



Think Automation and beyond...



IDEC Hydraulic-Magnetic Circuit Breakers
NC1V Series

Hydraulic-Magnetic Circuit Breakers

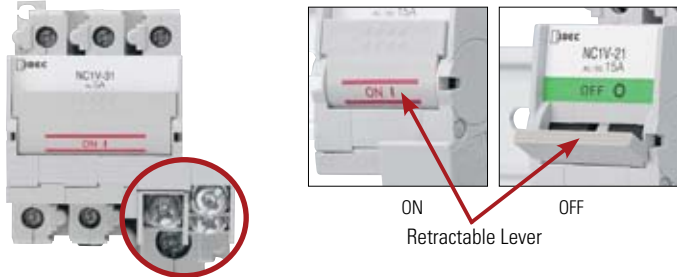
Using a hydraulic-magnetic tripping method ensures calibration of the NC1V Circuit Breaker is unaffected by ambient temperature. The NC1V series will carry their full rated current continuously over a wide temperature range, from -10 to 60°C, providing a more reliable and accurate system. With many other available features, make NC1V Circuit Breakers your choice to provide more value for your investment.



Reliable, safe and accurate

NC1V Circuit Breakers

- Hydraulic-magnetic tripping system
- Slim housing design; 1, 2, and 3-pole
- Cost-effective fuse block replacement - better accuracy over temperature
- Flat retractable lever for safety operations
- Spring-up terminals allow for use of ring terminals
- DIN rail or direct panel mount
- Optional built-in auxiliary or alarm controls
- UL1077



Auxiliary or Alarm Contact
(Shown without terminal cover.)



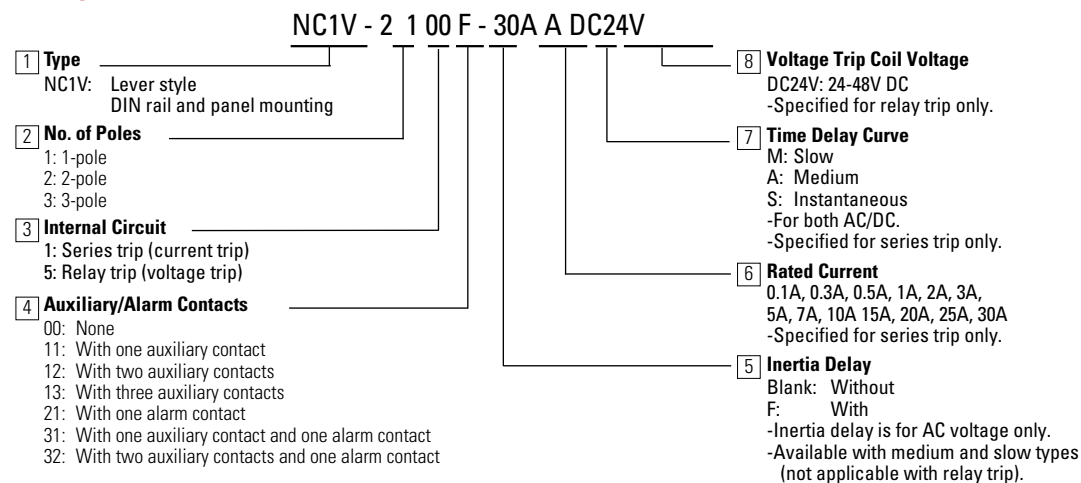
Specifications

| | | | | |
|--|--|---|----------------------------------|------------------|
| Operator Style | | Retractable lever | | |
| Internal Circuit | | Series trip (current trip), Relay trip (voltage trip) | | |
| Protection Method | | Hydraulic magnetic tripping system, Magnetic tripping system (voltage trip) | | |
| No. of Poles | | 1-pole | 2-pole | 3-pole |
| Rated Voltage (AC/DC) ^{Note 1} | | 250V AC 50/60Hz, 65V DC | 250V AC 50/60Hz, 125V DC | 250V AC, 50/60Hz |
| Series Trip (Current Trip) | Rated Short-circuit Capacity | 250V AC, 2500A 65V DC, 2500A | 250V AC, 2500A 125V DC, 2500A | 250V AC, 2500A |
| | Rated Current | 0.1A, 0.3A, 0.5A, 1A, 2A, 3A, 5A, 7A, 10A, 15A, 20A, 25A, 30A | | |
| | Operation Characteristics ^{Note 2} | Time delay curve curve M (slow), curve A (medium), S (instantaneous) , Curves M and A are also available with inertia delay option. | | |
| Relay Trip (Voltage Trip) ^{Note 3} | Rated Current | 30A | | |
| | Trip Voltage | 24 to 48V DC (at 25°C), Voltage application duration 10 sec maximum, tripping time 0.1 sec maximum (at rated voltage) | | |
| Auxiliary Contact/ Alarm Contact | Contact Rating | 125V AC 3A (resistive load), 30V DC 2A (resistive load) | | |
| | Minimum Applicable Load | 24V DC 1mA (resistive load, reference value) | | |
| Insulation Resistance | | 100MΩ minimum (500V DC megger) | | |
| Dielectric Strength | | 2,000V AC, 1 minute (between terminals when main contacts are open, between live parts of different poles, between live and dead parts) 600V AC (between terminals when auxiliary circuits are open) | | |
| Vibration Resistance (with rated current applied) | | Damage limits: 147m/s ² (10 to 55Hz) (1-pole, 2-pole), 78m/s ² (3-pole) Operating extremes: 98m/s ² (1-pole, 2-pole), 78m/s ² (3-pole) | | |
| Shock Resistance (S time delay curve: 80% rated current, A, M time delay curve: 100% rated current) | | Damage limits: 490m/s ² (1-pole, 2-pole), 297m/s ² (3-pole) Operating extremes: 196m/s ² (S, A, M types) | | |
| Electrical Life | | 10,000 cycles minimum (at rated current), 10 operations per minute | | |
| Reference Temperature | | 40°C | | |
| Operating Temperature | | -10 to +60°C (no freezing) Rated current is based on an ambient temperature of 40°C. When the operating temperature exceeds 40°C, derate the rated current by using the factors shown below. | | |
| Operating Humidity | | 45 to 85% RH (no condensation) | | |
| Terminal Style | Main Circuit Terminal | Spring-up, fingersafe terminal: M4 screw (up to 20A), M5 screw (25A and 30A) | | |
| | Auxiliary/Alarm Contacts, Voltage Coil Terminal | M3.5 screw | | |
| Weight (approx.) | | 1-pole: 90g, 2-pole: 170g, 3-pole: 260g | | |

- 3-pole type is for AC voltage only.
- For S (instantaneous) tripping curve, humming sound may occur when used in an AC sinusoidal-wave current circuit around 80% of the rated current, however, the performance of the circuit breaker will not be affected.

| | |
|-----------------|-----------------|
| Operating Temp. | Derating Factor |
| 50°C | 0.9 |
| 55°C | 0.8 |
| 60°C | 0.7 |
- Relay trip (voltage trip) type is not equipped with an overcurrent trip function. To avoid unnecessary tripping, do not use in circuits where inrush currents may be present. Do not use the NC1V circuit breakers in environments where they are exposed to extreme temperature, humidity, dust, corrosive gases, vibration, shock, or in a circuit where inrush current may be present, otherwise unnecessary operation and damage may occur.

Part Number Configuration



Part Numbers

| Internal Circuit | No. of Poles | Inertia Delay | Auxiliary Contact Alarm Contact | Part No. | Code | | | |
|----------------------------|--------------|--|---|--|---|---|-----------------------------|----------------|
| | | | | | 6 Rated Current | 7 Time Delay Curve | 8 Voltage Trip Coil Voltage | |
| Series Trip (Current Trip) | 1-pole | — | — | NC1V-1100-6 7 | 0.1A 0.3A 0.5A 1A 2A 3A 5A 7A 10A 15A 20A 25A 30A | M (slow) A (medium) S (instantaneous) | — | |
| | | | One Auxiliary Contact | NC1V-1111-6 7 | | | | |
| | | | One Alarm Contact | NC1V-1121-6 7 | | | | |
| | | With | — | NC1V-1100F-6 7 | | | | |
| | | | One Auxiliary Contact | NC1V-1111F-6 7 | | | | |
| | | | One Alarm Contact | NC1V-1121F-6 7 | | | | |
| | 2-pole | — | — | — | | | | NC1V-2100-6 7 |
| | | | | One Auxiliary Contact | | | | NC1V-2111-6 7 |
| | | | | Two Auxiliary Contacts | | | | NC1V-2112-6 7 |
| | | | | One Alarm Contact | | | | NC1V-2121-6 7 |
| | | | | One Auxiliary Contact and One Alarm Contact | | | | NC1V-2131-6 7 |
| | | | | — | | | | NC1V-2100F-6 7 |
| | | With | — | NC1V-2111F-6 7 | | | | |
| | | | Two Auxiliary Contacts | NC1V-2112F-6 7 | | | | |
| | | | One Alarm Contact | NC1V-2121F-6 7 | | | | |
| | | | One Auxiliary Contact and One Alarm Contact | NC1V-2131F-6 7 | | | | |
| | | | — | NC1V-3100-6 7 | | | | |
| | | | One Auxiliary Contact | NC1V-3111-6 7 | | | | |
| | 3-pole | — | — | Two Auxiliary Contacts | | | | NC1V-3112-6 7 |
| | | | | Three Auxiliary Contacts | | | | NC1V-3113-6 7 |
| | | | | One Alarm Contact | | | | NC1V-3121-6 7 |
| | | | | One Auxiliary Contact and One Alarm Contact | | | | NC1V-3131-6 7 |
| | | | | Two Auxiliary Contacts and One Alarm Contact | | | | NC1V-3132-6 7 |
| | | | | — | | | | NC1V-3100F-6 7 |
| With | | — | NC1V-3111F-6 7 | | | | | |
| | | Two Auxiliary Contacts | NC1V-3112F-6 7 | | | | | |
| | | Three Auxiliary Contacts | NC1V-3113F-6 7 | | | | | |
| | | One Alarm Contact | NC1V-3121F-6 7 | | | | | |
| | | One Auxiliary Contact and One Alarm Contact | NC1V-3131F-6 7 | | | | | |
| | | Two Auxiliary Contacts and One Alarm Contact | NC1V-3132F-6 7 | | | | | |
| Relay Trip (Voltage Trip) | 1-pole | — | — | NC1V-1500-8 | — | — | DC24V | |
| | 2-pole | — | — | NC1V-2500-8 | | | | |
| | 3-pole | — | — | NC1V-3500-8 | | | | |

