



FEATURES

1. This relay has an ISO (International Organization for Standardization) terminal arrangement.

Terminals are all solder plated.
*35 A type: Terminal is the plug-in type (no plating).

2. Relay is compact and high capacity (40 A).

Compact form factor realized with space saving 22 × 26 mm .866 × 1.024 inch small base area thanks to integrated bobbin and base construction. Features high switching capacity of 40 A

3. Features high thermal resistance of 125°C 257°F (heat resistant type).

Heat resistant type is available that can withstand use near engines. (40 A switching capacity)

4. Sealed type available for resisting adverse environments.

5. Surge absorbing built-in diode type that works when the relay coil is off and an internal resistor type are available. (Please inquire.)

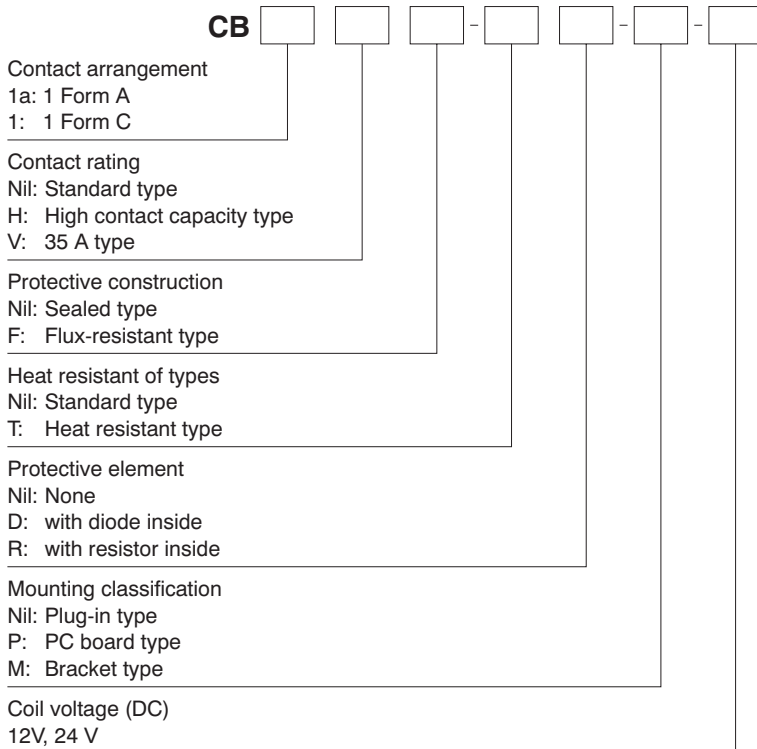
6. Protective element type is also available.

7. For only plug-in types, types with nominal switching capacities of 35 A (12 V) and 15 A (24 V) are available.

TYPICAL APPLICATIONS

- 1. Automobiles**
Headlights, Cell motors, Air conditioners, ABS, EPS, etc.
- 2. Construction equipment**
- 3. Agricultural equipment, Conveyor, etc.**

ORDERING INFORMATION



TYPES

1. Standard type

| Contact arrangement | Mounting classification | Nominal coil voltage | Sealed type | Flux-resistant type |
|-------------------------------------|-------------------------|----------------------|-------------|---------------------|
| | | | Part No. | Part No. |
| 1 Form A | PC board type | 12V DC | CB1a-P-12V | CB1aF-P-12V |
| | | 24V DC | CB1a-P-24V | CB1aF-P-24V |
| | Plug-in type | 12V DC | CB1a-12V | CB1aF-12V |
| | | 24V DC | CB1a-24V | CB1aF-24V |
| | Bracket type | 12V DC | CB1a-M-12V | CB1aF-M-12V |
| | | 24V DC | CB1a-M-24V | CB1aF-M-24V |
| 1 Form C | PC board type | 12V DC | CB1-P-12V | CB1F-P-12V |
| | | 24V DC | CB1-P-24V | CB1F-P-24V |
| | Plug-in type | 12V DC | CB1-12V | CB1F-12V |
| | | 24V DC | CB1-24V | CB1F-24V |
| | Bracket type | 12V DC | CB1-M-12V | CB1F-M-12V |
| | | 24V DC | CB1-M-24V | CB1F-M-24V |
| High contact capacity (1 Form A) | PC board type* | 12V DC | CB1aH-P-12V | CB1aHF-P-12V |
| | | 24V DC | CB1aH-P-24V | CB1aHF-P-24V |
| | Plug-in type | 12V DC | CB1aH-12V | CB1aHF-12V |
| | | 24V DC | CB1aH-24V | CB1aHF-24V |
| | Bracket type | 12V DC | CB1aH-M-12V | CB1aHF-M-12V |
| | | 24V DC | CB1aH-M-24V | CB1aHF-M-24V |

Packing quantity; Carton: 50 pcs. Case: 200 pcs.

Notes: 1. Please use "CB***R**" to order built-in resistor type and "CB***D**" to order built-in diode type. (Asterisks "*" should be filled in from parts table.)
2. *Regarding solder, this product is not MIL (Military Standard) compliant. Please evaluate solder mounting by the actual equipment before using.

2. Heat resistant type

| Contact arrangement | Mounting classification | Nominal coil voltage | Sealed type | Flux-resistant type |
|-------------------------------------|-------------------------|----------------------|---------------|---------------------|
| | | | Part No. | Part No. |
| 1 Form A | PC board type | 12V DC | CB1a-T-P-12V | CB1aF-T-P-12V |
| | | 24V DC | CB1a-T-P-24V | CB1aF-T-P-24V |
| | Plug-in type | 12V DC | CB1a-T-12V | CB1aF-T-12V |
| | | 24V DC | CB1a-T-24V | CB1aF-T-24V |
| | Bracket type | 12V DC | CB1a-T-M-12V | CB1aF-T-M-12V |
| | | 24V DC | CB1a-T-M-24V | CB1aF-T-M-24V |
| 1 Form C | PC board type | 12V DC | CB1-T-P-12V | CB1F-T-P-12V |
| | | 24V DC | CB1-T-P-24V | CB1F-T-P-24V |
| | Plug-in type | 12V DC | CB1-T-12V | CB1F-T-12V |
| | | 24V DC | CB1-T-24V | CB1F-T-24V |
| | Bracket type | 12V DC | CB1-T-M-12V | CB1F-T-M-12V |
| | | 24V DC | CB1-T-M-24V | CB1F-T-M-24V |
| High contact capacity (1 Form A) | PC board type* | 12V DC | CB1aH-T-P-12V | CB1aHF-T-P-12V |
| | | 24V DC | CB1aH-T-P-24V | CB1aHF-T-P-24V |
| | Plug-in type | 12V DC | CB1aH-T-12V | CB1aHF-T-12V |
| | | 24V DC | CB1aH-T-24V | CB1aHF-T-24V |
| | Bracket type | 12V DC | CB1aH-T-M-12V | CB1aHF-T-M-12V |
| | | 24V DC | CB1aH-T-M-24V | CB1aHF-T-M-24V |

Packing quantity; Carton: 50 pcs. Case: 200 pcs.

