

Automotive Relays  
**TM RELAYS**

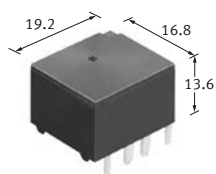
Product Catalog

**IN Your  
Future**

# TM RELAYS

## High Capacity Relay for Smart Junction Box

< Protective construction >  
Sealed



(Unit: mm)

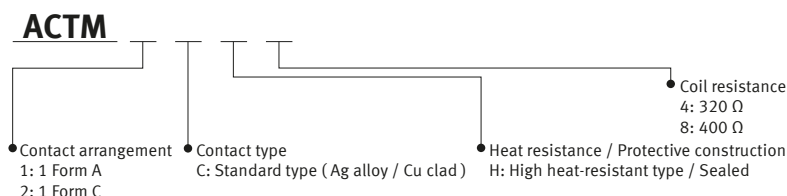
### FEATURES

- Flat type and ideal height ( 13.6 mm ) for smart junction box
- High capacity and 35 A type

### TYPICAL APPLICATIONS

- Fan motor, Defogger, etc.

### ORDERING INFORMATION ( PART NO. )



### TYPES

Contact arrangement	Contact type	Rated coil voltage	Coil resistance	Part No.		Packing	
				High heat-resistant type		Carton	Case
1 Form A	Standard type (Ag alloy/Cu clad)	12 V DC	320 Ω	ACTM1CH4	50 pcs.	2,000 pcs.	
			400 Ω	ACTM1CH8			
1 Form C	320 Ω		ACTM2CH4				

### RATING

#### Coil data

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	Max. 7.0 V DC	Min. 0.5 V DC	37.5 mA	320 Ω	450 mW	10 to 16 V DC
			30 mA	400 Ω	360 mW	

Note) Other operate voltage types are also available. Please inquire our sales representative for details.

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## ■ Specifications

	Item	Specifications
Contact data	Contact arrangement	1 Form A, 1 Form C
	Contact resistance ( initial )	Max. 50 mΩ ( N.O. side: typ. 1.5 mΩ, N.C. side: typ. 3 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.C. side: 15 A 14 V DC
	Max. carrying current* <sup>1</sup>	40 A/1 hour ( Coil applied voltage 12 V DC, at 20 °C )
	Min. switching load ( resistive ) * <sup>2</sup>	1 A 14 V DC ( at 20 °C )
Insulated resistance ( initial )		Min. 100 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 protective element )
Shock resistance	Functional	Min. 100 m/s <sup>2</sup> ( Half-wave pulse of sine wave: 11 ms, detection time: 10 μs )
	Destructive	Min. 1,000 m/s <sup>2</sup> ( Half-wave pulse of sine wave: 6 ms, number of shocks for each direction: X, Y and Z direction: 3 times )
Vibration resistance	Functional	10 to 100 Hz, Min. 44.1 m/s <sup>2</sup> ( Detection time: 10 μs )
	Destructive	10 to 500 Hz, Min. 44.1 m/s <sup>2</sup> Time of vibration for each direction; X, Y direction: 2 hours, Z direction: 4 hours
Expected life	Mechanical	Min. 10 <sup>7</sup> ( at 120 times/min )
	Electrical	< Resistive load > Min. 10 <sup>5</sup> at rated switching capacity, operating frequency: 1 s ON, 9 s OFF
Conditions	Conditions for usage, transport and storage* <sup>3</sup>	Ambient temperature: -40 to +110 °C Humidity : 2 to 85 % RH ( Avoid icing and condensation )
Weight		Approx. 11.5 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.

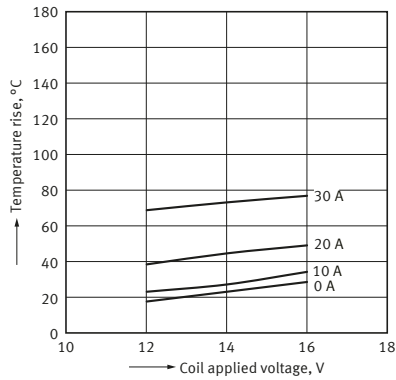
\*3: The upper operation ambient temperature limit is the maximum temperature that can satisfy the coil temperature rise value. For details, please refer to the " Automotive Relay Users Guide ".

