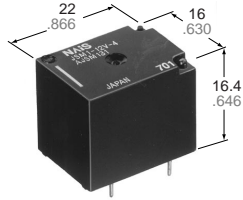


NAIS

Automotive Ultra-Miniature Power Relay

JS-M RELAYS



mm inch

FEATURES

- Low pick-up voltage for high ambient use
- Sealed construction
- Ultra-miniature size with universal footprint
- Usable at high temperature: 85°C 185°F

SPECIFICATIONS

Contact

| | | | |
|---|------------------------------|--|--------------------------|
| | | Standard type | High capacity type |
| Arrangement | 1 Form A, 1 Form C | | |
| Contact material | Silver alloy | | |
| Initial contact resistance, max.* (By voltage drop 6 V DC 1 A) | 200 mΩ | 100 mΩ | |
| Initial voltage drop | Max. 0.2 V (at 10 A 12 V DC) | | |
| Rating | Nominal switching capacity | 10 A 16 V DC (resistive) | 15 A 16 V DC (resistive) |
| | Max. switching power | 160 W | |
| | Max. switching voltage | 16 V DC | |
| | Max. switching current | 10 A | 15 A (10 A max. at 85°C) |
| Expected life (min. ope.) | Mechanical life (at 180 cpm) | | 10 ⁷ |
| | Electrical | Resistive | 10 ⁵ |
| | | N.O.: 10 ⁵ N.C.: 5×10 ⁴ | |

* Measured after operating 5 times at the rated load

Coil

| | |
|-------------------------|--------|
| Nominal operating power | 640 mW |
|-------------------------|--------|

Contact rating

| Load | Standard type | | | High capacity type | | |
|--------------------|---------------|--------|------|--------------------|--------|------|
| | Form A | Form C | | Form A | Form C | |
| | | N.O. | N.C. | | N.O. | N.C. |
| Max. carry current | 15 A | 15 A | 15 A | 15 A | 15 A | 15 A |
| Max. make current | 25 A | 25 A | 10 A | 50 A | 50 A | 15 A |
| Max. break current | 10 A | 10 A | 10 A | 15 A | 15 A | 15 A |

Characteristics

| | | |
|--|---------------------------|--|
| Max. operating speed (at rated load) | 15 cps. | |
| Initial insulation resistance* ¹ | Min. 100 MΩ (at 500 V DC) | |
| Initial breakdown voltage* ² | Between open contacts | 750 Vrms for 1 min. |
| | Between contacts and coil | 1,500 Vrms for 1 min. |
| Operate time* ³ (at nominal voltage) | Approx. 10 ms | |
| Release time (without diode)* ³ (at nominal voltage) | Approx. 10 ms | |
| Shock resistance | Functional* ⁴ | Min. 98 m/s ² {10 G} |
| | Destructive* ⁵ | Min. 980 m/s ² {100 G} |
| Vibration resistance | Functional* ⁶ | Approx. 98 m/s ² {10 G}, 10 to 55 Hz at double amplitude of 1.6 mm |
| | Destructive | Approx. 117.6 m/s ² {12 G}, 10 to 55 Hz at double amplitude of 2 mm |
| Conditions for operation, transport and storage* ⁷ (Not freezing and condensing at low temperature) | Ambient temp. | -40°C to +85°C -40°F to +185°F |
| | Humidity | 5 to 85% R.H. |
| Unit weight | Approx. 12 g .423 oz | |

Remarks

- * Specifications will vary with foreign standards certification ratings.
- *¹ Measurement at same location as "Initial breakdown voltage" section
- *² Detection current: 10mA
- *³ Excluding contact bounce time
- *⁴ Half-wave pulse of sine wave: 11ms; detection time: 10μs
- *⁵ Half-wave pulse of sine wave: 6ms
- *⁶ Detection time: 10μs
- *⁷ Refer to 5. Conditions for operation, transport and storage mentioned in AMBIENT ENVIRONMENT (Page 61)

TYPICAL APPLICATIONS

- Automotive:
Power-window, car antenna, door lock, intermittent wiper, interior lighting, power seat, power sunroof, car stereo power antenna, etc.

ORDERING INFORMATION

Ex. JSM 1a F — 12V — 4

| Contact arrangement | Protective construction | Coil voltage (DC) | Contact material |
|-----------------------------|--|-------------------|---|
| 1a: 1 Form A 1: 1 Form C | Nil: Sealed construction F: Flux-resistant type | 9, 12 V | 4: Standard type (10 A) 5: High capacity type (15 A) |

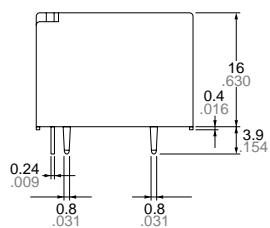
Note: Standard packing: Carton: 100 pcs. Case: 500 pcs.

