

## MDU BREAKER: MAIN UNIT




### MODEL

NF250-SEV with MDU, NF250-HEV with MDU  
 NF400-SEW with MDU, NF400-HEW with MDU  
 NF800-SEW with MDU, NF800-HEW with MDU

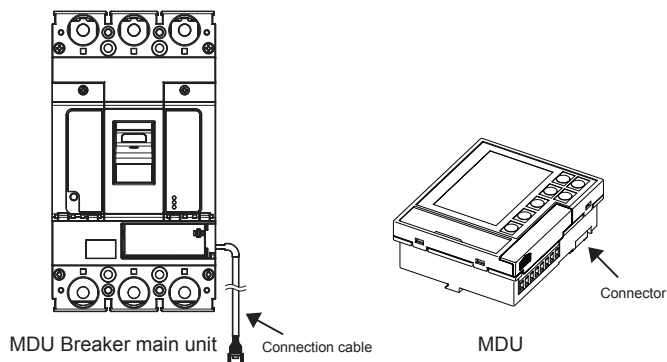
## INSTRUCTION MANUAL

- Read this Instruction Manual carefully prior to use, so that the product is used properly.
- After reading this manual, store it in a safe place so that it can be easily referenced when needed.
- Make sure that the end user receives this Instruction Manual.

Indications and what they mean are listed below.

 <b>Danger</b>	Wrong handling may cause dangerous situation in which possibility of fatal accidents or serious injuries assumed.
 <b>Caution</b>	Wrong handling may cause dangerous situation in which possibility of significant or minor injuries, or material damages assumed.
	Using this under certain conditions may cause an electrical shock.

### **Caution**



Securely insert the connection cable into the MDU connector (until the lock clicks into place). The product will be unable to measure properly if the connection is poor.

Some models/specifications do not measure or display some items. These items and functions will be skipped.

### **Danger**



Do not touch the terminal area. Doing so may cause an electrical shock.

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## 1. Safety Precautions

This Instruction Manual is intended mainly for those who have technical knowledge of electricity, such as manufacturers of assembly products using this product, electricians, and servicepersons.  
 This manual is also for operators (end users) of this product.  
 Be sure to also read "MDU Breaker Instruction Manual: MDU" if this product will be used in combination with a Measuring Display Unit (MDU).

### Caution

- For correct and safe usage, be sure to carefully read and fully understand the "Handling and Maintenance of Mitsubishi Molded Case Circuit Breaker" and this instruction manual before use.
- Before installing or removing the MDU Breaker, cut off the upper circuit breaker and make sure that no electricity is supplied.
- This product must be handled by someone with specialized knowledge.

## 2. Precautions for Use

Unless otherwise noted, the following terms used in this Instruction Manual indicate the models shown below.

	250 A frame	400 A frame	800 A frame
Molded Case Circuit Breaker (MCCB)	NF250-SEV with MDU, NF250-HEV with MDU	NF400-SEW with MDU, NF400-HEW with MDU	NF800-SEW with MDU, NF800-HEW with MDU

### 2.1 Standard operating conditions

#### Caution

- The standard usage status is described below. Be sure to use MDU Breaker within these conditions.
  - (1) Operating ambient temperature: -10°C to +40°C (must not exceed an average of +35°C within a 24 hour period)
  - (2) Ambient storage temperature: -25°C to +55°C (no condensation/freezing)
  - (3) Relative operating/storage humidity: 85% RH or less (no condensation)
  - (4) Altitude: 2,000 m or lower
  - (5) Operating/storage atmosphere: Must contain hardly any dust, smoke, corrosive gas, combustible gas, moisture, salt, etc.
- If the ambient temperature of MDU Breaker exceeds +40°C, use with a reduced continuous load current.  
 Ambient temperature of +50°C: 0.9 times; ambient temperature of +60°C: 0.7 times
- Do not install in abnormal environments subject to high temperature, high humidity, dust, corrosive gas, vibration, impact, etc. Doing so may cause electrical shock, fire, or may cause the product to stop working.
- Do not wipe the MDU Breaker main unit or MDU with thinner, detergent, or chemical cloth. Doing so may fade printing, reduce insulation performance, or cause mold to form.  
 Clean with air or by brushing.

### 2.2 Withstand voltage test

#### Caution

- A voltage measurement transformer is connected between poles on the load side of the MDU Breaker main unit.  
 In the table below, × indicates that, because it causes a failure, withstand voltage test between poles on the load side must not be performed.  
 In the table below, △ indicates that, although nothing broke during a 500 VDC insulation resistance test, there was a low insulation resistance value.  
 No problems found during withstand voltage test and insulation resistance test conducted on entire main circuit and between ground on MDU Breaker main unit.
- Refer to "MDU Breaker Instruction Manual: MDU" for information on each MDU terminal.