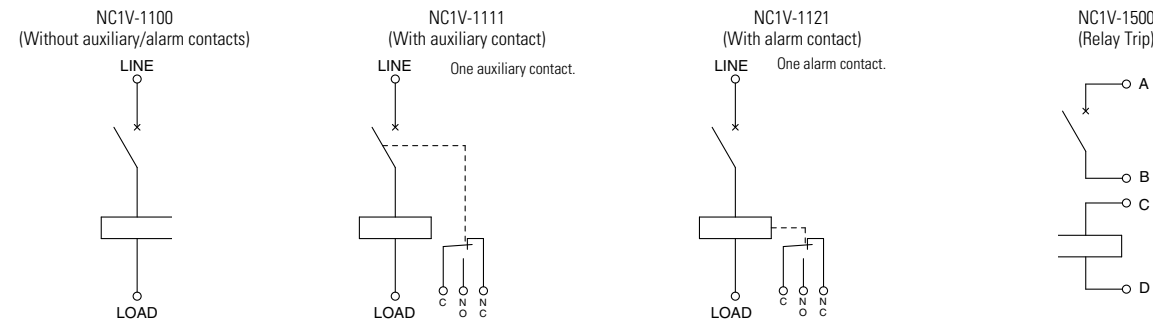
- Specify rated current, time delay curve, or voltage trip coil voltage in place of 6 7 8 when ordering.
- Inertia delay is for an AC circuit. Additionally, time delay curve of S (instantaneous) is not available with inertia delay.
- 8 only applies to voltage trip models.



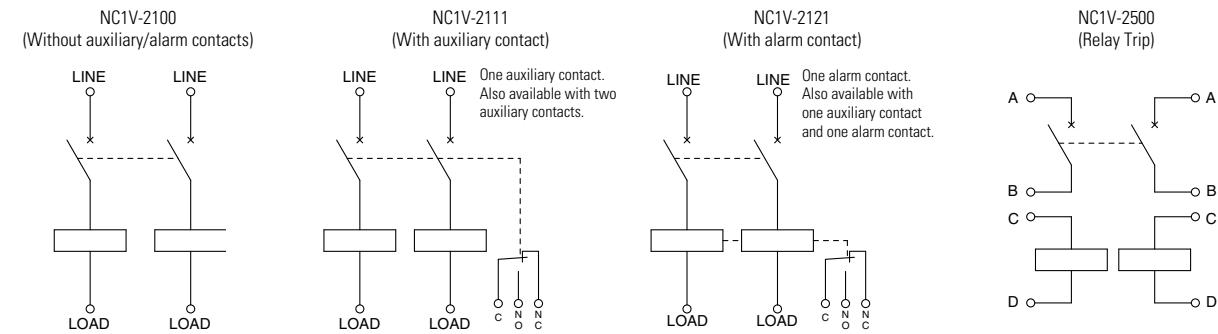
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Internal Circuits

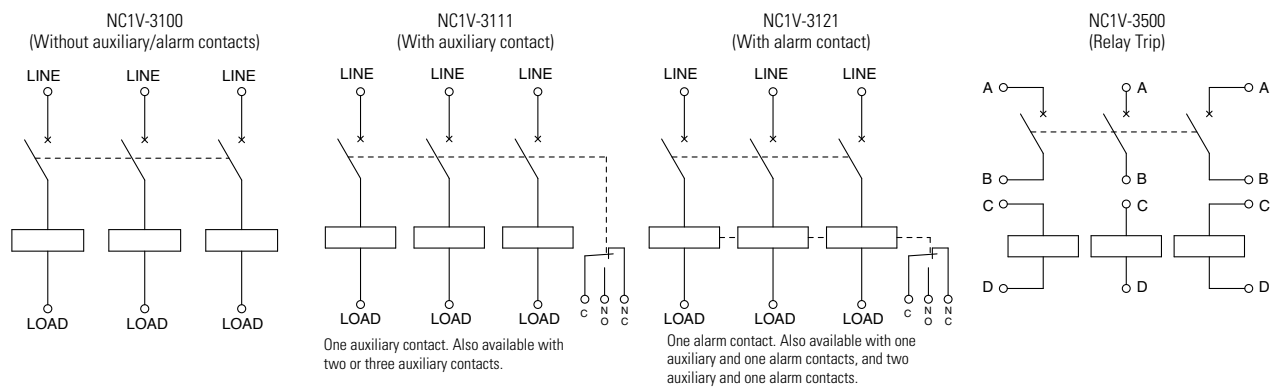
1-pole



2-pole



3-pole

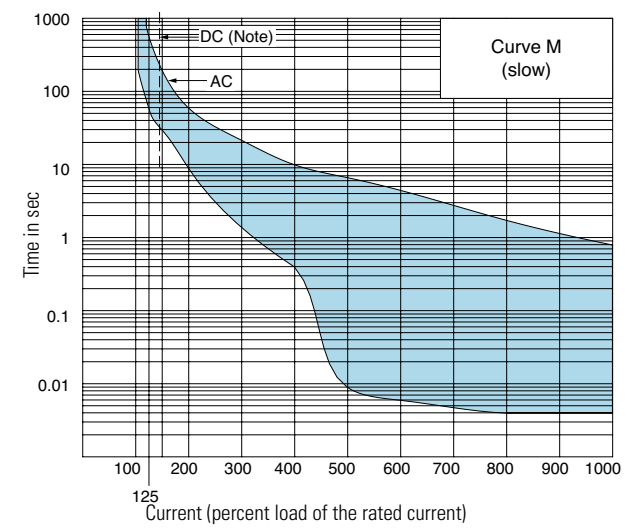
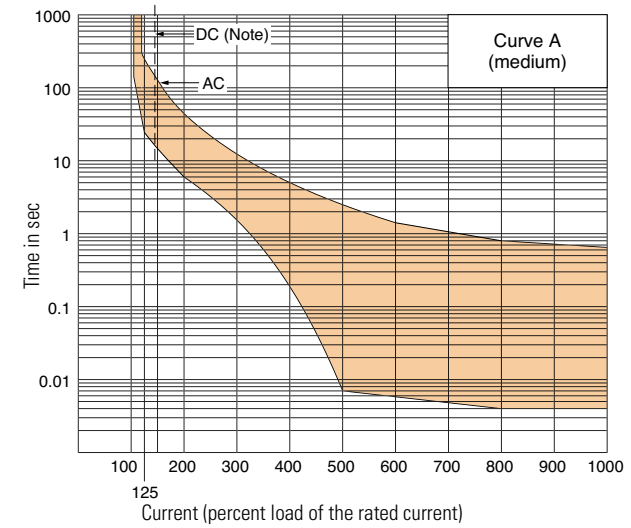


Overcurrent-Time Delay Characteristics (sec at 40°C) [vertical mounting]

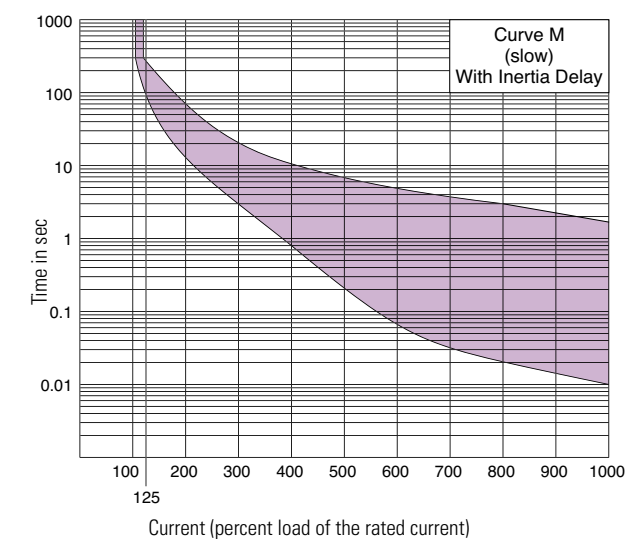
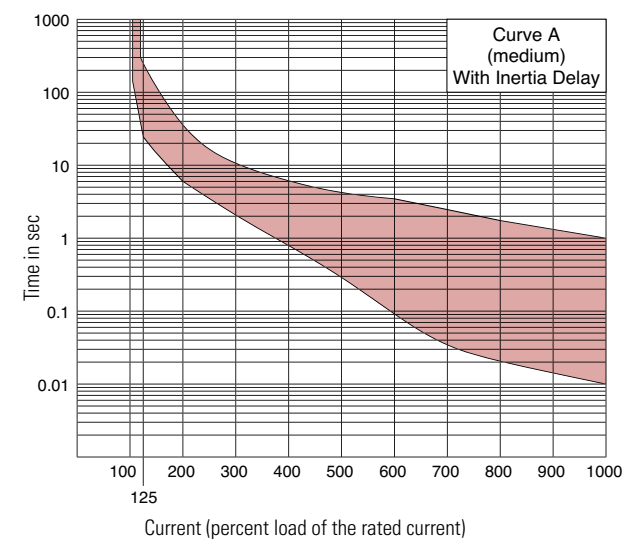
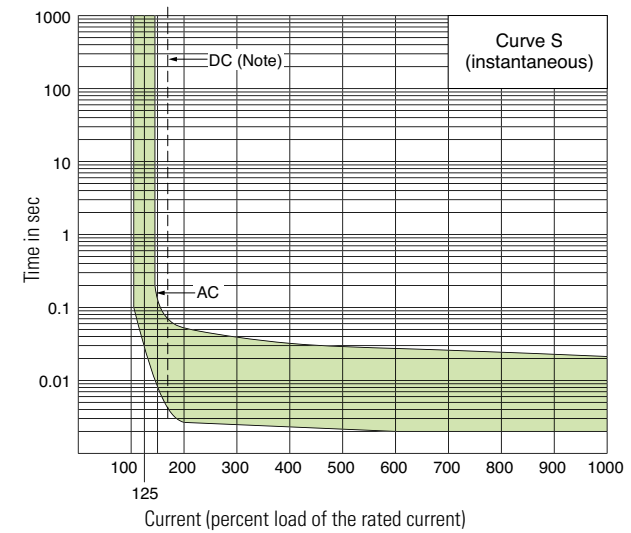
| Item | Time Delay Curve | Percent of Rated Current | | | | | | | | |
|-----------------|-------------------------------|--------------------------|------------|---------------|---------------|----------------|---------------|----------------|----------------|----------------|
| | | 100% | 125% | 150% | 175% | 200% | 400% | 600% | 800% | 1000% |
| AC (50/60Hz)/DC | S (instantaneous) | NO TRIP | — | *0.005 to 0.1 | 0.003 to 0.06 | 0.0027 to 0.05 | 0.002 to 0.03 | 0.002 to 0.028 | 0.002 to 0.025 | 0.002 to 0.022 |
| | A (medium) | NO TRIP | *25 to 240 | 16 to 140 | — | 6 to 32 | 0.4 to 4 | 0.0055 to 1.5 | 0.004 to 0.8 | 0.004 to 0.65 |
| | M (slow) | NO TRIP | *60 to 600 | 30 to 200 | — | 9 to 60 | 0.4 to 10 | 0.006 to 4.5 | 0.004 to 1.8 | 0.004 to 0.8 |
| AC (50/60Hz) | With Inertia Delay A (medium) | NO TRIP | 25 to 240 | — | — | 6 to 32 | 0.8 to 6 | 0.09 to 3.5 | 0.02 to 1.8 | 0.01 to 1.0 |
| | With Inertia Delay M (slow) | NO TRIP | 60 to 600 | — | — | 10 to 60 | 0.8 to 10 | 0.06 to 4.5 | 0.02 to 3 | 0.01 to 1.75 |

