Panasonic
ideas for life

HIGH LOAD RELAY FOR SMART J/B

TC RELAYS (ACTC)


FEATURES

- **Large capacity switching despite small size. Can replace micro ISO terminal type relays.**
- **Latching type added**
- **Pin in Paste compatible model added**

TYPICAL APPLICATIONS

Head lamp, Fog lamp, Fan motor, EPS, Defogger, Seat heater, etc.

RoHS compliant

ORDERING INFORMATION

ACTC □ □ □

Contact arrangement/Operation function
1: 1 Form A/Standard type
2: 1 Form C/Standard type
3: Double make contact 2 Form A/Standard type
6: Double make contact 2 Form A/2 coil latching type

Heat resistance/Protective construction
Nil: Standard type/Sealed type
H: High heat-resistant type/Sealed type
R: Pin in Paste type/Flux tight type

Coil resistance
1: 110Ω
2: 160Ω
3: 225Ω
6: 75Ω

TYPES

Contact arrangement/Operation function	Nominal coil voltage	Coil resistance	Part No.		
			Heat resistance		
			Standard type	High heat-resistant type	Pin in Paste type
1 Form A/Standard type	12V DC	110Ω	ACTC11	ACTC1H1	ACTC1R1
		160Ω	ACTC12	ACTC1H2	ACTC1R2
		225Ω	ACTC13	ACTC1H3	ACTC1R3
1 Form C/Standard type		110Ω	ACTC21	ACTC2H1	ACTC2R1
		160Ω	ACTC22	ACTC2H2	ACTC2R2
		225Ω	ACTC23	ACTC2H3	ACTC2R3
Double make contact 2 Form A/ Standard type		110Ω	ACTC31	ACTC3H1	ACTC3R1
		160Ω	ACTC32	ACTC3H2	ACTC3R2
Double make contact 2 Form A/ 2 coil latching type		75Ω	ACTC66	ACTC6H6	ACTC6R6

Standard packing; Carton (tube): 40 pcs.; Case: 800 pcs.

RATING

1. Coil data

1) Standard type

Nominal coil voltage	Pick-up voltage (at 20°C 68°F)	Drop-out voltage (at 20°C 68°F)	Nominal operating current [±10%] (at 20°C 68°F)	Coil resistance [±10%] (at 20°C 68°F)	Nominal operating power (at 20°C 68°F)	Usable voltage range
12V DC	Max. 6.5V DC (Initial)	Min. 0.5V DC (Initial)	109 mA	110Ω	1,309 mW	10 to 16V DC
	Max. 7.0V DC (Initial)	Min. 0.5V DC (Initial)	75 mA	160Ω	900 mW	
	Max. 7.5V DC (Initial)	Min. 0.5V DC (Initial)	53.3 mA	225Ω	640 mW	

Note: Other pick-up voltage types are also available. Please contact us for details.

2) 2 coil latching type

Nominal coil voltage	Set voltage (at 20°C 68°F)	Reset voltage (at 20°C 68°F)	Nominal operating current [±10%] (at 20°C 68°F)		Coil resistance [±10%] (at 20°C 68°F)		Nominal operating power (at 20°C 68°F)		Usable voltage range
			Set coil	Reset coil	Set coil	Reset coil	Set coil	Reset coil	
12V DC	Max. 7.2V DC (Initial)	Max. 7.2V DC (Initial)	160 mA	160 mA	75Ω	75Ω	1,920 mW	1,920 mW	10 to 16V DC