Notes: 1. Please use "CB***R**" to order built-in resistor type and "CB***D**" to order built-in diode type. (Asterisks "*" should be filled in from parts table.)
2. *Regarding solder, this product is not MIL (Military Standard) compliant. Please evaluate solder mounting by the actual equipment before using.

3. 35 A type (*Terminals are all of the plug-in type.)

| Contact arrangement | Nominal coil voltage | Sealed type | Flux-resistant type |
|-------------------------------|----------------------|-------------|---------------------|
| | | Part No. | Part No. |
| 1 Form A | 12V DC | CB1aV-12V | CB1aVF-12V |
| | 24V DC | CB1aV-24V | CB1aVF-24V |
| 1 Form C | 12V DC | CB1V-12V | CB1VF-12V |
| | 24V DC | CB1V-24V | CB1VF-24V |
| 1 Form A with resistor inside | 12V DC | CB1aV-R-12V | CB1aVF-R-12V |
| | 24V DC | CB1aV-R-24V | CB1aVF-R-24V |
| 1 Form C with resistor inside | 12V DC | CB1V-R-12V | CB1VF-R-12V |
| | 24V DC | CB1V-R-24V | CB1VF-R-24V |
| 1 Form A with diode inside | 12V DC | CB1aV-D-12V | CB1aVF-D-12V |
| | 24V DC | CB1aV-D-24V | CB1aVF-D-24V |
| 1 Form C with diode inside | 12V DC | CB1V-D-12V | CB1VF-D-12V |
| | 24V DC | CB1V-D-24V | CB1VF-D-24V |

Packing quantity; Carton: 50 pcs. Case: 200 pcs.

RATING

1. Coil data

1) 1. No protective element and with diode inside

| Contact arrangement | Nominal coil voltage | Pick-up voltage (Initial, at 20°C 68°F) | Drop-out voltage (Initial, at 20°C 68°F) | Nominal operating current (at 20°C 68°F) | Coil resistance (±10%) (at 20°C 68°F) | Nominal operating power (at 20°C 68°F) | Usable voltage range |
|-------------------------------------|----------------------|---|--|--|---------------------------------------|--|----------------------|
| 1 Form A, 1 Form C | 12V DC | 3 to 7V DC | 1.2 to 4.2V DC | 117mA | 103Ω | 1.4W | 10 to 16V DC |
| | 24V DC | 6 to 14V DC | 2.4 to 8.4V DC | 75mA | 320Ω | 1.8W | 20 to 32V DC |
| High contact capacity (1 Form A) | 12V DC | 3 to 7V DC | 1.2 to 4.2V DC | 117mA | 103Ω | 1.4W (PC board type) | 10 to 16V DC |
| | | | | 150mA | 80Ω | 1.8W | |
| | 24V DC | 6 to 14V DC | 2.4 to 8.4V DC | 58mA | 411Ω | 1.4W (PC board type) | 20 to 32V DC |
| | | | | 75mA | 320Ω | 1.8W | |

Note: Other pick-up voltage types are also available. Please contact us for details.

2) With resistor inside

| Contact arrangement | Nominal coil voltage | Pick-up voltage (Initial, at 20°C 68°F) | Drop-out voltage (Initial, at 20°C 68°F) | Nominal operating current (at 20°C 68°F) | Combined resistance (±10%) (at 20°C 68°F) | Nominal operating power (at 20°C 68°F) | Usable voltage range |
|-----------------------|----------------------|---|--|--|---|--|----------------------|
| 1 Form A, 1 Form C | 12V DC | 3 to 7V DC | 1.2 to 4.2V DC | 134mA | 89.5Ω | 1.6W | 10 to 16V DC |
| | 24V DC | 6 to 14V DC | 2.4 to 8.4V DC | 84mA | 287.2Ω | 2.0W | 20 to 32V DC |

2. Specifications

1) Standard type (12 V coil voltage)

| Characteristics | Item | Specifications | |
|--|--|---|---|
| Contact | Arrangement | 1 Form A 1 Form C High contact capacity (1 Form A) | |
| | Contact resistance (Initial) | Typ 2mΩ (By voltage drop 6 V DC 1 A) | |
| | Contact material | Ag alloy (Cadmium free) | |
| Rating | Nominal switching capacity (Initial) | 40A 14V DC N.O.: 40A 14V DC N.C.: 30A 14V DC 70A 14V DC (at 20°C 68°F) 50A 14V DC (at 85°C 185°F) | |
| | Max. carrying current (Initial) (14V DC, at 85°C 185°F, continuous) | N.O.: 40A N.O.: 40A, N.C.: 30A N.O.: 40A | |
| | Nominal operating power | 1.4W 1.4W 1.8W (1.4W: PC board type) | |
| | Min. switching capacity ^{*1} | 1A 12V DC (12V DC), 1A 24V DC (24V DC) | |
| Electrical characteristics | Initial insulation resistance | Min. 20 MΩ (at 500 V DC) | |
| | Initial breakdown voltage | Between open contacts | 500 Vrms for 1 min. (Detection current: 10mA) |
| | | Between contacts and coil | 500 Vrms for 1 min. (Detection current: 10mA) |
| | Operate time (at nominal voltage) (at 20°C 68°F) | Max. 15ms (at 20°C 68°F, excluding contact bounce time) (Initial) | |
| Release time (at nominal voltage) (at 20°C 68°F) | Max. 15ms (at 20°C 68°F, excluding contact bounce time, without diode) (Initial) | | |
| Mechanical characteristics | Shock resistance | Functional | Min. 200 m/s ² {20G} |
| | | Destructive | Min. 1,000 m/s ² {100G} |
| | Vibration resistance | Functional | 10 Hz to 500 Hz, Min. 44.1m/s ² {4.5G} |
| | | Destructive | 10 Hz to 2,000 Hz, Min. 44.1m/s ² {4.5G} Time of vibration for each direction; X. Y. Z direction: 4 hours |
| Expected life | Electrical (at nominal switching capacity) | Flux-resistant type: Min. 10 ⁵ , Sealed type: Min. 5×10 ⁴ (Operating frequency: 2s ON, 2s OFF) | |
| | Mechanical | Min. 10 ⁶ (at 120 cpm) | |
| Conditions | Conditions for operation, transport and storage ^{*2} | Standard type; Ambient temp: -40 to +85°C -40 to +185°F, Humidity: 5 to 85% R.H. (Not freezing and condensing at low temperature) | |
| | | Heat resistant type; Ambient temp: -40 to +125°C -40 to +257°F, Humidity: 5 to 85% R.H. (Not freezing and condensing at low temperature) | |
| | Max. operating speed | 15 cpm (At nominal switching capacity) | |
| Unit weight | | Approx. 33 g 1.16 oz | |

