

11. Pre-Alarm Module (PAL)

The pre-alarm is a function to output an alarm when the load current exceeds the preset current value. It is helpful in securing continuous power supply and preventive maintenance.

It can be fitted to electronic circuit breakers with a frame size from 125 to 1600A.

■ 125 and 250A frames

● Pre-alarm module (PAL module)

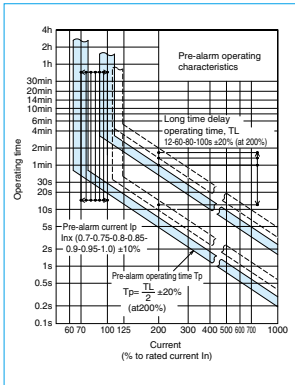
The standard modules have SLT. Other internal accessories cannot be installed on the right pole side.

A control power supply (compatible with 100 to 240VAC and DC) is necessary. The control power supply voltage range is 85 to 246VAC/DC, and the required volt-ampere is 5VA.

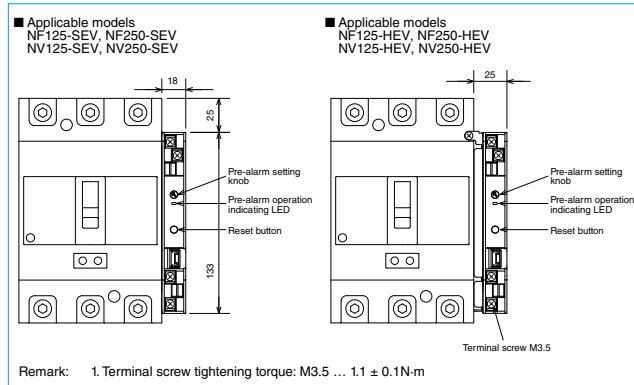
Table 6-20-1

Model	Switching capacity	Contact output (1a)	Resetting method
NF125-SEV NF125-HEV NF250-SEV NF250-HEV NV125-SEV NV125-HEV NV250-SEV NV250-HEV	125VAC 2A 250VAC 2A	30VDC 2A 100VDC 0.3A	Press the reset button, or turn off the control power supply.

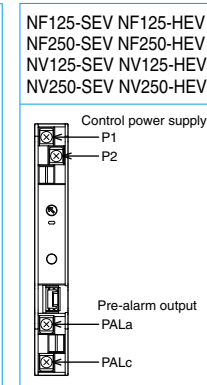
Pre-alarm characteristics



Dimensional drawing of pre-alarm module



Terminal arrangement



● Pre-alarm LED indication

When the load current exceeds the preset current value, the LED lamp on the pre-alarm module front panel starts blinking. When the pre-alarm output is given, the lamp stops blinking and turns on.

● Pre-alarm current setting (Ip setting)

The pre-alarm current can be set to the rated current $I_n \times 0.7-0.75-0.8-0.85-0.9-0.95-1.0$ with the knob on the pre-alarm module front panel.

■ 400A frame or above

● Solid state relay (SSR) output (PAL lead)

The lead wires are drawn out. On the right pole side, only internal accessories with lead wires drawn out can be installed. A control power supply is unnecessary.

Table 6-20-2

Model	Switching capacity	Resetting method
NF400-SEW NF400-HEW NF400-REW NF400-UW NF630-SEW NF630-HEW NF630-REW NF800-CEW NF800-SEW NF800-HEW NF800-REW NF800-UW NF1000-SEW NF1250-SEW NF1600-SEW NV400-SEW NV400-HEW NV630-SEW NV630-HEW NV800-SEW NV800-HEW	Solid state relay (SSR) – Non-contact output 24 to 240VAC/DC 20mA	When the load current becomes lower than the preset current value, the alarm is reset.