Measurement point/test			Insulation resistance measurement		Withstand voltage test		Test conditions
			ON	OFF	ON	OFF	
Status of handle			○	○	○	○	
Between live part and ground			○	○	○	○	
Between different poles	Line side	Between left and middle poles	△	○	×	○	2,500 VAC 1 min.
		Between middle and right poles	△	○	×	○	
		Between left and right poles	△	○	×	○	
	Load side	Between left and neutral poles, Between middle and neutral poles, Between right and neutral poles (for a four-poles circuit breaker)	△	○	×	○	
		Between left and middle poles	△	△	×	×	
		Between middle and right poles	△	△	×	×	
		Between left and right poles	△	△	×	×	
Between power supply and load terminal			—	○	—	○	

## 2.3 Connection and Installation

### ⚠ Caution

- MDU Breaker cannot be used with the line side and load side reversed.
- The MDU connection area is insulated from the inside of the MDU Breaker main unit. The product will operate normally and will not break even if the MDU Breaker main unit is energized with the connector area disconnected (open).  
If a MDU will be mounted later, do so within 1.5 years from installing the MDU Breaker main unit.  
Some space is required to install connection cables, so leave enough space when installing the MDU Breaker main unit.  
Refer to "5. MDU Breaker Installation Procedure" for details.
- If using MDU Breaker with a single-phase two-wire circuit, connect it as shown in Figure 1 below. The left pole (1-phase) load side is a live part, so be sure to insulate it.
- If using MDU Breaker with a single-phase three-wire circuit, connect it as shown in Figure 2 below with the neutral line connected to the middle pole (2-phase).  
If the neutral line is connected to either the left pole (1-phase) or right pole (3-phase), it will be impossible to measure with MDU.

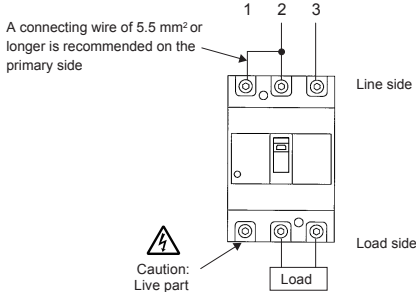


Figure 1. Connection method in a single-phase two-wire circuit

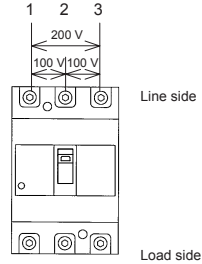


Figure 2. Connection method in a single-phase three-wire circuit

## 3. Requests


- The free warranty period and warranty scope for this product are as follows.
  - Free warranty period  
The free warranty period lasts for one year from the time of purchase.
  - Warranty scope
    - (1) Any failures that occur during the warranty period will be repaired free of charge, assuming that the usage status, usage method, usage environment, etc. are as described in the product's catalog, Instruction Manual, warning labels, etc., and that the product was used under standard conditions as described in the precautions, etc. However, the free warranty period shall last a maximum of 18 months after manufacture, with a maximum of six months for the distribution period after the product is shipped from Mitsubishi Electric.
    - (2) A fee will be charged for repairs under the following circumstances, even if the product is still within the free warranty period.
      - Failures resulting from inappropriate storage/handling, carelessness, error, etc. on the customer's part.
      - Failures resulting from installation mistakes.
      - Failures resulting from misuse or unreasonable modification.
      - Failures resulting from fires, abnormal voltage, or other external events beyond human control, or from earthquakes, wind disasters, or other natural disasters.
      - Failures resulting from phenomena that could not be foreseen using the scientific technology standards at the time the product was shipped by Mitsubishi Electric.
- The free warranty described here applies only to the delivered product, and does not apply to any damage or the like caused by failures in the delivered product.
- This free warranty does not apply to any damage or the like caused due to reprinting or reproducing the information included in this document in whole or in part in any form without the consent of Mitsubishi Electric.
  - All efforts have been made to keep the information in this document current as software and hardware is revised. However, there may be cases where inconsistencies arise.

### 3.1 Notes on Usage

- (1) The products described in this Instruction Manual were designed and manufactured as general-purpose items meant for general industrial use, etc. Please contact Mitsubishi Electric sales to discuss use for special purposes including atomic energy, electric power, aerospace, medical, or passenger transport devices or systems.
- (2) Mitsubishi Electric shall not be held responsible for damage caused for reasons not attributable to Mitsubishi Electric; opportunities or profit lost by customers caused by Mitsubishi Electric product failure; damage caused from extraordinary circumstances, secondary damage, accident compensation, damage to anything other than Mitsubishi Electric products, or compensation for any other work, whether foreseen or not by Mitsubishi Electric.