Notes:

*1 This value can change due to the switching frequency, environmental conditions, and desired reliability level, therefore it is recommended to check this with the actual load.

*2 The upper operation ambient temperature limit is the maximum temperature that can satisfy the coil temperature rise value. Refer to 6. Conditions for operation, transport and storage mentioned in [AMBIENT ENVIRONMENT \(p. 19, Relay Technical Information\)](#).

2) Standard type (24 V coil voltage)

| Characteristics | Item | Specifications |
|-----------------|---|--|
| Contact | Arrangement | 1 Form A 1 Form C High contact capacity (1 Form A) |
| | Contact resistance (Initial) | Max. 15mΩ (By voltage drop 6 V DC 1 A) |
| | Contact material | Ag alloy (Cadmium free) |
| Rating | Nominal switching capacity (Initial) | 20A 28V DC N.O.: 20A 28V DC N.C.: 10A 28V DC 20A 28V DC |
| | Max. carrying current (Initial) (28V DC, at 85°C 185°F, continuous) | 20A N.O.: 20A, N.C.: 10A 20A |
| | Nominal operating power | 1.8W 1.8W 1.8W, 1.4W (PC board type) |

Note: All other specifications are the same as those of standard type (12 V coil voltage)

3) Heat resistant type (12 V and 24 V coil voltage)

| Characteristics | Item | Specifications | | | | | |
|-----------------|--|--|--------------------------------------|----------------------------------|------------|--------------------------------------|----------------------------------|
| | | 12V | | | 24V | | |
| Contact | Arrangement | 1 Form A | 1 Form C | High contact capacity (1 Form A) | 1 Form A | 1 Form C | High contact capacity (1 Form A) |
| | Contact resistance (Initial) | Max. 15mΩ (By voltage drop 6 V DC 1 A) | | | | | |
| | Contact material | Ag alloy (Cadmium free) | | | | | |
| Rating | Nominal switching capacity (Initial) | 40A 14V DC | N.O.: 40A 14V DC N.C.: 30A 14V DC | 40A 14V DC | 20A 28V DC | N.O.: 20A 28V DC N.C.: 10A 28V DC | 20A 28V DC |
| | Max. carrying current (Initial) (at 85°C 185°F, continuous)* | 50A 14V DC | N.O.: 50A 14V DC N.C.: 30A 14V DC | 45A 14V DC 50A 14V DC | 25A 28V DC | N.O.: 25A 28V DC N.C.: 10A 28V DC | 25A 28V DC |
| | Nominal operating power | 1.4W | 1.4W | 1.8W 1.4W (PC board type) | 1.8W | 1.8W | 1.8W, 1.4W (PC board type) |

Notes: 1. All other specifications are the same as those of standard type (12 V coil voltage)
 2. *Current value in which carry current is possible when the coil temperature is 180°C 356°F

4) 35 A type (12 V coil voltage)

| Characteristics | Item | Specifications | |
|----------------------------|---|--|---|
| | | 1 Form A | 1 Form C |
| Contact | Arrangement | 1 Form A | 1 Form C |
| | Contact resistance (Initial) | Typ2mΩ (By voltage drop 6 V DC 1 A) | |
| | Contact material | Ag alloy (Cadmium free) | |
| Rating | Nominal switching capacity (Resistive load) | 35A 14V DC | N.O.: 35A 14V DC, N.C.: 25A 14V DC |
| | Max. carrying current (Initial) (14V DC, at 85°C 185°F, continuous) | N.O.: 35A | N.O.: 35A, N.C.: 25A |
| | Nominal operating power | 1.4W, 1.6W (with resistor inside) | |
| | Min. switching capacity (Reference value)* | 1A 12V DC (12V DC), 1A 24V DC (24V DC) | |
| Electrical characteristics | Initial insulation resistance | Min. 20 MΩ (at 500 V DC) | |
| | Initial breakdown voltage | Between open contacts | 500 Vrms for 1 min. (Detection current: 10mA) |
| | | Between contacts and coil | 500 Vrms for 1 min. (Detection current: 10mA) |
| | Operate time (at nominal voltage) | Max. 15ms (excluding contact bounce time) (Initial) | |
| | Release time (at nominal voltage) | Max. 15ms (excluding contact bounce time, without diode) (Initial) | |
| Mechanical characteristics | Shock resistance | Functional | Min. 100 m/s ² {10G} (Half-wave pulse of sine wave: 11ms; detection: 10μs) |
| | | Destructive | Min. 1,000 m/s ² {100G} (Half-wave pulse of sine wave: 6ms) |
| | Vibration resistance | Functional | 10 Hz to 100 Hz, Min. 44.1m/s ² {4.5G} (Detection time: 10μs) |
| Destructive | | 10 Hz to 2,000 Hz, Min. 44.1m/s ² {4.5G} Time of vibration for each direction; X. Y. Z direction: 4 hours | |
| Expected life | Electrical (at nominal switching capacity) | Flux-resistant type: Min. 10 ⁵ ; Sealed type: Min. 5×10 ⁴ (Operating frequency: 2s ON, 2s OFF) With diode inside: Min. 5×10 ⁴ (Operating frequency: 2s ON, 2s OFF) | |
| | Mechanical | Min. 10 ⁶ (at 120 cpm) | |
| Conditions | Conditions for operation, transport and storage | Ambient temp: -40°C to +85°C -40°F to +185°F Humidity: 5% R.H. to 85% R.H. (Not freezing and condensing at low temperature) | |
| | Max. operating speed | 15 cpm (At nominal switching capacity) | |
| Unit weight | | Approx. 26 g .92 oz, Approx. 28 g .99 oz (with diode inside) | |

Note: * This value can change due to the switching frequency, environmental conditions, and desired reliability level, therefore it is recommended to check this with the actual load.

