

Automotive Relays
CM RELAYS

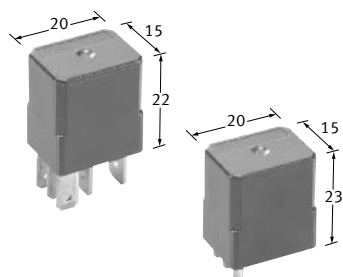
Product Catalog

**IN Your
Future**

CM RELAYS

Micro-ISO Automotive Relay

[Protective construction] Flux tight/Sealed



(Unit: mm)

FEATURES

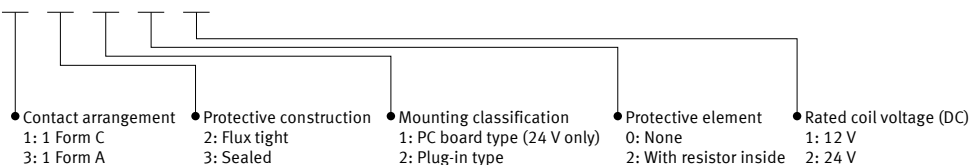
- Micro-ISO type terminals and small size
- Wide line-up
- Compact and high-capacity switching

TYPICAL APPLICATIONS

- Fan motor, Heater, Head lamp, Air compressor, ABS, Blower fan and Defogger, etc.

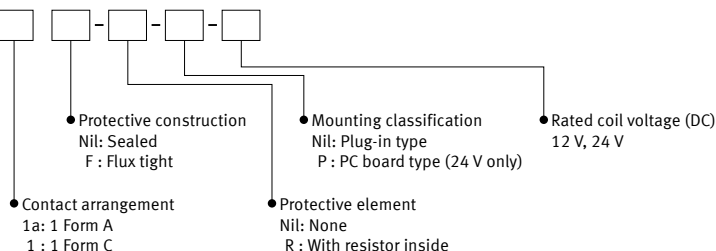
ORDERING INFORMATION (PART NO. : Ordering part number for Japanese market)

ACM



ORDERING INFORMATION (TYPE NO. : Ordering part number for non Japanese market)

CM



TYPES

" Type No. " is ordering part number for non Japanese market. " Part No. " is ordering part number for Japanese market.

Standard type

Contact arrangement	Rated coil voltage	Plug-in type				PC board type				Packing	
		Sealed		Flux tight		Sealed		Flux tight		Carton	Case
		Type No.	Part No.	Type No.	Part No.	Type No.	Part No.	Type No.	Part No.		
1 Form A	12 V DC	CM1a-12V	ACM33201	CM1aF-12V	ACM32201	-	-	-	-	50 pcs.	200 pcs.
	24 V DC	CM1a-24V	ACM33202	CM1aF-24V	ACM32202	CM1a-P-24V	ACM33102	CM1aF-P-24V	ACM32102		
1 Form C	12 V DC	CM1-12V	ACM13201	CM1F-12V	ACM12201	-	-	-	-		
	24 V DC	CM1-24V	ACM13202	CM1F-24V	ACM12202	CM1-P-24V	ACM13102	CM1F-P-24V	ACM12102		

Note: Please use " CM**R-*.** " built-in resistor type. (Asterisks " * " should be filled in from ORDERING INFORMATION.)

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RATING

Coil data

1) No protective element

Rated coil voltage	Operate voltage (at 20°C)(Initial)	Release voltage (at 20°C)(Initial)	Rated operating current [$\pm 10\%$](at 20°C)	Coil resistance [$\pm 10\%$](at 20°C)	Rated operating power (at 20°C)	Usable voltage range
12V DC	3 to 7 V DC	1.2 to 4.2 V DC	125mA	96 Ω	1.5W	10 to 16 V DC
24V DC	6 to 14 V DC	2.4 to 8.4 V DC	75mA	320 Ω	1.8W	20 to 32 V DC

2) With resistor inside

Rated coil voltage	Operate voltage (at 20°C)(Initial)	Release voltage (at 20°C)(Initial)	Rated operating current [$\pm 10\%$](at 20°C)	Equivalent coil resistance [$\pm 10\%$](at 20°C)	Rated operating power (at 20°C)	Usable voltage range
12V DC	3 to 7 V DC	1.2 to 4.2 V DC	143mA	84.1 Ω	1.71W	10 to 16 V DC
24V DC	6 to 14 V DC	2.4 to 8.4 V DC	83.6mA	287.2 Ω	2.0W	20 to 32 V DC