## 4. Cautionary Instructions for Handling MDU Breaker

### 4.1 Cautionary instructions for using MCCB

 <b>Caution</b>
<ul style="list-style-type: none"> <li>● Electrical work must be performed by a qualified person (electrical worker).</li> <li>● Maintenance and inspections must be conducted by someone with specialized knowledge. Turn the host circuit breaker OFF and confirm that no electricity is flowing. Doing otherwise could cause electrical shock.</li> <li>● Connect the line side and load side correctly. When connecting the power supply, make sure that the terminal screws are tightened at the torque listed on the included terminal screw case. Otherwise, a fire may be resulted.</li> <li>● Install MDU Breaker so that no dirt or dust, concrete dust, iron dust, rainwater, or other foreign matter enters. Doing so may result in a fire or operation accident.</li> <li>● Make sure protective grounding is performed for the load device.</li> <li>● Be sure to connect the neutral line to the middle pole (2-phase) for a single-phase three-wire system, and connect the neutral line to the neutral-phase for a three-phase four-wire system.</li> <li>● If the product automatically cuts off, resolve the issue before switching the handle to ON. Otherwise, an electric shock or a fire may be resulted.</li> <li>● To configure, first set the MDU Breaker main unit to OFF or TRIP.</li> <li>● In the case of tripping, re-closing is possible by resetting. Pull down the handle forcefully in OFF direction. If handle returns to trip, please repeat resetting once more.</li> </ul>

### 4.2 Periodic inspections

To prevent trouble and to maintain the performance of the breaker, inspect the breaker one month after starting use and periodically thereafter according to the operation environment.

 <b>Caution</b>	Yardstick for inspection periodicity		
<ul style="list-style-type: none"> <li>● Make sure that the product is not energized prior to performing periodic inspections. Otherwise, an electrical shock, a device accident, or a fire may be resulted.</li> <li>● Periodically tighten terminal screws. Otherwise, a fire may be resulted.</li> </ul>	1	Clean and dry environment	Once every 2 to 3 years
	2	Environment not exposed to severe dust, corrosive gas vapor, salt, etc.	Once a year
	3	Other places than 1 and 2	Once every six months

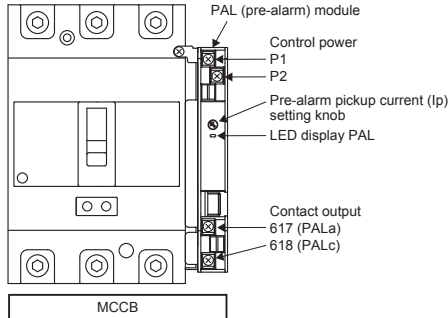
Inspection item	Criterion
1. Is any conductor connection not loosened?	No loosening allowed. If loosened, the connection should be retightened with such appropriate torque as indicated in the Attached Table.
2. Are the cover and base not cracked or otherwise damaged? Is the handle not broken?	No crack nor damage on the cover and base. No broken handle.
3. Internal submersion by inundation or substantial mud or dust not adhered?	No internal submersion nor substantial mud and/or dust adhered to. In case of internal submersion, replace the circuit breaker with a new one, or have it overhauled at our service center.
4. Check whether the temperature has abnormally risen. Maximum allowable terminal temperature rise is 60K. (There is a slight temperature difference between the terminals on the line side and the load side, and between the middle pole and the left and right pole.)	By visual inspection, the rear studs of terminals, the tightening area of the main body, and the molded area must not discolor from burning. When the current of each phase is balanced, there is no terminal that shows an abnormally high temperature rise. When the load current is balanced, the temperature difference between the left and right of the base is small.
5. Is there ON/OFF operation by handle smooth?	Operation should be done smoothly.
6. Is there TRIP operation by trip button?	The circuit breaker should be able to reset after tripping.

### 4.3 Cautionary instructions for using MDU breaker with PAL module (Optional) (only for 250 A frame)

#### Caution

- Cut OFF the control power before setting the pre-alarm pickup current.
- For the control power to the PAL module, refer to the table below. During the operation, set the voltage distortion to 10% or less.