*MAY TRIP on DC

Time Delay Curves at 40°C



Note: The entire shaded area applies to AC.
 For DC, the shaded area on the right of the dashed line applies.



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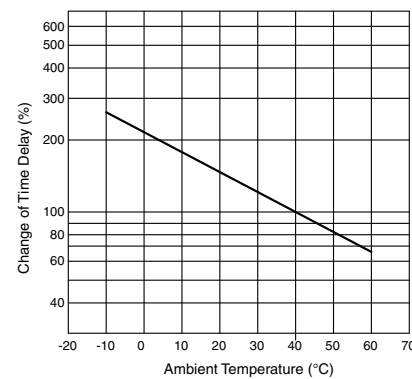
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Time Delay Curve and Ambient Temperature

NC1V circuit breakers employ an electromagnetic tripping system, where the rated current (trip current) is not affected by ambient temperatures. But, the time delay may vary with the oil viscosity in the oil dash pot. Lower oil viscosity at higher temperatures results in a shorter delay, whereas at lower temperatures, the delay will be longer.

Temperature Correction Curve

The time delay curves on the preceding page are measured at 40°C. With reference to the following curves, time delays can be corrected according to ambient temperature.



The time delay is based on an ambient temperature of 40°C. Time delays at other temperatures are corrected according to the temperature correction curve. The time delay of the instantaneous time delay curve (S) is not affected by the ambient temperature.

When operating temperature exceeds 40°C, derate the rated current by multiplying the derating factor shown on the right.

| Operating Temp. | Derating Factor |
|-----------------|-----------------|
| 50°C | 0.9 |
| 55°C | 0.8 |
| 60°C | 0.7 |

Impedance and Coil Resistance

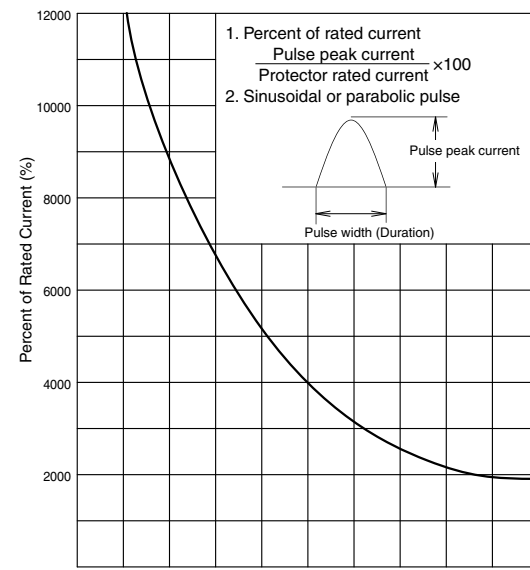
Series Trip (Current Trip) at 25°C

| Rated Current | For AC 50/60 Hz Impedance (Ω) | | For DC Resistance (Ω) | |
|---------------|-------------------------------|-------------|-----------------------|-------------|
| | Curve S | Curves A, M | Curve S | Curves A, M |
| 0.1A | 66.0 | 116.0 | 43.0 | 106.0 |
| 0.3A | 6.6 | 11.0 | 4.1 | 10.0 |
| 0.5A | 1.92 | 3.65 | 0.86 | 3.40 |
| 1A | 0.50 | 0.93 | 0.25 | 0.90 |
| 2A | 0.16 | 0.27 | 0.11 | 0.25 |
| 3A | 0.07 | 0.12 | 0.050 | 0.11 |
| 5A | 0.025 | 0.050 | 0.015 | 0.045 |
| 7A | 0.014 | 0.027 | 0.011 | 0.025 |
| 10A | 0.007 | 0.021 | 0.005 | 0.020 |
| 15A | 0.006 | 0.010 | 0.005 | 0.009 |
| 20A | 0.005 | 0.006 | 0.004 | 0.005 |
| 25A | 0.004 | 0.005 | 0.004 | 0.005 |
| 30A | 0.003 | 0.004 | 0.003 | 0.004 |

Tolerance: ±25% (up to 20A), ±50% (25A and 30A)

Inertia Delay

Inertia delay is designed not to trip on a non-repeating single pulse of 20 times the rated current (peak value) for a duration of 8ms. In addition, circuit breakers equipped with inertia delay do not respond to high inrush currents caused by transformer or lamp loads, but perform the specified interruption on subsequent overcurrents. Inertia delay is available on AC circuits, and is not available with the series trip curve S (instantaneous).



Relay Trip (Voltage Trip) at 25°C

| Tripping Voltage | For DC Resistance (Ω) |
|------------------|-----------------------|
| 24-48V | 100.0 |

Tolerance: ±25%

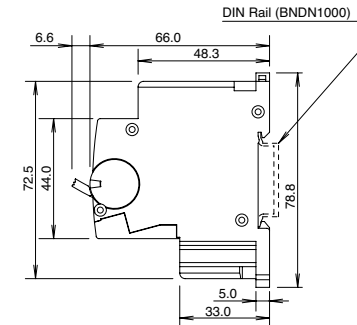
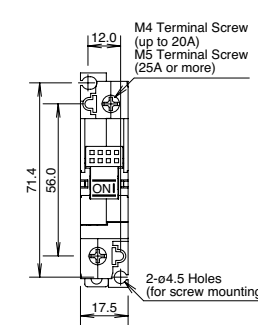
Voltage Drop Due to Coil Resistance or Impedance

The internal resistance or impedance of a circuit breaker tends to be larger for a smaller-rated current. Therefore, when circuit breakers with a small rated current are used, voltage drop should be taken into consideration. Internal resistance also varies with time delay curves, which should also be considered during installation.

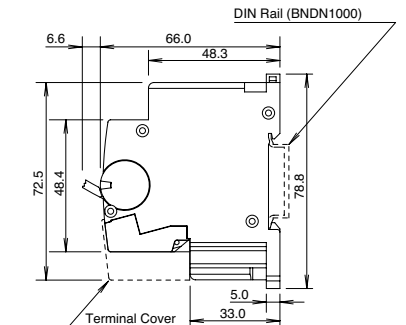
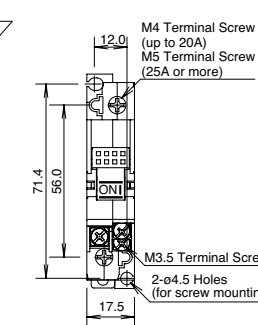
Dimensions (mm)

1-pole

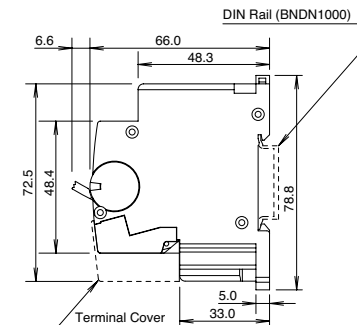
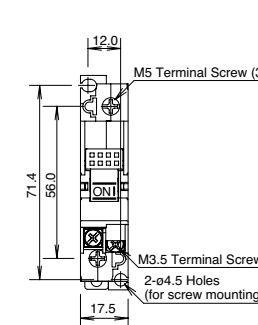
NC1V-1100



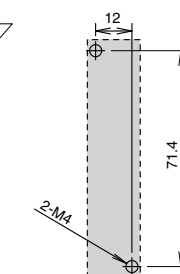
NC1V-1111 (Auxiliary Contact), NC1V-1121 (Alarm Contact)



NC1V-1500 (Relay Trip)

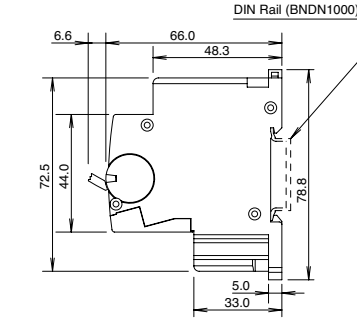
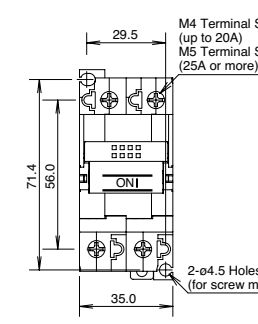


Mounting Hole Layout (M4 Mounting Screws)

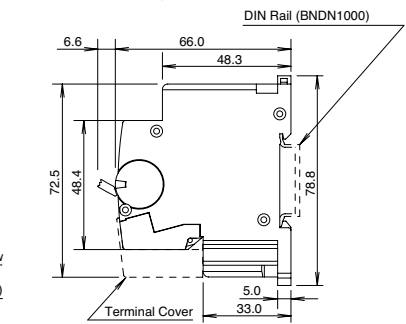
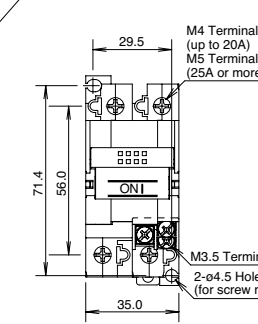


2 Pole

NC1V-2100

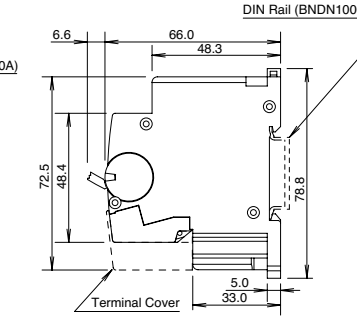
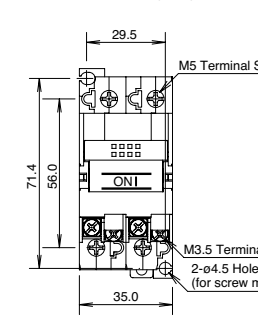


NC1V-2111 (one auxiliary contact), NC1V-2112 (two auxiliary contacts)
 NC1V-2121 (one alarm contact), NC1V-2131 (one auxiliary and one alarm contact)

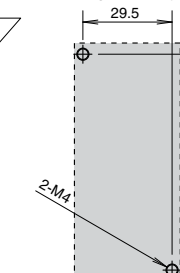


Dimensions shown are for NC1V-2111 and NC1V-2121.