Specifications

Item		Specifications			
		12 V DC		24 V DC	
Contact data	Contact arrangement	1 Form A	1 Form C	1 Form A	1 Form C
	Contact resistance (initial)	Max. 15 m Ω (By voltage drop 1 A 6 V DC)			
	Contact material	Ag alloy			
	Rated switching capacity (resistive)	N.O. side: 35 A 14 V DC	N.O. side: 35 A 14 V DC N.C. side: 20 A 14 V DC	N.O. side: 15 A 28 V DC	N.O. side: 15 A 28 V DC N.C. side: 8 A 28 V DC
	Max. carrying current (at 85°C, continuous)*1	N.O. side: 20 A (coil applied voltage 14 V DC)	N.O. side: 20 A (coil applied voltage 14 V DC) N.C. side: 10 A	N.O. side: 15 A (coil applied voltage 28 V DC)	N.O. side: 15 A (coil applied voltage 28 V DC) N.C. side: 8 A
	Min. switching load (resistive)*2	1 A 14 V DC (at 20°C)		1 A 14 V DC (at 20°C)	
	Contact voltage drop (after electrical life)	N.O. side: Max. 0.5 V (by voltage drop 14 V DC 35 A)	N.O. side: Max. 0.5 V (by voltage drop 14 V DC 35 A) N.C. side: Max. 0.3 V (by voltage drop 14 V DC 20 A)	N.O. side: Max. 0.3 V (by voltage drop 28 V DC 15 A)	N.O. side: Max. 0.3 V (by voltage drop 28 V DC 15 A) N.C. side: Max. 0.2 V (by voltage drop 28 V DC 8 A)
Insulated resistance (initial)		Min. 20 M Ω (at 500 V DC, Measurement at same location as "Dielectric strength" section.)			
Dielectric strength (initial)	Between open contacts	500 Vrms for 1 min (Detection current: 10 mA)			
	Between contacts and coil	500 Vrms for 1 min (Detection current: 10 mA)			
Time characteristics (initial)	Operate time (at rated voltage)	Max. 10 ms (at 20°C, without contact bounce time)			
	Release time (at rated voltage)	Max. 10 ms (at 20°C, without contact bounce time) (without diode)			
Shock resistance	Functional	Min. 200 m/s ² , Min. (Half-wave pulse of sine wave: 11 ms, detection time: 10 μ s)			
	Destructive	Min. 1,000 m/s ² , Min. (Half-wave pulse of sine wave: 6 ms)			
Vibration resistance	Functional	10 to 500 Hz, Min. 44.1 m/s ² , Min.			
	Destructive	10 to 2,000 Hz, Min. 44.1 m/s ² , Min. Time of vibration for each direction; X, Y, Z direction: 4 hours			
Expected life	Mechanical	Min. 10 ⁶ (at 120 times/min)			
	Electrical	Flux tight: Min. 10 ⁵ , Sealed: Min. 5 \times 10 ⁴ (operating frequency: 2 s ON, 2 s OFF)			
Conditions	Conditions for usage, transport and storage*3	Ambient temperature: -40 to +85°C, Humidity: 5 to 85% RH (Avoid icing and condensation)			
Weight		Approx. 20 g			

Notes: *1. Depends on connection conditions. Also, this does not guarantee repeated switching. We recommend that you confirm operation under actual conditions.

*2. 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.

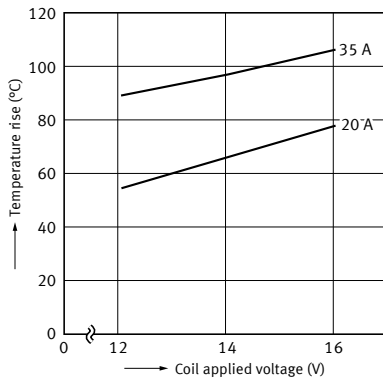
*3. The upper operation ambient temperature limit is the maximum temperature that can satisfy the coil temperature rise value. For details, please refer to the "Automotive Relay Users Guide".