Control power supply	Allowable voltage range	Control VA
100-240 VAC, 50/60 Hz	80 to 264 VAC	5 VA or less
100-240 VDC	80 to 264 VDC	

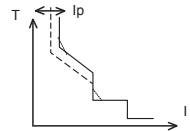


#### (1) PAL function

- When the load current exceeded the pre-alarm pickup current ( $I_p$ ), the pre-alarm operation display LED starts blinking every second. When the load current stays over the pre-alarm pickup current for the pre-alarm operating time, a contact output occurs, the pre-alarm operation display LED stays lit, and the MDU breaker's display shows the PAL alarm. For the information displayed by the MDU breaker's display, refer to "7.2.3 Fault/alarm display details" in INSTRUCTION MANUAL MDU BREAKER: MDU.
- The method of resetting the pre-alarm output is selectable between electric self-retention and automatic reset. Select the method using the operation switch part or via transmission.  
Refer to "7.1.2-2 (5) Alarm reset method setting" in INSTRUCTION MANUAL MDU BREAKER: MDU.  
For reset, use the operation switch part.  
For the procedure, refer to "4.5.1 MDU Breaker alarms" in INSTRUCTION MANUAL MDU BREAKER: MDU.
- The method of setting of the pre-alarm current value  
Set the value by rotating the pre-alarm setting knob. As in the case of setting the rated current or the instantaneous tripping current, use a flathead screwdriver.  
The appropriate driver is 3 mm in tip width and 0.5 mm in thickness.  
Do not apply excessive force more than necessary. Doing so may cause breakdown. (The appropriate operation torque is 0.05 N·m or less.)

Pre-alarm current $I_p$	<u>0.7</u> -0.75-0.8-0.85-0.9-0.95-1.0 × $I_r$
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Underlined: Standard default value (unless otherwise specified)



PAL operating characteristics

#### (2) Terminal markings and functions of PAL

- Pre-alarm output terminal (618(PALa), 617(PALc)): Alarm output terminal for pre-alarm
- Control power terminal (L1, L2): Control power supply terminal for PAL module

#### Caution

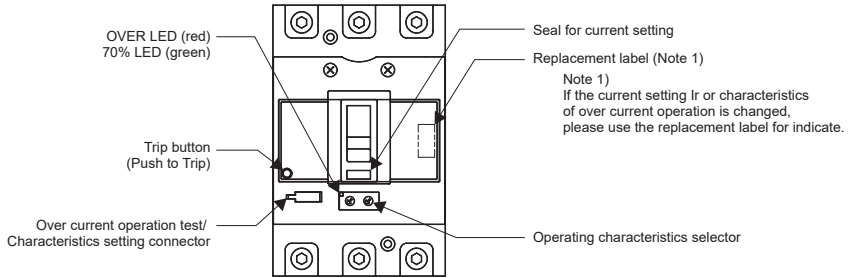
- Do not remove the connectors that connect between the circuit breaker and the PAL module and between the circuit breaker and the MDU. If they are disconnected, reconnect them securely.
- Other internal accessory devices cannot be installed on the right pole side of the circuit breaker.
- The length of the wire to the side terminal block should be within 100 m. Wiring exceeding 100 m may cause malfunctions.

- For the contact capacity of Pre-alarm output, refer to the table below.

Voltage	COS $\phi$ = 1	COS $\phi$ = 0.4 L/R = 0.007
125 VAC	3 A	2 A
250 VAC	3 A	2 A
30 VDC	2 A	2 A
100 VDC	0.4 A	0.3 A

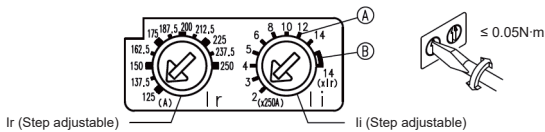
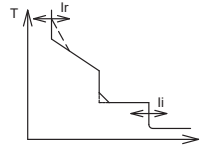
## 4.4 Setting method of overcurrent tripping characteristics

### 1 250 A frame



#### (1) Setting of current setting ( $I_r$ ), instantaneous pickup current ( $I_i$ )

- Change the value with turning the operating characteristics selector. Please use a flathead screwdriver shown in the figure of lower right. The appropriate flathead is 3 mm in tip width and 0.5 mm in thickness. Do not apply excessive force more than necessary. Doing so may cause breakdown. (The appropriate operation torque is 0.05 N·m or less.)
- Take out the label for current setting from the inside of the right side of circuit breaker. And stick the label to the position under the handle.



Model name	NF250-SEV with MDU, NF250-HEV with MDU
Rated current $I_n$ (A)	250
Current setting $I_r$ (A)	Variable from 125 to 250 (variable in 12.5-A steps)
Instantaneous pickup current $I_i$ (A)	(A) $2-3-4-5-6-8-10-12-14 \times$ Rated current $I_n$ (B) $14 \times$ Current setting $I_r$

Underlined: Setting for shipment.