5) 35 A type (24 V coil voltage)

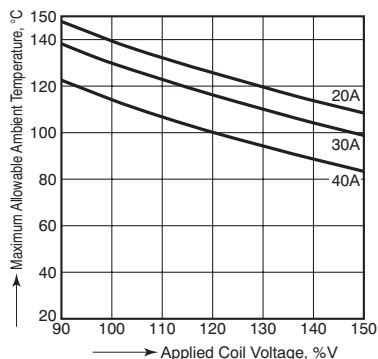
| Characteristics | Item | Specifications | |
|-----------------|---|-----------------------------------|------------------------------------|
| | | 1 Form A | 1 Form C |
| Contact | Arrangement | 1 Form A | 1 Form C |
| | Nominal switching capacity (Resistive load) | 15A 28V DC | N.O.: 15A 28V DC, N.C.: 25A 14V DC |
| Rating | Max. carrying current (14V DC, at 85°C 185°F, continuous) | N.O.: 15A | N.O.: 15A, N.C.: 8A |
| | Nominal operating power | 1.8W, 2.0W (with resistor inside) | |

Note: All other specifications are the same as those of 35 A type (12 V coil voltage).

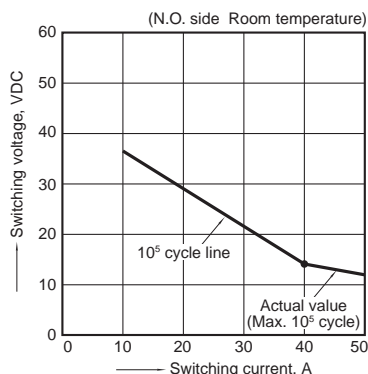
REFERENCE DATA

CB RELAYS (Standard type)

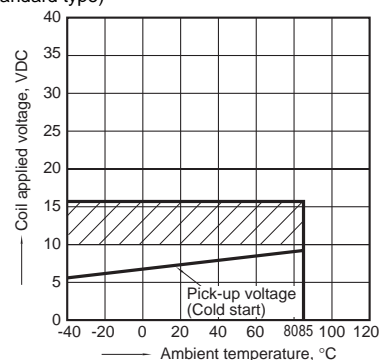
1. Allowable ambient temperature



2. Max. switching capability (Resistive load) (Standard type)



3. Ambient temperature and operating voltage range (Standard type)

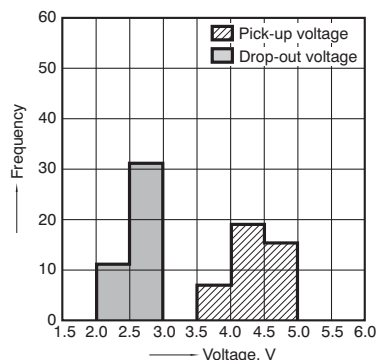


Assumption:

- Maximum mean coil temperature: 180°C
- Curves are based on 1.4W (Nominal power consumption of the unsuppressed coil at nominal voltage)

4. Distribution of pick-up and drop-out voltage

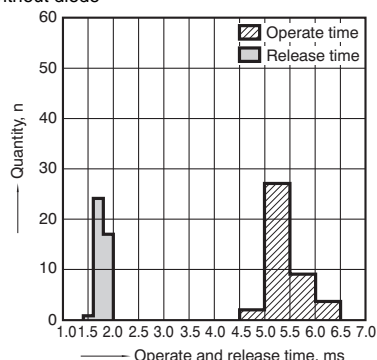
Sample: CB1-P-12V, 42pcs.



5. Distribution of operate and release time

Sample: CB1-P-24V, 42pcs.

* Without diode



6-(1). Electrical life test (Motor free)

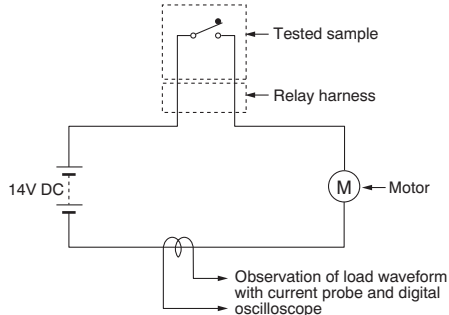
Sample: CB1F-12V, 5pcs.

Load: 25A 14V DC, motor free actual load

Switching frequency: (ON:OFF = 1s:9s)

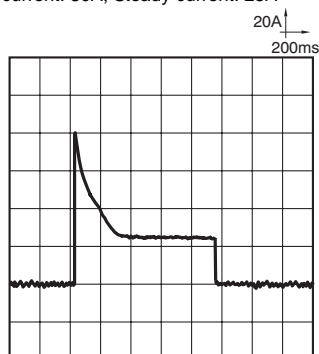
Ambient temperature: Room temperature

Circuit

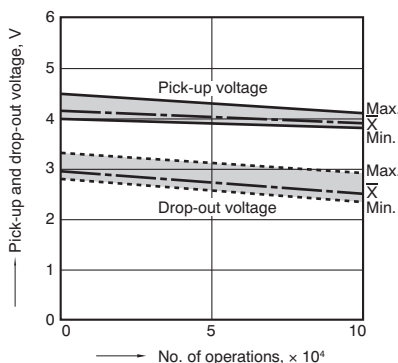


Load current waveform

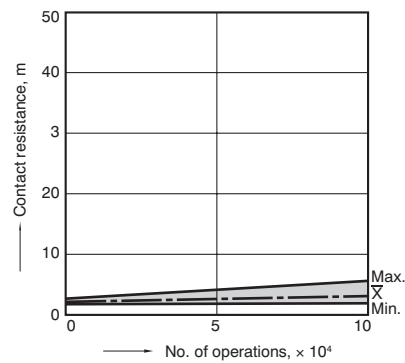
Inrush current: 80A, Steady current: 25A