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

## REFERENCE DATA

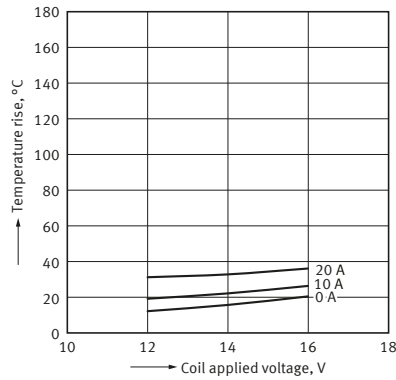
### 1-1. Coil temperature rise ( at room temperature )

Sample: ACTM1CH8, 6 pcs  
 Carrying current: 0 A, 10 A, 20 A, 30 A  
 Ambient temperature: Room temperature



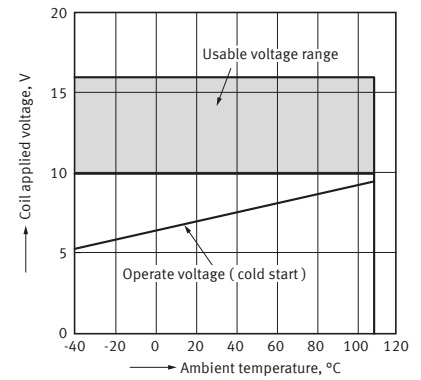
### 1-2. Coil temperature rise ( at 110°C )

Sample: ACTM1CH8, 6 pcs  
 Carrying current: 0 A, 10 A, 20 A  
 Ambient temperature: 110°C



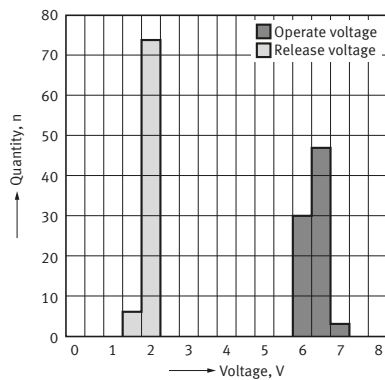
### 2. Ambient temperature and usable voltage range

Sample: ACTM1CH8



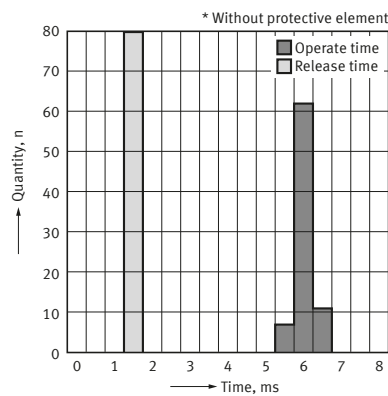
### 3. Distribution of operate and release voltage

Sample: ACTM1CH8, 80 pcs.



### 4. Distribution of operate and release time

Sample: ACTM1CH8, 80 pcs.



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## DIMENSIONS ( Unit: mm )

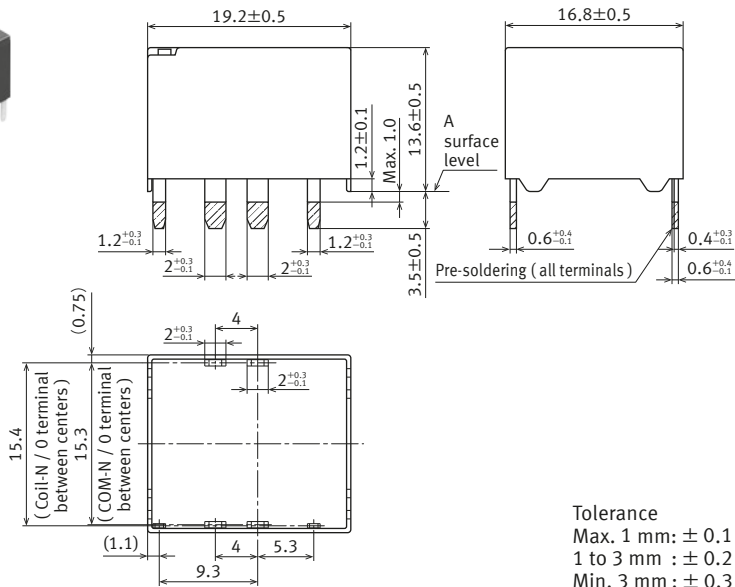
**CAD** The CAD data of the products with a " CAD " mark can be downloaded from our Website.

