

mm inch

FEATURES

- 40 A rating at 85°C 185°F
- ISO type terminals
- High shock resistance for drop test requirements (2 meters 6.6 feet)
- Low temperature rise — all current carrying material is copper.
- Quick connect and PC board type

SPECIFICATIONS

Contact

(1) Standard type (12V coil voltage)

| Arrangement | | 1 Form A | 1 Form C | High contact capacity (1 Form A) |
|----------------------------------|--|---|--|---|
| Rating | Nominal switching capacity | 40 A 14 V DC | N.O.: 40 A 14 V DC N.C.: 30 A 14 V DC | 70 A 14 V DC (at 20°C 68°F) 50 A 14 V DC (at 85°C 185°F) |
| | Max. switching current (at 85°C 185°F) | 40 A 14 V DC | N.O.: 40 A 14 V DC N.C.: 30 A 14 V DC | 40 A 14 V DC |
| Initial contact resistance, max. | | 15mΩ | | |
| Contact material | | Silver alloy | | |
| Expected life | Mechanical (at 120 cpm) | Min. 10 ⁶ | | |
| | Electrical (at rated load) | Flux-resistant type: Min. 10 ⁵ *1 Sealed type: Min. 5 × 10 ⁴ | | |

(2) Standard type (24V coil voltage)

| Arrangement | | 1 Form A | 1 Form C |
|-------------|--|--------------|--|
| Rating | Nominal switching capacity | 20 A 28V DC | N.O.: 20 A 28 V DC N.C.: 10 A 28 V DC |
| | Max. switching current (at 85°C 185°F) | 20 A 28 V DC | N.O.: 20 A 28 V DC N.C.: 10 A 28 V DC |

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

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

| Type | | 12V coil voltage | | 24V coil voltage | |
|-------------|--|------------------|--|------------------|--|
| Arrangement | | 1 Form A | 1 Form C | 1 Form A | 1 Form C |
| Rating | Nominal switching capacity | 35 A 14V DC | N.O.: 35 A 14 V DC N.C.: 30 A 14 V DC | 20 A 28 V DC | N.O.: 20 A 28 V DC N.C.: 10 A 28 V DC |
| | Max. switching current (at 85°C 185°F) | 35 A 14 V DC | N.O.: 35 A 14 V DC N.C.: 30 A 14 V DC | 20 A 28V DC | N.O.: 20 A 28 V DC N.C.: 10 A 28 V DC |

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

Coil

| Arrangement | Coil voltage | Nominal operating power |
|-----------------------|--------------|-------------------------|
| 1 Form A, 1 Form C | 12V DC | 1.4W |
| | 24V DC | 1.8W |
| High contact capacity | 12V DC | 1.8W |

Characteristics

| | | |
|---|---------------------------|--|
| Max. operating speed (at rated load) | | 15 cpm |
| Initial insulation resistance*2 | | Min. 20 MΩ (at 500 V DC) |
| Initial breakdown voltage*3 | Between open contacts | 500 Vrms for 1 min. |
| | Between contacts and coil | 500 Vrms for 1 min. |
| Operate time*4 (at nominal voltage) | | Max. 15 ms |
| Release time (without diode)*4 (at nominal voltage) | | Max. 15 ms |
| Shock resistance | Functional*5 | Min. 200 m/s ² {20 G} |
| | Destructive*6 | Min. 1,000 m/s ² {100 G} |
| Vibration resistance | Functional*7 | 10 to 500Hz, Min. 44.1m/s ² {4.5G} |
| | Functional*8 | 10 to 2,000Hz, Min. 44.1m/s ² {4.5G} |
| Conditions for operation, transport and storage*9 (Not freezing and condensing at low temperature) | Ambient temp. | -40°C to +85°C -40°F to +185°F (Heat resistant type: -40°C to +125°C -40°F to +257°F) |
| | Humidity | 5 to 85% R.H. |
| Unit weight | | Approx. 33 g 1.16 oz |

Remarks

- * Specifications will vary with foreign standards certification ratings.
- *1 All other specifications are the same as those of standard type (12V coil voltage)
- *2 Measurement at same location as "Initial breakdown voltage" section
- *3 Detection current: 10 mA
- *4 Wave is standard shock voltage of $\pm 1.2 \times 50\mu\text{s}$ according to JEC-212-1981
- *5 Excluding contact bounce time

- *6 Half-wave pulse of sine wave: 11ms; detection time: 10μs
- *7 Half-wave pulse of sine wave: 6ms
- *8 Detection time: 10μs
- *9 Refer to 5. Conditions for operation, transport and storage mentioned in AMBIENT ENVIRONMENT (Page 61)