Change of pick-up and drop-out voltage

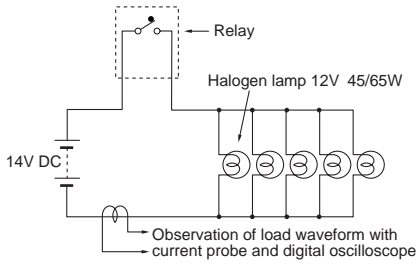


Change of contact resistance



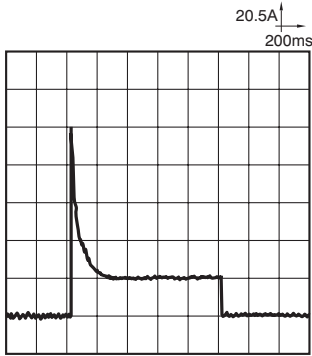
6-(2). Electrical life test (Lamp load)

Sample: CB1F-12V, 5pcs.
 Load: 45/65Wx5 parallel, 14V DC, halogen lamp actual load
 Switching frequency: (ON:OFF = 1s:8s)
 Ambient temperature: Room temperature
 Circuit

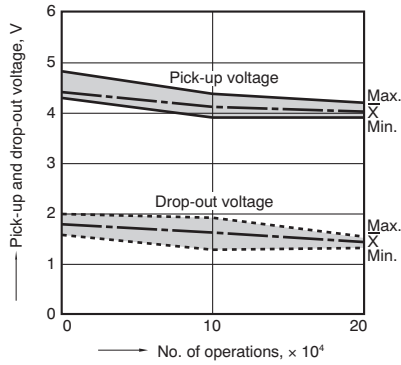


Load current waveform

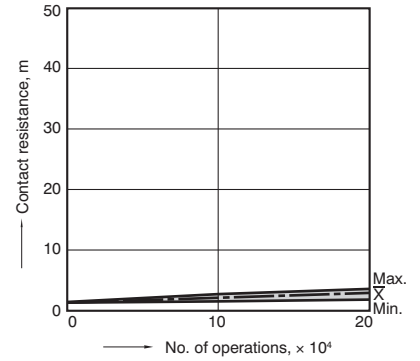
Inrush current: 100A, Steady current: 20A



Change of pick-up and drop-out voltage

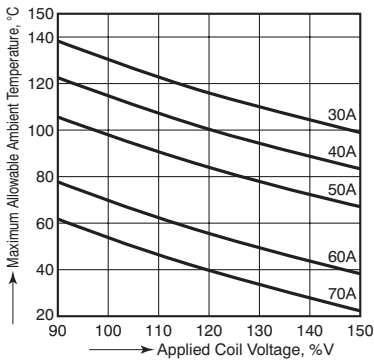


Change of contact resistance

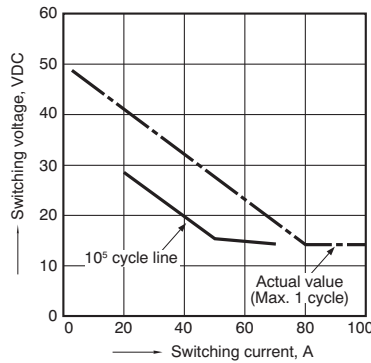


CB RELAYS (High contact capacity type)

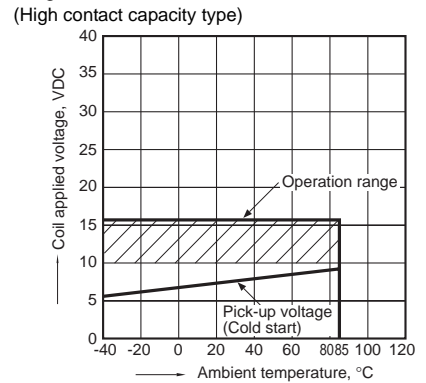
1. Allowable ambient temperature



2. Max. switching capability (High contact capacity type)



3. Ambient temperature and operating voltage range (High contact capacity type)

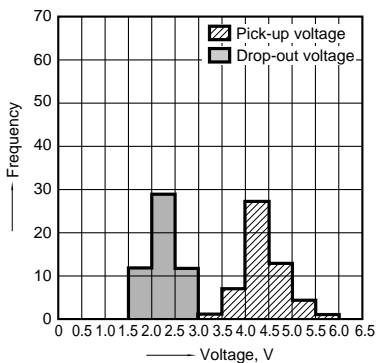


Assumption:

- Maximum mean coil temperature: 180°C
- Curves are based on 1.4W (Nominal power consumption of the unsuppressed coil at nominal voltage)

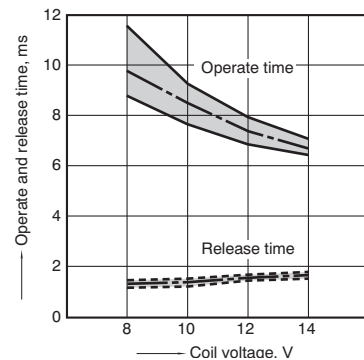
4. Distribution of pick-up and drop-out voltage

Sample: CB1aHF-12V, 53pcs.



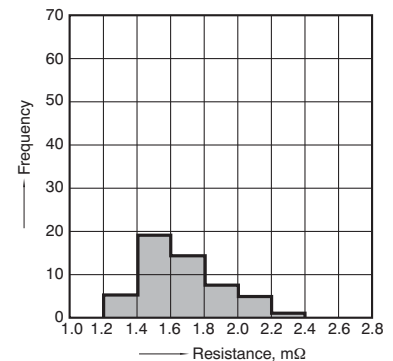
5. Distribution of operate and release time

Sample: CB1aHF-12V, 53pcs.