Please inquire our sales representative if you will be using the relay in a high temperature atmosphere. (110°C)

REFERENCE DATA

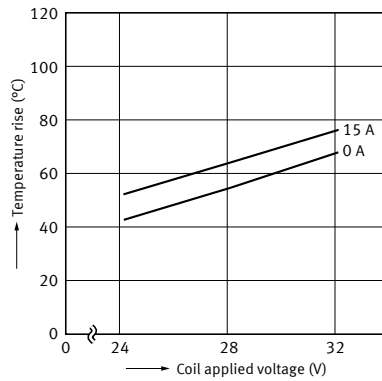
1-1. Coil temperature rise
(12 V type, 85°C)

Sample: CM1F-12V, 3 pcs.
Measured portion: Inside the coil
Contact carrying current: 20 A, 35 A
Ambient temperature: 85°C

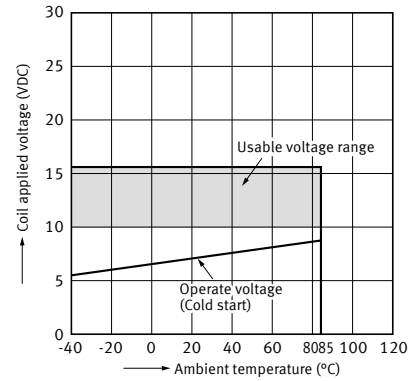


1-2 Coil temperature rise
(24 V type, 85°C)

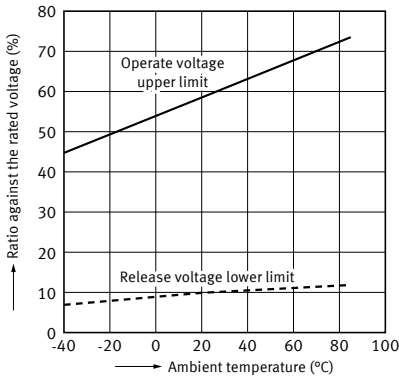
Sample: CM1F-24V, 4 pcs.
Measured portion: Inside the coil
Contact carrying current: 0 A, 15 A
Ambient temperature: 85°C



2. Ambient temperature and usable voltage range (12 V type)

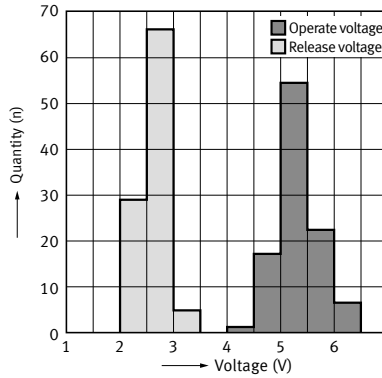


3. Ambient temperature characteristics
(Cold/initial)

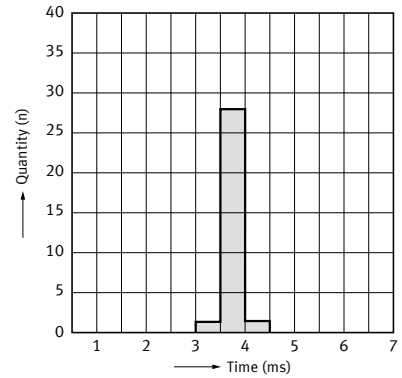


4. Distribution of operate and release voltage 5. Distribution of operate time

Sample: CM1F-12V, 100 pcs.

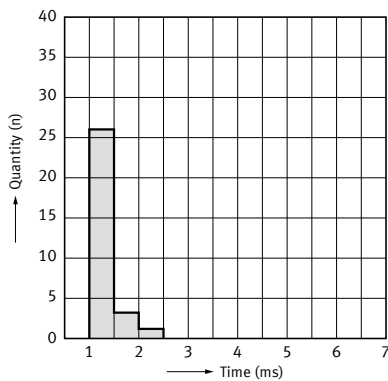


Sample: CM1F-12V, 30 pcs.
* Max. 10 ms standard (excluding contact bounce)



6. Distribution of release time

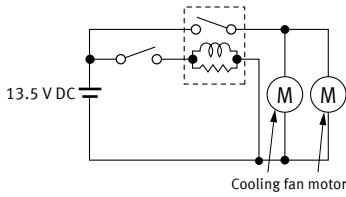
Sample: CM1F-12V, 30 pcs.
* Max. 10 ms standard (excluding contact bounce)



