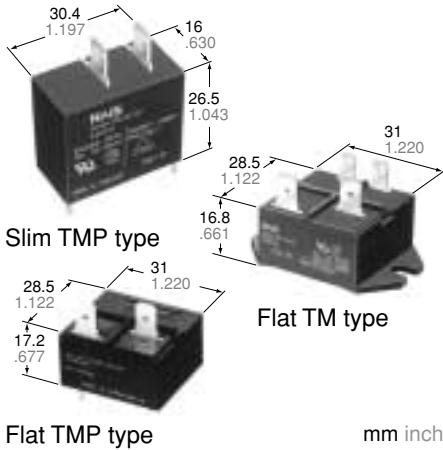


# NAIS

## COMPACT POWER RELAY FOR INDUCTIVE LOAD

# JM RELAYS



- Excellent contact welding resistance**  
 High contact pressure, a forced opening mechanism, and a forced wiping mechanism realizes an excellent contact welding resistance.
- High breakdown voltage and surge resistant relay**  
 More than 6.4 mm .252 inch maintained for the insulation distance between contacts and coil, and the breakdown voltage between contacts and coil is 5,000 V for 1 minute. In addition, the surge resistance between contacts and coil is greater than 10,000 V.
- Resistant to external force**  
 An absorber mechanism is used on the load terminals, giving a large improvement in characteristics variations caused by the external force during FASTON placement/removal.

- Flux resistance mechanism**  
 The terminal area is plugged with resin to prevent flux seepage during PCB mounting. (TMP type)
- Conforms to the various safety standards**  
 UL, CSA approved.  
 TÜV, VDE under application.
- The line up can support economical mounting methods.**  
 The relay are equipped with a drive terminal (coil terminal) on one side for PCBs, and a load terminal (tab terminal #250) on the reverse side. The line up includes the TM type which can be attached directly to the PCB composing a drive circuit, and the TMP type which supports economical wiring. The TMP type can also be directly attached, and a high capacity load can be wired to the tab terminal.

## FEATURES

### • Compact, high-capacity, and resistant to inductive loads

The relay is a compact 16×30.4×26.5 mm .630×1.197×1.043 inch. It can control an inductive load ( $\cos\phi = 0.7$ ) with inrush current of 70 A and steady state current of 20 A.

## SPECIFICATIONS

### Contact

Arrangement		1 Form A	
Initial contact resistance, max. (By voltage drop 6 V DC 1 A)		30 mΩ (Cd free type: 100 mΩ)	
Contact material		Silver alloy	
Rating (resistive load)	Nominal switching capacity	20 A 250 V AC	
	Max. switching power	5,000 VA	
	Max. switching voltage	250 V AC	
	Max. switching current	20 A	
	Min. switching capacity#1	100 mA, 5 V DC	
Expected life (min. ope.)	Electrical Life (at 20 cpm)	Resistive load 20 A, 250 V AC ( $\cos\phi = 1$ )	10 <sup>6</sup>
		Inductive load	Inrush 70 A, Steady 20 A (250 V AC $\cos\phi = 0.7$ )
	Inrush 80 A, Cut-off 80 A (When the motor is locked) (250 V AC $\cos\phi = 0.7$ )		1.5×10 <sup>3</sup>
	Mechanical (at 180 cpm)		10 <sup>6</sup>

### Coil

Nominal operating power	900 mW
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#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.

### Remarks

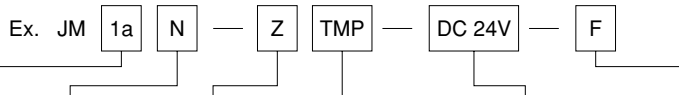
- \* Specifications will vary with foreign standards certification ratings.
- \*1 Measurement at same location as "Initial breakdown voltage" section
- \*2 Detection current: 10mA
- \*3 Wave is standard shock voltage of  $\pm 1.2 \times 50\mu s$  according to JEC-212-1981
- \*4 Excluding contact bounce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

### Characteristics

Max. operating speed		180 cpm
Initial insulation resistance*1		Min. 100 MΩ (at 500 V DC)
Initial breakdown voltage*2	Between open contacts	1,000 Vrms for 1 min.
	Between contacts and coil	5,000 Vrms for 1 min.
Surge voltage between contact and coil*3		Min. 10,000 V
Operate time*4 (at nominal voltage)(at 20°C)		Max. 20ms (Approx. 8 ms)
Release time (without diode)*4 (at nominal voltage)(at 20°C)		Max. 10ms (Approx. 3 ms)
Temperature rise (at 60°C)		Max. 55°C (Contact switching current: 20 A/voltage applied to coil: 100%V)
Shock resistance	Functional*5	Min. 98 m/s <sup>2</sup> {10 G}
	Destructive*6	Min. 980 m/s <sup>2</sup> {100 G}
Vibration resistance	Functional*7	10 to 55 Hz at double amplitude of 1.6 mm
	Destructive	10 to 55 Hz at double amplitude of 2 mm
Conditions for operation, transport and storage*8 (Not freezing and condensing at low temperature)	Ambient temp.	-40°C to +60°C -40°F to +140°F
	Humidity	5 to 85% R.H.
Unit weight	Slim TMP	Approx. 28 g .99 oz
	Flat TMP	Approx. 32 g 1.13 oz
	Flat TM	Approx. 33 g 1.16 oz

## TYPICAL APPLICATIONS ORDERING INFORMATION

- Compressor and heater control in air conditioners
- Power control in hot air type heaters
- Magnetron control in microwave ovens
- Lamp and motor control in OA equipment such as copiers and facsimiles.