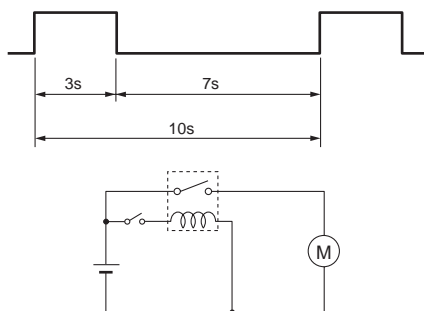
6. Contact resistance

Sample: CB1aHF-12V, 53pcs.
 (By voltage drop 6V DC 1A)



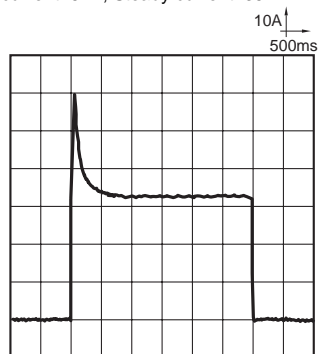
7-(1). Electrical life test (Motor free)

Sample: CB1aH-12V, 3pcs.
 Load: Inrush current: 64A/Steady current: 35A
 Fan motor actual load (motor free) 12V DC
 Switching frequency: (ON:OFF = 3s:7s)
 Ambient temperature: Room temperature
 Circuit

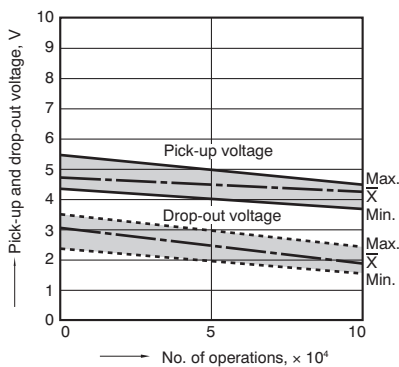


Load current waveform

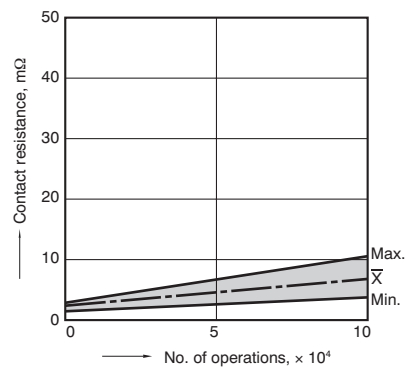
Inrush current: 64A, Steady current: 35A



Change of pick-up and drop-out voltage

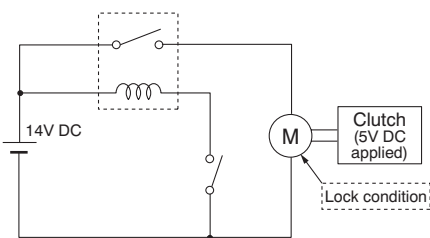


Change of contact resistance



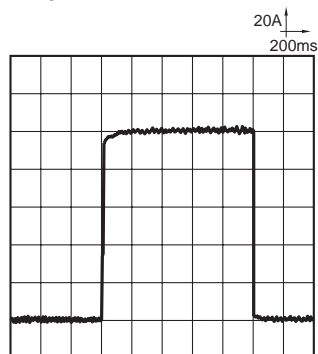
7-(2). Electrical life test (Motor lock)

Sample: CB1aH-12V, 5pcs.
 Load: 100A 14V DC
 Magnet clutch actual load (lock condition)
 Switching frequency: (ON:OFF = 1s:9s)
 Ambient temperature: Room temperature
 Circuit

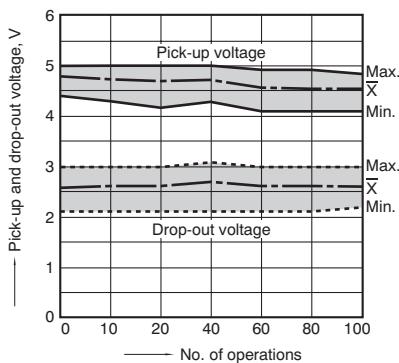


Load current waveform

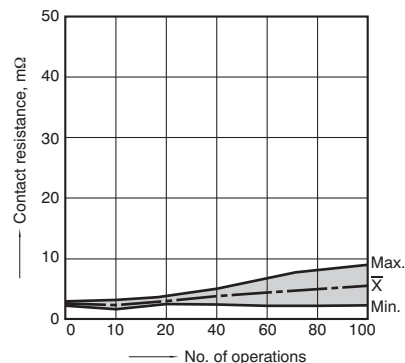
100A 14V DC



Change of pick-up and drop-out voltage



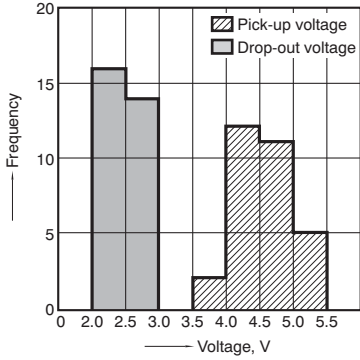
Change of contact resistance



CB RELAY (35 A type)

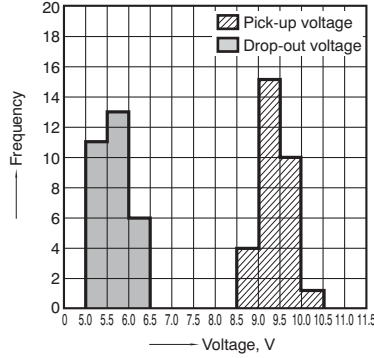
1-(1). Distribution of pick-up and drop-out voltage

Sample: CB1aV-12V, 30pcs.



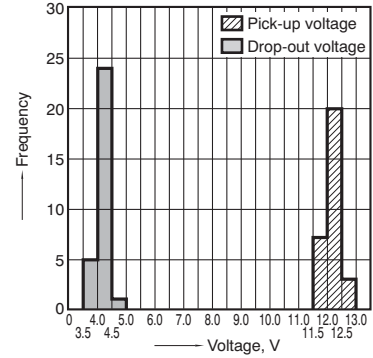
1-(2). Distribution of pick-up and drop-out voltage

Sample: CB1aV-24V, 30pcs.



1-(3). Distribution of pick-up and drop-out voltage

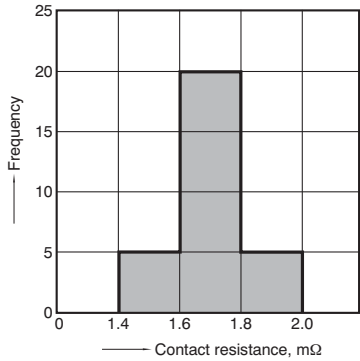
Sample: CB1V-24V, 30pcs.



2-(1) Contact resistance

Sample: CB1aV-12V, 30pcs.

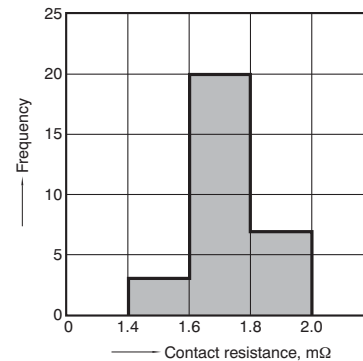
(By voltage drop 12 V DC 1A)



2-(2) Contact resistance

Sample: CB1aV-24V, 30pcs.

