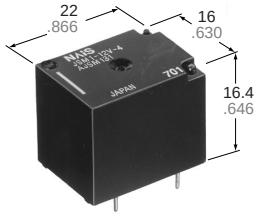
NAiS

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/s² {10 G}
	Destructive*5	Min. 980 m/s² {100 G}
Vibration resistance	Functional*6	Approx. 98 m/s² {10 G}, 10 to 55 Hz at double amplitude of 1.6 mm
	Destructive	Approx. 117.6 m/s² {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 "Intial 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)

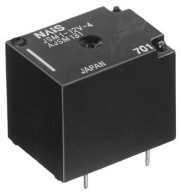
Note: Standard packing: Carton: 100 pcs. Case: 500 pcs.

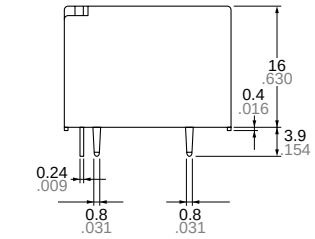
TYPES AND COIL DATA (at 20°C 68°F)

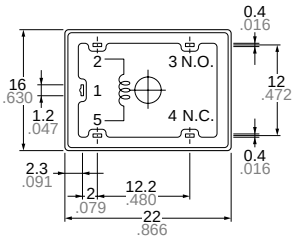
Contact arrangement	Coil voltage, V DC	Standard type (10 A)		High capacity type (15 A)		Nominal voltage, V DC	Pick-up voltage, V DC (max.)	Drop-out voltage, V DC (min.)	Coil resistance Ω (±10%)	Nominal operating current, mA (±10%)	Nominal operating power, mW	Max. allowable voltage, V DC (at 80°C 176°F)
		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





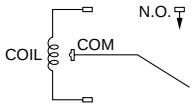


Note: Terminal No. 4 is only for 1 Form C type

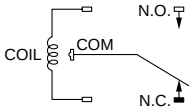
General tolerance: ±0.3 ±.012

Schematic (Bottom view)

1a

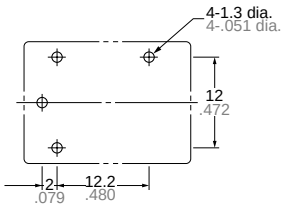


1c

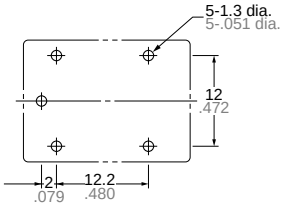


PC board pattern (Copper-side view)

1a



1c



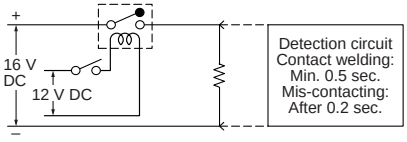
Tolerance: ±0.1 ±.004

REFERENCE DATA

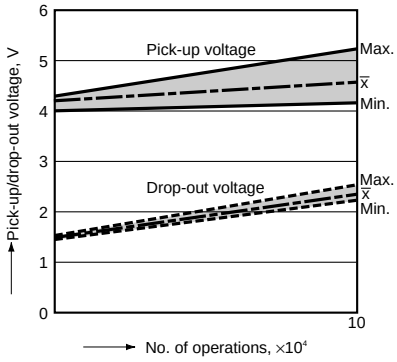
1-(1) Electrical life test (Resistive)