TYPES AND COIL DATA (at 20°C 68°F)

| Contact arrangement | Coil voltage, V DC | Standard type (10 A) | | High capacity type (15 A) | | Nominal voltage, V DC | Pick-up voltage, V DC (max.) | Drop-out voltage, V DC (min.) | Coil resistance Ω ($\pm 10\%$) | Nominal operating current, mA ($\pm 10\%$) | Nominal operating power, mW | Max. allowable voltage, V DC (at 80°C 176°F) |
|---------------------|--------------------|----------------------|---------------------|---------------------------|---------------------|-----------------------|------------------------------|-------------------------------|---|--|-----------------------------|--|
| | | Sealed type | Flux-resistant type | Sealed type | Flux-resistant type | | | | | | | |
| 1 Form A | 9 | JSM1a-9V-4 | JSM1aF-9V-4 | JSM1a-9V-5 | JSM1aF-9V-5 | 9 | 4.7 | 0.7 | 126 | 71.4 | 640 | 12 |
| | 12 | JSM1a-12V-4 | JSM1aF-12V-4 | JSM1a-12V-5 | JSM1aF-12V-5 | 12 | 6.3 | 0.9 | 225 | 53.3 | 640 | 16 |
| 1 Form C | 9 | JSM1-9V-4 | JSM1F-9V-4 | JSM1-9V-5 | JSM1F-9V-5 | 9 | 4.7 | 0.7 | 126 | 71.4 | 640 | 12 |
| | 12 | JSM1-12V-4 | JSM1F-12V-4 | JSM1-12V-5 | JSM1F-12V-5 | 12 | 6.3 | 0.9 | 225 | 53.3 | 640 | 16 |

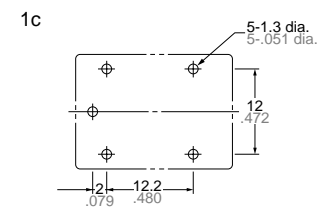
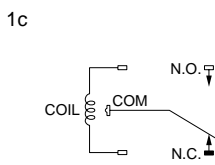
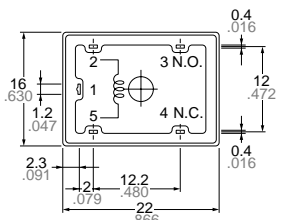
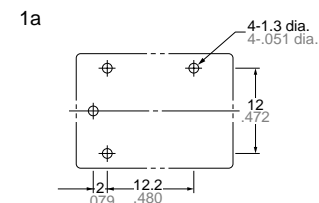
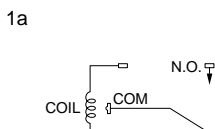
DIMENSIONS

mm inch



Schematic (Bottom view)

PC board pattern (Copper-side view)



Note: Terminal No. 4 is only for 1 Form C type

General tolerance: $\pm 0.3 \pm 0.12$

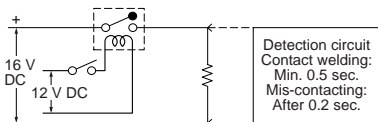
Tolerance: $\pm 0.1 \pm 0.04$

REFERENCE DATA

1-(1) Electrical life test (Resistive)

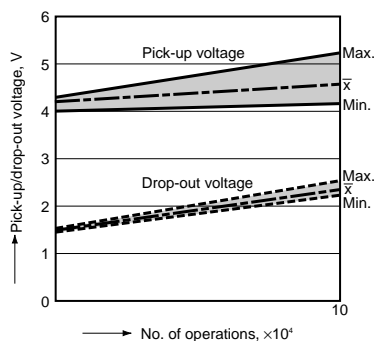
Tested sample: JSM-12V-4, 3 pcs.
Condition: 10 A 16 V DC resistive load, 20 cpm
Ambient temperature: 25°C 77°F

Circuit

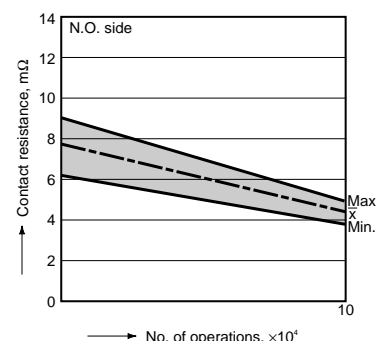


Detection circuit:
Contact welding:
Min. 0.5 sec.
Mis-contacting:
After 0.2 sec.