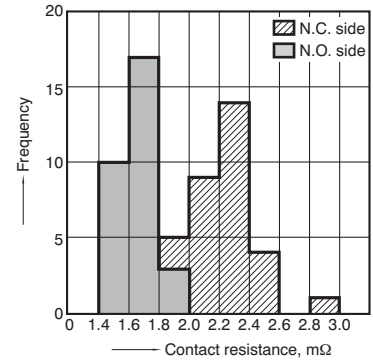
(By voltage drop 24 V DC 1A)



2-(3) Contact resistance

Sample: CB1V-24V, 30pcs.

(By voltage drop 24 V DC 1A)



3. Electrical life test (Blower fan)

Sample: CB1aV-D-24V, 3pcs.

Load: Blower fan load 28 V DC

Inrush current: 30 A/Steady current: 10 A

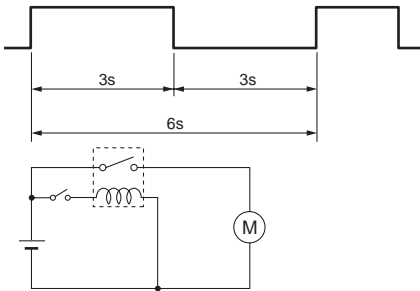
Switching frequency: (ON:OFF = 3s:3s)

Switching cycle: 10⁵

Ambient temperature: 85°C

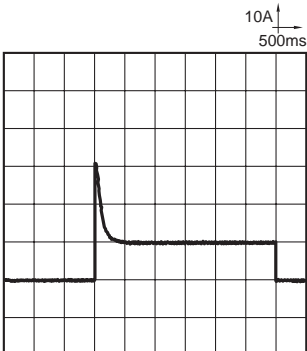
Coil protective element: Diode

Circuit

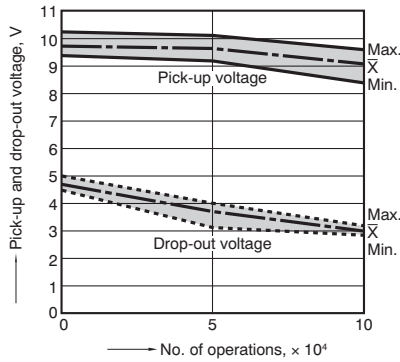


Load current waveform

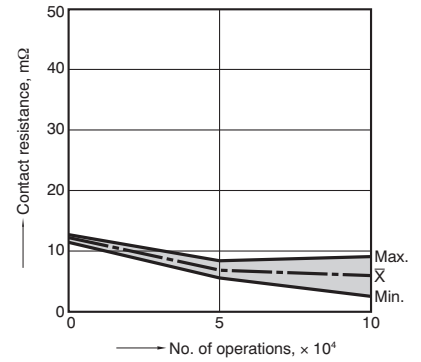
Inrush current: 30 A, Steady current: 10 A



Change of pick-up and drop-out voltage



Change of contact resistance

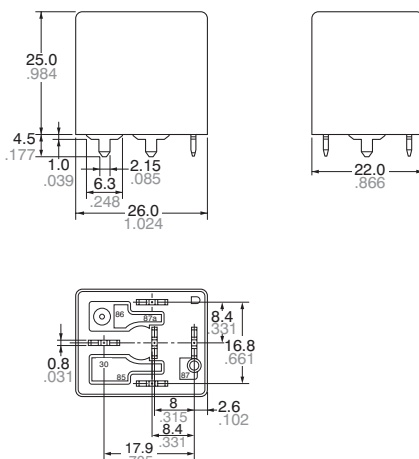


DIMENSIONS (Unit: mm inch)

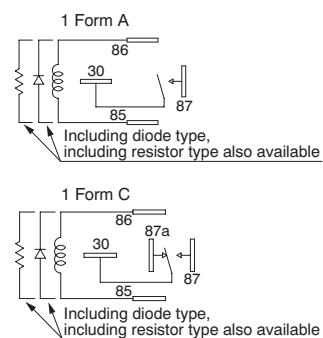
1. PC board type



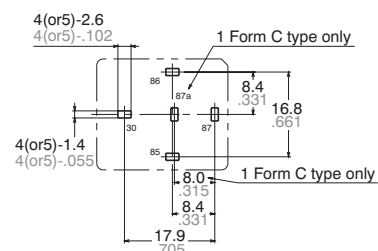
External dimensions



Schematic (Bottom view)



PC board pattern (Bottom view)

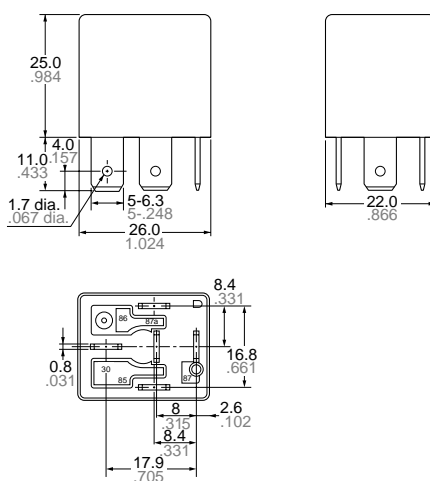


| | |
|-----------------------------|--------------------------|
| Dimension: | General tolerance |
| Max. 1mm .039 inch: | $\pm 0.1 \pm .004$ |
| 1 to 3mm .039 to .118 inch: | $\pm 0.2 \pm .008$ |
| Min. 3mm .118 inch: | $\pm 0.3 \pm .012$ |

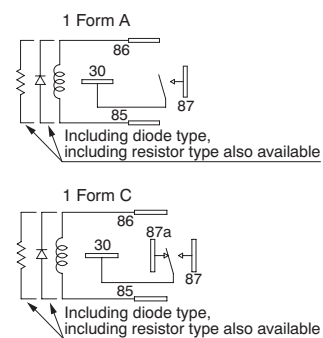
2. Plug-in type * The dimensions are the same as those of 35A type.



