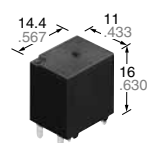


High Load Relay for Smart Junction Box

TL RELAYS

<Protective construction>
High heat-resistant type: Sealed
Pin in Paste compliant type: Flux tight

New



(Unit: mm inch)

RoHS compliant

FEATURES

- Large capacity switching despite small size. Can replace micro ISO terminal type relays.
- 40A and supports fuse
- Pin in Paste compliant model added

TYPICAL APPLICATIONS

- Head lamp, Fog lamp, Fan motor, etc.

ORDERING INFORMATION

ACTL

Contact arrangement

3: Double make contact 2 Form A

Contact type

C: Standard type (Ag alloy / Cu clad)

D: Lamp control type (Ag alloy / Cu clad)

Heat resistance/Protective construction

H: High heat-resistant type/Sealed

R: Pin in Paste compliant type/Flux tight

Coil resistance

3: 225Ω

TYPES

Contact arrangement	Contact type	Rated coil voltage	Coil resistance	Part No.		Packing	
				Heat resistance		Carton	Case
				High heat-resistant type	Pin in Paste compliant type		
Double make contact 2 Form A	Standard type (Ag alloy / Cu clad)	12V DC	225Ω	ACTL3CH3	ACTL3CR3	50 pcs.	2,000 pcs.
	Lamp control type (Ag alloy / Cu clad)			ACTL3DH3	ACTL3DR3		

RATING

1. Coil data

Rated coil voltage	Operate (Set) voltage (at 20°C 68°F) (Initial)	Release (Reset) voltage (at 20°C 68°F) (Initial)	Rated operating current [±10%] (at 20°C 68°F)	Coil resistance [±10%] (at 20°C 68°F)	Rated operating power (at 20°C 68°F)	Usable voltage range
12 V DC	Max. 6.5 V DC	Min. 0.5 V DC	53.3 mA	225Ω	640 mW	10 to 16 V DC

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

2. Specifications

Item		Specifications	
Contact data	Contact arrangement	Double make contact 2 Form A	
	Contact resistance (initial)	Max. 50mΩ (Typ. 2mΩ) (By voltage drop 1A 6V DC)	
	Contact material	Ag alloy	
	Rated switching capacity (resistive)	40A 14V DC	
	Max. carrying current (initial)*1	40A/1 hour (14V DC, at 20°C 68°F)	
	Min. switching load (resistive)*2	1A 14V DC (at 20°C 68°F)	
Insulated resistance (initial)		Min. 100 MΩ (at 500V DC, Measurement at same location as "Dielectric strength" section.)	
Dielectric strength (initial)	Between open contacts	500 Vrms for 1 min. (Detection current: 10mA)	
	Between contacts and coil	500 Vrms for 1 min. (Detection current: 10mA)	
Time characteristics (initial)	Operate (Set) time (at rated voltage)	Max. 10ms (at 20°C 68°F, without contact bounce time)	
	Release (Reset) time (at rated voltage)	Max. 10ms (at 20°C 68°F, without contact bounce time) (Without diode)	
Shock resistance	Functional	Min. 100 m/s ² {approx. 10G} (Half-wave pulse of sine wave: 11ms; detection time: 10μs)	
	Destructive	Min. 1,000 m/s ² {approx. 100G} (Half-wave pulse of sine wave: 6ms)	
Vibration resistance	Functional	10 to 100 Hz, Min. 44.1m/s ² {approx. 4.5G} (Detection time: 10μs)	
	Destructive	10 to 500 Hz, Min. 44.1m/s ² {approx. 4.5G} Time of vibration for each direction; X, Y direction: 2 hours, Z direction: 4 hours	
Expected life	Mechanical	Min. 5×10 ⁶ (at 120 cpm)	
	Electrical	Standard type	<Resistive load> Min. 10 ⁵ at rated switching capacity, operating frequency: ON 1s, OFF 2s <Resistive and capacitor loads> Min. 10 ⁵ : at 90 A (inrush), 20 A (steady), 14 V DC, Operating frequency: ON 0.15s, OFF 4.85s
		Lamp control type*4	<Lamp load> Min. 10 ⁵ : at 120 A (inrush), 14 A (steady), 14 V DC, Operating frequency: ON 1s, OFF 14s
Conditions	Conditions for usage, transport and storage*3	Ambient temperature: -40 to +110°C -40 to +230°F, Humidity: 2 to 85% R.H. (Please avoid icing or condensation)	
Weight		Approx. 6.5 g .23 oz	

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".