● Pre-alarm module (PAL module)

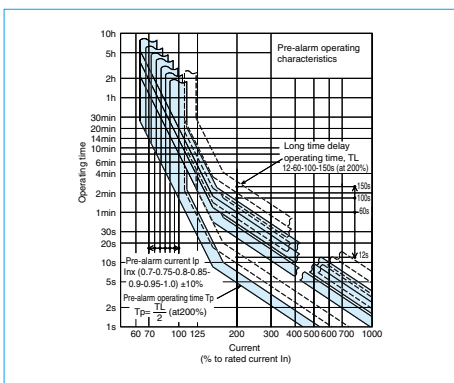
The standard modules have SLT. Other internal accessories cannot be installed on the right pole side.

A control power supply (compatible with 100 to 200VAC) is necessary. The control power supply voltage range is 80 to 242VAC, and the required volt-ampere is 10VA.

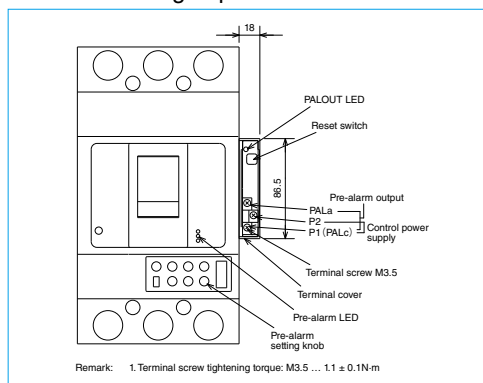
Table 6-20-3

Model	Switching capacity	Contact output (1a)	Resetting method
NF400-SEW NF400-HEW NF400-REW NF400-UW NF630-SEW NF630-HEW NF630-REW NF800-CEW NF800-SEW NF800-HEW NF800-REW NF800-UW NF1000-SEW NF1250-SEW NF1600-SEW NV400-SEW NV400-HEW NV630-SEW NV630-HEW NV800-SEW NV800-HEW	100VAC or 200VAC, 2A		Press the reset button, or turn off the control power supply.

Pre-alarm characteristics



Detailed drawing of pre-alarm module



Pre-alarm module output rating

Voltage V	AC Current (A)	
	Resistive load	Inductive load
200	3	2
100	3	2

A control power supply (compatible with 100 to 200VAC) is necessary. For the wiring method, see the following figure. (The control power supply voltage range is 80 to 242VAC.) The required volt-ampere is 10VA.

● Pre-alarm LED display (standard device)

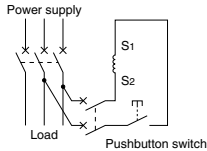
When the load current exceeds the preset current value, the LED lamp on the circuit breaker front panel starts blinking. When the pre-alarm output is given, the lamp stops blinking and turns on at PALOUT LED.

● Pre-alarm current setting (Ip setting)

The pre-alarm current can be set to the rated current $I_n \times 0.7-0.75-0.8-0.85-0.9-0.95-1.0$ with the knob on the circuit breaker front panel.

SHT (Shunt trip)

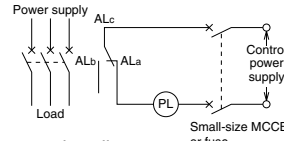
Device to electrically trip a circuit breaker from a distance. The allowable operating voltage range is 70 to 110% of the rated voltage.



Connection diagram

AL (Alarm switch)

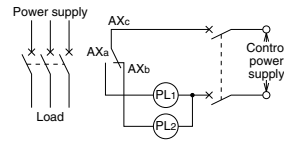
Switch to electrically display the tripping status of circuit breaker.



