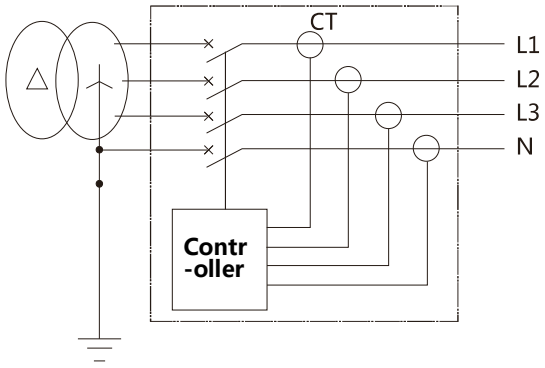
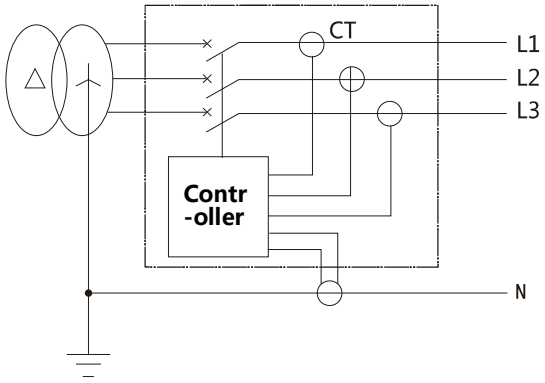
In three-phase four-wire system using 4-pole breaker without external transformer , earthing fault signal comes from three- phase current and N-Pole current vector sum. Operating characteristic is definite time protection.

4PT mode




In three-phase four-wire system using 3-pole breaker with external N-pole transformer, earthing fault signal comes from three- phase and N-Pole current vector sum. Operating characteristic is definite time protection.

(3P+N)T mode




Note:

① External N-pole transformer (connected to 6#, 7# terminal for NA1-1000, connected to 25#, 26# terminal for NA1-2000-6300) is a special product. Default lead wire is 2 meters long.

② Earthing protection in 3PT mode can only be used in balance load. It should be turned off or set value above allowable unbalance current when the load is unbalance or the controller may operate.

③ The distance between external transformer and breaker should be less than 5m in (3P+N)T mode. When lead wire of external transformer needs to be longer than 2 meters, special requirement should be noted when ordering.

## 15. Accessories

15.1 Shunt release

The power-on time cannot be greater than 2 seconds / time, and the power-on frequency cannot be greater than 5 times / minute.

a.The shunt release should be used except for special products where the circuit breaker must be directly disconnected manually;

b.The shunt release could operated within 10 meters to break the circuit breaker.

Characteristics of shunt release

| Rated control power supply voltage Us(V) | | | AC220/230 | AC380/400 | DC220 | pulse | AC110 ( not available for NA1-1000X ) |
|---|---|---|---|---|---|---|---|
| Operating voltage (V) | | | (0.7-1.1)Us | | | | |
| Break time (ms) | | | ≤ 28 | | | | |
| Power consumption (VA/W) | Inm=1000A | pulse | 56 | 56 | 250 | 250 | - |
| | Inm=2000A~6300A | Intermittent(default) | 300 | 300 | 132 | 70 | 300 |
| | | Pulse(option) | 880 | 1800 | 880 | 850 | 850 |

Notes:

1.It must select pulse type in the automatic control system.

2. power-on time of the intermittent type cannot be greater than 2 s, pulse frequency of the pulse type cannot be more than 5 times/min, or the components are easily burnt;

3. If the circuit breaker is not break by a single power-on of 15 s, must disconnect the power on the shunt release immediately.

15.2 Closed Electromagnet

After the energy storage of the motor is completed, the closed electromagnet can be operated and controlled within a range of 10 meters to instantaneously release the energy storage spring force of the operating mechanism to close the circuit breaker.