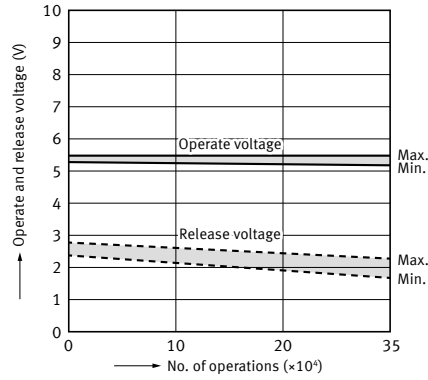
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7-1. Electrical life test (Motor free)

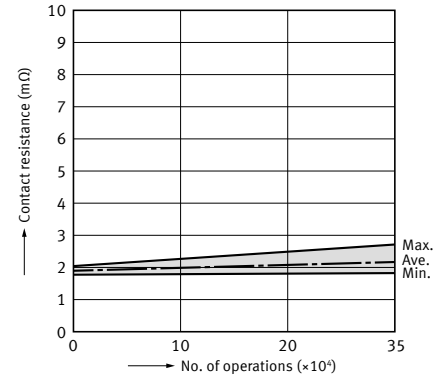
Sample: CM1aF-R-12V, 6 pcs.
 Load: 16 A 13.5 V DC
 Cooling fan motor actual load
 (free condition)
 Operating frequency: ON 2 s, OFF 6 s
 Ambient temperature: Room temperature
 Circuit:



Change of operate and release voltage

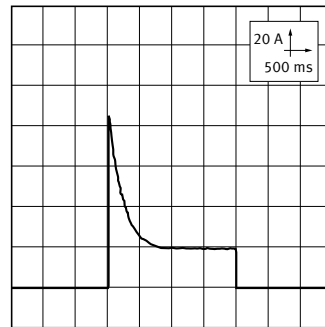


Change of contact resistance



Load current waveform

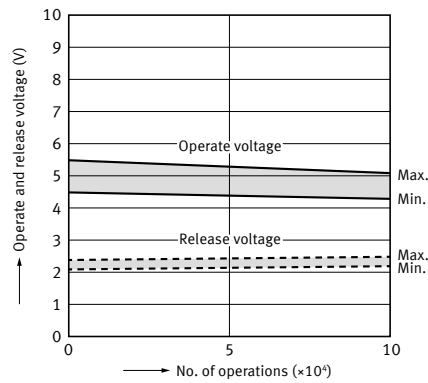
Load; Inrush current: 85 A, Steady current: 18 A



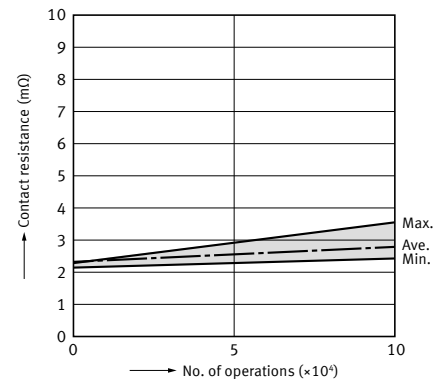
7-2. Electrical life test (Halogen lamp load)

Sample: CM1aF-R-12V, 6 pcs.
 Load: 20 A 13.5 V DC
 Operating frequency: ON 1 s, OFF 14 s
 Ambient temperature: Room temperature

Change of operate and release voltage



Change of contact resistance



DIMENSIONS

CAD The CAD data of the products with a "CAD" mark can be downloaded from our Website.

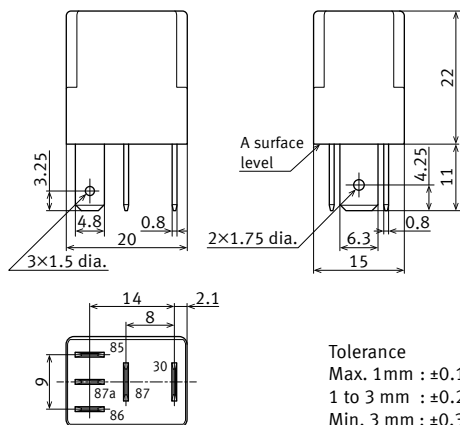
Unit: mm

Plug-in type (1 Form C)

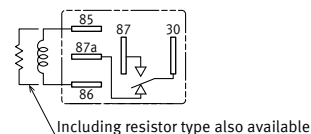
CAD



External dimensions



Schematic (BOTTOM VIEW)