### 1 Form A type

**CAD**



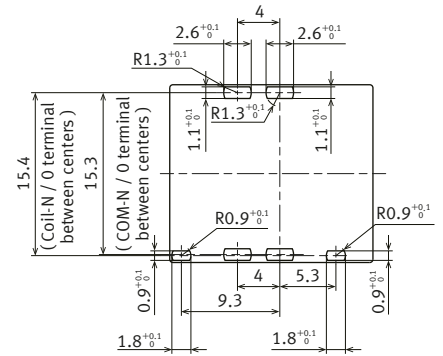
External dimensions



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

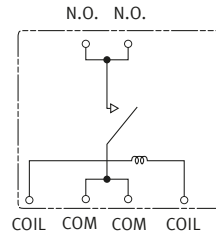
\* Dimensions (thickness and width) of terminal is measured after pre-soldering.  
 Intervals between terminals is measured at A surface level.

PC board pattern ( BOTTOM VIEW )



Tolerance: ± 0.1

Schematic ( BOTTOM VIEW )



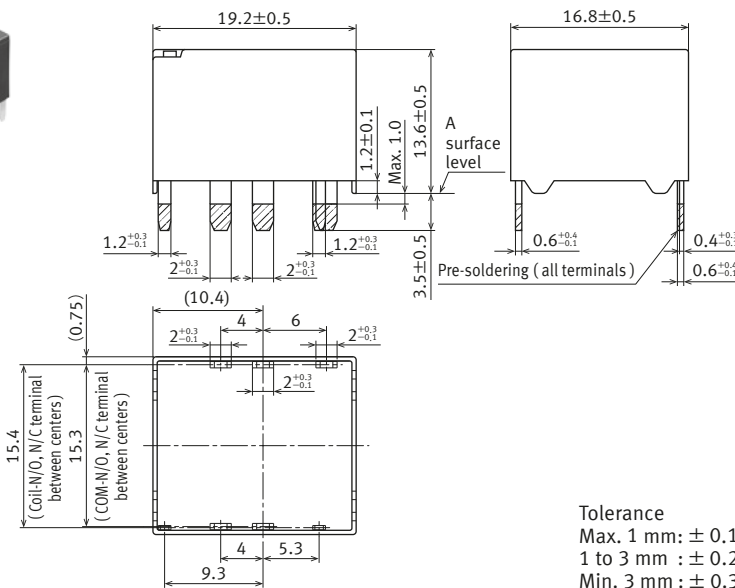
\* The lamp control type has polarized contacts. Connect N.O. to the "+" (plus)" side.

### 1 Form C type

**CAD**



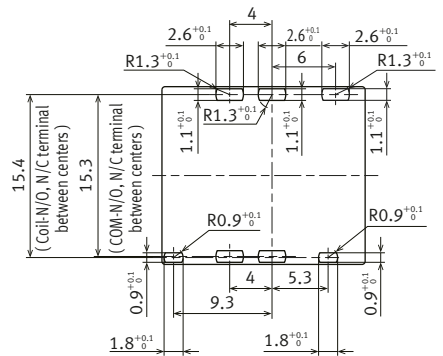
External dimensions



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

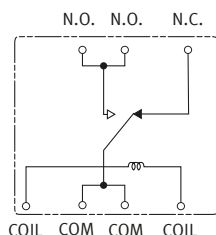
\* Dimensions (thickness and width) of terminal is measured after pre-soldering.  
 Intervals between terminals is measured at A surface level.

