

Automotive Relays
CM RELAYS

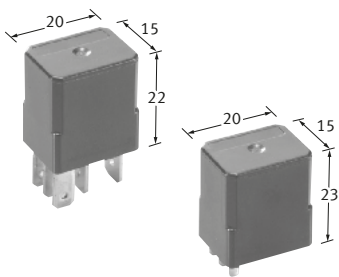
Product Catalog

**IN Your
Future**

CM RELAYS

Micro-ISO Automotive Relay

[Protective construction] Flux tight/Sealed



(Unit: mm)

FEATURES

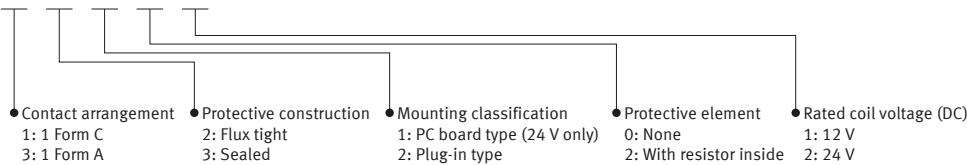
- Micro-ISO type terminals and small size
- Wide line-up
- Compact and high-capacity switching

TYPICAL APPLICATIONS

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

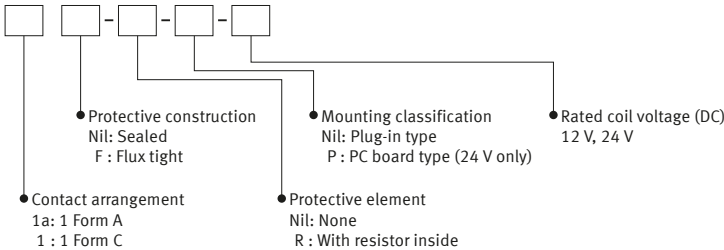
ORDERING INFORMATION (PART NO. : Ordering part number for Japanese market)

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	CM1aP-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 [±10 %] (at 20 °C)	Coil resistance [±10 %] (at 20 °C)	Rated operating power (at 20 °C)	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 °C) (Initial)	Release voltage (at 20 °C) (Initial)	Rated operating current [±10 %] (at 20 °C)	Equivalent coil resistance [±10 %] (at 20 °C)	Rated operating power (at 20 °C)	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 °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 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 °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 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 °C, 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.

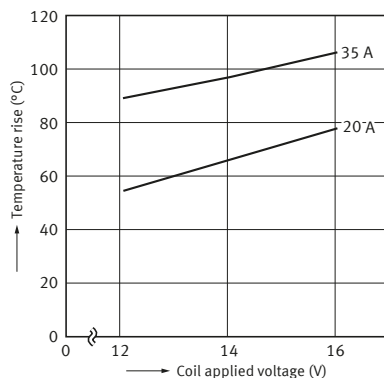
*3: The upper operation ambient temperature limit is the maximum temperature that can satisfy the coil temperature rise value. For details, please refer to the " Automotive Relay Users Guide " .

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

REFERENCE DATA

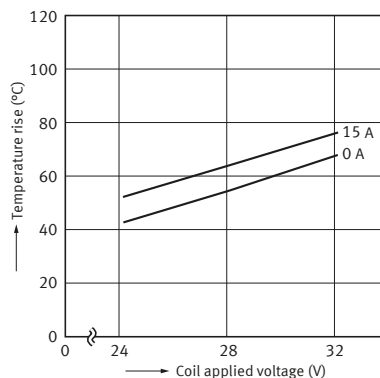
1-1. Coil temperature rise (12 V type, 85 °C)

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

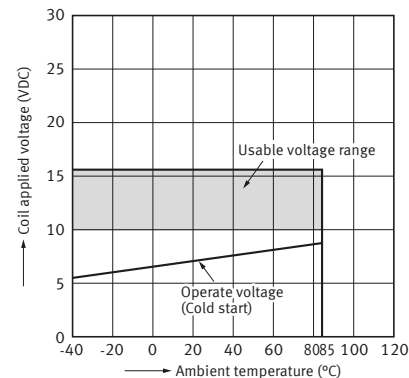


1-2. Coil temperature rise (24 V type, 85 °C)

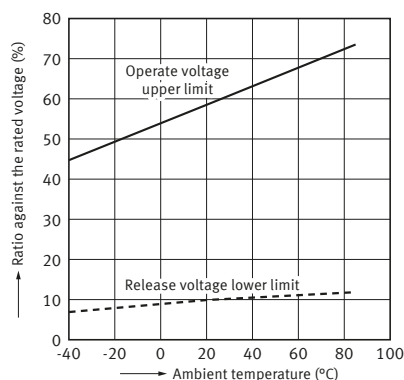
Sample: CM1F-24V, 4 pcs.
Measured portion: Inside the coil
Contact carrying current: 0 A, 15 A
Ambient temperature: 85°C



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

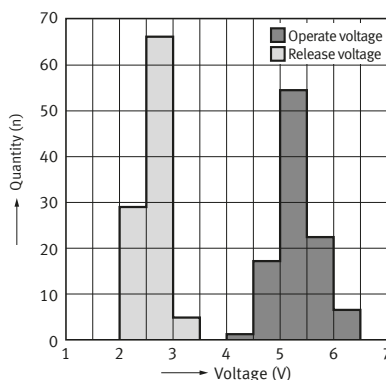


3. Ambient temperature characteristics (Cold/initial)



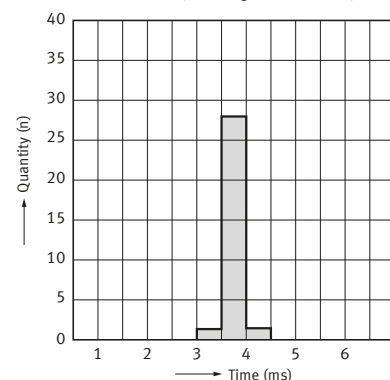
4. Distribution of operate and release voltage

Sample: CM1F-12V, 100 pcs.