NC1V-2500 (Relay Trip)



Mounting Hole Layout (M4 Mounting Screws)

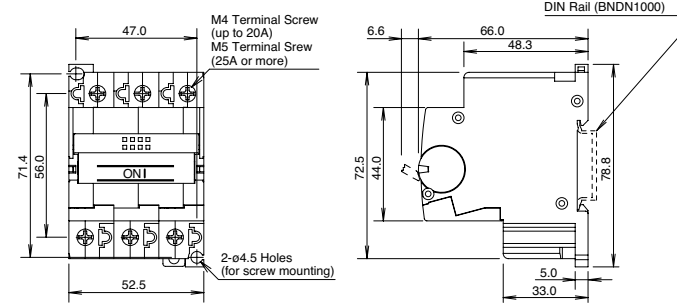


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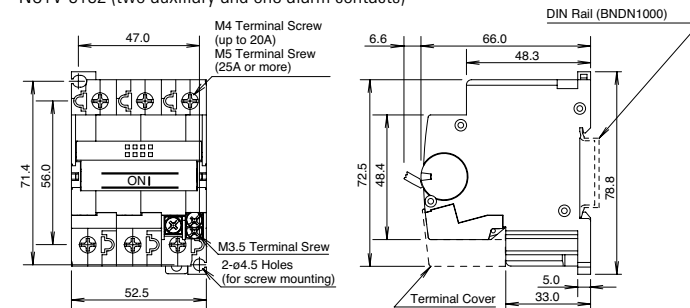
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3-pole

NC1V-3100

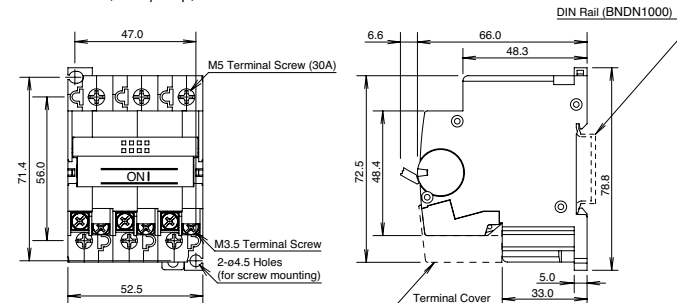


NC1V-3111 (one auxiliary contact), NC1V-3112 (two auxiliary contacts)
 NC1V-3113 (three auxiliary contacts), NC1V-3121 (one alarm Contact)
 NC1V-3131 (one auxiliary and one alarm contact)
 NC1V-3132 (two auxiliary and one alarm contacts)

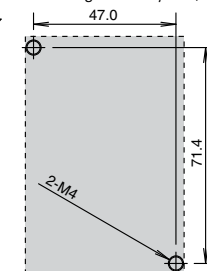


Dimensions shown are for NC1V-3111 and NC1V-3121.

NC1V-3500 (Relay Trip)



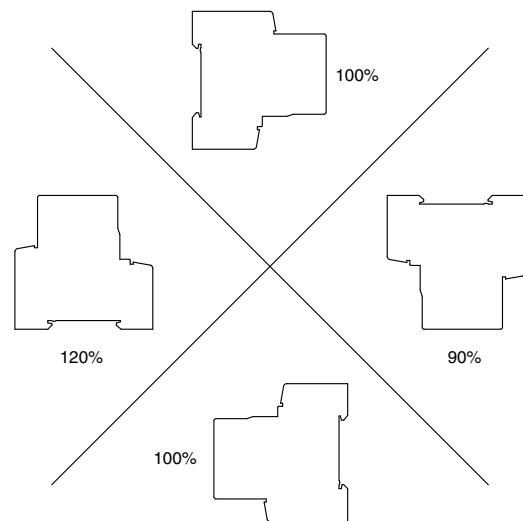
Mounting Hole Layout (M4 Mounting Screws)



Instructions

Installation Angle

Tripping method is hydraulic magnetic. Minimum operating current varies with installation angle. Operating currents are influenced by the weight of movable iron core. With reference to the following figures, correct the rated current.



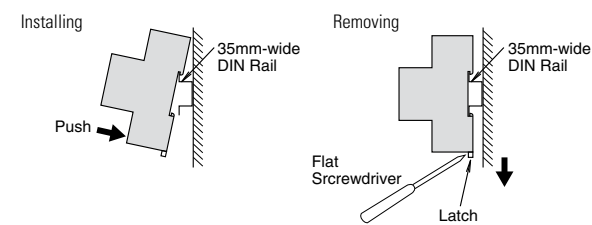
Minimum operating current is calculated from the following formula:
 (Minimum operating current) = (Rated current) × (Correction factor by installation angle) × (Reference minimum tripping current rate)

DIN Rail Installation

1. Fasten the DIN rail securely.
2. With the latch facing downward, install the NC1V circuit breaker on the DIN rail as shown below.

DIN Rail Removal

Using a flat screwdriver, pull the latch on the circuit breaker to remove from the DIN rail.



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Applicable Wire and Crimp Terminals

| Terminal | Terminal Screw | Connectable Wire Size (mm ²) | Applicable Crimping Terminal | Tightening Torque (N·m) |
|--|--|--|------------------------------|-------------------------|
| Main Circuit Terminals | Spring-up, fingersafe, slotted Phillips screw with square washer (up to 20A) | 0.25 to 1.65 | R1.25-4 | 1 to 1.4 |
| | | 1.04 to 2.63 | R2-4 | |
| | | 2.63 to 6.64 | R5.5-4 | |
| | Spring-up fingersafe terminal (25A and 30A) | 0.25 to 1.65 | R1.25-5 | 1.8 to 2.2 |
| | | 1.04 to 2.63 | R2-5 | |
| | | 2.63 to 6.64 | R5.5-5 | |
| Auxiliary Contact Alarm Contact Voltage Coil Terminals | Slotted Phillips screw with square washer | 0.25 to 1.65 | R1.25-3.5 | 0.7 to 0.9 |
| | | 1.04 to 2.63 | R2-3.5 | |

- For wiring the main circuit terminal, use the applicable crimp terminals and tighten to the recommended torque.
- When using the NC1V circuit breaker as CSA-certified product, use with CSA-certified crimp terminal.
- When using the NC1V circuit breaker as UL-listed product, use with UL-listed crimp terminal.

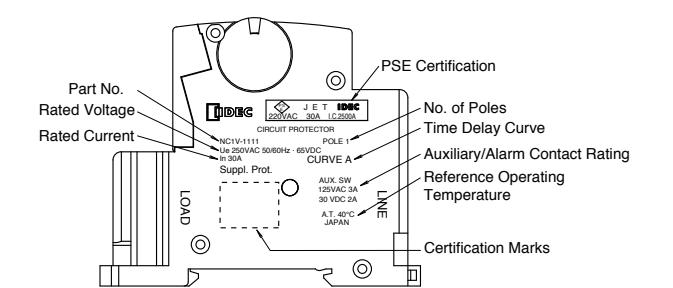
Panel Mounting Screws (not supplied)

| Screw Type | Tightening Torque | Shape |
|------------|-------------------|-------------------------------|
| M4 | 0.8 to 1.0 N·m | Spring Washer Plain Washer |

Accessories

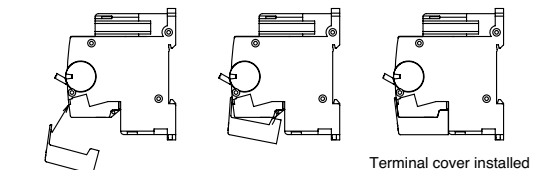
| Item | Part No. | Description |
|------|-------------|---|
| | NC9Z-MA11 | Panel Cut-Out Mounting bracket for 1-pole model |
| | NC9Z-MA21 | Panel Cut-Out Mounting bracket for 2-pole model |
| | NC9Z-MA31 | Panel Cut-Out Mounting bracket for 3-pole model |
| | NC9Z-PW1 | Marking Plate Holder* |
| | NC1V-AUX-CV | Auxiliary/Alarm Terminal Cover (Nylon - PA66) |

Product Markings (Example: NC1V-1111-30AA)



Installation of Auxiliary/Alarm Terminal Cover

After wiring the terminals, install the terminal cover by aligning with the circuit breaker as shown below.



| Item | Part No. | Description |
|------|----------|---|
| | NC9Z-LK1 | Padlock attachment |
| | NC9Z-TA1 | Replacement Wiring Clip when using panel mount brackets |

*Marking plate not supplied.

PS6R: World's First Expandable Power Supply



Less cost + less space = more savings! More value!

Replace 3 full-priced, space-consuming power supplies with 1.

Reduce the amount of space needed for wiring and installation

The addition of a DC-DC converter expansion module will eliminate the need for multiple power supplies or snap on a branch terminal module to replace multiple terminal blocks.

Flexibility, expandability, versatility

Add DC-DC converter units for up to three separate output voltages (5, 12, or 15V). Or, add a branch terminal module to get two additional + and – slots.