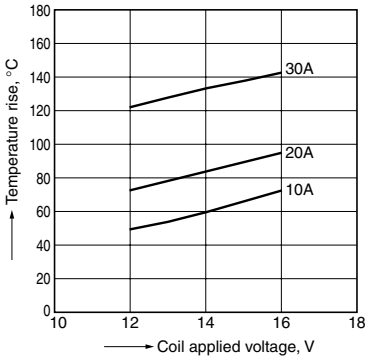
2. Specifications

Characteristics	Item		Specifications
Contact	Arrangement		1 Form A, 1 Form C, Double make contact 2 Form A
	Contact resistance (Initial)		N.O.: Typ3mΩ, N.C.: Typ4mΩ (By voltage drop 6V DC 1A)
	Contact material		Ag alloy (Cadmium free)
Rating	Nominal switching capacity (resistive load)		N.O.: 30A 14V DC, N.C.: 15A 14V DC
	Max. carrying current (12V DC initial)*3		35A for 1 hour (at 20°C 68°F)
	Nominal operating power		1,309 mW (Pick-up voltage 6.5V DC type)
			900 mW (Pick-up voltage 7.0V DC type)
			640 mW (Pick-up voltage 7.5V DC type)
			1,920 mW (2 coil latching type)
	Min. switching capacity (resistive load)*1		1A 14V DC
Electrical characteristics	Insulation resistance (Initial)		Min. 100 MΩ (at 500V DC, Measurement at same location as “Breakdown voltage” section.)
	Breakdown voltage (Initial)	Between open contacts	500 Vrms for 1 min. (Detection current: 10mA)
		Between contacts and coil	500 Vrms for 1 min. (Detection current: 10mA)
	Operate time [Set time] (at nominal voltage)		Max. 10ms (at 20°C 68°F, excluding contact bounce time) (Initial)
	Release time [Reset time] (at nominal voltage)		Max. 10ms (at 20°C 68°F, excluding contact bounce time) (Initial) (without protective element)
Mechanical characteristics	Shock resistance	Functional	Min. 100 m/s² {10G} (Half-wave pulse of sine wave: 11ms; detection time: 10μs)
		Destructive	Min. 1,000 m/s² {100G} (Half-wave pulse of sine wave: 6ms)
	Vibration resistance	Functional	10 Hz to 100 Hz, Min. 44.1 m/s² {4.5G} (Detection time: 10μs)
		Destructive	10 Hz to 500 Hz, Min. 44.1 m/s² {4.5G}, Time of vibration for each direction; X, Y direction: 2 hours, Z direction: 4 hours
Expected life	Mechanical		Min. 10^7 (at 120 cpm)
			Min. 10^6 (at 120 cpm) (2 coil latching type)
	Electrical		<Resistive load> Min. 10^5 (at nominal switching capacity, operating frequency: 1s ON, 9s OFF)
			<Motor load> Min. 10^5 (30 A 14V DC at motor lock condition), operating frequency: 0.5s ON, 9.5s OFF
			<Lamp load> *4 Min. 2×10^5 (at 84 A (inrush), 12A (steady), 14 V DC), Operating frequency: 1s ON, 14s OFF
Conditions	Conditions for operation, transport and storage*2		Standard type Ambient temperature: –40°C to +85°C –40°F to +185°F, Humidity: 5% R.H. to 85% R.H. High heat-resistant/Pin in Paste type Ambient temperature: –40°C to +110°C –40°F to +230°F, Humidity: 2% R.H. to 85% R.H. (Not freezing and condensing at low temperature)
Mass			Approx. 10 g .35 oz

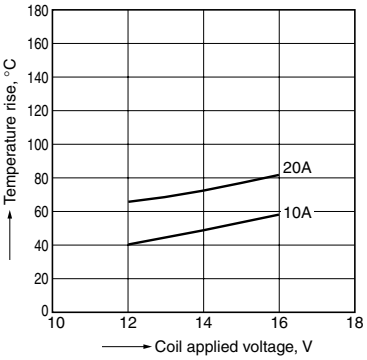
Notes: *1. This value can change due to the switching frequency, environmental conditions, and desired reliability level, therefore it is recommended to check this with the actual load.
*2. The upper operation ambient temperature limit is the maximum temperature that can satisfy the coil temperature rise value. Please refer to “Usage ambient condition” in CAUTIONS FOR USE OF AUTOMOTIVE RELAYS. Please inquire if you will be using the relay in a high temperature atmosphere (110°C 230°F).
*3. Depends on connection conditions. Also, this does not guarantee repeated switching. We recommend that you confirm operation under actual conditions.
*4. When using with an electric discharge lamp load or any other lamp load, or a capacitor load, connect COM to the “+ (plus)” side.