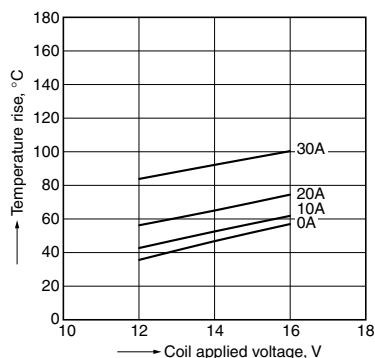
Please inquire our sales representative if you will be using the relay in a high temperature atmosphere (110°C 230°F).

*4. When using the lamp control type, connect N.O. to the "+" (plus) side. Please inquire our sales representative for details.

REFERENCE DATA

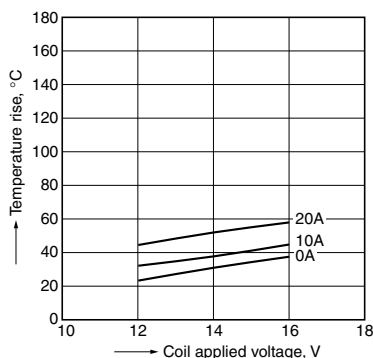
1-(1). Coil temperature rise

Sample: ACTL3CR3, 3pcs
 Carrying current: 0A, 10A, 20A, 30A
 Ambient temperature: Room temperature



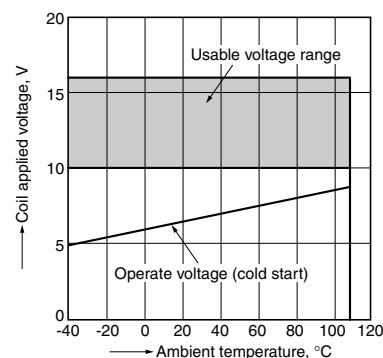
1-(2). Coil temperature rise (110°C 230°F)

Sample: ACTL3CR3, 3pcs
 Carrying current: 0A, 10A, 20A
 Ambient temperature: 110°C 230°F



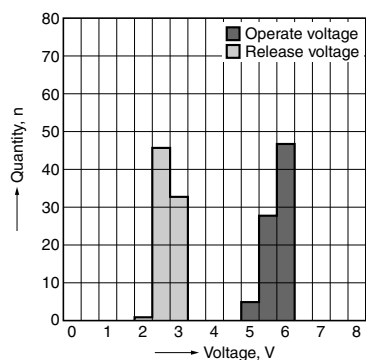
2. Ambient temperature and usable voltage range

Sample: ACTL3CR3



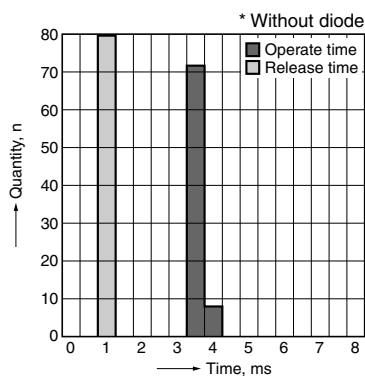
3. Distribution of operate (set) and release (reset) voltage

Sample: ACTL3CR3, 80pcs.



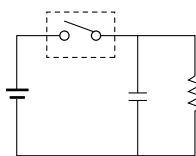
4. Distribution of operate (set) and release (reset) time

Sample: ACTL3CR3, 80pcs.