Energy-saving 93% Efficiency

Save energy and generate less heat in the cabinet, reducing temperature stress on critical components.

Easy Maintenance - LED Indicator

DC low or ON indicator.

Technical support:

support@idec.com

Sales support:

sales@idec.com

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Catalog No. NC9Y-B100-2 08/14 5K

Specifications and other descriptions in this catalog are subject to change without notice.



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IDEC Hydraulic-Magnetic Circuit Breakers
NC1V Series

Hydraulic-Magnetic Circuit Breakers

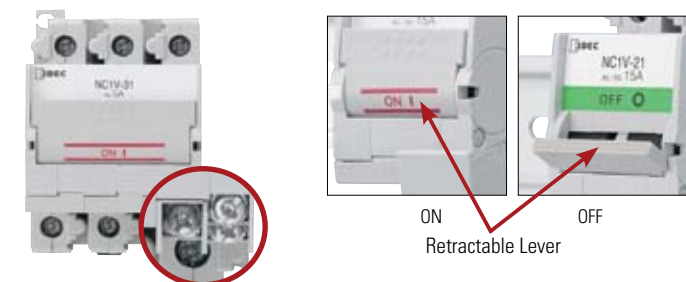
Using a hydraulic-magnetic tripping method ensures calibration of the NC1V Circuit Breaker is unaffected by ambient temperature. The NC1V series will carry their full rated current continuously over a wide temperature range, from -10 to 60°C, providing a more reliable and accurate system. With many other available features, make NC1V Circuit Breakers your choice to provide more value for your investment.



Reliable, safe and accurate

NC1V Circuit Breakers

- Hydraulic-magnetic tripping system
- Slim housing design; 1, 2, and 3-pole
- Cost-effective fuse block replacement - better accuracy over temperature
- Flat retractable lever for safety operations
- Spring-up terminals allow for use of ring terminals
- DIN rail or direct panel mount
- Optional built-in auxiliary or alarm controls
- UL1077



Auxiliary or Alarm Contact
(Shown without terminal cover.)



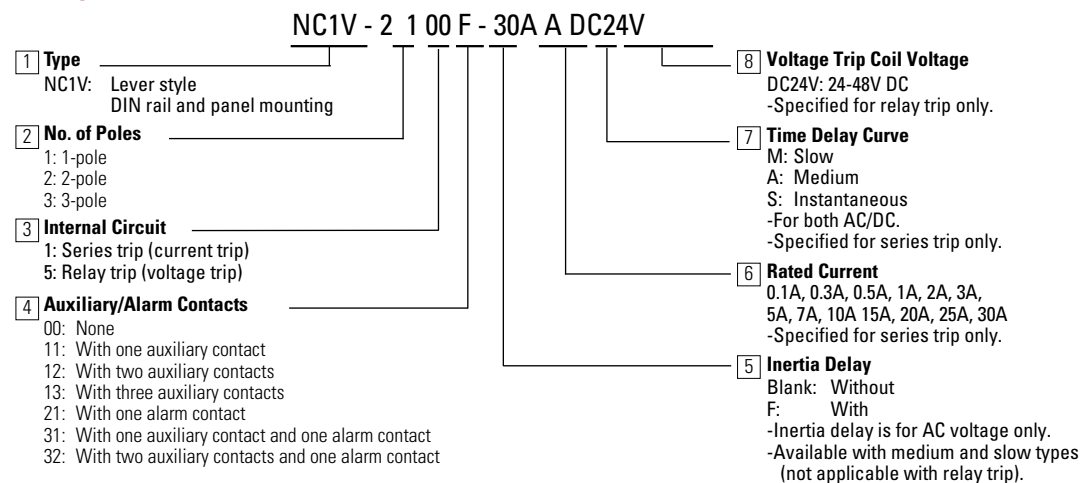
Specifications

| | | | |
|--|---|---|----------------------------------|
| Operator Style | Retractable lever | | |
| Internal Circuit | Series trip (current trip), Relay trip (voltage trip) | | |
| Protection Method | Hydraulic magnetic tripping system, Magnetic tripping system (voltage trip) | | |
| No. of Poles | 1-pole | 2-pole | 3-pole |
| Rated Voltage (AC/DC) ^{Note 1} | 250V AC 50/60Hz, 65V DC | 250V AC 50/60Hz, 125V DC | 250V AC, 50/60Hz |
| Series Trip (Current Trip) | Rated Short-circuit Capacity | 250V AC, 2500A 65V DC, 2500A | 250V AC, 2500A 125V DC, 2500A |
| | Rated Current | 0.1A, 0.3A, 0.5A, 1A, 2A, 3A, 5A, 7A, 10A, 15A, 20A, 25A, 30A | |
| | Operation Characteristics ^{Note 2} | Time delay curve curve M (slow), curve A (medium), S (instantaneous) , Curves M and A are also available with inertia delay option. | |
| Relay Trip (Voltage Trip) ^{Note 3} | Rated Current | 30A | |
| | Trip Voltage | 24 to 48V DC (at 25°C), Voltage application duration 10 sec maximum, tripping time 0.1 sec maximum (at rated voltage) | |
| Auxiliary Contact/ Alarm Contact | Contact Rating | 125V AC 3A (resistive load), 30V DC 2A (resistive load) | |
| | Minimum Applicable Load | 24V DC 1mA (resistive load, reference value) | |
| Insulation Resistance | 100MΩ minimum (500V DC megger) | | |
| Dielectric Strength | 2,000V AC, 1 minute (between terminals when main contacts are open, between live parts of different poles, between live and dead parts) 600V AC (between terminals when auxiliary circuits are open) | | |
| Vibration Resistance (with rated current applied) | Damage limits: 147m/s ² (10 to 55Hz) (1-pole, 2-pole), 78m/s ² (3-pole) Operating extremes: 98m/s ² (1-pole, 2-pole), 78m/s ² (3-pole) | | |
| Shock Resistance (S time delay curve: 80% rated current, A, M time delay curve: 100% rated current) | Damage limits: 490m/s ² (1-pole, 2-pole), 297m/s ² (3-pole) Operating extremes: 196m/s ² (S, A, M types) | | |
| Electrical Life | 10,000 cycles minimum (at rated current), 10 operations per minute | | |
| Reference Temperature | 40°C | | |
| Operating Temperature | -10 to +60°C (no freezing) Rated current is based on an ambient temperature of 40°C. When the operating temperature exceeds 40°C, derate the rated current by using the factors shown below. | | |
| Operating Humidity | 45 to 85% RH (no condensation) | | |
| Terminal Style | Main Circuit Terminal | Spring-up, fingersafe terminal: M4 screw (up to 20A), M5 screw (25A and 30A) | |
| | Auxiliary/Alarm Contacts, Voltage Coil Terminal | M3.5 screw | |
| Weight (approx.) | 1-pole: 90g, 2-pole: 170g, 3-pole: 260g | | |

- 3-pole type is for AC voltage only.
- For S (instantaneous) tripping curve, humming sound may occur when used in an AC sinusoidal-wave current circuit around 80% of the rated current, however, the performance of the circuit breaker will not be affected.
To avoid unnecessary tripping, do not use in circuits where inrush currents may be present.
- Relay trip (voltage trip) type is not equipped with an overcurrent trip function.
Do not use the NC1V circuit breakers in environments where they are exposed to extreme temperature, humidity, dust, corrosive gases, vibration, shock, or in a circuit where inrush current may be present, otherwise unnecessary operation and damage may occur.

| Operating Temp. | Derating Factor |
|-----------------|-----------------|
| 50°C | 0.9 |
| 55°C | 0.8 |
| 60°C | 0.7 |

Part Number Configuration



Part Numbers

| Internal Circuit | No. of Poles | Inertia Delay | Auxiliary Contact Alarm Contact | Part No. | Code | | | | | |
|---|----------------|---|---------------------------------|--|---|---|-----------------------------|------------------------|--------------------------|----------------|
| | | | | | 6 Rated Current | 7 Time Delay Curve | 8 Voltage Trip Coil Voltage | | | |
| Series Trip (Current Trip) | 1-pole | — | — | NC1V-1100-6 7 | 0.1A 0.3A 0.5A 1A 2A 3A 5A 7A 10A 15A 20A 25A 30A | M (slow) A (medium) S (instantaneous) | — | | | |
| | | | One Auxiliary Contact | NC1V-1111-6 7 | | | | | | |
| | | | One Alarm Contact | NC1V-1121-6 7 | | | | | | |
| | | With | — | NC1V-1100F-6 7 | | | | | | |
| | | | One Auxiliary Contact | NC1V-1111F-6 7 | | | | | | |
| | | | One Alarm Contact | NC1V-1121F-6 7 | | | | | | |
| | 2-pole | — | — | — | | | | NC1V-2100-6 7 | | |
| | | | | One Auxiliary Contact | | | | NC1V-2111-6 7 | | |
| | | | | Two Auxiliary Contacts | | | | NC1V-2112-6 7 | | |
| | | | | One Alarm Contact | | | | NC1V-2121-6 7 | | |
| | | | | One Auxiliary Contact and One Alarm Contact | | | | NC1V-2131-6 7 | | |
| | | | | With | | | | — | NC1V-2100F-6 7 | |
| | | | | | | | | One Auxiliary Contact | NC1V-2111F-6 7 | |
| | | | | | | | | Two Auxiliary Contacts | NC1V-2112F-6 7 | |
| | | | | | | | | One Alarm Contact | NC1V-2121F-6 7 | |
| | | One Auxiliary Contact and One Alarm Contact | NC1V-2131F-6 7 | | | | | | | |
| | | 3-pole | — | | | | | — | — | NC1V-3100-6 7 |
| | | | | | | | | | One Auxiliary Contact | NC1V-3111-6 7 |
| | | | | | | | | | Two Auxiliary Contacts | NC1V-3112-6 7 |
| | | | | | | | | | Three Auxiliary Contacts | NC1V-3113-6 7 |
| | | | | One Alarm Contact | | | | | NC1V-3121-6 7 | |
| | | | | One Auxiliary Contact and One Alarm Contact | | | | | NC1V-3131-6 7 | |
| | | | | Two Auxiliary Contacts and One Alarm Contact | | | | | NC1V-3132-6 7 | |
| | | | | With | | | | | — | NC1V-3100F-6 7 |
| One Auxiliary Contact | NC1V-3111F-6 7 | | | | | | | | | |
| Two Auxiliary Contacts | NC1V-3112F-6 7 | | | | | | | | | |
| Three Auxiliary Contacts | NC1V-3113F-6 7 | | | | | | | | | |
| One Alarm Contact | NC1V-3121F-6 7 | | | | | | | | | |
| One Auxiliary Contact and One Alarm Contact | NC1V-3131F-6 7 | | | | | | | | | |
| Relay Trip (Voltage Trip) | 1-pole | — | — | NC1V-1500-8 | — | — | DC24V | | | |
| | 2-pole | — | — | NC1V-2500-8 | | | | | | |
| | 3-pole | — | — | NC1V-3500-8 | | | | | | |

