



**TV-5 rated  
1 Form A 10A power relays**

# LK-P RELAYS



**RoHS compliant**

Protective construction: Flux-resistant type

### FEATURES

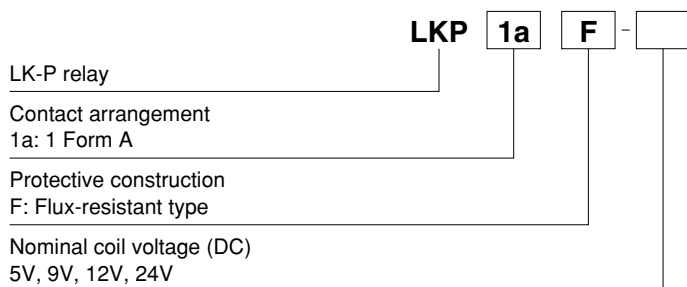
- High switching capacity: 10 A 277V AC (TV-5)**
- Long insulation distance**
  - Creepage distance and clearances between contact and coil: Min. 6 mm .236 inch (In compliance with IEC60065)
  - Surge withstand voltage between contact and coil: 10,000 V
- Popular terminal pitch in AV equipment field**
- Space-saving slim type**  
Base area: Width 11 × Length 24 mm  
Width .433 × Length .945 inch

- Conforms to the various safety standards**  
UL, CSA, VDE, TÜV and SEMKO approved

### TYPICAL APPLICATIONS

- **Audio visual equipment**  
TVs, VTRs
- **Office equipment**  
LBP, CRT
- **Home appliances**  
Refrigerator, Air conditioner

### ORDERING INFORMATION



Notes: Certified by UL, CSA, TÜV, SEMKO, VDE and TV-5

### TYPES

Contact arrangement	Nominal coil voltage	Part No.
1 Form A	5V DC	LKP1aF-5V
	9V DC	LKP1aF-9V
	12V DC	LKP1aF-12V
	24V DC	LKP1aF-24V

Notes: 1. Standard packing Carton: 100 pcs. Case: 500 pcs.  
2. 18 V DC types are also available. Please consult us for details.

### RATING

#### 1. Coil data

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	Max. applied voltage (at 20°C 68°F)
5V DC	70%V or less of nominal voltage (Initial)	10%V or more of nominal voltage (Initial)	106.4mA	47Ω	530mW	6.5V DC
9V DC			58.8mA	153Ω		11.7V DC
12V DC			44.2mA	272Ω		15.6V DC
24V DC			22.1mA	1,087Ω		31.2V DC

2. Specifications

Characteristics	Item	Specifications	
Contact	Arrangement	1 Form A	
	Contact resistance (Initial)	Max. 100 mΩ (By voltage drop 6 V DC 1A)	
	Contact material	AgSnO <sub>2</sub> type	
Rating	Nominal switching capacity (resistive load)	10A 277V AC, 5A 30V DC	
	Max. switching power (resistive load)	2,770VA, 150W	
	Max. switching voltage	277V AC, 30V DC	
	Max. switching current	10A (AC), 5A (DC)	
	Min. switching capacity (reference value)*1	100mA, 5V DC	
Electrical characteristics	Insulation resistance (Initial)	Min. 1,000MΩ (at 500V DC) Measurement at same location as "Breakdown voltage" section.	
	Breakdown voltage (Initial)	Between open contacts	1,000 Vrms for 1 min. (Detection current: 10 mA)
		Between contact and coil	4,000 Vrms for 1 min. (Detection current: 10 mA)
	Surge breakdown voltage*2 (Between contact and coil) (Initial)	10,000 V	
	Operate time (at nominal voltage) (at 20°C 68°F) (Initial)	Max. 15 ms (excluding contact bounce time.)	
	Release time (at nominal voltage) (at 20°C 68°F) (Initial)	Max. 5 ms (excluding contact bounce time) (Without diode)	
Mechanical characteristics	Shock resistance	Functional	200 m/s <sup>2</sup> (Half-wave pulse of sine wave: 11 ms; detection time: 10μs.)
		Destructive	1,000 m/s <sup>2</sup> (Half-wave pulse of sine wave: 6 ms.)
	Vibration resistance	Functional	10 to 55 Hz at double amplitude of 1.5 mm (Detection time: 10μs.)
		Destructive	10 to 55 Hz at double amplitude of 1.5 mm
Expected life	Mechanical (at 180 times/min.)	Min. 2×10 <sup>6</sup>	
	Electrical	Min. 10 <sup>5</sup> (ON/OFF = 1.5s : 1.5s at nominal switching capacity)	
Conditions	Conditions for operation, transport and storage*3	Ambient temperature: -40°C to +70°C -40°F to +158°F, Humidity: 5 to 85% R.H. (Not freezing and condensing at low temperature), Air pressure: 86 to 106kPa	
	Max. operating speed	20 times/min. (at nominal switching capacity)	
Unit weight		Approx. 12 g .42 oz	

\* Specifications will vary with foreign standards certification ratings.