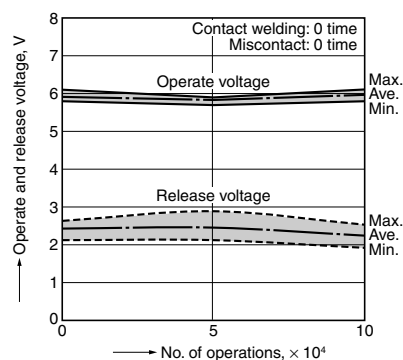


5-(1). Electrical life test (Resistive and capacitor load)

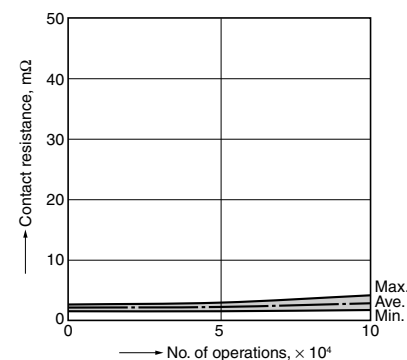
Sample: ACTL3CR3, 6pcs.
 Load: Inrush current: 90A, Steady current: 20A 14V DC
 Operating frequency: ON 0.15s, OFF 4.85s
 Ambient temperature: Room temperature
 Circuit:



Change of operate (set) and release (reset) voltage



Change of contact resistance



TL (ACTL)

DIMENSIONS (mm inch)

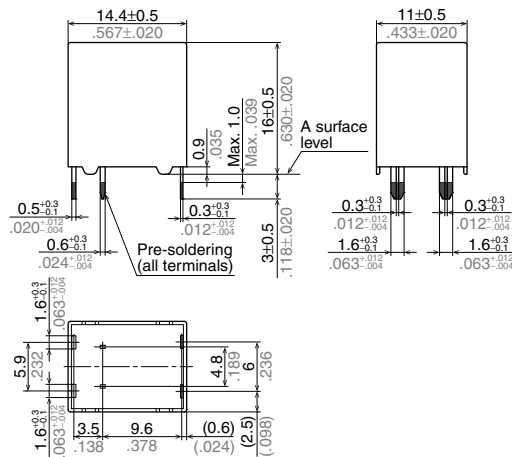
The CAD data of the products with a **CAD** mark can be downloaded from: <http://industrial.panasonic.com/ac/e/>

Double make contact 2 Form A type

CAD



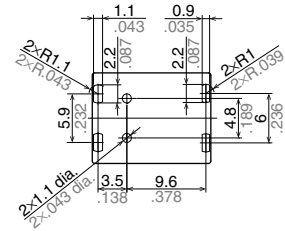
External dimensions



Dimension:	Tolerance
Max. 1mm .039 inch :	$\pm 0.1 \pm .004$
1 to 3mm .039 to .118 inch :	$\pm 0.2 \pm .008$
Min. 3mm .118 inch :	$\pm 0.3 \pm .012$

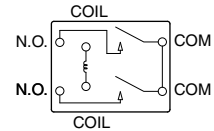
* Dimensions (thickness and width) of terminal is measured after pre-soldering. Intervals between terminals is measured at A surface level.

PC board pattern (Bottom view)



Tolerance: $\pm 0.1 \pm .004$

Schematic (Bottom view)



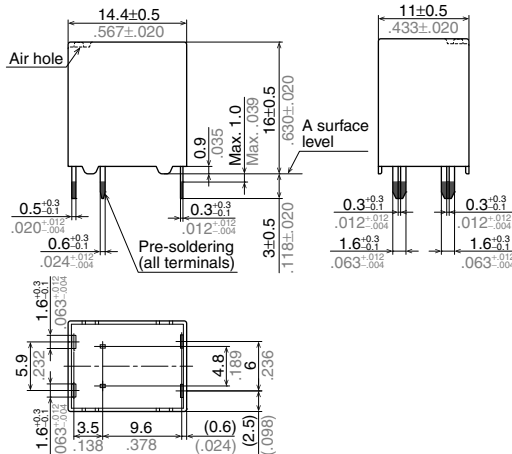
* The lamp control type has polarized contacts. Connect N.O. to the "+" (plus)" side.