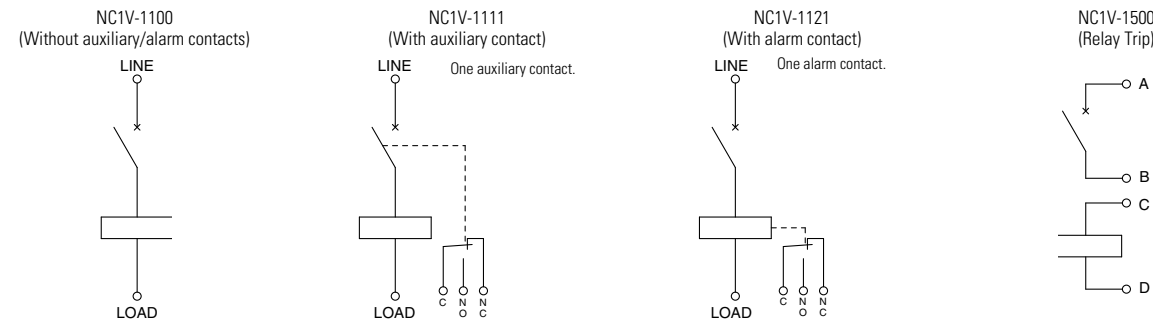
- Specify rated current, time delay curve, or voltage trip coil voltage in place of 6 7 8 when ordering.
- Inertia delay is for an AC circuit. Additionally, time delay curve of S (instantaneous) is not available with inertia delay.
- 8 only applies to voltage trip models.



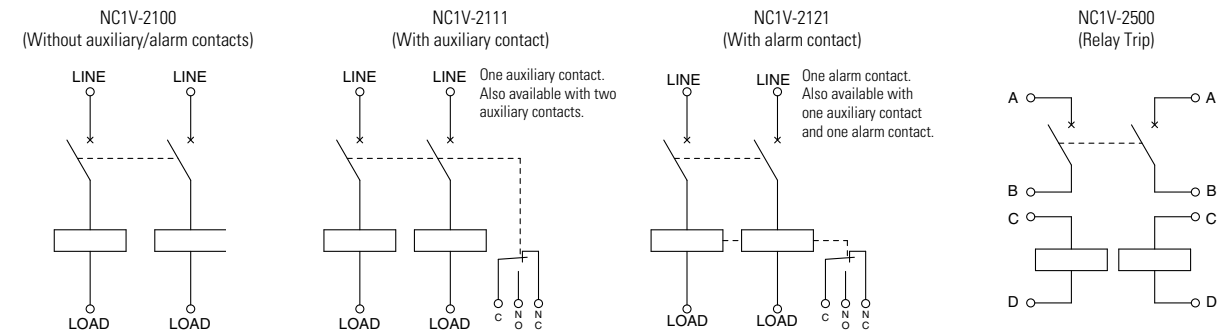
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Internal Circuits

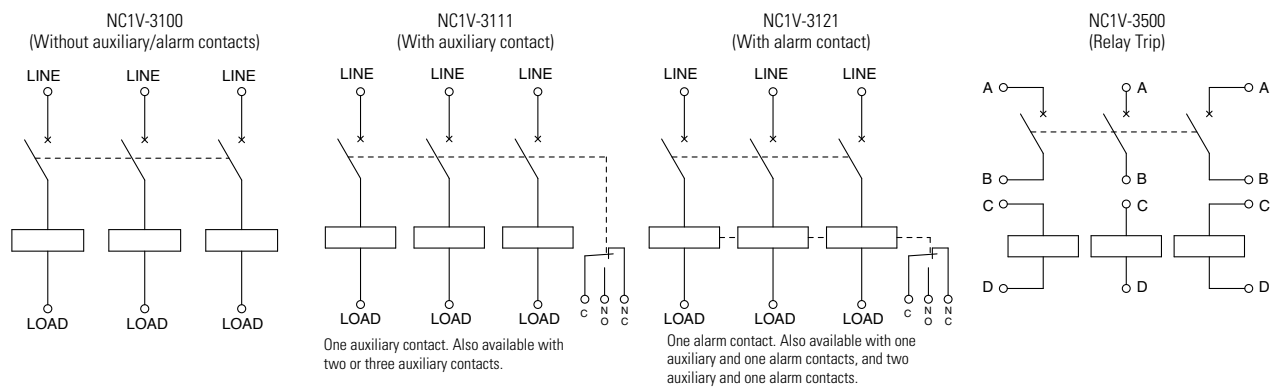
1-pole



2-pole



3-pole

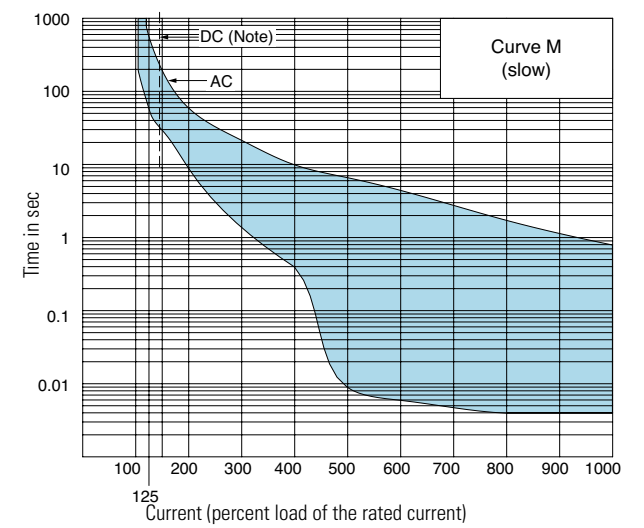
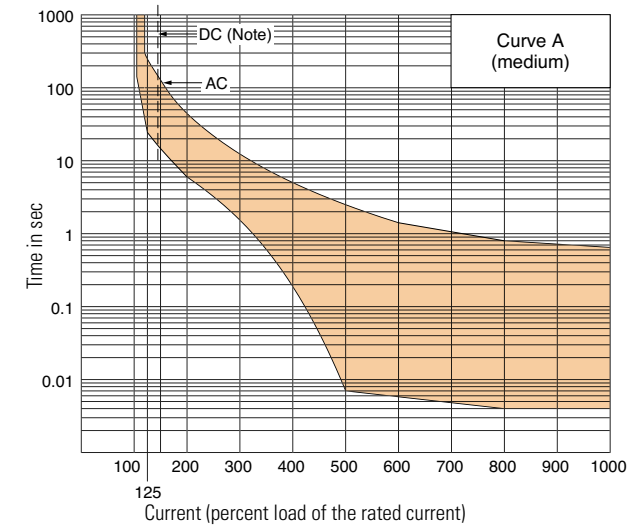


Overcurrent-Time Delay Characteristics (sec at 40°C) [vertical mounting]

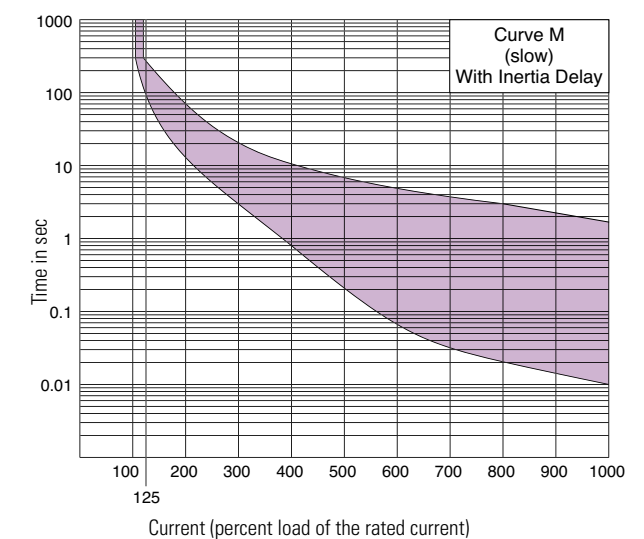
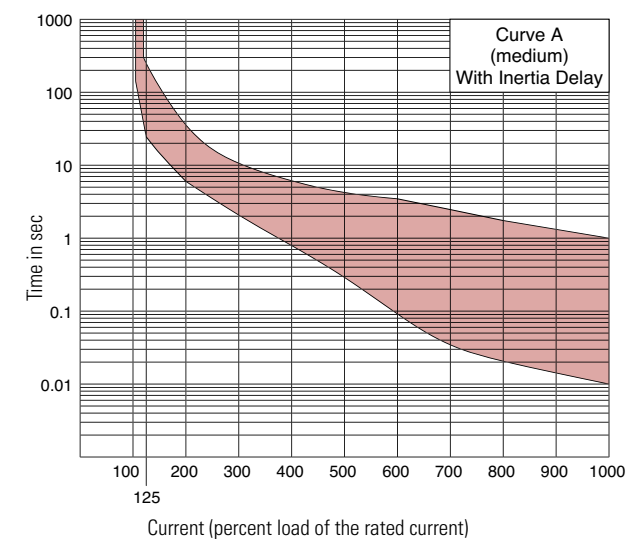
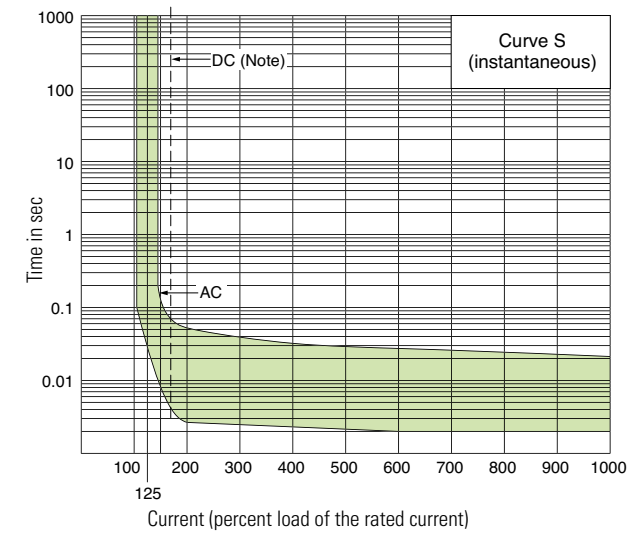
| Item | Time Delay Curve | Percent of Rated Current | | | | | | | | |
|-----------------|-------------------------------|--------------------------|------------|---------------|---------------|----------------|---------------|----------------|----------------|----------------|
| | | 100% | 125% | 150% | 175% | 200% | 400% | 600% | 800% | 1000% |
| AC (50/60Hz)/DC | S (instantaneous) | NO TRIP | — | *0.005 to 0.1 | 0.003 to 0.06 | 0.0027 to 0.05 | 0.002 to 0.03 | 0.002 to 0.028 | 0.002 to 0.025 | 0.002 to 0.022 |
| | A (medium) | NO TRIP | *25 to 240 | 16 to 140 | — | 6 to 32 | 0.4 to 4 | 0.0055 to 1.5 | 0.004 to 0.8 | 0.004 to 0.65 |
| | M (slow) | NO TRIP | *60 to 600 | 30 to 200 | — | 9 to 60 | 0.4 to 10 | 0.006 to 4.5 | 0.004 to 1.8 | 0.004 to 0.8 |
| AC (50/60Hz) | With Inertia Delay A (medium) | NO TRIP | 25 to 240 | — | — | 6 to 32 | 0.8 to 6 | 0.09 to 3.5 | 0.02 to 1.8 | 0.01 to 1.0 |
| | With Inertia Delay M (slow) | NO TRIP | 60 to 600 | — | — | 10 to 60 | 0.8 to 10 | 0.06 to 4.5 | 0.02 to 3 | 0.01 to 1.75 |