Characteristics of closed electromagnet

| Rated control power supply voltage Us(V) | | | AC220/230 | AC380/400 | DC220 | DC110 | AC110 ( not available for NA1-1000X ) |
|---|---|---|---|---|---|---|---|
| Operating voltage (V) | | | (0.85-1.1)Us | | | | |
| Close time (ms) | | | ≤ 50 | | | | |
| Power consumption (VA/W) | Inm=1000A | pulse | 56 | 56 | 250 | 250 | - |
| | Inm=2000A~6300A | Intermittent(default) | 300 | 300 | 132 | 70 | 300 |
| | | Pulse(option) | 880 | 1800 | 880 | 850 | 850 |

Notes:

1.It must select pulse type in the automatic control system.

2. ppower-on time of the intermittent type cannot be greater than 2 s, pulse frequency of the pulse type cannot be more than 5 times/min, or the components are easily burnt;

3. Ensure that the product is in the energy storage state so that the closed electromagnet may be energized;

4.If the product is not closed after a single power-on for 15s, must disconnect the power on the closed electromagnet immediately.

15.3 Undervoltage release (UVT) (The power must be turned on before the circuit breaker is closed)

15.3.1 The undervoltage release has instantaneous operation and delayed operation:

Operation types of each frame under voltage release

| | Self-priming | Helped priming |
|---|---|---|
| Undervoltage instantaneous release | Inm=1000A, 6300A | Inm=2000A, 3200A, 4000A/3 |
| Undervoltage delay release | Inm=1000A, 6300A | Inm=2000A, 3200A, 4000A/3 |

Notes:

1.Inm=1000A undervoltage delay does not require an external delay controller. The power-off operation is an instantaneous operation. There is no zero voltage delay function;

2.Inm=6300A undervoltage delay does not require an external undervoltage delay controller. There is a delay function for low voltage and power off;

3.Inm=2000A~4000A/3 undervoltage delay requires an external delay controller. There is a delay operation when the power is off. There is a zero voltage delay function.

Delay time of under voltage release

| | Delay time (optional) | Accuracy |
|---|---|---|
| Inm=1000A | 1 s, 3 s, 5 s, 7 s (not adjustable) | ±15% |
| Inm=2000A~4000A/3 | 1 s, 3 s, 5 s (non-adjustable) | 0~1s |
| Inm=6300A | 0.3 s~7.5 s (adjustable) | ±15%e |
| The undervoltage will not operate when the voltage returns to 85% Ue and higher,, within 1/2 delay time. | | |

Note:

A self-priming undervoltage delay release may be provided for special orders of NA1-2000X~6300X. There is no external undervoltage delay controller, and the delay time is 0.3s~7.5s, selectable and adjustable with an accuracy of ±15%.

15.3.2 When the undervoltage release is not powered, the circuit breaker cannot be closed either electrically or manually:

Characteristics of under voltage release

| Rated control power supply voltage Ue(V) | AC110, AC220/230, AC380/400 |
|---|---|
| Operating voltage (V) | (0.35~0.7)Ue |
| Reliable closing voltage (V) | (0.85~1.1)Ue |
| Reliable not-closing voltage (V) | ≤ 0.35Ue |
| Power consumption (Inm=1000A/Inm=2000A~6300A) | 20VA/48VA (W) |

15.4 The electric energy storage mechanism (the power-on time cannot be greater than 5 seconds / time, and the power-on frequency cannot be greater than 3 times/min) has an automatic re-energy storage function to facilitate dual power switching.

Characteristics of electric energy storage mechanism

| Rated control power supply voltage Ue(V) | AC380, AC220 | DC220, DC110 |
|---|---|---|
| Operating voltage (V) | (0.85-1.1)Us | (0.85-1.1)Us |
| Power consumption (Inm=1000A) | 90W | 90W |
| Power consumption (Inm=2000A) | 85W | 85W |
| Power consumption (Inm=3200A, 4000A/3) | 110W | 110W |
| Power consumption (Inm=6300A) | 150W | 150W |
| Energy storage time | ≤ 5s | ≤ 5s |

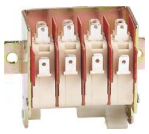
Notes:

1.It is forbidden to turn on the power for 7 seconds to avoid damage.

