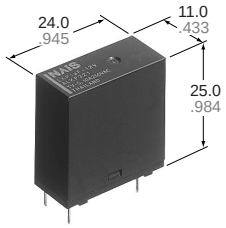
NAiS

**10 A Slim Power Relay**

# LK-P RELAYS




mm inch

## FEATURES

**1. High switching capacity: 10 A 277V AC**

**2. High insulation resistance between contact and coil**

1) Creepage distance and clearances between contact and coil: Min. 6 mm .236 inch (In compliance with IEC65)

2) Surge withstand voltage between contact and coil: 10,000 V or more

**3. High noise immunity realized by the card separation structure between contact and coil**

**4. Popular terminal pitch in AV equipment field**

**5. Space-saving slim type**

Base area: Width 11 × Length 24 mm
Width .433 × Length .945 inch

**6. Conforms to the various safety standards**

UL/CSA, VDE, TÜV and SEMKO, SEV approved

## SPECIFICATIONS

### Contact

| | | |
|---|---|---|
| Arrangement | | 1 Form A |
| Initial contact resistance, max. (By voltage drop 6 V DC 1 A) | | Max. 100 mΩ |
| Contact material | | Silver alloy |
| Rating (resistive load) | Nominal switching capacity | 10 A 277 V AC, 5 A 30V DC |
| | Max. switching power | 2,770 V A, 150W |
| | Max. switching voltage | 277 V AC, 30 V DC |
| | Max. switching current | 10 A (AC), 5A (DC) |
| Expected life (min. operations) | Mechanical (at 180 cpm) | $2 \times 10^6$ |
| | Electrical (at 20 cpm) (at rated load) | $10^5$ |

### Coil

| | |
|---|---|
| Nominal operating power | 530 mW |

**Remarks**

* Specifications will vary with foreign standards certification ratings.
*1 Measurement at same location as "Initial breakdown voltage" section.
*2 Detection current: 10mA
*3 Wave is standard shock voltage of ±1.2 × 50μs according to JEC-212-1981
*4 Excluding contact bounce time.
*5 Half-wave pulse of sine wave: 11 ms; detection time: 10 μs
*6 Half-wave pulse of sine wave: 6 ms
*7 Detection time: 10 μs
*8 Refer to 5. Conditions for operation, transport and storage mentioned in AMBIENT ENVIRONMENT (Page 24).

### Characteristics

| | | |
|---|---|---|
| Max. operating speed | | 20 cpm (at rated load) |
| Initial insulation resistance*1 | | Min. 1,000 MΩ (at 500 V DC) |
| Initial *2 breakdown voltage | Between open contacts | 1,000 Vrms for 1 min. |
| | Between contact and coil | 4,000 Vrms for 1 min. |
| Initial surge voltage between contact and coil*3 | | Min. 10,000 V |
| Operate time*4 (at nominal voltage) | | Approx. 7 ms (at 20°C 68°F) |
| Release time (without diode)*4 (at nominal voltage) | | Approx. 2 ms (at 20°C 68°F) |
| Temperature rise (at 70°C) | | Max. 45°C with nominal coil voltage and at 10 A contact carrying current (resistance method) |
| Shock resistance | Functional*5 | Min. 200 m/s²{approx. 20 G} |
| | Destructive*6 | Min. 1,000 m/s²{approx. 100 G} |
| Vibration resistance | Functional*7 | 10 to 55Hz at double amplitude of 1.5mm |
| | Destructive | 10 to 55Hz at double amplitude of 1.5mm |
| Conditions for operation, transport and storage*8 (Not freezing and condensing at low temperature) | Ambient temp. | –40°C to +70°C –40°F to +158°F |
| | Humidity | 5 to 85% R.H. |
| | Air pressure | 86 to 106 kPa |
| Unit weight | | Approx. 12 g .42 oz |

## TYPICAL APPLICATIONS

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

## ORDERING INFORMATION

Ex. LKP [1a] [F] – [12V]

| Contact arrangement | Protective construction | Coil voltage(DC) |
|---|---|---|
| 1a: 1 Form A | F: Flux-resistant type | 12, 24V |

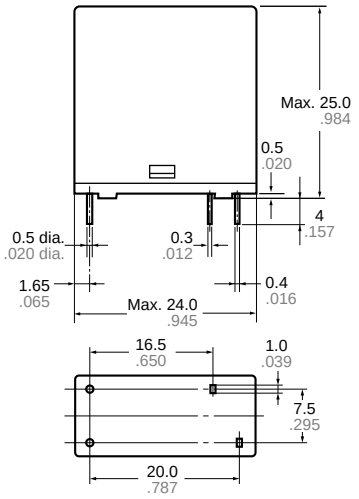
UL/CSA, TÜV, SEMKO, TV-5 approved type is standard.
Notes 1. Standard packing Carton: 100 pcs. Case: 500 pcs.
2. 5 V, 9 V, 18 V DC types are also available. Please consult us for details.

