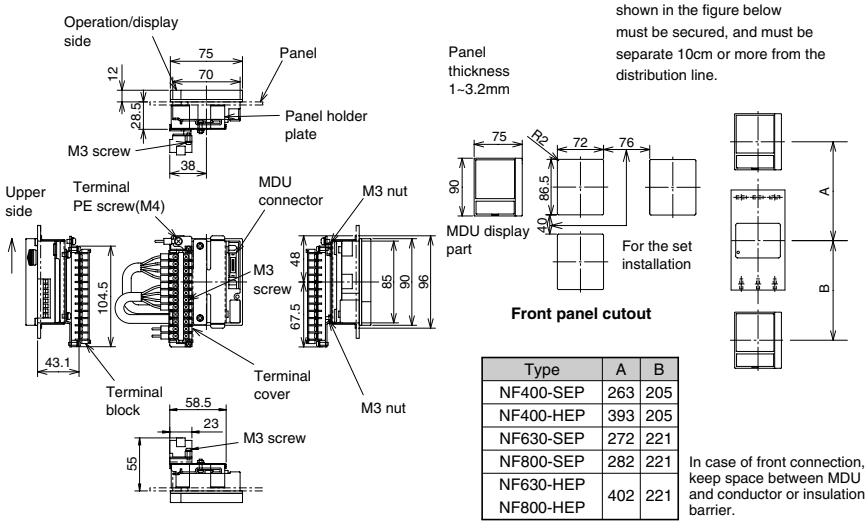


CC-Link ; only MDU panel mounting

NF400-SEP, NF400-HEP, NF630-SEP, NF630-HEP, NF800-SEP, NF800-HEP with MDU (CC-Link)

MDU panel mounting

MDU is connected with circuit breaker via MDU connection cable.



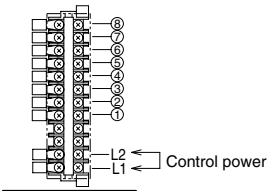
Type	A	B
NF400-SEP	263	205
NF400-HEP	393	205
NF630-SEP	272	221
NF800-SEP	282	221
NF630-HEP NF800-HEP	402	221

In case of front connection, keep space between MDU and conductor or insulation barrier.

MDU Terminal

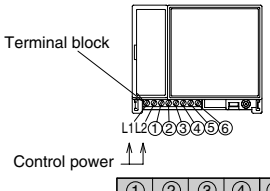
Figure of the breaker mounting is removed the terminal cover.

<Panel mounting>



①	②	③	④
SLD	DG	DB	DA
⑤	⑥	⑦	⑧
SLD	DG	DB	DA

<Breaker mounting>



①	②	③	④	⑤	⑥
—	FG	SLD	DG	DB	DA