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

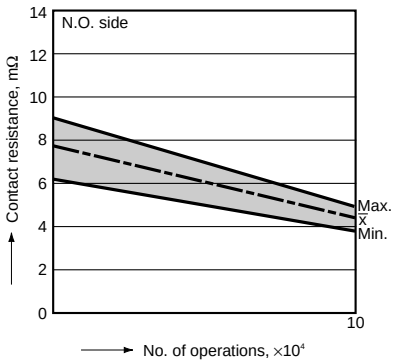
Circuit



Change of pick-up and drop-out voltage



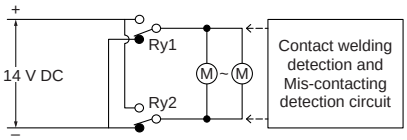
Change of contact resistance



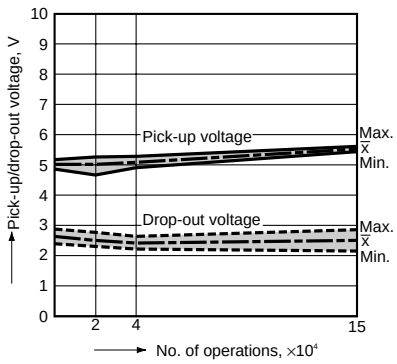
1-(2) Electrical life test
(Power window motor load)

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 × 10⁴ cycle → (2) 2 x 10⁴ cycle → (3) 11 × 10⁴ cycle (Total 15 × 10⁴ cycles)

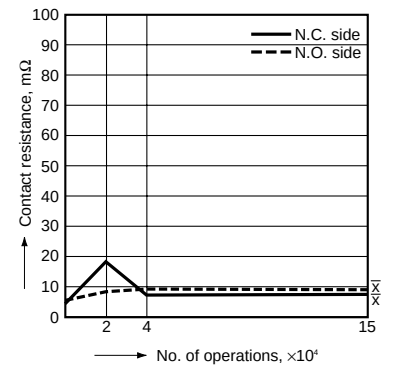
Circuit



Change of pick-up and drop-out voltage



Change of contact resistance

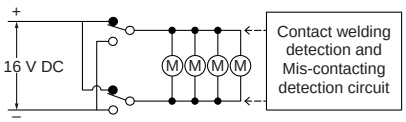


JS-M

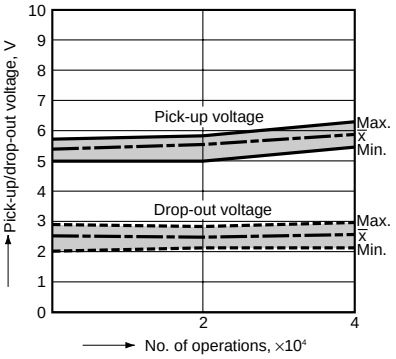
1-(3) Electrical life test (Door lock motor load)

