Panasonic
INDUSTRY

Automotive Relays

CM RELAYS

Product Catalog

IN Your Future

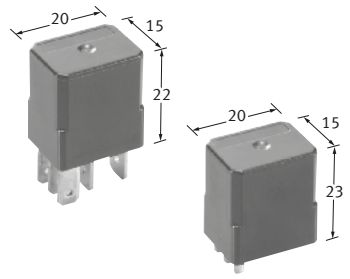
2024.10

RoHS

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 □ □ □ □ □

- Contact arrangement: 1: 1 Form C, 3: 1 Form A
- Protective construction: 2: Flux tight, 3: Sealed
- Mounting classification: 1: PC board type (24 V only), 2: Plug-in type
- Protective element: 0: None, 2: With resistor inside
- Rated coil voltage (DC): 1: 12 V, 2: 24 V

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

CM □ □-□-□-□

- Protective construction: Nil: Sealed, F : Flux tight
- Mounting classification: Nil: Plug-in type, P : PC board type (24 V only)
- Rated coil voltage (DC): 12 V, 24 V
- Contact arrangement: 1a: 1 Form A, 1 : 1 Form C
- Protective element: Nil: None, R : With resistor inside

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.)

RATING

■ Coil data

1) No protective element

Rated coil voltage	Operate voltage (at 20 ℃) (Initial)	Release voltage (at20 ℃) (Initial)	Rated operating current [±10 %] (at 20 ℃)	Coil resistance [±10 %] (at 20 ℃)	Rated operating power (at 20 ℃)	Usable voltage range
12 V DC	3 to 7 V DC	1.2 to 4.2 V DC	125 mA	96 Ω	1.5 W	10 to 16 V DC
24 V DC	6 to 14 V DC	2.4 to 8.4 V DC	75 mA	320 Ω	1.8 W	20 to 32 V DC

2) With resistor inside

Rated coil voltage	Operate voltage (at 20 ℃) (Initial)	Release voltage (at20 ℃) (Initial)	Rated operating current [±10 %] (at 20 ℃)	Equivalent coil resistance [±10 %] (at 20 ℃)	Rated operating power (at 20 ℃)	Usable voltage range
12 V DC	3 to 7 V DC	1.2 to 4.2 V DC	143 mA	84.1 Ω	1.71 W	10 to 16 V DC
24 V DC	6 to 14 V DC	2.4 to 8.4 V DC	83.6 mA	287.2 Ω	2.0 W	20 to 32 V DC

■ Specifications

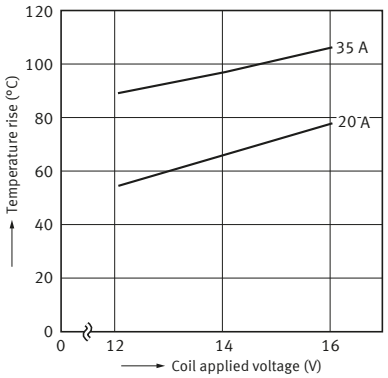
Item		Specifications			
		12 V DC		24 V DC	
Contact data	Contact arrangement	1 Form A	1 Form C	1 Form A	1 Form C
	Contact resistance (initial)	Max. 15 mΩ (By voltage drop 1 A 6 V DC)			
	Contact material	Ag alloy			
	Rated switching capacity (resistive)	N.O. side: 35 A 14 V DC	N.O. side: 35 A 14 V DC 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 ℃, 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 ℃)		1 A 14 V DC (at 20 ℃)	
	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 MΩ (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 ℃, without contact bounce time)			
	Release time (at rated voltage)	Max. 10 ms (at 20 ℃, 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 μs)			
	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. 5×10^4 (operating frequency: 2 s ON, 2 s OFF)			
Conditions	Conditions for usage, transport and storage*3	Ambient temperature: −40 to +85 ℃, Humidity: 5 to 85 % RH (Avoid icing and condensation)			
Weight		Approx. 20 g			