TYPICAL APPLICATIONS

- Automotive system
- ABS, Head Lamp, Air conditioner
- Tracter, Combine

ORDERING INFORMATION

| | | | | | | | | | | |
|---|--|--|---|---|---|--|---|-------------------|---|------|
| CB | 1 | F | — | T | — | R | — | M | — | 12 V |
| Contact arrangement | Protective construction | Heat resistant of types | | Type classification | | Mounting classification | | Coil voltage (DC) | | |
| 1a: 1 Form A 1: 1 Form C 1aH: High contact capacity*1 (1 Form A) | Nil: Sealed type F: Flux-resistant type | Nil: Standard type T: Heat resistant type*2 | | Nil: Standard type D: with diode inside R: with resistor inside | | Nil: Quick connect type P: PC board type M: Bracket type | | 12, 24 V | | |

Note: Bulk package: 50 pcs.; Case: 200 pcs.

- *1 High contact capacity type is available only for "Quick connect" and 12 V.
(See "1. Standard type in TYPES" Page 380)
- *2 Heat resistant type with high contact capacity is not available.
(See "2. Heat resistant type in TYPES" Page 381)

TYPES

1. Standard type

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

2. Heat resistant type

| Contact arrangement | Mounting classification | Coil voltage, V DC | Part No. | |
|---------------------|-------------------------|--------------------|--------------|---------------------|
| | | | Sealed type | Flux-resistant type |
| 1 Form A | PC board type | 12V | CB1a-T-P-12V | CB1aF-T-P-12V |
| | | 24V | CB1a-T-P-24V | CB1aF-T-P-24V |
| | Quick connect type | 12V | CB1a-T-12V | CB1aF-T-12V |
| | | 24V | CB1a-T-24V | CB1aF-T-24V |
| | Bracket type | 12V | CB1a-T-M-12V | CB1aF-T-M-12V |
| | | 24V | CB1a-T-M-24V | CB1aF-T-M-24V |
| 1 Form C | PC board type | 12V | CB1-T-P-12V | CB1F-T-P-12V |
| | | 24V | CB1-T-P-24V | CB1F-T-P-24V |
| | Quick connect type | 12V | CB1-T-12V | CB1F-T-12V |
| | | 24V | CB1-T-24V | CB1F-T-24V |
| | Bracket type | 12V | CB1-T-M-12V | CB1F-T-M-12V |
| | | 24V | CB1-T-M-24V | CB1F-T-M-24V |

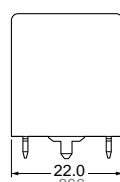
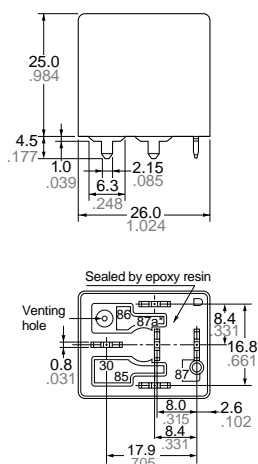
COIL DATA (at 20°C 68°F)

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

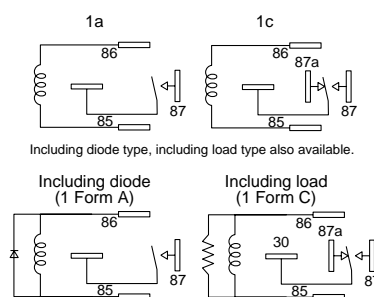
DIMENSIONS

mm inch

1. PC board type



Schematic (Bottom view)



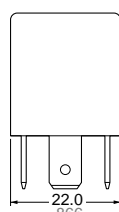
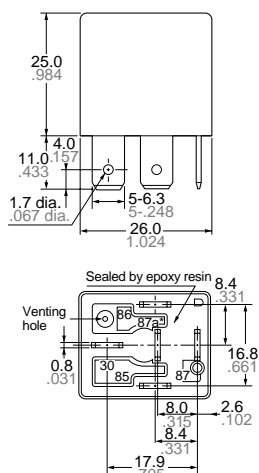
Dimension:

Max. 1mm .039 inch:
1 to 3mm .039 to .118 inch:
Min. 3mm .118 inch:

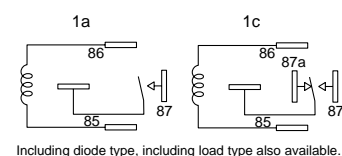
General tolerance

±0.1 ±.004
±0.2 ±.008
±0.3 ±.012

2. Quick connect type



Schematic (Bottom view)



Dimension:

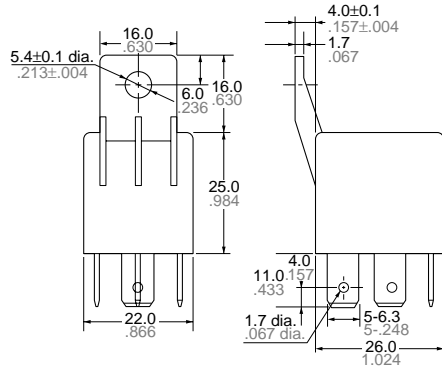
Max. 1mm .039 inch:
1 to 3mm .039 to .118 inch:
Min. 3mm .118 inch:

General tolerance

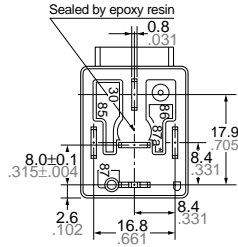
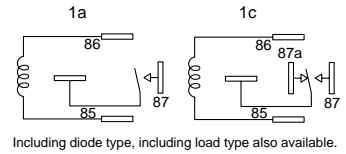
±0.1 ±.004
±0.2 ±.008
±0.3 ±.012

3. Bracket type

mm inch

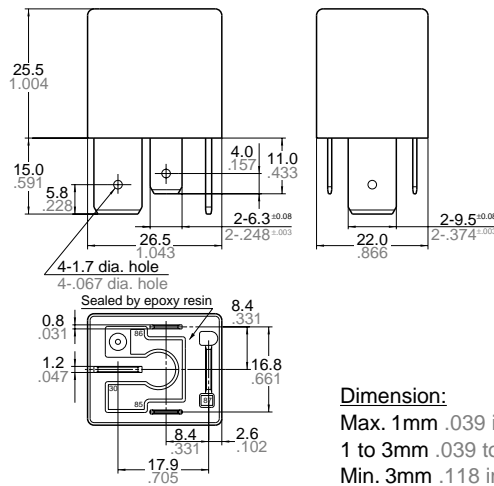


Schematic (Bottom view)

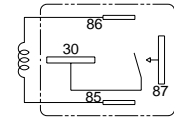


| Dimension: | General tolerance |
|-----------------------------|-------------------|
| Max. 1mm .039 inch: | ±0.1 ±.004 |
| 1 to 3mm .039 to .118 inch: | ±0.2 ±.008 |
| Min. 3mm .118 inch: | ±0.3 ±.012 |

4. High contact capacity type



Schematic (Bottom view)

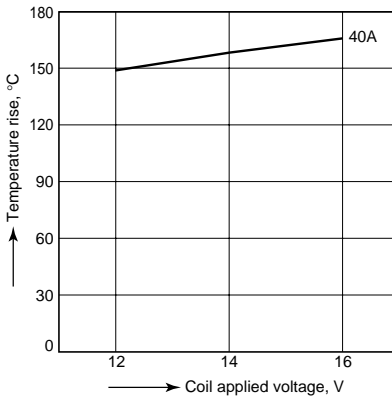


| Dimension: | General tolerance |
|-----------------------------|-------------------|
| Max. 1mm .039 inch: | ±0.1 ±.004 |
| 1 to 3mm .039 to .118 inch: | ±0.2 ±.008 |
| Min. 3mm .118 inch: | ±0.3 ±.012 |

REFERENCE DATA

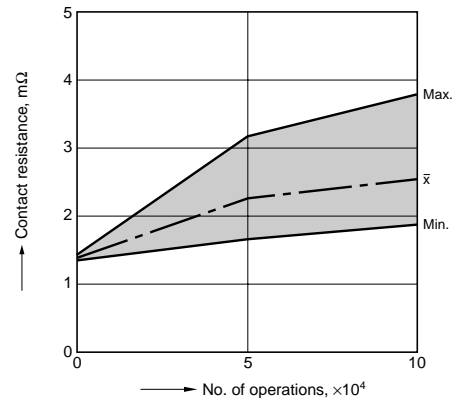
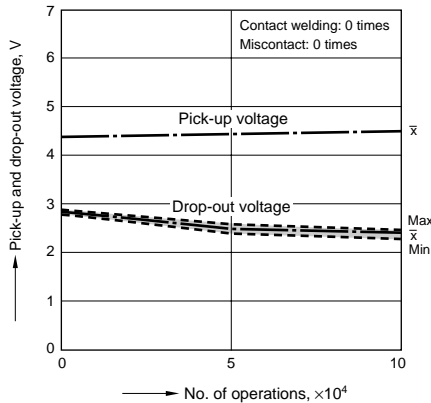
1. Coil temperature rise

Tested sample: CB1aF-P-12V, 3pcs.
 Ambient temperature: 85°C 185°F
 Contact carrying current: 40A



2. Electrical life test (Motor load)

Tested sample: CB1a-12V, 3pcs.
 Load: 18A steady, Inrush 82A
 Operating frequency: ON 2s, OFF 6s



For Cautions for use, see Relay Technical Information (Page 48 to 76).