Change of pick-up and drop-out voltage



Change of contact resistance



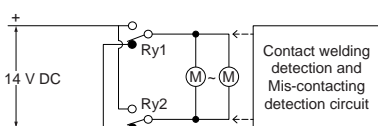
1-(2) Electrical life test

(Power window motor load)

Tested sample: JSM1-12V-4, 4 pcs.
Load: DC 14 V

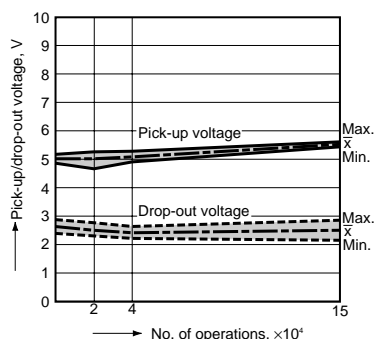
- (1) Max. 14.8 A (Inrush) Max. 14.2 A (Break)
 - (2) Max. 20.3 A (Inrush) Max. 20.0 A (Break)
 - (3) Max. 16.2 A (Inrush) Max. 11.6 A (Break)
- Switching frequency: 3 cycle/min. (ON:OFF = 1:9 s)
Ambient temperature: (1) 85°C 185°F;
(2) -40°C -40°F; (3) 35°C 95°F
Tested cycle: (1) 2×10^4 cycle \rightarrow (2) 2×10^4 cycle \rightarrow
(3) 11×10^4 cycle (Total 15×10^4 cycles)

Circuit

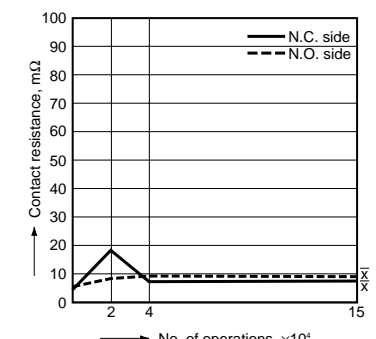


Contact welding detection and Mis-contacting detection circuit

Change of pick-up and drop-out voltage



Change of contact resistance

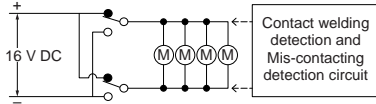


JS-M

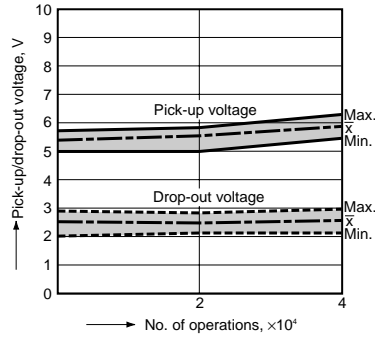
1-(3) Electrical life test (Door lock motor load)

Tested sample: JSM1-12V-4, 10 pcs.
 Load: DC 16 V Max. 17.7 A, Min. 15.2 A
 Switching frequency: 6 cycles/min.
 (ON:OFF = 0.5:0.5 s)
 Ambient temperature: 30°C 86°F
 Tested cycle: 4×10^4 cycles

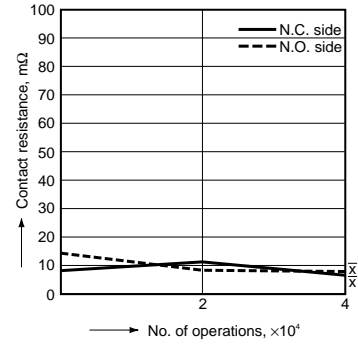
Circuit



Change of pick-up and drop-out voltage



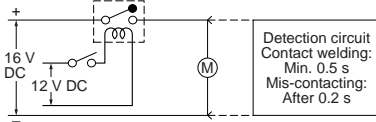
Change of contact resistance



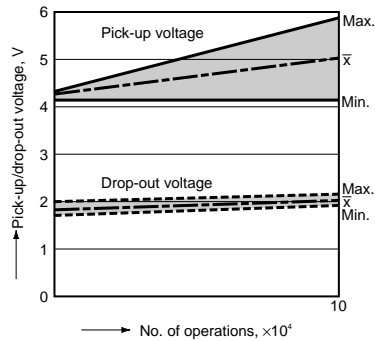
1-(4) Electrical life test

Tested sample: JSM1-12V-4, 3 pcs.
 Load: 16 V DC 25 A/5 A motor load
 Switching frequency: 6 cycles
 (ON:OFF = 1:9 s)
 Ambient temperature: 27°C 81°F