Double make contact 2 Form A type Pin in Paste compliant type

CAD



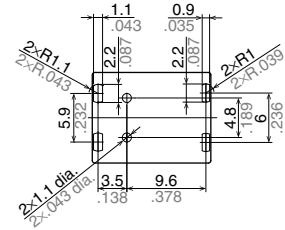
External dimensions



Dimension:	Tolerance
Max. 1mm .039 inch :	$\pm 0.1 \pm .004$
1 to 3mm .039 to .118 inch :	$\pm 0.2 \pm .008$
Min. 3mm .118 inch :	$\pm 0.3 \pm .012$

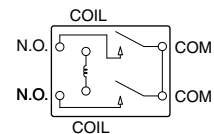
* Dimensions (thickness and width) of terminal is measured after pre-soldering. Intervals between terminals is measured at A surface level.

PC board pattern (Bottom view)



Tolerance: $\pm 0.1 \pm .004$

Schematic (Bottom view)



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

NOTES

1. 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.

2. 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.

3. Expected life

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

4. Soldering

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

1) Automatic soldering

Preheating soldering: 100°C 212°F, within 2 sec (surface of PC board)

Soldering: 260°C 500°F, within 5 sec

2) Manual soldering

Tip temperature: 280 to 300°C 536 to 572°F.

Soldering iron: 30 to 60W

Soldering time: within 5 sec

5. Usage, transport and storage conditions

1) Ambient temperature, humidity, and air pressure during usage, transport, and storage of the relay:

(1) Temperature:

–40 to +85°C –40 to +185°F (Standard type)

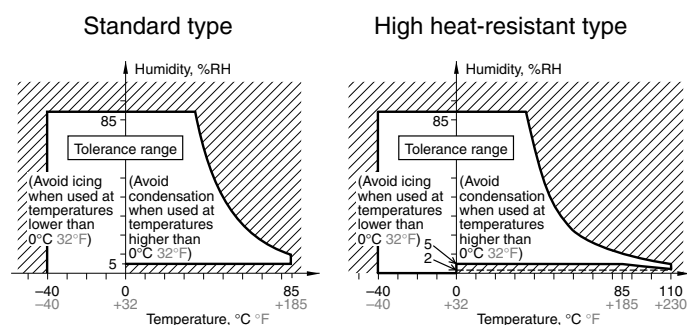
–40 to +110°C –40 to +230°F (High heat-resistant type)

(2) Humidity: 2 to 85% RH (Avoid icing and condensation.)

(3) Air 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]



2) Condensation

Condensation forms when there is a sudden change in temperature under high temperature and high humidity conditions. Condensation will cause deterioration of the relay insulation.

3) Icing

Condensation or other moisture may ice on the relay when the temperature is lower than 0°C 32°F. This causes problems such as sticking of movable parts, operational time lags or poor contact conduction.

4) Low temperature and low humidity environments

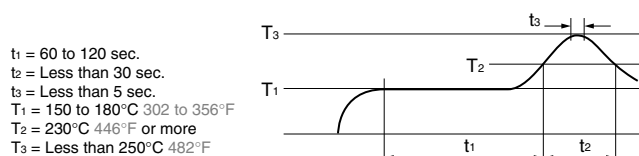
The plastic becomes brittle if the relay is exposed to a low temperature, low humidity environment for long periods of time.

6. Mounting and cleaning conditions for Pin-in-Paste compliant type

When soldering this relay, please observe the following conditions.

[I.R.S. method (recommended)]

(Recommended number of reflows: 1)



• Cautions for mounting

1. The temperature profile shows the temperature at the soldering portion on the PCB surface.
2. Depending on the mounting density condition, reflow heating method, and PCB type (metal etc.), the relay's exterior and interior temperature may become extremely high. Therefore, please confirm well under the actual use condition before use.

The other cautions of reflow soldering:

1. When soldering condition is out of recommendation, the relay performance may be adversely affected. If soldering conditions are out of our recommendation, please contact us before operation.
2. Please check the effect at the actual soldering because heat stress to relay is changed by PCB type and manufacturing process condition.
3. Solder creepage, wettability or soldering strength will be affected by the mounting condition or soldering material. Please check the actual production condition in detail.
4. Do not wash the relay as failures may occur.
5. This product is not plastic sealed type. Please perform coating with sufficient attention to avoid infiltration of the solvent to the inside. Also, please pay careful attention to use and store them with no contamination of foreign material.

7. Others handling precautions

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

For general cautions for use, please refer to the “Automotive Relay Users Guide”.

Please contact

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