*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 ℃)

REFERENCE DATA

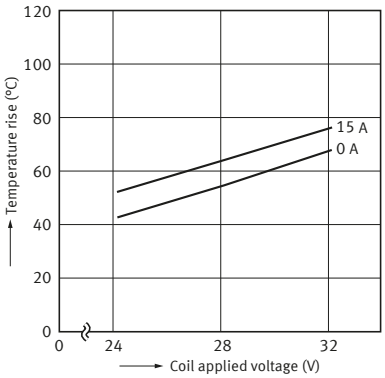
1-1. Coil temperature rise (12 V type, 85 ℃)

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

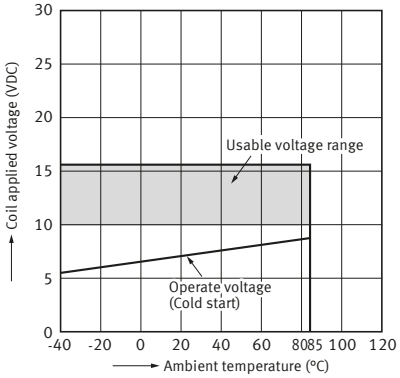


1-2. Coil temperature rise (24 V type, 85 ℃)

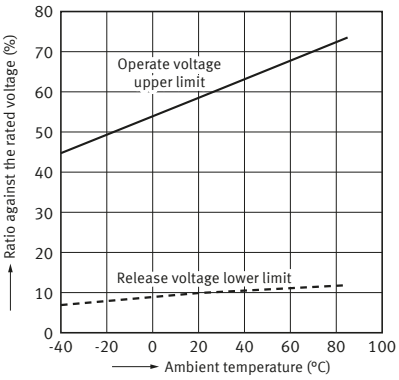
Sample: CM1F-24V, 4 pcs.
Measured portion: Inside the coil
Contact carrying current: 0 A, 15 A
Ambient temperature: 85°C



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

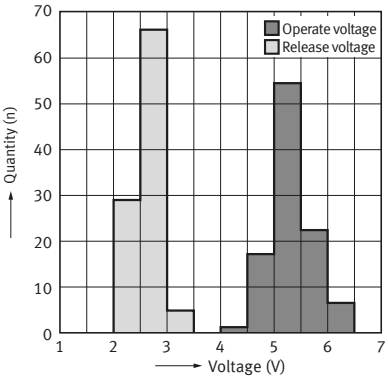


3. Ambient temperature characteristics (Cold/initial)



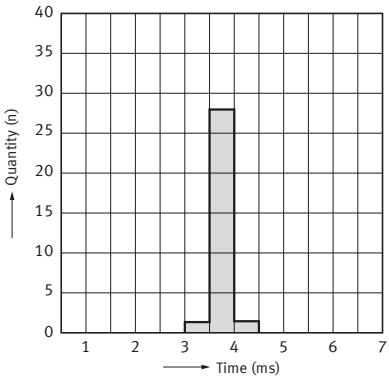
4. Distribution of operate and release voltage

Sample: CM1F-12V, 100 pcs.



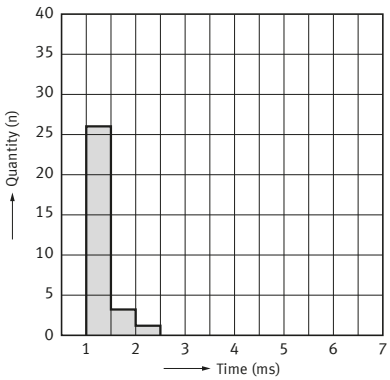
5. Distribution of operate time

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



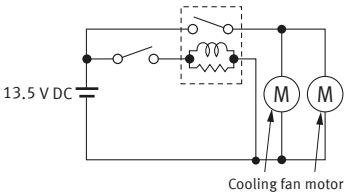
6. Distribution of release time

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

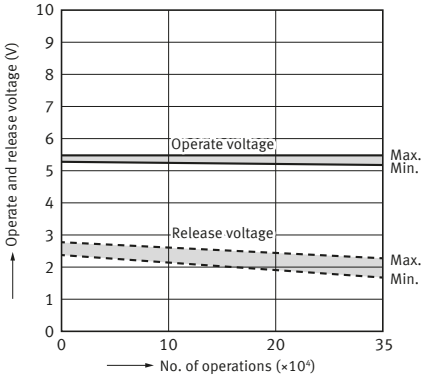


7-1. Electrical life test (Motor free)