REFERENCE DATA

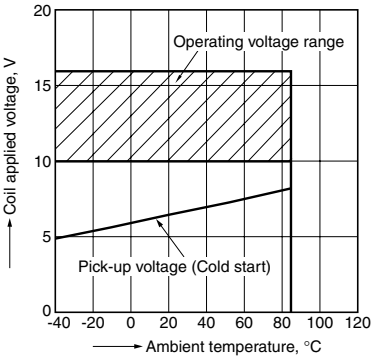
1.-(1) Coil temperature rise (at room temperature)
Sample: ACTC12, 3pcs.
Contact carrying current: 10A, 20A, 30A
Ambient temperature: Room temperature



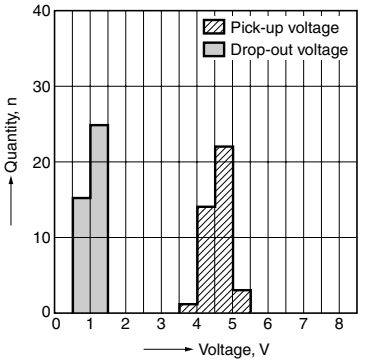
1.-(2) Coil temperature rise (at 85°C 185°F)
Sample: ACTC12, 3pcs.
Contact carrying current: 10A, 20A
Ambient temperature: 85°C 185°F



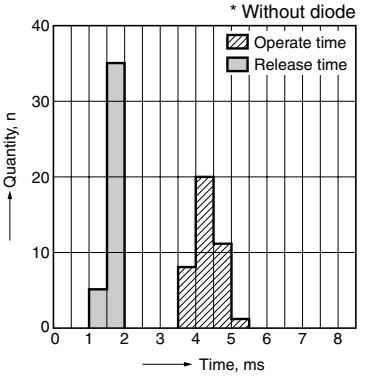
2. Ambient temperature and operating voltage range
Sample: ACTC12



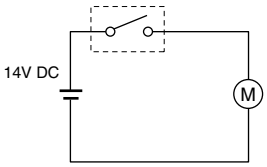
3. Distribution of pick-up and drop-out voltage
Sample: ACTC12, 40pcs.



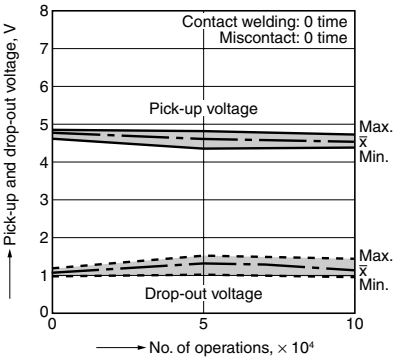
4. Distribution of operate and release time
Sample: ACTC12, 40pcs.



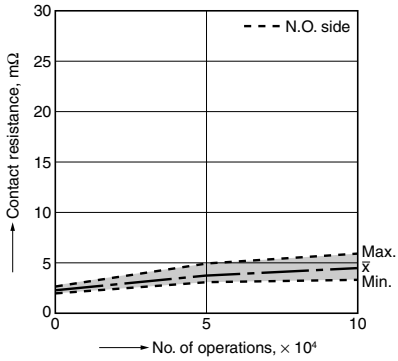
5.-(1) Electrical life test (Motor lock)
Sample: ACTC12, 6pcs.
Load: 30A 14V DC
Power window motor actual load (lock condition)
Operating frequency: ON 0.5s, OFF 9.5s
Ambient temperature: Room temperature
Circuit:



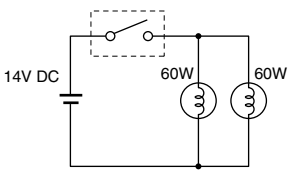
Change of pick-up and drop-out voltage



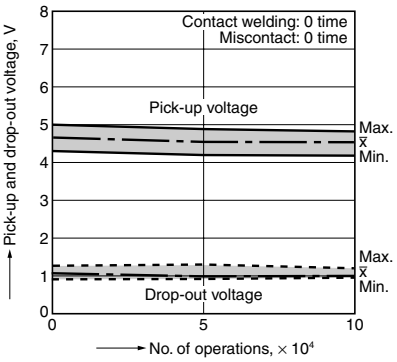
Change of contact resistance



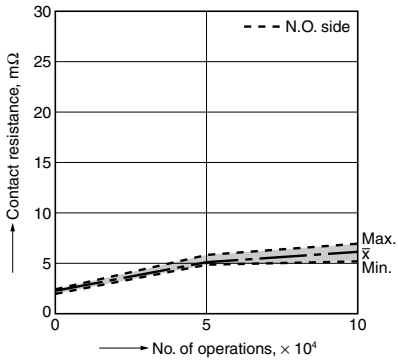
5.-(2) Electrical life test (Lamp load)
Sample: ACTC12, 6pcs.
Load: inrush: 84A/steady: 12A 14V DC
Operating frequency: ON 1s, OFF 14s
Ambient temperature: Room temperature
Circuit:



Change of pick-up and drop-out voltage



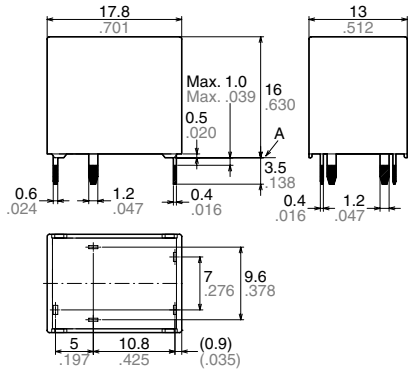
Change of contact resistance



DIMENSIONS (mm inch)

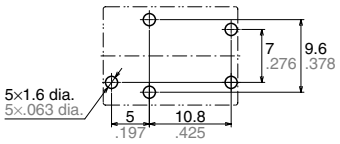
1 Form A type/Standard type

External dimensions



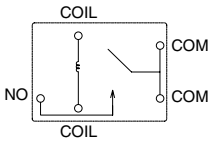
Dimension:	Tolerance
Less than 1mm .039inch:	±0.1 ±.004
Min. 1mm .039inch less than 3mm .118 inch:	±0.2 ±.008
Min. 3mm .118 inch:	±0.3 ±.012

PC board pattern (Bottom view)



Tolerance: ±0.1 ±.004

Schematic (Bottom view)

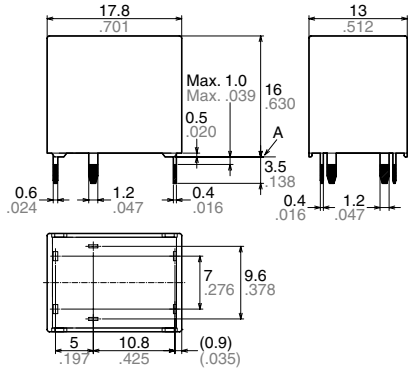


* The lamp control type has polarized contacts. Connect COM to the "+ (plus)" side.

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

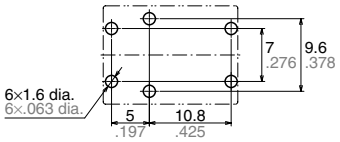
1 Form C/Standard type

External dimensions



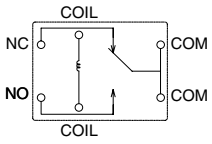
Dimension:	Tolerance
Less than 1mm .039inch:	±0.1 ±.004
Min. 1mm .039inch less than 3mm .118 inch:	±0.2 ±.008
Min. 3mm .118 inch:	±0.3 ±.012

PC board pattern (Bottom view)



Tolerance: ±0.1 ±.004

Schematic (Bottom view)



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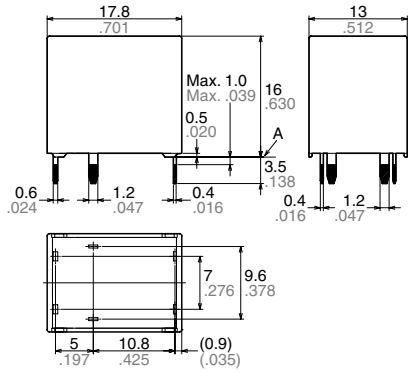
Double make contact 2 Form A type/Standard type

External dimensions



Dimension:	Tolerance
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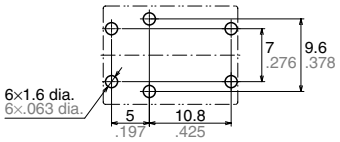
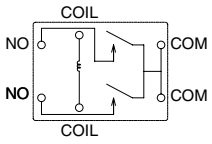
Min. 1mm .039inch less than 3mm .118 inch:	±0.2 ±.008
Min. 3mm .118 inch:	±0.3 ±.012

PC board pattern (Bottom view)



Tolerance: ±0.1 ±.004

Schematic (Bottom view)