Tolerance
 Max. 1 mm : ±0.1
 1 to 3 mm : ±0.2
 Min. 3 mm : ±0.3

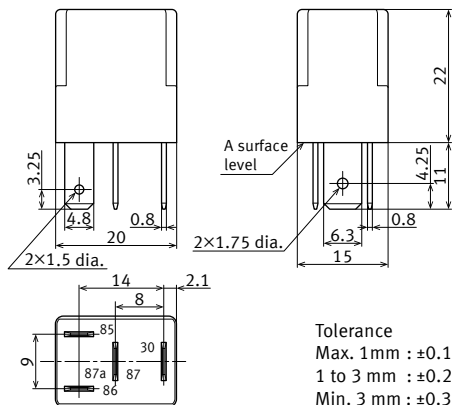
* Intervals between terminals is measured at A surface level.

Plug-in type (1 Form A)

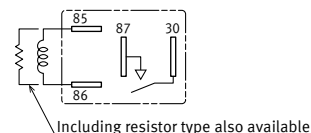
CAD



External dimensions



Schematic (BOTTOM VIEW)



Tolerance
 Max. 1 mm : ±0.1
 1 to 3 mm : ±0.2
 Min. 3 mm : ±0.3

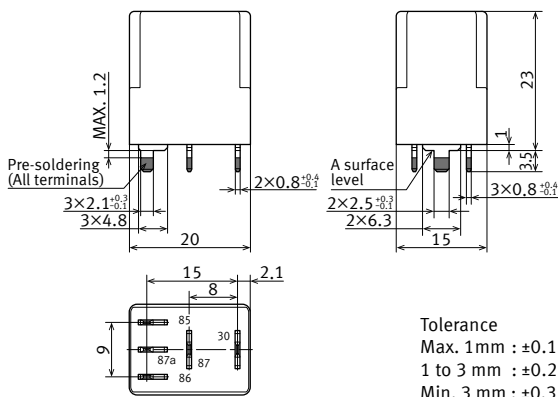
* Intervals between terminals is measured at A surface level.

PC board type (1 Form C, 24 V only)

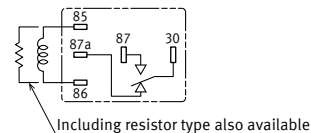
CAD



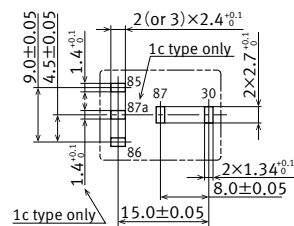
External dimensions



Schematic (BOTTOM VIEW)



PC board pattern (BOTTOM VIEW)



Tolerance
 Max. 1 mm : ±0.1
 1 to 3 mm : ±0.2
 Min. 3 mm : ±0.3

* Dimensions (thickness and width) of terminal is measured after pre-soldering.
 Intervals between terminals is measured at A surface level.

Tolerance: ±0.1

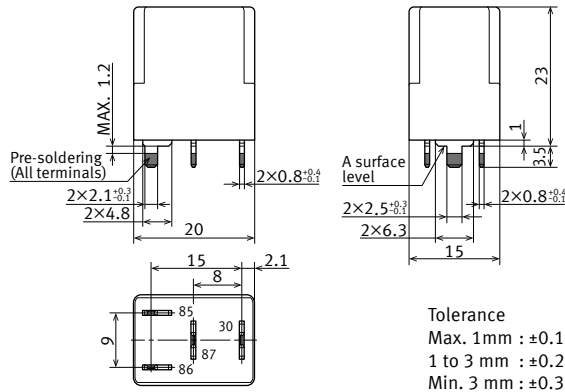
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■ PC board type (1 Form A, 24 V only)

CAD

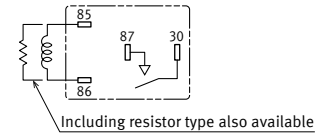


External dimensions



* Dimensions (thickness and width) of terminal is measured after pre-soldering.
Intervals between terminals is measured at A surface level.

Schematic
(BOTTOM VIEW)



GUIDELINES FOR USAGE

■ For general cautions for use, please refer to the "Automotive Relay Users Guide".

■ Precautions when using CM relays

● Soldering

Max. 350°C (solder temperature), within 3 s (soldering time)
The effect on the relay depends on the actual PC board used.
Please verify the PC board to be used.

Please refer to **"the latest product specifications"** when designing your product.
•Requests to customers:
<https://industrial.panasonic.com/ac/e/salespolicies/>

Panasonic
INDUSTRY

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