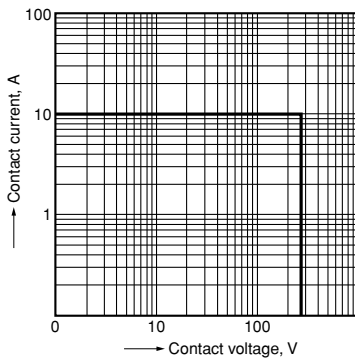
Notes: \*1. This value can change due to the switching frequency, environmental conditions, and desired reliability level, therefore it is recommended to check this with the actual load.

\*2. Wave is standard shock voltage of ±1.2×50μs according to JEC-212-1981

\*3. The upper limit of the ambient temperature is the maximum temperature that can satisfy the coil temperature rise value. Refer to Usage, transport and storage conditions in NOTES.

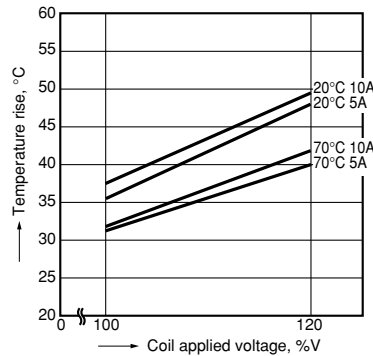
REFERENCE DATA

1. Max. switching power

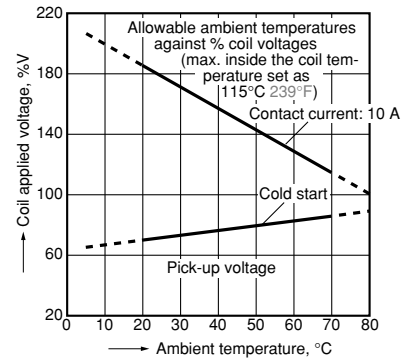


2. Coil temperature rise

Sample: LKP1aF-12V, 6 pcs.  
Point measured: coil inside  
Contact current: 5 A, 10 A

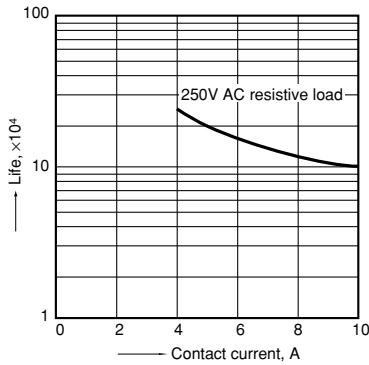


3. Ambient temperature characteristics and coil applied voltage



4. Life curve

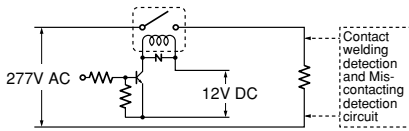
Operation frequency: 20 times/min.  
 (ON/OFF = 1.5s: 1.5s)  
 Ambient temperature: room temperature



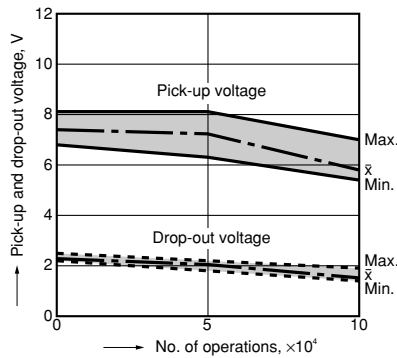
5. Electrical life test

(10 A 277 V AC, resistive load)  
 Sample: LKP1aF-12V, 6 pcs.  
 Operation frequency: 20 times/min.  
 (ON/OFF = 1.5s: 1.5s)  
 Ambient temperature: 20°C 68°F