#### (2) Setting method except current setting and instantaneous pickup current

In the case of change the characteristics except current setting and instantaneous pickup current, change the setting with the operation check and setup unit "Y-360" (option) or display unit of MDU breaker.

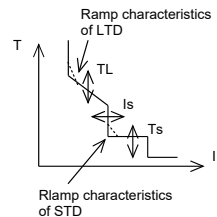
For setting using "Y-360", refer to the instruction manual for "Y-360".

For settings using the MDU breaker, refer to "7.1.1 Display method for protection characteristic setting values" in INSTRUCTION MANUAL MDU BREAKER: MDU.

LTD time: TL	12-60-80- <u>100</u> s (at 200% $I_r$ )
STD pickup current: $I_s$	2-2.5-3-3.5-4-5-6-7-8-9- <u>10</u> $\times I_r$
STD time: $T_s$	0.1-0.2-0- <u>3</u> s
Ramp characteristics of LTD	ON ( <u><math>I^{1.2}</math></u> ) – OFF ( $I^{1.2}$ )
Ramp characteristics of STD	ON ( $I^{1.2}$ ) – OFF ( <u>FLAT</u> )
Neutral pole protection: NP (Note 2)	<u>ON (function)</u> – OFF (none)

Underlined: Setting for shipment.

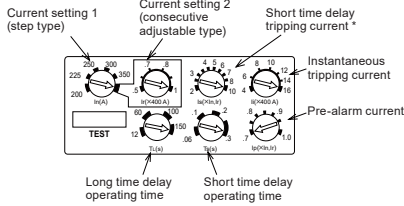
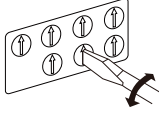
Note 2) It can set only 4-pole circuit breaker.



## 2 400/800 A frame

- Open the transparent cover.
- Turn the dials to set the tripping characteristics. As shown in the figure below, use a screwdriver to turn the dials for setting tripping characteristics.

Turn the dial in the direction of the arrow to the desired setting



Current setting 1 (In)  
 Long time delay operating time (TL)  
 Short time delay tripping current (Is)  
 Short time delay operating time (Ts)  
 Pre-alarm current (Ip)

Current setting 2 (Ir) (\*1)  
 Instantaneous tripping current (Ii)

... Step type  
 ... Consecutive adjustable type

\* When setting Is, the value next to the value that was set may actually be set.

- A flathead screwdriver with a tip width of 4.5 mm and a thickness of 0.6 mm is ideal for changing settings.
  - The dial for setting current setting 1 (In) provides a clicking sensation when turned.
  - Do not use more force than necessary when changing settings. Doing so could cause accident. (The optimal operation torque is 0.05 N·m or less.)
  - The arrows on all dials (except for adjustable current setting and instantaneous tripping current) must be set to setting values within the thick lines. Leaving the dial in an intermediate position may result in the next setting value being set.
  - Setting values can be confirmed using the MDU or the separately sold "Y-360" breaker tester/setting device.
  - To configure, first set the MDU Breaker main unit to OFF or TRIP.
  - If the long time delay operating time is set to "12 s", long time delay operating may be performed prior to short time delay operation.
- Find the sticker for the set current setting from among the replacement stickers, and stick the current setting sticker to the rated value display location on the knob.
  - Close the transparent cover. Affix a sealing sticker if required.

\*1: The adjustable current setting dial functions when the current setting dial is set to maximum.

Setting example 1

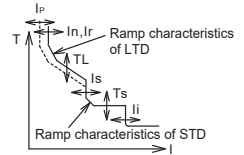


Current setting 1 : Maximum  
 Current setting 2 : 0.7  
 Current setting : 280 A (=400 A×0.7)

Setting example 2



Current setting 1 : 250 A  
 Current setting 2 : 0.7 (does not function)  
 Current setting : 250 A

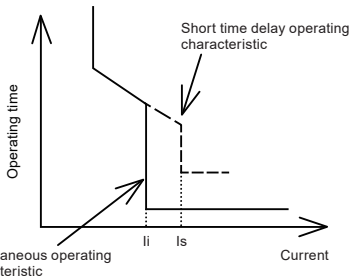


Ramp characteristics is fixed to ON.