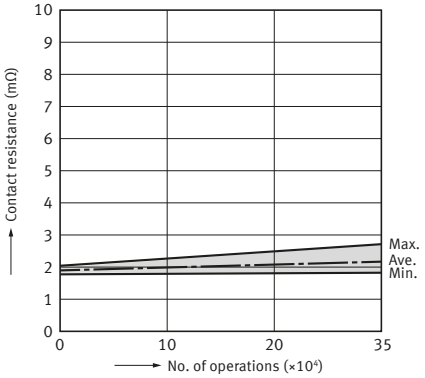
Sample: CM1aF-R-12V, 6 pcs.
Load: 16 A 13.5 V DC
Cooling fan motor actual load
(free condition)
Operating frequency: ON 2 s, OFF 6 s
Ambient temperature: Room temperature
Circuit:



Change of operate and release voltage

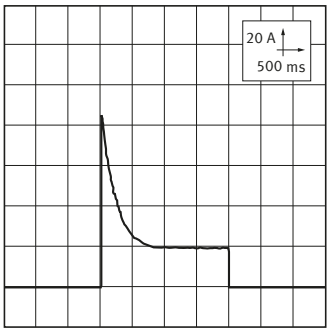


Change of contact resistance



Load current waveform

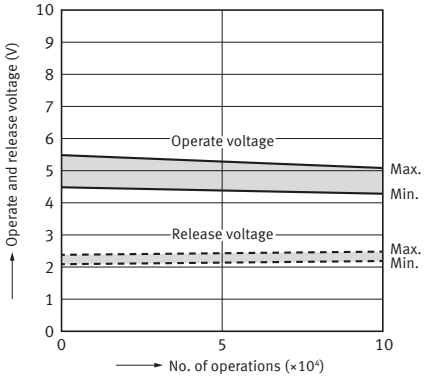
Load; Inrush current: 85 A, Steady current: 18 A



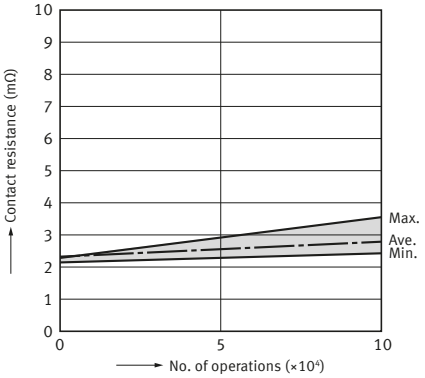
7-2. Electrical life test (Halogen lamp load)

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



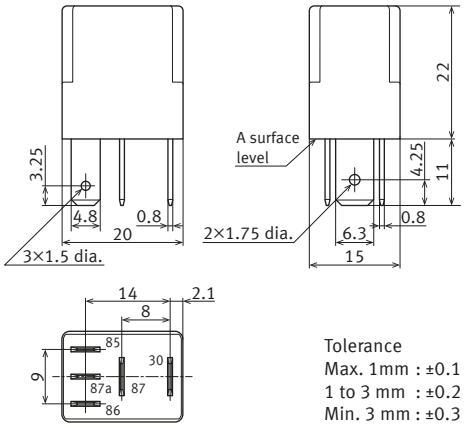
DIMENSIONS (Unit: mm)

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

■ Plug-in type (1 Form C)

CAD

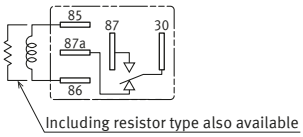
External dimensions



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

* Intervals between terminals is measured at A surface level.

