

mm inch

FEATURES

- **Small size: 20 mm(L)×15 mm(W)×22 mm(H)**
.787 inch(L)×.591 inch(L)×.866 inch(H)
- **Wide line-up**
PC board and Plug-in type, Resistor and diode inside type
- **35 Amp contact Rating, 100,000 Operations (12V type)**
- **Micro-ISO type terminals**

SPECIFICATIONS

Contact

Type	12 V coil voltage	24 V coil voltage
Arrangement	1 Form A, 1 Form C	
Contact material	Silver alloy	
Initial contact resistance, max.	15mΩ	
Contact voltage drop, max.	N.O.: 0.5 V (at 35 A 14 V DC) N.C.: 0.3 V (at 20 A 14 V DC)	N.O.: 0.3 V (at 15 A 28 V DC) N.C.: 0.2 V (at 8 A 28 V DC)
Rating (resistive load)	Nominal switching capacity	N.O.: 35 A 14 V DC N.C.: 20 A 14 V DC
	Max. switching current	N.O.: 20 A (14 V DC, at 85°C 185°F) N.C.: 10 A (14 V DC, at 85°C 185°F)
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

Coil

Nominal operating power	1.5 W 1.7 W (Internal resistor type)	1.8 W 2.0 W (Internal resistor type)
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Remarks

- * Specifications will vary with foreign standards certification ratings.
- *1 At nominal switching capacity, operating frequency: 2s ON, 2s OFF
- *2 Measurement at same location as "Initial breakdown voltage" section.
- *3 Detection current: 10mA
- *4 Excluding contact bounce time.
- *5 Half-wave pulse of sine wave: 11 ms; detection time: 10 μs
- *6 Half-wave pulse of sine wave: 6 ms
- *7 Detection time: 10 μs

Characteristics

Type	24V coil type	12V coil type
Max. operating speed (at nominal switching capacity)	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) (at 20°C 85°F)	Max. 10 ms	
Release time*4 (at nominal voltage) (at 20°C 85°F)	Max. 10 ms Max. 15 ms (with diode)	
Shock resistance	Functional*5	Min. 200 m/s ² {20G}
	Destructive*6	Min. 1,000m/s ² {100G}
Vibration resistance	Functional*7	10 to 500 Hz, Min. 44.1 m/s ² {4.5 G}
	Destructive*8	10 to 2,000 Hz, Min. 44.1 m/s ² {4.5 G}
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
	Humidity	25 to 85% R.H.
Unit weight	Approx. 20g .71oz	

*8 Time of vibration for each direction; X, Y, Z direction: 4 hours



*9 Refer to 5. Conditions for operation, transport and storage mentioned in AMBIENT ENVIRONMENT (Page 61)

TYPICAL APPLICATIONS

Automotive system

Fan motor, Heater, Tail lump, Air Compressor

ORDERING INFORMATION



Contact arrangement	Protective construction	Classification of types	Mounting classification	Coil voltage (DC)
1a: 1 Form A 1: 1 Form C	Nil: Sealed type F: Flux-resistant type	Nil: Standard type D: with diode inside R: with resistor inside	Nil: Quick connect type P: PC board type	12 V 24 V

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

TYPES

Packing quantity: Inner 50pcs, Outer 200pcs.

Contact arrangement	Part No.	Coil voltage	Mounting classification	Protective construction
1 Form A	CM1a-12V	12 V DC	Quick connect type	Sealed type
	CM1aF-12V			Flux-resistant type
	CM1a-P-12V		PC board type	Sealed type
	CM1aF-P-12V			Flux-resistant type
1 Form C	CM1-12V		Quick connect type	Sealed type
	CM1F-12V			Flux-resistant type
	CM1-P-12V		PC board type	Sealed type
	CM1F-P-12V			Flux-resistant type

Contact arrangement	Part No.	Coil voltage	Mounting classification	Protective construction
1 Form A	CM1a-24V	24 V DC	Quick connect type	Sealed type
	CM1aF-24V			Flux-resistant type
	CM1a-P-24V		PC board type	Sealed type
	CM1aF-P-24V			Flux-resistant type
1 Form C	CM1-24V		Quick connect type	Sealed type
	CM1F-24V			Flux-resistant type
	CM1-P-24V		PC board type	Sealed type
	CM1F-P-24V			Flux-resistant type

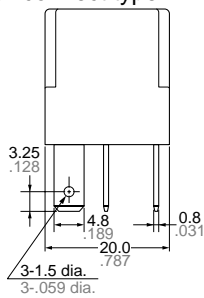
COIL DATA (at 20°C 68°F)

Nominal voltage, V DC	Pick-up voltage, V DC (max.)	Drop-out voltage, V DC (min.)	Nominal current, mA (±10%)	Coil resistance, ohm (±10%)	Nominal operating power, W	Usable voltage range, V DC
12	3 to 7	1.2 to 4.2	125	96	1.5	10 to 16
24	6 to 14	2.4 to 8.4	75	320	1.8	20 to 32