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

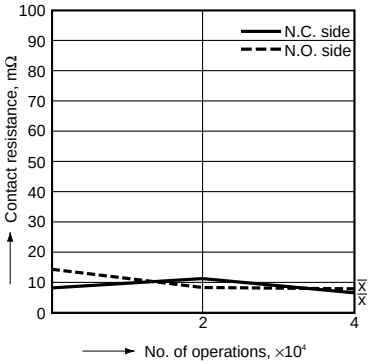
Circuit



Change of pick-up and drop-out voltage



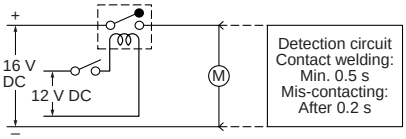
Change of contact resistance



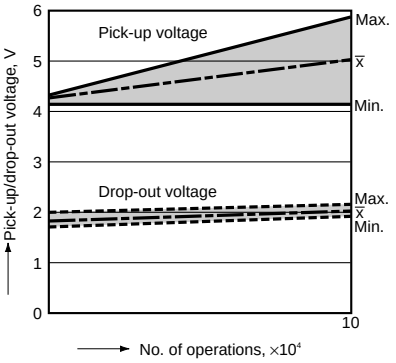
1-(4) Electrical life test

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

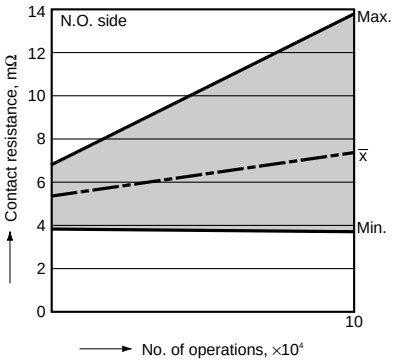
Circuit



Change of pick-up and drop-out voltage



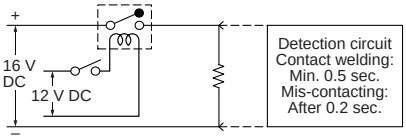
Change of contact resistance



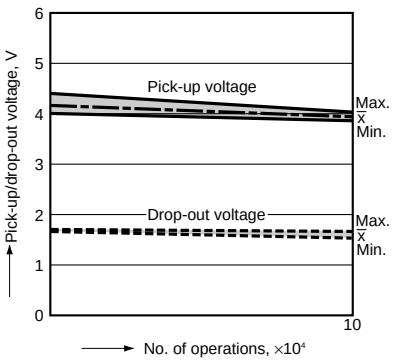
1-(5) Electrical life test

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

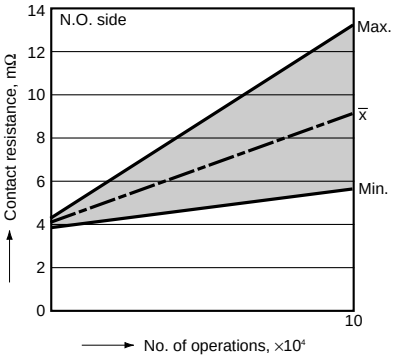
Circuit



Change of pick-up and drop-out voltage



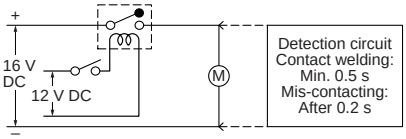
Change of contact resistance



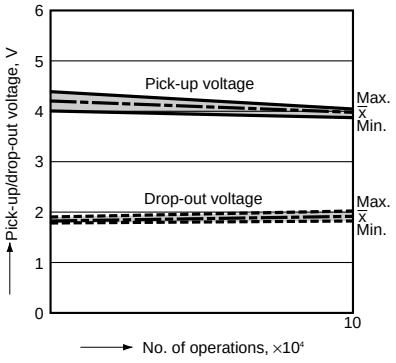
1-(6) Electrical life test

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

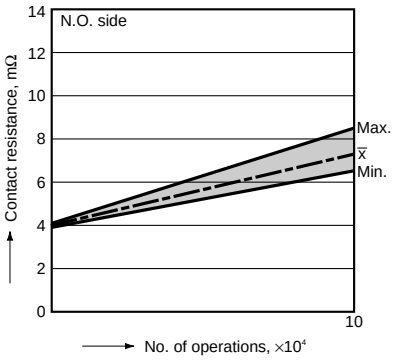
Circuit



Change of pick-up and drop-out voltage



Change of contact resistance

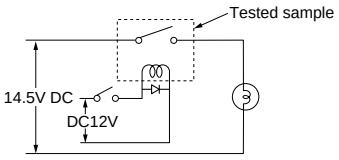


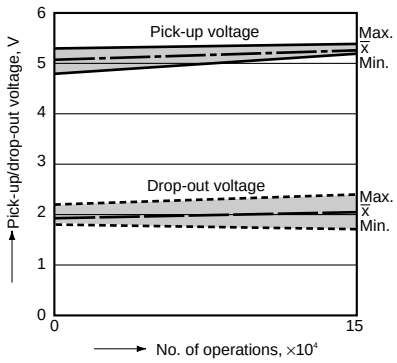
1-(7) Electrical life test (Lamp load)

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

Contact welding: 0 time
Miscontact: 0 time

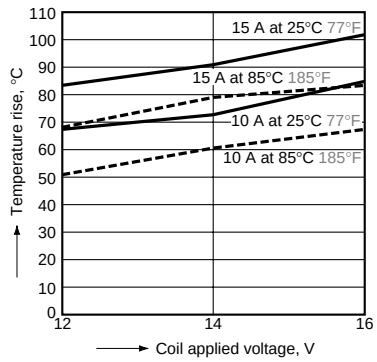
Circuit





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).