PC board pattern ( BOTTOM VIEW )



Tolerance: ± 0.1

Schematic ( BOTTOM VIEW )



\* The lamp control type has polarized contacts. Connect N.O. to the "+" (plus)" side.

## GUIDELINES FOR USAGE

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

### ■ Precautions when using TM relays

#### ● Coil operating power

Pure DC current should be applied to the coil. If it includes ripple, the ripple factor should be less than 5%. However, check it with the actual circuit since the characteristics may be slightly different. Also, the power waveform should be rectangular.

#### ● Coil applied voltage

To ensure proper operation, the voltage applied to the coil should be the rated operating voltage of the coil. Also, be aware that the pick-up and drop-out voltages will fluctuate depending on the ambient temperature and operating conditions.

#### ● Expected life

Check this with the actual device as it is affected by coil driving circuit, load type, activation frequency, activation phase, ambient conditions and other factors.

#### ● Soldering

When soldering the relays, ensure conformance with the conditions listed.

##### 1) Automatic soldering

Conditions	Preheating	Soldering
Temperature	100 °C ( surface of PC board )	260 °C
Time	within 2 min	within 5 s

##### 2) Manual soldering

Tip temperature	280 to 300 °C
Soldering iron	30 to 60 W
Soldering time	within 5 s

#### ● Atmosphere when using, storing and transporting

1) Ambient temperature, humidity and air pressure during usage and when storing or transporting

(1) Temperature

−40 to +110 °C ( High heat-resistant type )

(2) Humidity

2 to 85 % RH

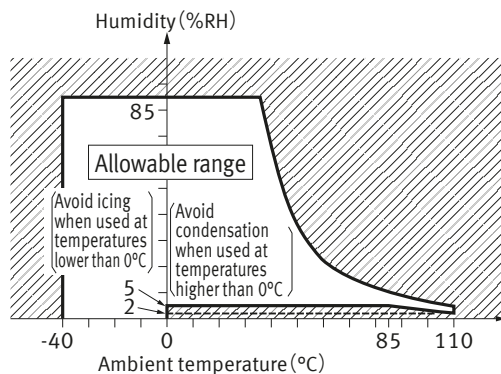
( Avoid icing and condensation )

(3) Air pressure: 86 to 106 kPa

Note) The humidity range varies with the temperature. Use within the range indicated in the graph.

[ Temperature and humidity range for usage, transport, and storage ]

[ High heat-resistant type ]



2) Water condensation

Water condensation occurs when the ambient temperature drops suddenly from a high temperature and humidity, or the relay is suddenly transferred from a low ambient temperature to a high temperature and humidity. Condensation causes the failures like insulation deterioration, wire disconnection and rust etc. Panasonic Industry Co., Ltd. does not guarantee the failures caused by condensation. The heat conduction by the equipment may accelerate the cooling of relay itself, and the condensation may occur. Please confirm no condensation in the worst condition of the actual usage. ( Special attention should be paid when high temperature heating parts are close to the relay. Also, please consider the condensation may occur inside of the relay. )

3) Icing

Please check the icing when an ambient temperature is lower than 0 °C. Icing means, the moisture contained in the surrounding environment and inside the relay freezes when the ambient temperature falls below the freezing point. The icing causes the sticking of movable portion, the operation delay and the contact conduction failure etc. Panasonic Industry Co., Ltd. does not guarantee the failures caused by the icing. The heat conduction by the equipment may accelerate the cooling of relay itself and the icing may occur. Icing condition is changed by ambient environment, please make sure to confirm no icing in the worst condition of the actual usage.

4) Low-temperature, low-humidity atmosphere

The plastic becomes brittle if the relay is exposed to a low temperature, low humidity environment for long periods of time.

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- Others handling precautions

Do not use relays that have been dropped, because doing so may be a cause of faulty operation.

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](https://industry.panasonic.com/global/en/salesnetwork/globalnetwork)

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