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

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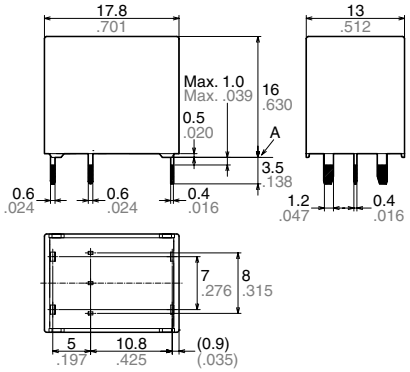
Double make contact 2 Form A type/2 coil latching type

External dimensions



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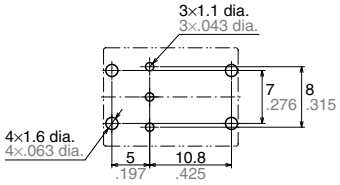
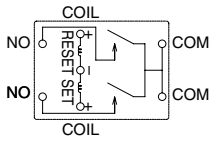
Min. 3mm .118 inch:	±0.3 ±.012

PC board pattern (Bottom view)



Tolerance: ±0.1 ±.004

Schematic (Bottom view)



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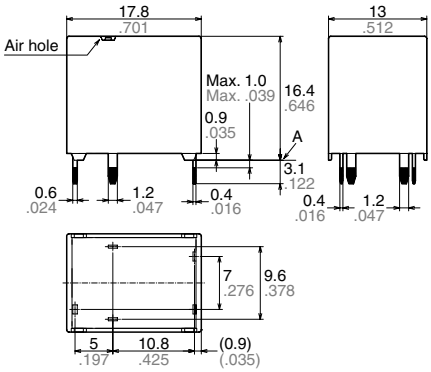
* Dimensions (thickness and width) of terminal is measured before pre-soldering. Intervals between terminals is measured at A surface level.

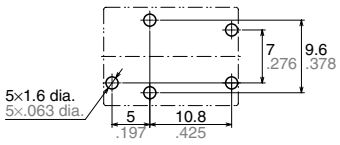
1 Form A/Standard type Pin in Paste type

External dimensions



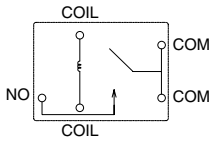
Dimension:	Tolerance
Less than 1mm .039inch:	±0.1 ±.004
Min. 1mm .039inch less than 3mm .118 inch:	±0.2 ±.008
Min. 3mm .118 inch:	±0.3 ±.012

PC board pattern (Bottom view)



Tolerance: ±0.1 ±.004

Schematic (Bottom view)

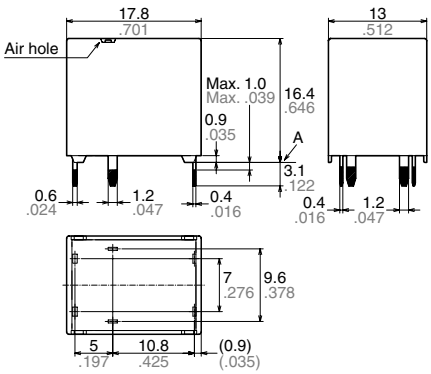


* The lamp control type has polarized contacts. Connect COM to the "+ (plus)" side.

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

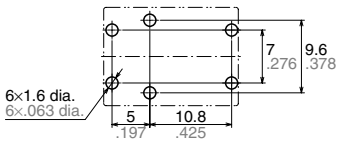
1 Form C/Standard type Pin in Paste type

External dimensions



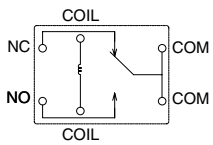
Dimension:	Tolerance
Less than 1mm .039inch:	±0.1 ±.004
Min. 1mm .039inch less than 3mm .118 inch:	±0.2 ±.008
Min. 3mm .118 inch:	±0.3 ±.012

PC board pattern (Bottom view)



Tolerance: ±0.1 ±.004

Schematic (Bottom view)



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

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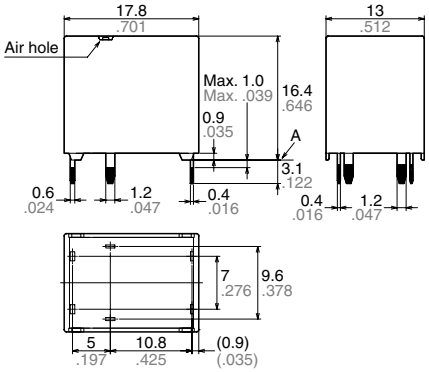
TC (ACTC)