15.5 Auxiliary contact NO

Standard type: Provides users with 4 sets of conversion contacts (default configuration).
Special type: 6 sets of Inm=1000A conversion contacts (for AC only);

Characteristic

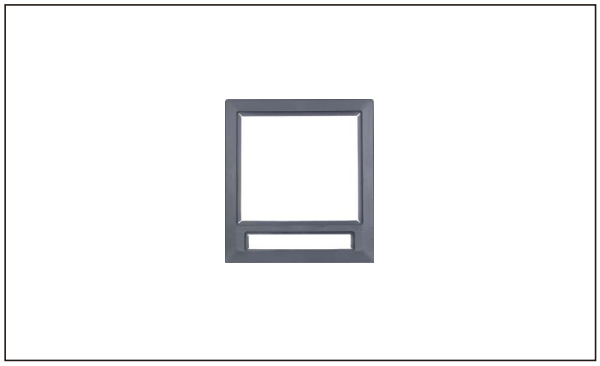


| Type | NA1-1000X | | | NA1-2000X/NA1-2000XN/NA1-2000XH/NA1-3200X/NA1-3200XN/NA1-4000X/NA1-6300X/NA1-6300XN | | |
|---|---|---|---|---|---|---|
| Rated voltage (V) | AC230 | AC400 | DC220 | AC230 | AC400 | DC220 |
| conventional free-air thermal current Ith (A) | 10 | 6 | 0.5 | 6 | 6 | 6 |
| Rated control capacity | 300VA | 100VA | 60W | 300VA | 300VA | 60W |

| NA1-1000X | | | NA1-2000X/NA1-2000XN/NA1-2000XH/NA1-3200X/NA1-3200XN/NA1-4000X/NA1-6300X/NA1-6300XN | | |
|---|---|---|---|---|---|
| Category | Voltage | Current | Category | Voltage | Current |
| AC-15 | AC230V | 1.3A | AC-15 | AC230V | 1.3A |
| | AC400V | 0.25A | | AC400V | 0.75A |
| DC-13 | DC110V | 0.55A | DC-13 | DC110V | 0.55A |
| | DC220V | 0.27A | | DC220V | 0.27A |

15.6 Doorcase

Installed on the door of the distribution cubicle, for sealing the distribution cubicle and making the protection class to IP40( fixed type and drawout type).



15.7 Phases barrier (Optional)

Installed between the busbars to increase the creepage distance.

15.8 Transparent shield (NA1-2000) (Optional)

Installed on the doorcase of the cubicle's small door, make the protection class to IP54. It is suitable for the fixed, drawout type circuit breaker and the load switch.

15.9 Off position locking mechanism

When the circuit breaker is disconnected, padlock can be used to lock it after pulling out the lock lever, then the circuit breaker can't be "Test" or "connected" position.( Padlock is prepared by users)

15.10 Key lock

Lock the circuit breaker on the OFF position, then the circuit breaker can't be closed.
Locks and keys will be provided by us.
Separate lock and key is matched with one set of the circuit breaker.
Three same locks and two same keys are matched with three circuit breaker.

Note: Before pulling out the key, the break pushbutton should be pressed first, rotate the key anticlockwise, then pull it out.