*MAY TRIP on DC

Time Delay Curves at 40°C



Note: The entire shaded area applies to AC.
For DC, the shaded area on the right of the dashed line applies.



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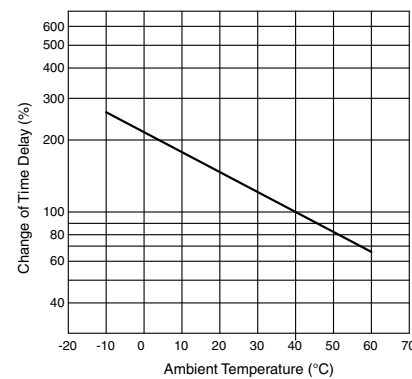
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Time Delay Curve and Ambient Temperature

NC1V circuit breakers employ an electromagnetic tripping system, where the rated current (trip current) is not affected by ambient temperatures. But, the time delay may vary with the oil viscosity in the oil dash pot. Lower oil viscosity at higher temperatures results in a shorter delay, whereas at lower temperatures, the delay will be longer.

Temperature Correction Curve

The time delay curves on the preceding page are measured at 40°C. With reference to the following curves, time delays can be corrected according to ambient temperature.



The time delay is based on an ambient temperature of 40°C. Time delays at other temperatures are corrected according to the temperature correction curve. The time delay of the instantaneous time delay curve (S) is not affected by the ambient temperature.

When operating temperature exceeds 40°C, derate the rated current by multiplying the derating factor shown on the right.

| Operating Temp. | Derating Factor |
|-----------------|-----------------|
| 50°C | 0.9 |
| 55°C | 0.8 |
| 60°C | 0.7 |

Impedance and Coil Resistance

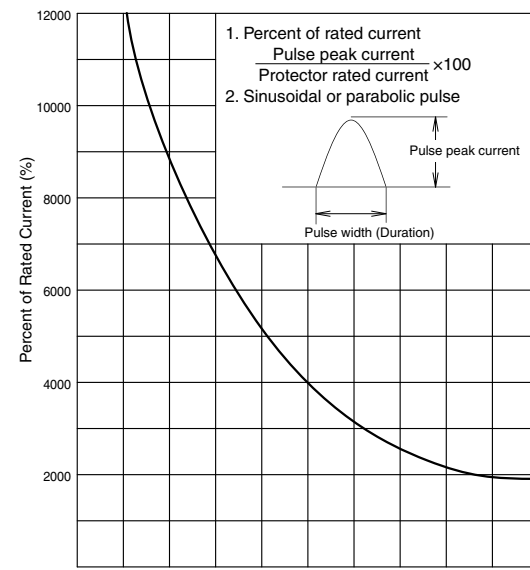
Series Trip (Current Trip) at 25°C

| Rated Current | For AC 50/60 Hz Impedance (Ω) | | For DC Resistance (Ω) | |
|---------------|-------------------------------|-------------|-----------------------|-------------|
| | Curve S | Curves A, M | Curve S | Curves A, M |
| 0.1A | 66.0 | 116.0 | 43.0 | 106.0 |
| 0.3A | 6.6 | 11.0 | 4.1 | 10.0 |
| 0.5A | 1.92 | 3.65 | 0.86 | 3.40 |
| 1A | 0.50 | 0.93 | 0.25 | 0.90 |
| 2A | 0.16 | 0.27 | 0.11 | 0.25 |
| 3A | 0.07 | 0.12 | 0.050 | 0.11 |
| 5A | 0.025 | 0.050 | 0.015 | 0.045 |
| 7A | 0.014 | 0.027 | 0.011 | 0.025 |
| 10A | 0.007 | 0.021 | 0.005 | 0.020 |
| 15A | 0.006 | 0.010 | 0.005 | 0.009 |
| 20A | 0.005 | 0.006 | 0.004 | 0.005 |
| 25A | 0.004 | 0.005 | 0.004 | 0.005 |
| 30A | 0.003 | 0.004 | 0.003 | 0.004 |

Tolerance: ±25% (up to 20A), ±50% (25A and 30A)

Inertia Delay

Inertia delay is designed not to trip on a non-repeating single pulse of 20 times the rated current (peak value) for a duration of 8ms. In addition, circuit breakers equipped with inertia delay do not respond to high inrush currents caused by transformer or lamp loads, but perform the specified interruption on subsequent overcurrents. Inertia delay is available on AC circuits, and is not available with the series trip curve S (instantaneous).



Relay Trip (Voltage Trip) at 25°C

| Tripping Voltage | For DC Resistance (Ω) |
|------------------|-----------------------|
| 24-48V | 100.0 |

Tolerance: ±25%

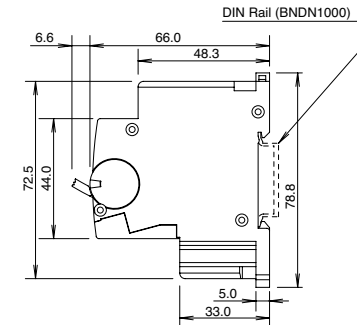
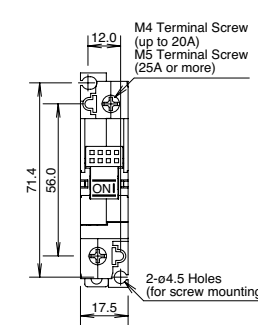
Voltage Drop Due to Coil Resistance or Impedance

The internal resistance or impedance of a circuit breaker tends to be larger for a smaller-rated current. Therefore, when circuit breakers with a small rated current are used, voltage drop should be taken into consideration. Internal resistance also varies with time delay curves, which should also be considered during installation.

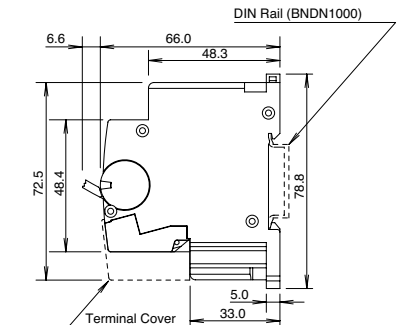
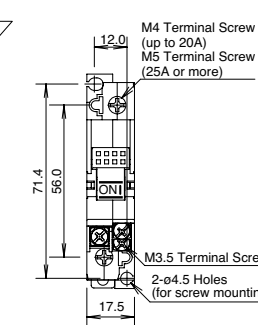
Dimensions (mm)

1-pole

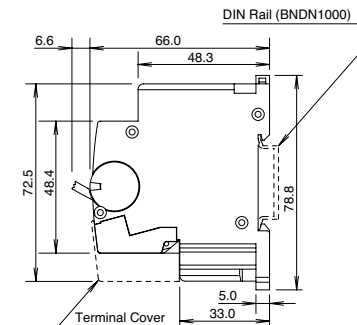
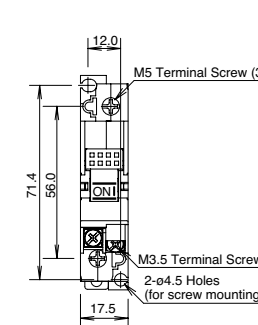
NC1V-1100



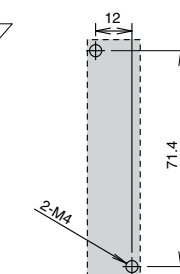
NC1V-1111 (Auxiliary Contact), NC1V-1121 (Alarm Contact)



NC1V-1500 (Relay Trip)

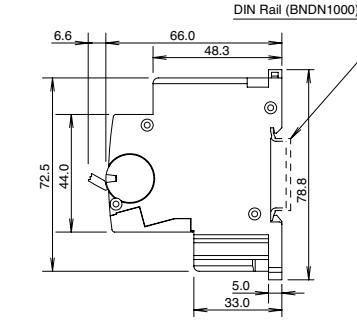
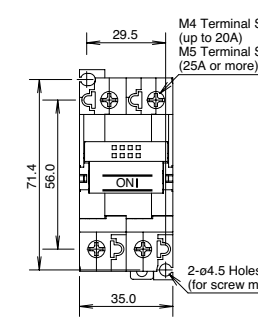


Mounting Hole Layout (M4 Mounting Screws)