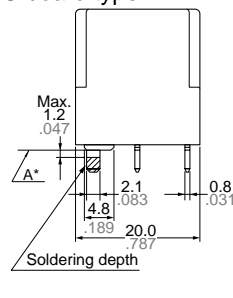
DIMENSIONS

mm inch

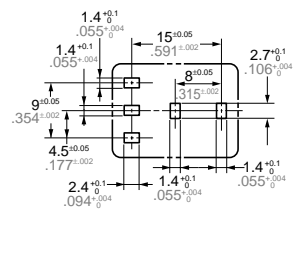
Quick connect type



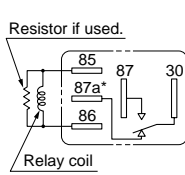
PC board type



PC board pattern (Bottom view)

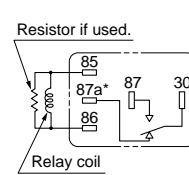


Schematic (Bottom view)



*Not used on 1 Form A type

Schematic (Bottom view)



*Not used on 1 Form A type

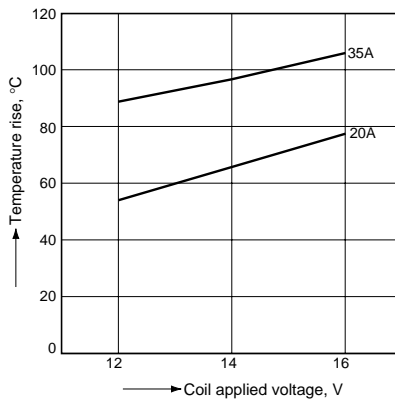
Dimension:	General tolerance
Max. 1mm .039 inch:	±0.1 ±.004
1 to 3mm .039 to .118 inch:	±0.2 ±.008
Min. 3mm .118 inch:	±0.3 ±.012

* Dimensions (thickness and width) of terminal specified in this catalog is measured before pre-soldering. Intervals between terminals is measured at A surface level.

REFERENCE DATA

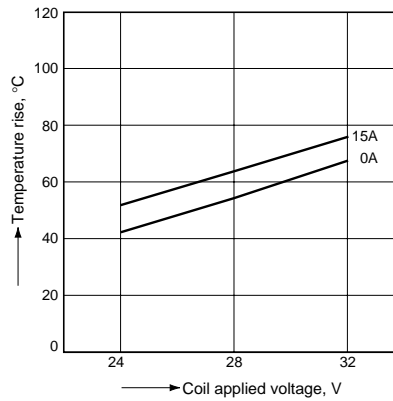
1-(1). Coil temperature rise (12V type)

Tested sample: CM1F-12V, 3 pcs.
 Ambient temperature: 85°C 185°F
 Contact carrying current: 20 A, 35 A



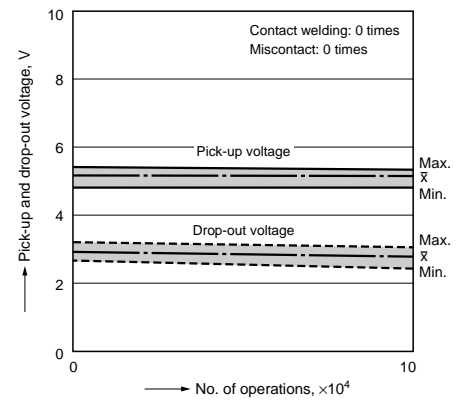
1-(2). Coil temperature rise (24V type)

Tested sample: CM1F-24V, 4 pcs.
 Ambient temperature: 85°C 185°F
 Contact carrying current: 0 A, 15 A



2-(1). Electrical life test (resistive load)

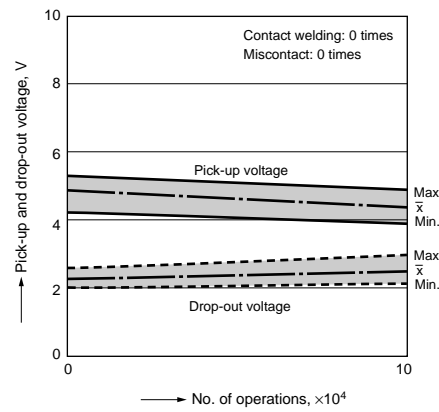
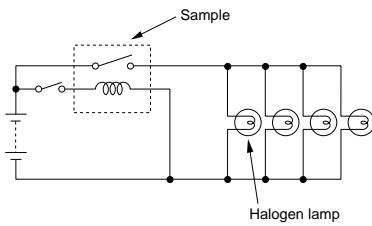
Tested sample: CM1F-12V, 6 pcs.
 Load: N.C.: 20A 14V DC
 N.O.: 35A 14V DC
 Operate frequency: ON 2s, OFF 2s



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

Tested sample: CM1aF-R-12V, 6 pcs.
 Load: 20A 13.5V DC
 Operate frequency: ON 1s, OFF 14s

Circuit:



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