

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 <sup>6</sup>		
	Electrical (at rated load)	Flux-resistant type: Min. 10 <sup>5</sup> *1 Sealed type: Min. 5 × 10 <sup>4</sup>		

##### (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 <sup>2</sup> {20 G}
	Destructive*6	Min. 1,000 m/s <sup>2</sup> {100 G}
Vibration resistance	Functional*7	10 to 500Hz, Min. 44.1m/s <sup>2</sup> {4.5G}
	Functional*8	10 to 2,000Hz, Min. 44.1m/s <sup>2</sup> {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  $\pm 1.2 \times 50\mu s$  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 pakage: 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

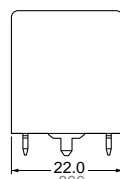
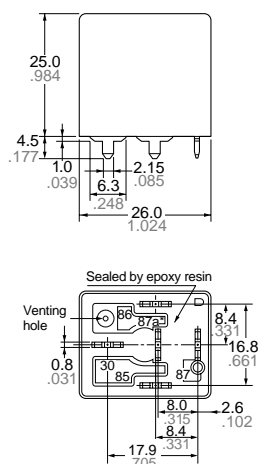
## COIL DATA (at 20°C 68°F)

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

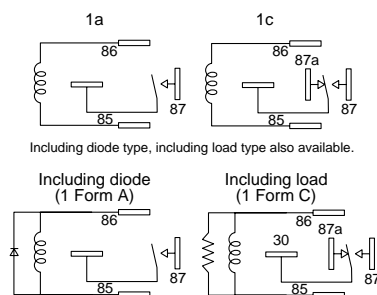
## DIMENSIONS

mm inch

### 1. PC board type



#### Schematic (Bottom view)



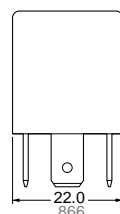
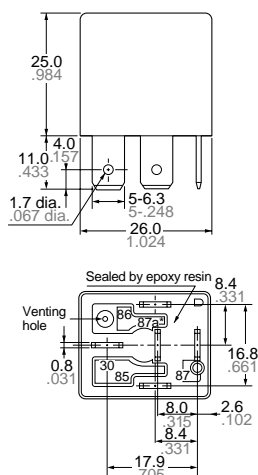
#### Dimension:

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

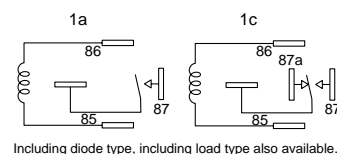
#### General tolerance

±0.1 ±.004  
±0.2 ±.008  
±0.3 ±.012

### 2. Quick connect type



#### Schematic (Bottom view)



#### Dimension:

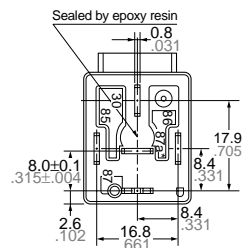
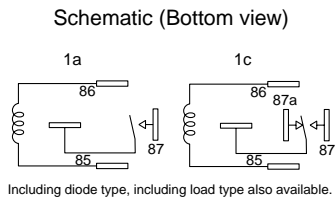
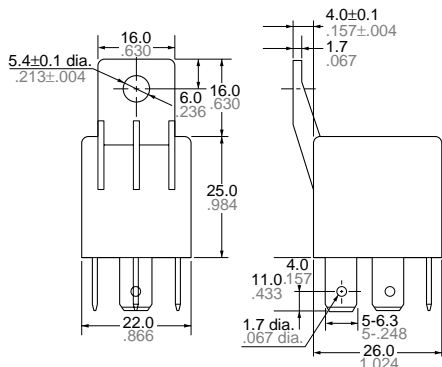
Max. 1mm .039 inch:  
1 to 3mm .039 to .118 inch:  
Min. 3mm .118 inch:

#### General tolerance

±0.1 ±.004  
±0.2 ±.008  
±0.3 ±.012

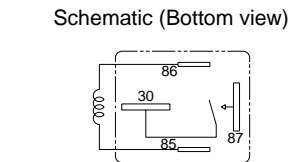
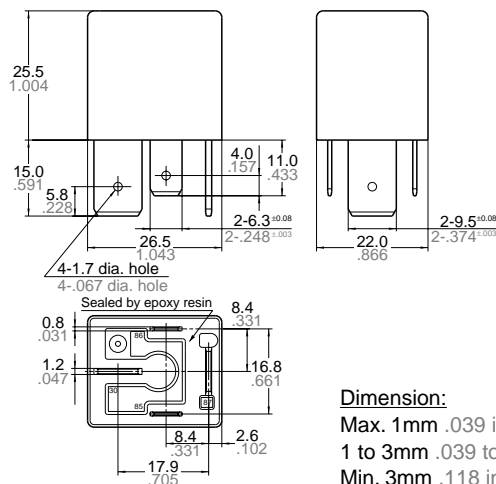
3. Bracket type

mm inch



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

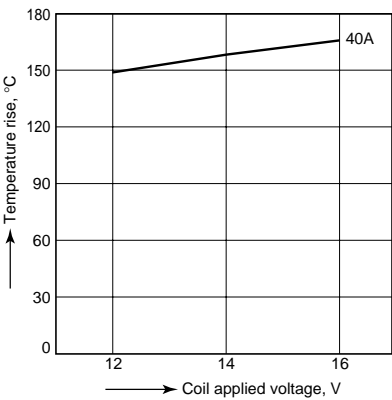
4. High contact capacity type



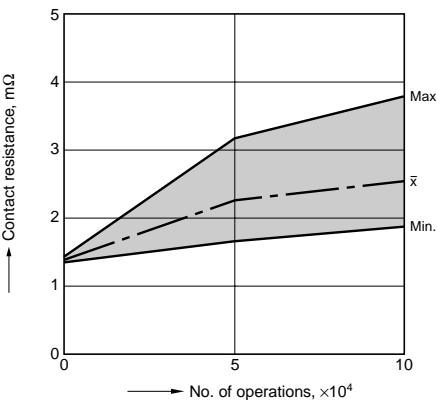
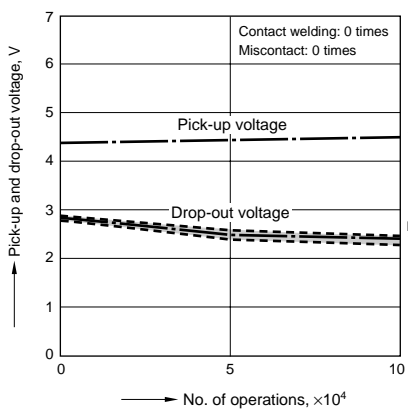
Dimension:	General tolerance
Max. 1mm .039 inch:	±0.1 ±.004
1 to 3mm .039 to .118 inch:	±0.2 ±.008
Min. 3mm .118 inch:	±0.3 ±.012

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).