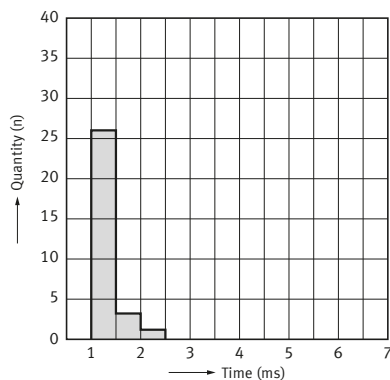
5. Distribution of operate time

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



6. Distribution of release time

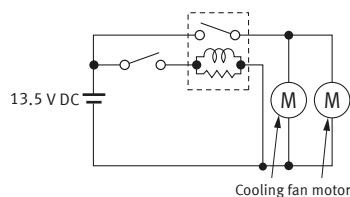
Sample: CM1F-12V, 30 pcs.
* Max. 10 ms standard (excluding contact bounce)



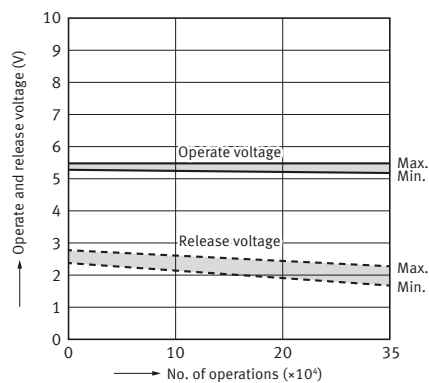
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7-1. Electrical life test (Motor free)

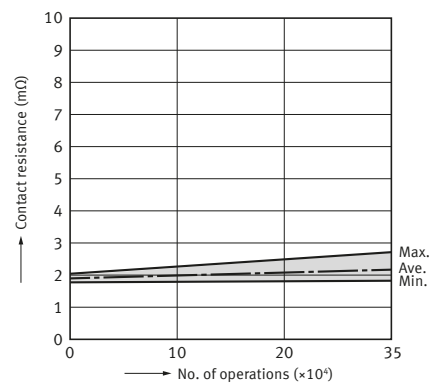
Sample: CM1aF-R-12V, 6 pcs.
Load: 16 A 13.5 V DC
Cooling fan motor actual load
(free condition)
Operating frequency: ON 2 s, OFF 6 s
Ambient temperature: Room temperature
Circuit:



Change of operate and release voltage

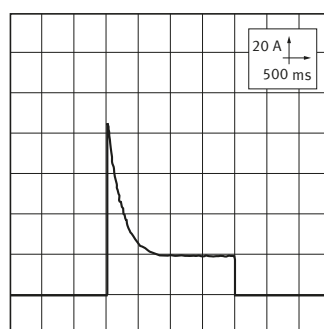


Change of contact resistance



Load current waveform

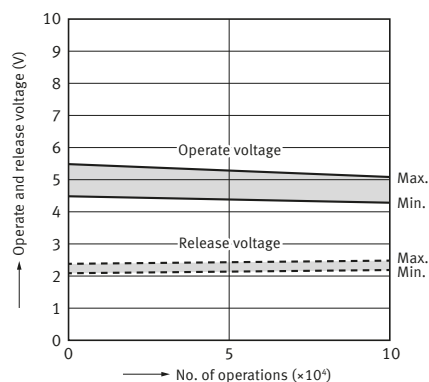
Load; Inrush current: 85 A, Steady current: 18 A



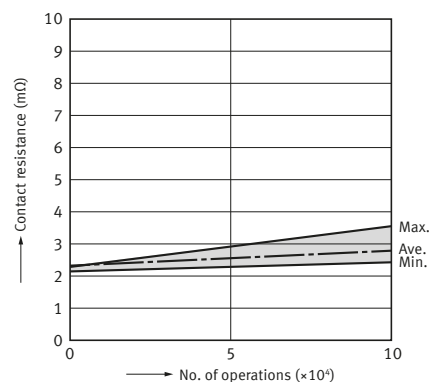
7-2. Electrical life test (Halogen lamp load)

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



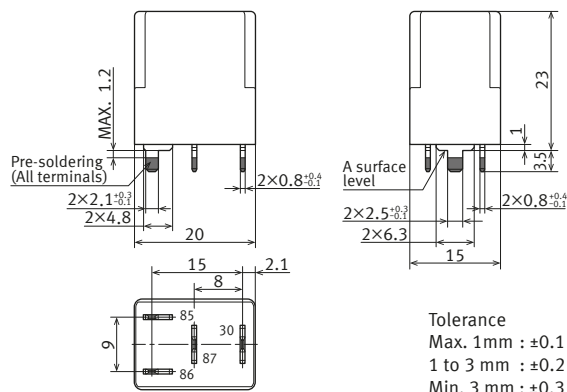
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■ PC board type (1 Form A, 24 V only)

CAD

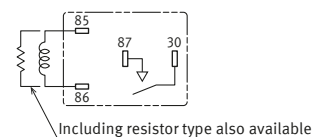


External dimensions



* 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://industry.panasonic.com/global/en/salespolicies>

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