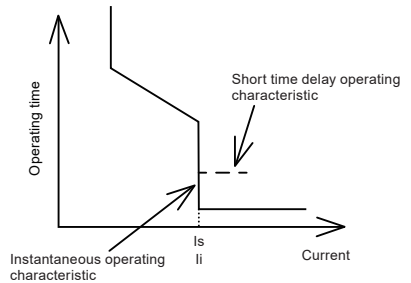
### Precautions when setting short time delay tripping current (Is) and instantaneous tripping current (Ii)

\* Short time delay operation will not function if short time tripping current (Is) is set to the same value (or higher) as the value for instantaneous tripping current (Ii).

- Value of short time delay tripping current (Is) exceeds value of instantaneous tripping current (Ii)  
 Example: When NF400-SEW with MDU Ir=200 A, if "Is=10×Ir" and "Ii=4×rated current", Is=2,000 A and Ii=1,600 A, so instantaneous tripping operating functions prior to short time delay tripping operation.  
 The operating characteristic curve is shown in the figure below.



- Value of short time tripping current (Is) is the same as value of instantaneous tripping current (Ii)  
 Example: When NF400-SEW with MDU Ir=200 A, if "Is=10×Ir" and "Ii=5×rated current", Is=2,000 A and Ii=2,000 A, so instantaneous tripping operation is prioritized over short time delay tripping operation.  
 The operating characteristic curve is shown in the figure below.





## 4.5 Testing method of overcurrent trip

Test by using the "Y-360" breaker tester (option) or by energizing the MDU Breaker main unit.  
If using the "Y-360" breaker tester, follow the instructions in that product's Instruction Manual.

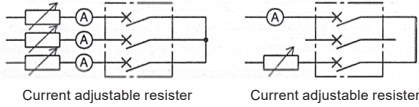
### ⚠ Caution

- For the pre-alarm contact output for MCCB (with alarm contact attached [optional]), the MDU is connected to the MDU Breaker main unit and will not operate unless control power is applied to the MDU and the alarm contact output.
- When the test is performed using the "Y-360" breaker tester, the measurement function, alarm function, fault cause and current display, and communication in the MDU cannot be checked.

This section describes how to test after energizing the MDU Breaker main unit.

#### 1 250 A frame

- (1) Send AC power to the MDU Breaker main unit from a 3-phase power supply or 1-phase power supply.  
When using a 1-phase power supply, do so from two poles in series.



- (2) Each operating current can be confirmed by checking the LEDs on the front of the MDU Breaker main unit.

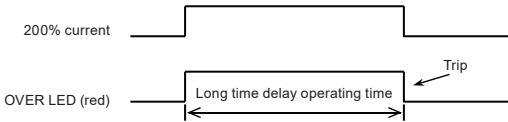
70% LED (green): Acceptable when it begins to stay ON within 60% to 80% of current setting (I<sub>r</sub>).  
OVER LED (red) : Acceptable when it begins to stay ON within 105% to 125% of current setting (I<sub>r</sub>).

\* MDU breaker with PAL/EPAL module (option)

Pre-alarm operation display LED: Acceptable when it starts to blink within 90% to 110% of current setting (I<sub>r</sub>).

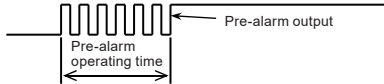
With I<sub>p</sub> = 0.7 × I<sub>r</sub>, acceptable when it starts to blink within 60% to 80% of current setting (I<sub>r</sub>).

- (3) The long time delay and pre-alarm operating times can be confirmed by sending a current equivalent to 200% of current setting (I<sub>r</sub>).  
However, if a current exceeding current setting (I<sub>r</sub>) is sent prior to this test, the operating time will shorten and the first measurement will be invalid.  
Tripping the MDU Breaker main unit will reset the tripping circuit, allowing the following operating time to be measured correctly.  
The pre-alarm operating time is half of the long time delay operating time (TL).



\* MDU breaker with PAL/EPAL module (option)

Pre-alarm operation display LED

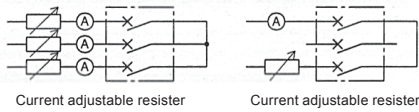


Acceptable if measured operating time is within range below.

Measurement item	TL = 12 s	TL = 60 s	TL = 80 s	TL = 100 s
Pre-alarm operating time	4.8 to 7.2 s	24 to 36 s	32 to 48 s	40 to 60 s
Long time delay operating time	9.6 to 14.4 s	48 to 72 s	64 to 96 s	80 to 120 s

**2] 400/800 A frame**

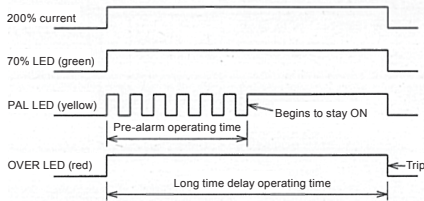
- (1) Send AC power to the MDU Breaker main unit from a 3-phase power supply or 1-phase power supply.  
When using a 1-phase power supply, do so from two poles in series.