External dimensions



Schematic (Bottom view)

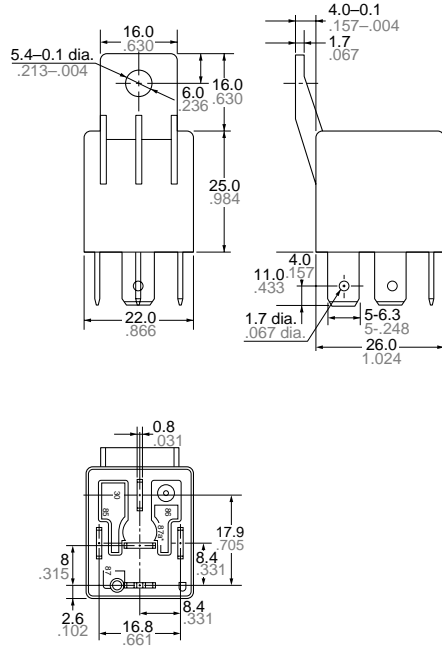


| | |
|-----------------------------|--------------------------|
| Dimension: | General tolerance |
| Max. 1mm .039 inch: | $\pm 0.1 \pm .004$ |
| 1 to 3mm .039 to .118 inch: | $\pm 0.2 \pm .008$ |
| Min. 3mm .118 inch: | $\pm 0.3 \pm .012$ |

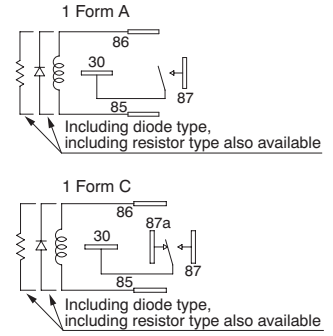
3. Bracket type



External dimensions



Schematic (Bottom view)

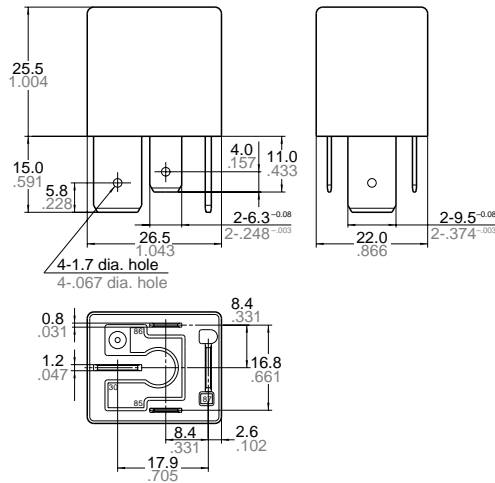


| <u>Dimension:</u> | <u>General tolerance</u> |
|-----------------------------|--------------------------|
| Max. 1mm .039 inch: | ±0.1 ±.004 |
| 1 to 3mm .039 to .118 inch: | ±0.2 ±.008 |
| Min. 3mm .118 inch: | ±0.3 ±.012 |

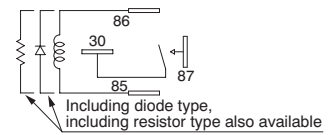
4. High contact capacity (1 Form A) (Plug-in type)



External dimensions



Schematic (Bottom view)

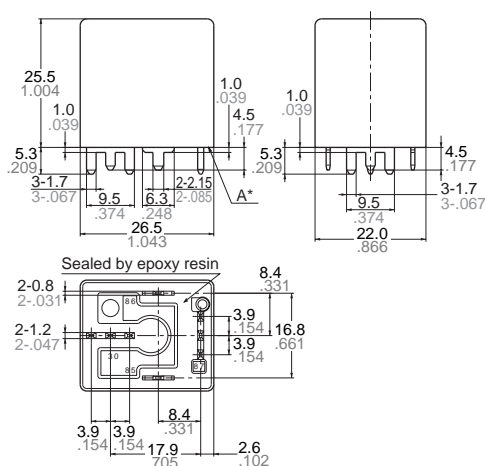


| <u>Dimension:</u> | <u>General tolerance</u> |
|-----------------------------|--------------------------|
| Max. 1mm .039 inch: | ±0.1 ±.004 |
| 1 to 3mm .039 to .118 inch: | ±0.2 ±.008 |
| Min. 3mm .118 inch: | ±0.3 ±.012 |

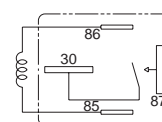
5. High contact capacity (1 Form A) (PC board type)



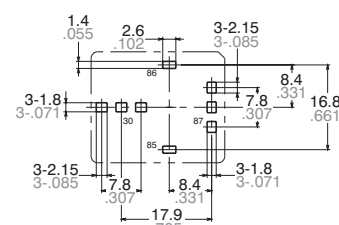
External dimensions



Schematic (Bottom view)



PC board pattern (Bottom view)



* Intervals between terminals is measured at A surface level.

| Dimension: | General tolerance |
|-----------------------------|---------------------|
| Max. 1mm .039 inch: | $\pm 0.1 \pm 0.004$ |
| 1 to 3mm .039 to .118 inch: | $\pm 0.2 \pm 0.008$ |
| Min. 3mm .118 inch: | $\pm 0.3 \pm 0.012$ |

Cautions regarding the protection element

1. Part numbers without protection elements

1) 12 V models

When connecting a coil surge protection circuit to these relays, we recommend a zener diode with a zener voltage of 24 V or higher, or a resistor (680Ω to 1,000Ω). When a diode is connected to the coil in parallel, the release time will slow down and working life may shorten. Before use, please check the circuit and verify that the diode is not connected in parallel to the coil drive circuit.

2) 24 V models

When connecting a coil surge protection circuit to these relays, we recommend a zener diode with a zener voltage of 48 V or higher, or a resistor (2,800Ω to 4,700Ω).

When a diode is connected to the coil in parallel, the release time will slow down and working life may shorten. Before use, please check the circuit and verify that the diode is not connected in parallel to the coil drive circuit.

2. Part numbers with diodes

These relays use a diode in the coil surge protection element. Therefore, the release time is slower and the working life might be shorter compared to part numbers without protection elements and part numbers with resistors. Be sure to use only after evaluating under actual load conditions.

3. Part numbers with resistors

This part number employs a resistor in the coil surge protection circuit; therefore, an external surge protection element is not required. In particular, when a diode is connected in parallel with a coil, the release time becomes slower which could adversely affect working life. Please check the circuit and make sure that a diode is not connected in parallel with the coil drive circuit.

For Cautions for Use, see [Relay Technical Information](#).