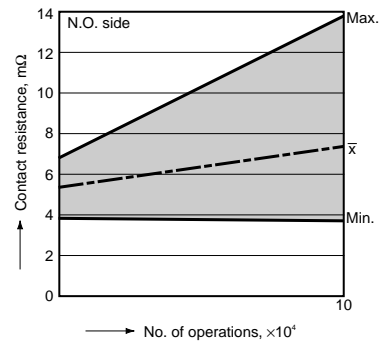
Circuit



Change of pick-up and drop-out voltage



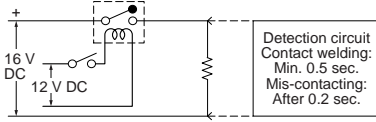
Change of contact resistance



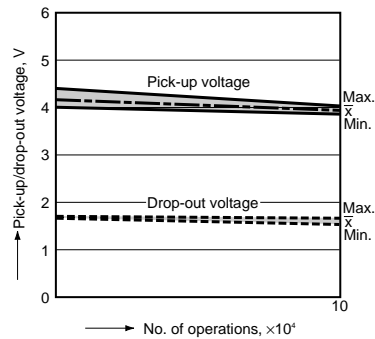
1-(5) Electrical life test

Tested sample: JSM1-12V-5, 4 pcs.
 Load: 16 V DC 15 A (resistive)
 Switching frequency: 20 cpm
 Ambient temperature: 25°C 77°F

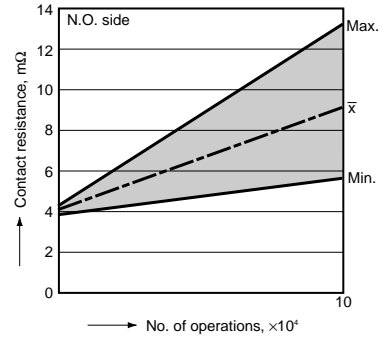
Circuit



Change of pick-up and drop-out voltage



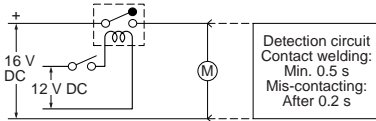
Change of contact resistance



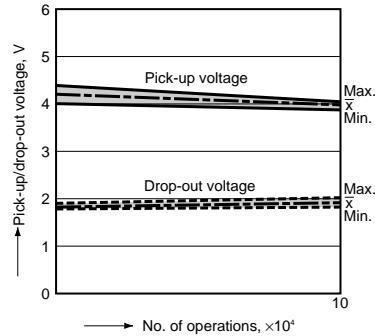
1-(6) Electrical life test

Tested sample: JSM1-12V-5, 3 pcs.
 Load: 16 V DC 50 A/10 A motor load
 Switching frequency: 6 cycles
 (ON:OFF = 1:9 s)
 Ambient temperature: 27°C 81°F

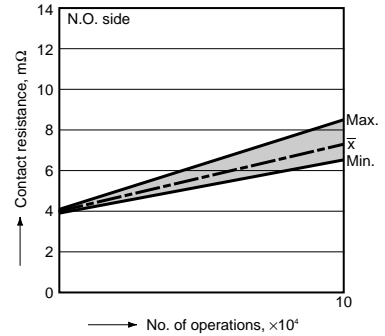
Circuit



Change of pick-up and drop-out voltage



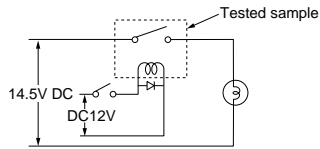
Change of contact resistance



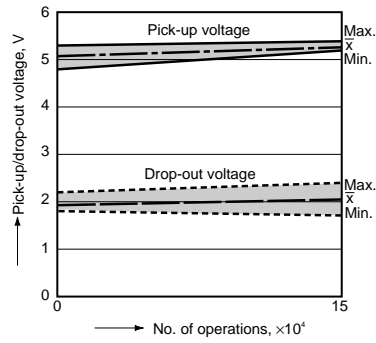
1-(7) Electrical life test (Lamp load)

Tested sample: JSM1a-12V-5, 4 pcs.
 Load: 9.6A Steady, Inrush 55.2A,
 14.5V DC (Lamp load)
 Operating frequency: ON 1s, OFF 2s

Circuit

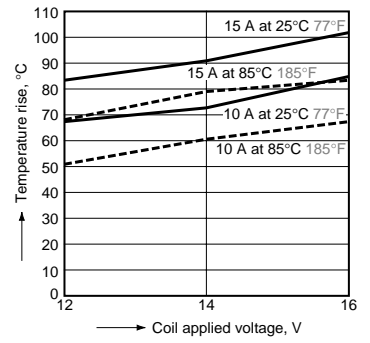


Contact welding: 0 time
 Miscontact: 0 time



2. Temperature rise

Tested sample: JSM1-12V-4 & -5, 5 pcs.
 Measured portion: Inside the coil



For Cautions for use, see Relay Technical Information (Page 48 to 76).