- (2) Each operating current can be confirmed by checking the LEDs on the front of the MDU Breaker main unit.

70% LED (green) ..... Acceptable when it begins to stay ON within 60% to 80% of current setting.  
 PAL LED (yellow) ..... With  $I_p = 0.7 \times I_r$ , acceptable when it starts to blink every 0.5 seconds within 60% to 80% of current setting.  
 OVER LED (red) ..... Acceptable when it begins to stay ON at 105% to 125% of current setting.

- (3) The long time delay and pre-alarm operating times can be confirmed by sending a current equivalent to 200% of current setting.  
 However, if a current exceeding current setting is sent prior to this test, the operating time will shorten and the first measurement will be invalid.  
 Tripping the MDU Breaker main unit will reset the tripping circuit, allowing the following operating time to be measured correctly.



Acceptable if measured operating time is within range below.

Measurement item	TL = 12 s	TL = 60 s	TL = 100 s	TL = 150 s
Pre-alarm operating time	4.8 to 7.2 s	24 to 36 s	40 to 60 s	60 to 90 s
Long time delay operating time	9.6 to 14.4 s	48 to 72 s	80 to 120 s	120 to 180 s

## 5. MDU Breaker Installation Procedure

### Caution

- Turn the host circuit breaker OFF and confirm that no electricity is flowing.
- Set the MDU Breaker main unit to OFF or TRIP.
- If installing with connection cables attached to the MDU Breaker main unit, make sure that connection cables and connectors are not caught and damaged.
- Connection cable connectors are precision parts. Be especially careful to protect them from damage during mounting.
- This product uses dedicated connection cables. Using other cables or modifying them could prevent proper measurements from being made.
- Install with at least 30 mm of wiring space to the right of the MDU Breaker main unit, in order to wire connection cables and attach connection cable connectors.

(1) Use the included "circuit breaker fixing screws" to install the MDU Breaker main unit. (Figure 1 to 4)

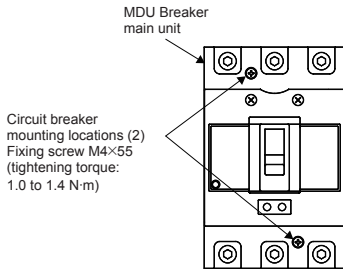


Figure 1. 250 A frame circuit breaker (3P)

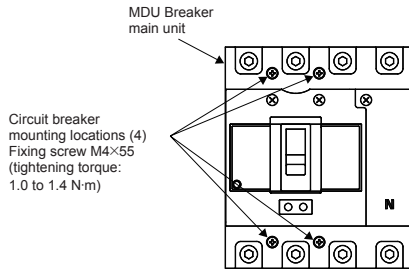


Figure 2. 250 A frame circuit breaker (4P)

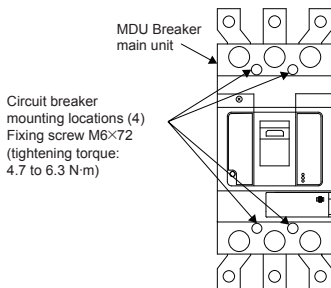


Figure 3. 400 A frame circuit breaker

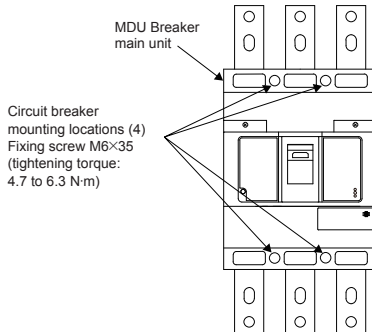


Figure 4. 800 A frame circuit breaker

(2) When external mounting type, screw the MDU mounting plate into the load side of the MDU Breaker main unit. (Figure 5 to 7)