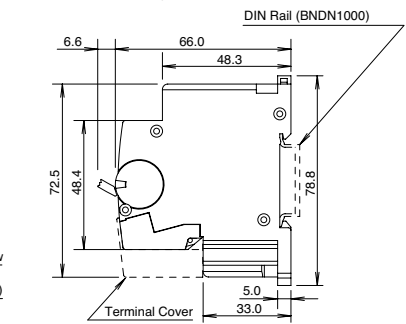
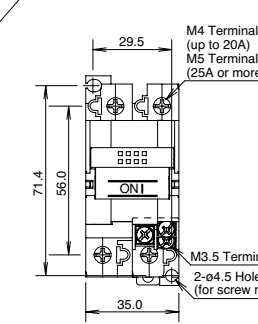


2 Pole

NC1V-2100

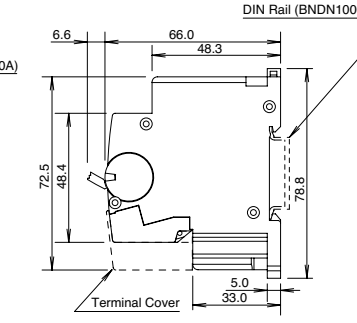
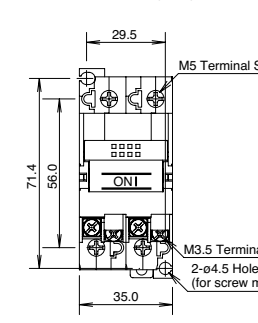


NC1V-2111 (one auxiliary contact), NC1V-2112 (two auxiliary contacts)
 NC1V-2121 (one alarm contact), NC1V-2131 (one auxiliary and one alarm contact)

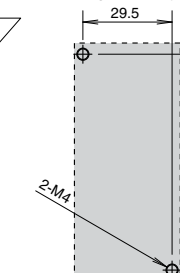


Dimensions shown are for NC1V-2111 and NC1V-2121.

NC1V-2500 (Relay Trip)



Mounting Hole Layout (M4 Mounting Screws)

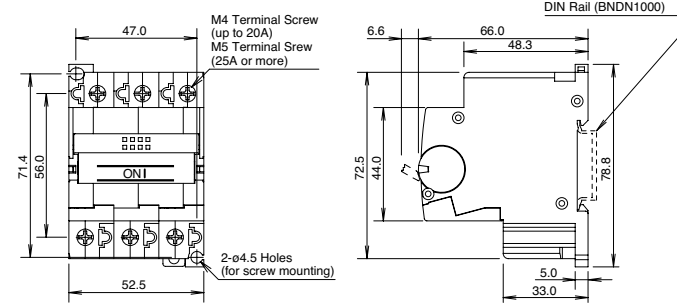


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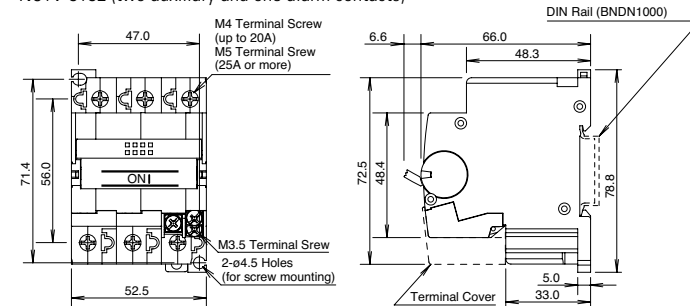
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3-pole

NC1V-3100

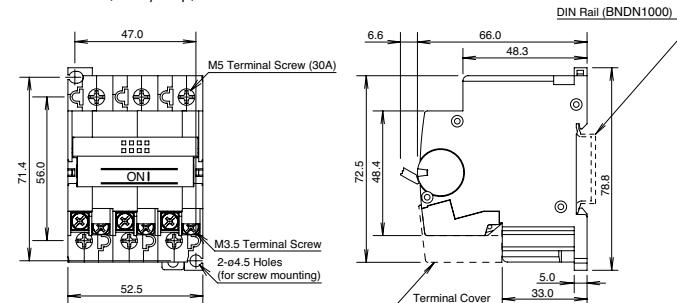


NC1V-3111 (one auxiliary contact), NC1V-3112 (two auxiliary contacts)
 NC1V-3113 (three auxiliary contacts), NC1V-3121 (one alarm contact)
 NC1V-3131 (one auxiliary and one alarm contact)
 NC1V-3132 (two auxiliary and one alarm contacts)

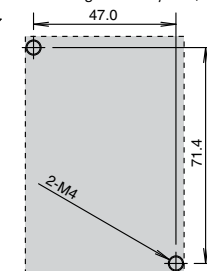


Dimensions shown are for NC1V-3111 and NC1V-3121.

NC1V-3500 (Relay Trip)



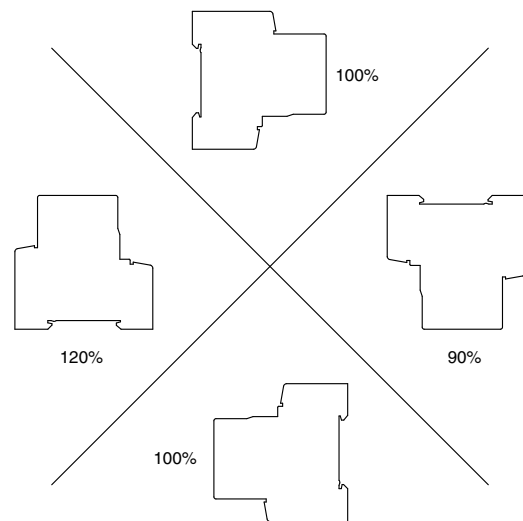
Mounting Hole Layout (M4 Mounting Screws)



Instructions

Installation Angle

Tripping method is hydraulic magnetic. Minimum operating current varies with installation angle. Operating currents are influenced by the weight of movable iron core. With reference to the following figures, correct the rated current.



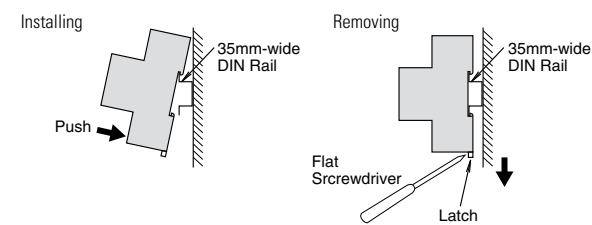
Minimum operating current is calculated from the following formula:
 (Minimum operating current) = (Rated current) × (Correction factor by installation angle) × (Reference minimum tripping current rate)

DIN Rail Installation

1. Fasten the DIN rail securely.
2. With the latch facing downward, install the NC1V circuit breaker on the DIN rail as shown below.

DIN Rail Removal

Using a flat screwdriver, pull the latch on the circuit breaker to remove from the DIN rail.



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Applicable Wire and Crimp Terminals

| Terminal | Terminal Screw | Connectable Wire Size (mm ²) | Applicable Crimping Terminal | Tightening Torque (N·m) |
|--|--|--|------------------------------|-------------------------|
| Main Circuit Terminals | Spring-up, fingersafe, slotted Phillips screw with square washer (up to 20A) | 0.25 to 1.65 | R1.25-4 | 1 to 1.4 |
| | | 1.04 to 2.63 | R2-4 | |
| | | 2.63 to 6.64 | R5.5-4 | |
| | Spring-up fingersafe terminal (25A and 30A) | 0.25 to 1.65 | R1.25-5 | 1.8 to 2.2 |
| | | 1.04 to 2.63 | R2-5 | |
| | | 2.63 to 6.64 | R5.5-5 | |
| Auxiliary Contact Alarm Contact Voltage Coil Terminals | Slotted Phillips screw with square washer | 0.25 to 1.65 | R1.25-3.5 | 0.7 to 0.9 |
| | | 1.04 to 2.63 | R2-3.5 | |

- For wiring the main circuit terminal, use the applicable crimp terminals and tighten to the recommended torque.
- When using the NC1V circuit breaker as CSA-certified product, use with CSA-certified crimp terminal.
- When using the NC1V circuit breaker as UL-listed product, use with UL-listed crimp terminal.

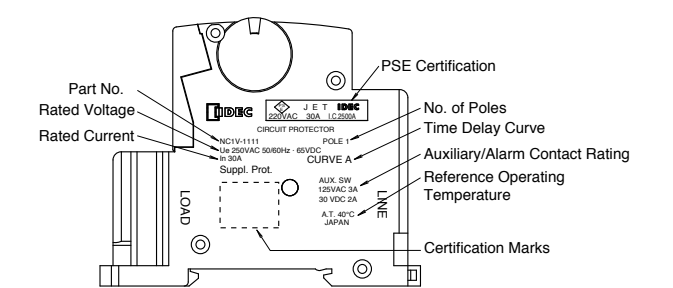
Panel Mounting Screws (not supplied)

| Screw Type | Tightening Torque | Shape |
|------------|-------------------|-------------------------------|
| M4 | 0.8 to 1.0 N·m | Spring Washer Plain Washer |

Accessories

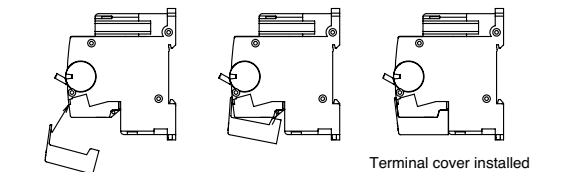
| Item | Part No. | Description |
|------|-------------|---|
| | NC9Z-MA11 | Panel Cut-Out Mounting bracket for 1-pole model |
| | NC9Z-MA21 | Panel Cut-Out Mounting bracket for 2-pole model |
| | NC9Z-MA31 | Panel Cut-Out Mounting bracket for 3-pole model |
| | NC9Z-PW1 | Marking Plate Holder* |
| | NC1V-AUX-CV | Auxiliary/Alarm Terminal Cover (Nylon - PA66) |

Product Markings (Example: NC1V-1111-30AA)



Installation of Auxiliary/Alarm Terminal Cover

After wiring the terminals, install the terminal cover by aligning with the circuit breaker as shown below.



| Item | Part No. | Description |
|------|----------|---|
| | NC9Z-LK1 | Padlock attachment |
| | NC9Z-TA1 | Replacement Wiring Clip when using panel mount brackets |

*Marking plate not supplied.

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Add DC-DC converter units for up to three separate output voltages (5, 12, or 15V). Or, add a branch terminal module to get two additional + and – slots.

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