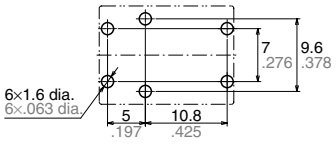
Double make contact 2 Form A type/Standard type
Pin in Paste type

External dimensions



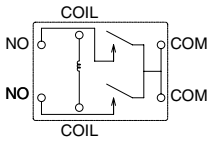
Dimension:	Tolerance
Less than 1mm .039inch:	±0.1 ±.004
Min. 1mm .039inch less than 3mm .118 inch:	±0.2 ±.008
Min. 3mm .118 inch:	±0.3 ±.012

PC board pattern (Bottom view)



Tolerance: ±0.1 ±.004

Schematic (Bottom view)

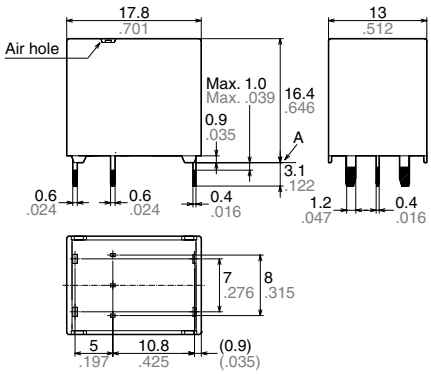


* The lamp control type has polarized contacts. Connect COM to the "+ (plus)" side.

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

Double make contact 2 Form A type/2 coil latching type
Pin in Paste type

External dimensions



Dimension:	Tolerance
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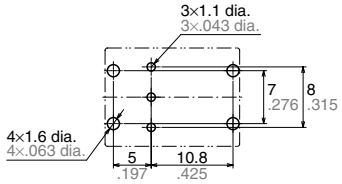
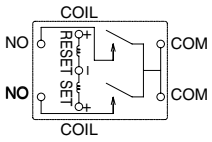
PC board pattern (Bottom view)



Tolerance: ±0.1 ±.004

Schematic (Bottom view)



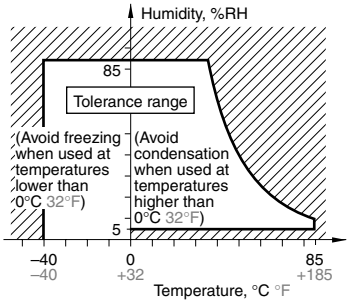
* The lamp control type has polarized contacts. Connect COM to the "+ (plus)" side.

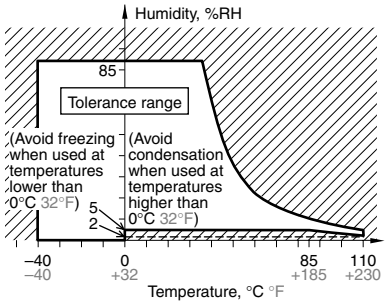
* Dimensions (thickness and width) of terminal is measured before pre-soldering. Intervals between terminals is measured at A surface level.

NOTES

Usage, transport and storage conditions

1) Ambient temperature, humidity, and atmospheric pressure during usage, transport, and storage of the relay:
(1) Temperature: –40 to +85°C –40 to +185°F (Standard type)
–40 to +110°C –40 to +230°F (High heat-resistant type/Pin in Paste type)
(2) Humidity: 2 to 85% RH (Avoid freezing and condensation.)
(3) Atmospheric pressure: 86 to 106 kPa
The humidity range varies with the temperature. Use within the range indicated in the graph below.
(Temperature and humidity range for usage, transport, and storage)





PRECAUTIONS REGARDING LATCHING RELAYS

• Latching relays are shipped from the factory in the reset state. A shock to the relay during shipping or installation may cause it to change to the set state. Therefore, it is recommended that the relay be used in a circuit which initializes the relay to the required state (reset) whenever the power is turned on.
• Avoid impressing voltages to the set coil and reset coil at the same time.
• The positive "+" and negative "–" connections to the coil should be done as indicated on the wiring diagram. If connected incorrectly, it may malfunction or fail to operate.
• In order to set or reset a latch relay, as a guide, apply the square wave rated voltage for set time or five times or more of the reset time for each product and then verify operation again.

For general cautions for use, please refer to the "CAUTIONS FOR USE OF AUTOMOTIVE RELAYS"