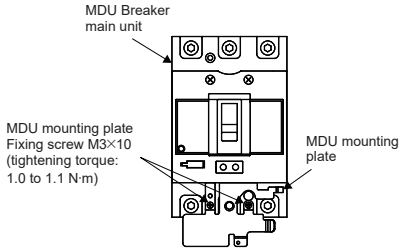


Figure 5. 250 A frame circuit breaker

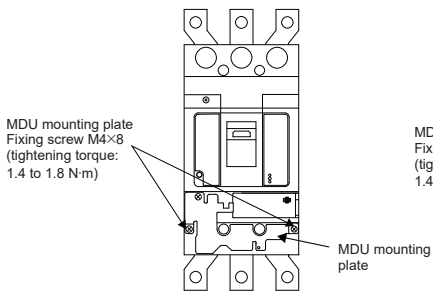


Figure 6. 400 A frame circuit breaker

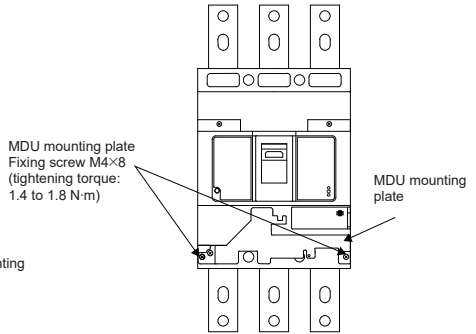
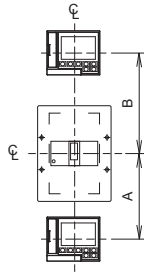


Figure 7. 800 A frame circuit breaker

(3) When panel mounting type, leave some space (listed below) between the MDU Breaker main unit and MDU.

[1] No transmission, with electric energy pulse output

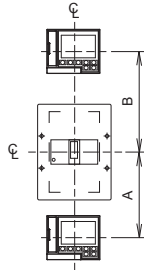
	Model	A	B
250 A frame	NF250-SEV with MDU	158	198
	NF250-HEV with MDU		208
400 A frame	NF400-SEW with MDU	205	244
	NF400-HEW with MDU		374
800 A frame	NF800-SEW with MDU	221	263
	NF800-HEW with MDU		383



\* Rear type shown.  
For surface type, leave some space from the connection wiring, insulation barrier, etc.

[2] With CC-Link or MODBUS communication

	Model	A	B
250 A frame	NF250-SEV with MDU	158	218
	NF250-HEV with MDU		228
400 A frame	NF400-SEW with MDU	205	263
	NF400-HEW with MDU		393
800 A frame	NF800-SEW with MDU	221	282
	NF800-HEW with MDU		402



\* Rear type shown.  
For surface type, leave some space from the connection wiring, insulation barrier, etc.

## 6. Alarm Contact Output (Optional)

### Caution

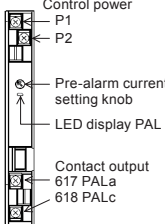
- Note that alarm contact output will not operate unless control power is applied to the MDU and the alarm contact output. Refer to "MDU Breaker Instruction Manual: MDU" for details on operation.
- Alarm contact output is a factory installed option. It cannot be installed after.

### 6.1 Contact capacity and combinations for alarm contact output

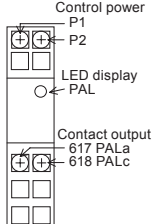
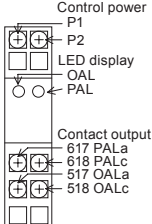
- Refer to the table below for alarm contact output contact capacity.

	COS $\phi$ = 1 L/R = 0	COS $\phi$ = 0.4 L/R = 0.007
125 VAC	3 A	2 A
250 VAC	3 A	2 A
30 VDC	2 A	2 A
100 VDC	0.4 A	0.3 A

(1) 250 A frame

Accessory device name	PAL	
Alarm name	PAL	○
Part names	 <p>Control power P1 P2</p> <p>Pre-alarm current setting knob</p> <p>LED display PAL</p> <p>Contact output 617 PALa 618 PALc</p>	

(2) 400/800 A frame

Accessory device name	PAL		TI
Alarm name	PAL	○	○
	OAL	—	○
Part names	 <p>Control power P1 P2</p> <p>LED display PAL</p> <p>Contact output 617 PALa 618 PALc</p>		 <p>Control power P1 P2</p> <p>LED display OAL PAL</p> <p>Contact output 617 PALa 618 PALc 517 OALa 518 OALc</p>

### 6.2 Precautions for alarm contact output

### Caution

- Control power is required for alarm contact output. Connect control power to terminals L1 and L2. (No polarity.)  
Rated voltage: 100 to 240 VAC/DC common 50/60 Hz  
VA consumption: 5 VA  
Use a power supply to prevent power outages when the MDU Breaker is tripped.
- Note that alarm contact output will not operate unless control power is applied to the MDU. Confirm that the MDU Breaker main unit and MDU are securely connected with a connection cable.
- Make sure that terminal connections are tightened at the optimal tightening torque (0.9 to 1.2 N·m).
- Alarm contact output may generate a slight noise when control voltage is applied. This is due to the operation of the internal electronic circuit, and is not an abnormality.
- If alarm contact output is attached, internal accessory devices cannot be installed on the right pole side.

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