## TYPES AND COIL DATA (at 20°C 68°F)

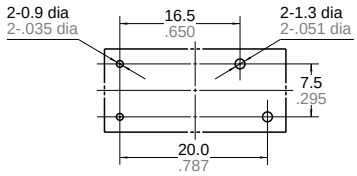
| Part No. | Nominal voltage, V DC | Pick-up voltage, V DC (max.) (Initial) | Drop-out voltage, V DC (min.) (Initial) | Coil resistance, Ω (±10%) | Nominal operating current, mA (±10%) | Nominal operating power, mW | Maximum allowable voltage, V DC (at 20°C 68°F) |
|---|---|---|---|---|---|---|---|
| LKP1aF-12V | 12 | 8.4 | 1.2 | 272 | 44.2 | 530 | 15.6 |
| LKP1aF-24V | 24 | 16.8 | 2.4 | 1,087 | 22.1 | 530 | 31.2 |

## DIMENSIONS

mm inch




PC board pattern (Bottom view)



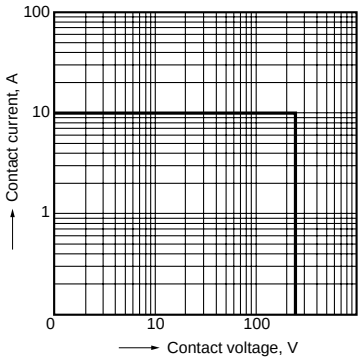

Tolerance: ±0.1 ±.004

Schematic (Bottom view)

| Dimension: | General tolerance |
|---|---|
| Max. 1mm .039 inch: | ±0.1 ±.004 |
| 1 to 3mm .039 to .118 inch: | ±0.2 ±.008 |
| Min. 3mm .118 inch: | ±0.3 ±.012 |

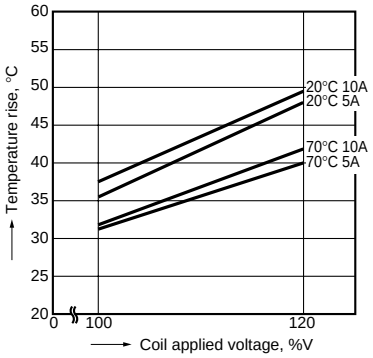
## REFERENCE DATA

1. Max. switching power



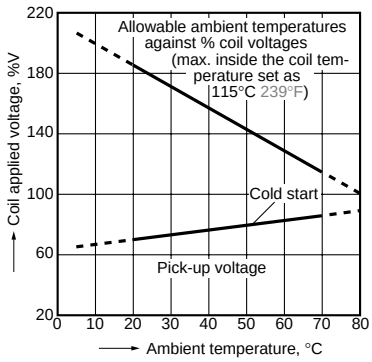

2. Coil temperature rise

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



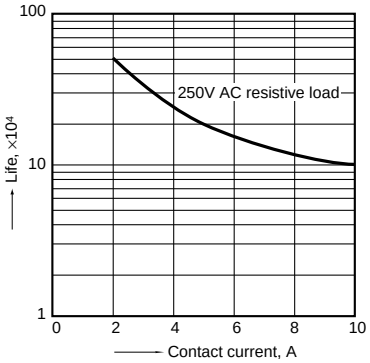

3. Ambient temperature characteristics and coil applied voltage

Contact current: 10 A



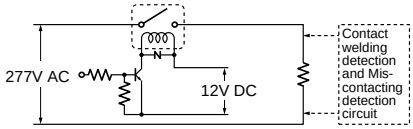

4. Life curve

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

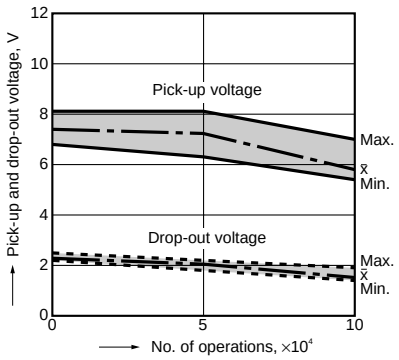


5. Electrical life test
(10 A 277 V AC, resistive load)
Sample: LKP1aF-12V, 6 pcs.
Operation frequency: 20 times/min.
(ON/OFF = 1.5s: 1.5s)
Ambient temperature: 20°C 68°F

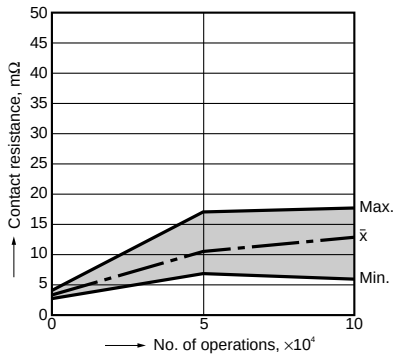
Circuit:




Change of pick-up and drop-out voltage




Change of contact resistance




**For Cautions for Use, see Relay Technical Information (Page 11 to 39).**