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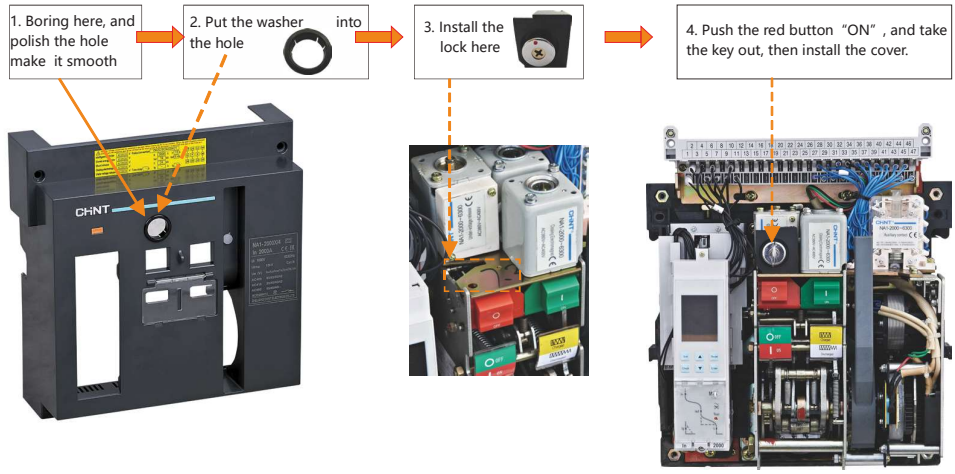
★ NA1Install the locking system

1. Components of the locking system:


2. Installation sequence:

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15.11 Cable mechanical interlock

It can realize the interlock of two horizontal or vertical-installed, three poles or four poles , drawout type or fixed type circuit breaker.

a. If need bend the cable, make sure the radian is more than 120° .

b. Check and make sure enough lubricating oil of the cable.

c. The maximum distance between two interlock circuit breakers is 1.5m.

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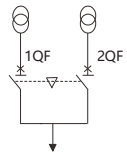
Circuit diagram




Available running manner

| 1QF | 2QF |
|---|---|
| 0 | 0 |
| 0 | 1 |
| 1 | 0 |

Notes: a. when the steel cable needs to be bent, enough transition arc should be reserved to guarantee flexible movement of steel cable;

b. check the steel cable and make sure there is enough lubricant in the steel cable to guarantee flexible movement of steel cable.

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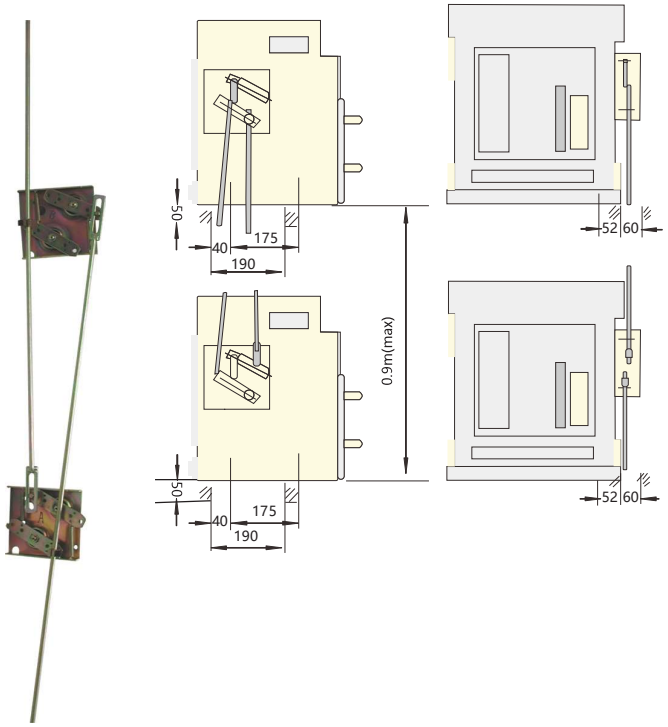
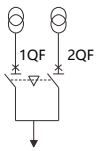
15.12 Connecting-rod type mechanical interlock

For two vertically mounted three-pole or four-pole circuit breakers, the interlock can be realized where one makes and the other breaks.




Circuit diagram Available running manner

Manner 1: three power supplies are provided for one circuit breaker only




| 1QF | 2QF |
|---|---|
| 0 | 0 |
| 0 | 1 |
| 1 | 0 |

C