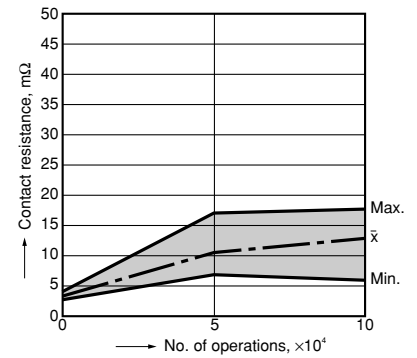
Circuit:



Change of pick-up and drop-out voltage



Change of contact resistance



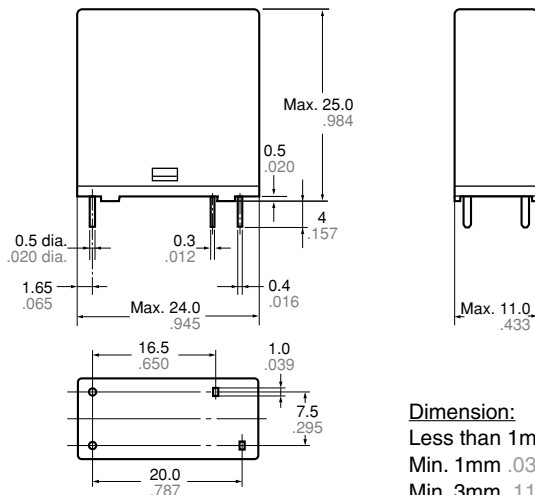
**DIMENSIONS** (mm inch)

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

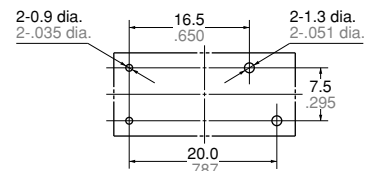
**CAD Data**



External dimensions



PC board pattern (Bottom view)



Tolerance:  $\pm 0.1 \pm 0.004$

Schematic (Bottom view)



**Dimension:**

Less than 1mm .039inch:  
 Min. 1mm .039inch less than 3mm .118 inch:  $\pm 0.2 \pm 0.008$   
 Min. 3mm .118 inch:  $\pm 0.3 \pm 0.012$

**General tolerance**

$\pm 0.1 \pm 0.004$   
 $\pm 0.2 \pm 0.008$   
 $\pm 0.3 \pm 0.012$

**SAFETY STANDARDS**

UL (Recognized)			CSA (Certified)			VDE (Certified)		
File No.	Contact rating	Cycles	File No.	Contact rating	Cycles	File No.	Contact rating	Cycles
E43149	10A 277V AC General use	10 <sup>5</sup>	LR26550	10A 277V AC	10 <sup>5</sup>	40014390	10A 250V AC (cosφ=1.0)	10 <sup>5</sup>
	5A 30V DC Resistive	10 <sup>5</sup>		5A 30V DC	10 <sup>5</sup>		10A 30V DC (0ms)	10 <sup>5</sup>
TÜV (Certified)			SEMKO (Certified)			TV Rating (UL,CSA)		
File No.	Contact rating	Cycles	File No.	Contact rating	File No.	Contact rating		
B 12 09 13461 333	10A 250V AC (cosφ=1.0)	10 <sup>5</sup>	1408509	3/100A 250V AC	UL: E43149	TV-5		
	5A 30V DC (0ms)	10 <sup>5</sup>		5/40A 250V AC	CSA: LR26550	TV-5		
	—	—		10A 250V DC	—	—		

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**EN/IEC VDE Certified  
INSULATION CHARACTERISTIC (IEC61810-1)**

Item	Characteristic
Clearance/Creepage distance (IEC61810-1)	Min. 5.5mm/5.5mm
Category of protection (IEC61810-1)	RT II
Tracking resistance (IEC60112)	PTI 175
Insulation material group	III a
Over voltage category	III
Rated voltage	250V
Pollution degree	2
Type of insulation (Between contact and coil)	Reinforced insulation
Type of insulation (Between open contacts)	Micro disconnection

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**NOTES**

1. For cautions for use, please read "GENERAL APPLICATION GUIDELINES".

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Please contact .....

**Panasonic Corporation**

Electromechanical Control Business Division

■ 1006, Oaza Kadoma, Kadoma-shi, Osaka 571-8506, Japan  
[industrial.panasonic.com/ac/e/](http://industrial.panasonic.com/ac/e/)

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