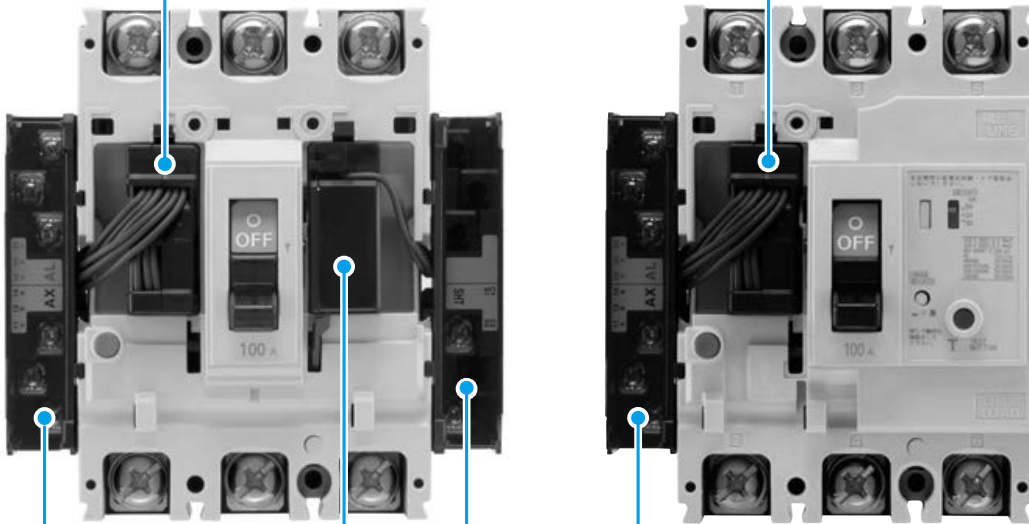
Connection diagram

AX (Auxiliary switch)

Switch to electrically display the ON-OFF status of circuit breaker.

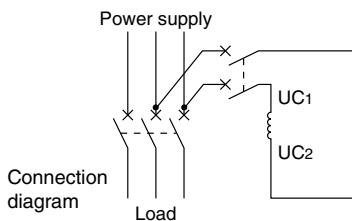


Connection diagram



UVT (Under voltage trip)

Device to automatically trip a circuit breaker when the voltage drops. The operating voltage is 70 to 35% of the UVT rated voltage. When the voltage recovers at least to 85% or more, the circuit breaker can be turned on after the device is manually reset.



Connection diagram

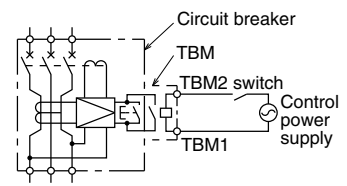
SLT (Lead wire terminal block)

Terminals for connecting with internal accessories. The terminal block will be manufactured to order. For the detailed dimensions, refer to pages 120 and 121. (The dimensions of SLT slightly vary depending on the number of installed accessories and the model.)

However, circuit breakers with a frame size of 400A and above having an electrical operation device are normally provided with SLT.

TBM (Test button module)

Unit to perform test under voltage from a distance. TBMs can be connected in parallel. (The standard TBMs are provided with SLT. In the case of the flush plate type, the external dimensions are partially different from those of the standard type.)

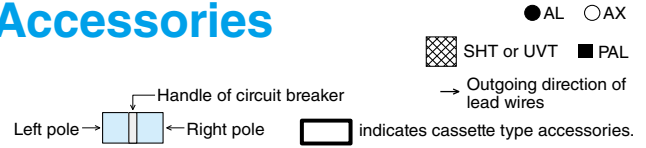


TBM circuit diagram

4. Maximum Number of Internal Accessories

MCCB and Motor Protection Breakers

Table 6-7 Table of maximum number of internal accessories



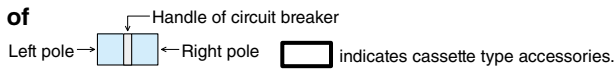
Model	C	NF63-CV NF125-CV	NF63-CV NF125-CV NF250-CV		NF400-CW NF630-CW	NF800-CEW	
	S	NF32-SV NF63-SV NF125-SV	NF32-SV NF63-SV NF125-SV NF125-SGV NF160-SGV NF250-SV NF250-SGV	NF125-SEV NF250-SEV	NF400-SW NF400-SEW NF630-SW NF630-SEW	NF800-SEW NF800-SDW	NF1000-SEW NF1250-SEW NF1600-SEW
L • H • R	L	NF63-HV	NF63-HV NF125-HV NF125-LGV NF125-HGV NF125-RGV NF160-LGV NF160-HGV NF250-HV NF250-LGV NF250-HGV NF250-RGV	NF125-HEV NF250-HEV	NF400-HEW NF400-REW NF630-HEW NF630-REW	NF800-HEW NF800-REW	
	U		NF125-UV NF250-UV		NF400-UEW(3P)	NF400-UEW(4P) NF800-UEW	
Number of poles AL and AX (standard) switches	HDV HDW HDVA	NF63-HDV	NF63-HDV(3P) NF125-HDVA(4P) NF250-HDVA(4P)		NF400-HDW(3P, 4P)	NF800-HDW(3P, 4P)	
	Accessory	2 poles	2, 3 or 4 poles	3, 4 poles	2, 3 or 4 poles	2, 3 or 4 poles	2, 3 or 4 poles
				S	V		
AL							
AX							
SHT or UVT							
AL + AX							
SHT + UVT							
AL + SHT or UVT							
AX + SHT or UVT							
AL + AX + SHT or UVT							
PAL (contact output)							