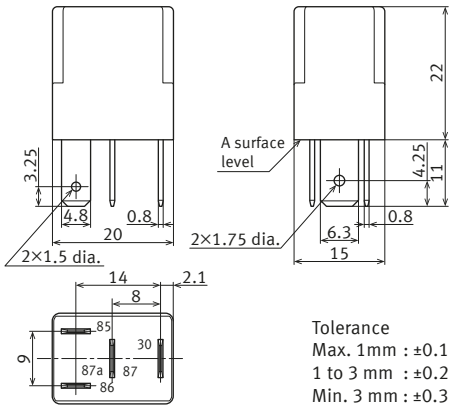
Schematic
(BOTTOM VIEW)



■ Plug-in type (1 Form A)

CAD

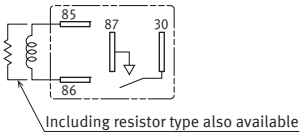
External dimensions



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

* Intervals between terminals is measured at A surface level.

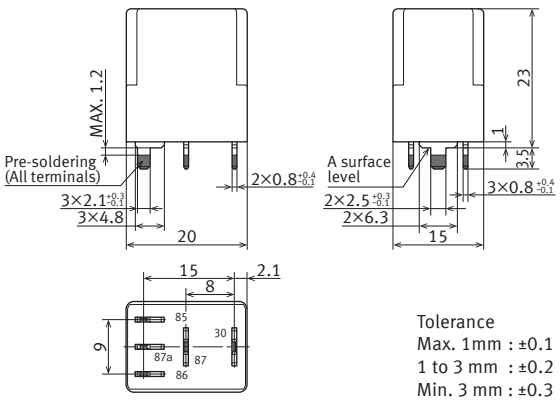
Schematic
(BOTTOM VIEW)



■ PC board type (1 Form C, 24 V only)

CAD

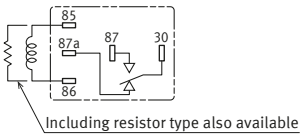
External dimensions



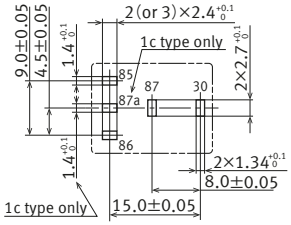
Tolerance
Max. 1mm : ±0.1
1 to 3 mm : ±0.2
Min. 3 mm : ±0.3

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

Schematic
(BOTTOM VIEW)



PC board pattern
(BOTTOM VIEW)

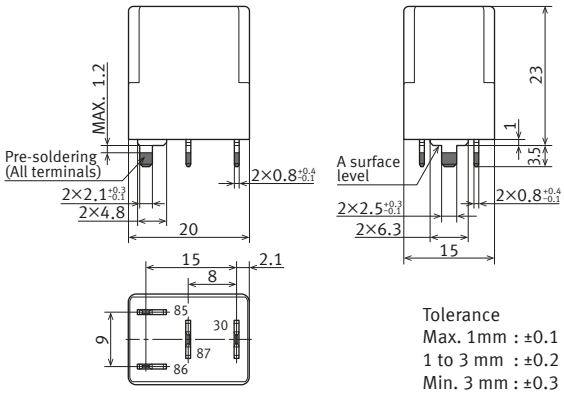


Tolerance: ±0.1

■ PC board type (1 Form A, 24 V only)

CAD

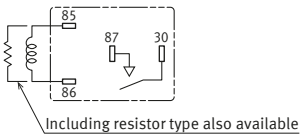
External dimensions



Tolerance
Max. 1mm : ±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.

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 ℃ (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://industry.panasonic.com/global/en/salespolicies

■ Global Sales Network Information: industry.panasonic.com/global/en/salesnetwork/globalnetwork

Panasonic
INDUSTRY

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Specifications are subject to change without notice.
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