Notes *1 When UVT is provided, the UVT voltage module will come in the vertical lead wire terminal block type. (SHT does not have a voltage module.)
 *2 The second AX can be installed in place of the AL on the left pole side. When placing an order, specify the incorporation of the switches in the body.
 *3 PAL (contact output) can be installed together with AL and AX on the left pole side. (It cannot be installed together with SHT or UVT.) The standard type is provided with SLT. PAL control voltage (compatible with 100 to 200VAC) is necessary.
 *4 SHT and UVT can be installed on the left side.
 *5 SHT and UVT are normally installed on the right pole side. If you intend to install them on the left pole side, specify so. (The non-reset type UVT must be installed on the left pole side.)
 *6 In the case where three or more accessories are installed on the left pole side and AL, AX or AL and AX are installed on the pole on which SLT, SHT or UVT is installed, the SLT will be manufactured to order.
 *7 When AL, AX or AL and AX are installed on the pole on which UVT is installed, the UVT voltage module must be installed separately.
 *8 SLT is provided as standard. A control power supply (100 to 200VAC) is required. (In this case, other internal accessories cannot be installed on the right pole side.)
 Remarks: 1. For electrically operated automatic reset type circuit breakers having a frame size of 400A or above, the numbers of AL switches which can be installed are smaller by 1 than the values shown above.
 2. The circled numbers indicate the order of installation.
 3. AL and AX for minute load can be manufactured to order.

ELCB

● AL ○ AX  SHT or UVT

Table 6-8 Table of maximum number of internal accessories



 TBM → Outgoing direction of lead wires

Model	C	NV63-CV NV125-CV NV250-CV	NV400-CW NV630-CW	
	S	NV32-SV NV63-SV NV125-SV NV125-SEV NV250-SV NV250-SEV	NV400-SW NV400-SEW NV630-SW NV630-SEW	NV800-SEW
H • R		NV63-HV NV125-HV NV125-HEV NV250-HV NV250-HEV	NV400-HEW NV630-HEW	NV800-HEW
Number of poles		2, 3, or 4 poles	3 poles	
Switch		S		
Accessory		S		
AL				(⁶)
AX				(⁶)
AL + AX				(⁶)
SHT or UVT				(⁵)
SHT AL + or UVT				(⁴) (⁵) (⁶)
SHT AX + or UVT				(⁴) (⁵) (⁶)
SHT AL + AX + or UVT				(⁴) (⁵) (⁶)
TBM				(¹)

- Notes
- *1 The standard type is provided with SLT. Only in the case of 24VDC, specify the control voltage.
 - *2 The second AX can be installed in place of the AL on the left pole side. When placing an order, specify the incorporation of the switches in the body.
 - *3 When UVT is provided, the UVT voltage module will come in the vertical lead wire terminal block type. (SHT does not have a voltage module.)
 - *4 When AL, AX or AL and AX are installed on the pole on which UVT is installed, the UVT voltage module must be separately installed.
 - *5 When the accessory is provided with UVT, the UVT voltage module has a vertical lead wire terminal block. The UVT is not provided with a cassette.
 - *6 SLT to be used when three or more accessories are installed on the left pole is manufactured to order.

- Remarks:
1. The encircled numbers indicate the order of installation.
 2. TBM can be installed regardless of the number of installed AL, AX, SHT and UVT.
 3. AL and AX for minute load can be manufactured to order.