Contact arrangement	Pickup voltage	Classification of type	Mounting classification	Coil voltage	Environmental support
1a: 1 Form A	N: 70% of nominal voltage	Nil: Slim type Z: Flat type	TMP: TMP type TM: TM type (Flat type) P: PCB type(Slim type)	DC 5, 6, 9, 12, 24, 48 V	F: RoHS Directive conforming type (AgSnO <sub>2</sub> type) Nil: RoHS Directive non-conforming type (AgCdO type)

(Note) 1. Standard packing: Carton: 50pcs. Case: 200pcs.  
UL/CSA, VDE approved type is standard.

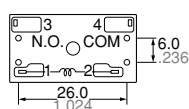
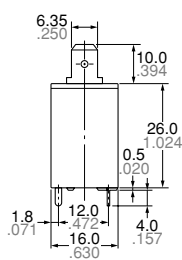
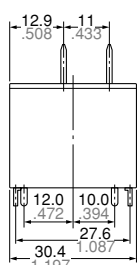
## TYPES AND COIL DATA (at 20°C 68°F)

Part No.				Nominal voltage, V DC	Pick-up voltage	Drop-out voltage,	Nominal operating current, mA	Coil resistance, Ω (±10%)	Nominal operating power, mW	Max. allowable voltage, V DC
Slim		Flat								
TMP	PCB	TMP	TM							
JM1aN-TMP-DC5V (-F)	JM1aN-P-DC5V (-F)	JM1aN-ZTMP-DC5V (-F)	JM1aN-ZTM-DC5V (-F)	5	3.5	0.5	180	27.8	900	5.5
JM1aN-TMP-DC6V (-F)	JM1aN-P-DC6V (-F)	JM1aN-ZTMP-DC6V (-F)	JM1aN-ZTM-DC6V (-F)	6	4.2	0.6	150	40	900	6.6
JM1aN-TMP-DC9V (-F)	JM1aN-P-DC9V (-F)	JM1aN-ZTMP-DC9V (-F)	JM1aN-ZTM-DC9V (-F)	9	6.3	0.9	100	90	900	9.9
JM1aN-TMP-DC12V (-F)	JM1aN-P-DC12V (-F)	JM1aN-ZTMP-DC12V (-F)	JM1aN-ZTM-DC12V (-F)	12	8.4	1.2	75	160	900	13.2
JM1aN-TMP-DC24V (-F)	JM1aN-P-DC24V (-F)	JM1aN-ZTMP-DC24V (-F)	JM1aN-ZTM-DC24V (-F)	24	16.8	2.4	37.5	640	900	26.4
JM1aN-TMP-DC48V (-F)	JM1aN-P-DC48V (-F)	JM1aN-ZTMP-DC48V (-F)	JM1aN-ZTM-DC48V (-F)	48	33.6	4.8	18.75	2,560	900	52.8

## DIMENSIONS

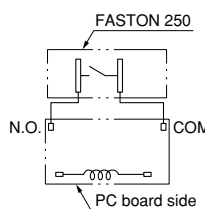
mm inch

### Slim TMP type



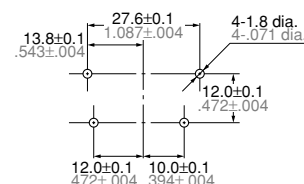
General tolerance: ±0.4 ±.016

### Schematic

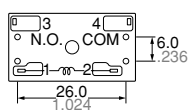
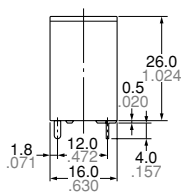
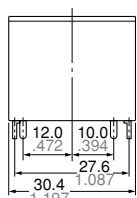


PC board pattern

### (Copper-side view)

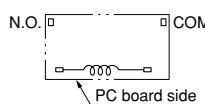


### Slim PCB type



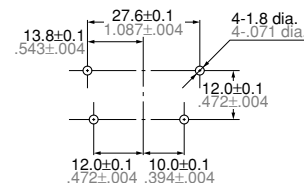
General tolerance: ±0.4 ±.016

### Schematic

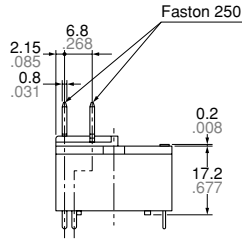
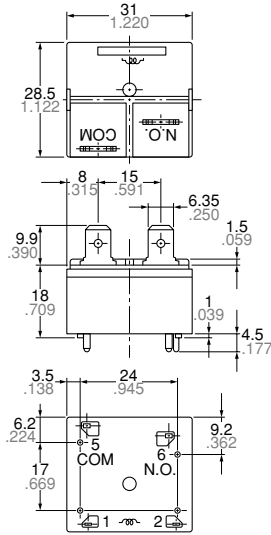


PC board pattern

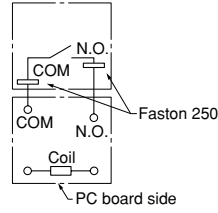
### (Copper-side view)



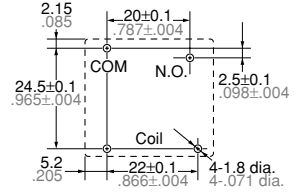
Tolerance: ±0.1 ±.004



Schematic



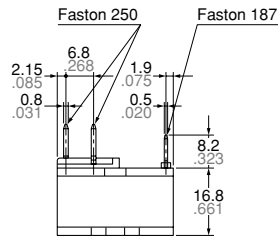
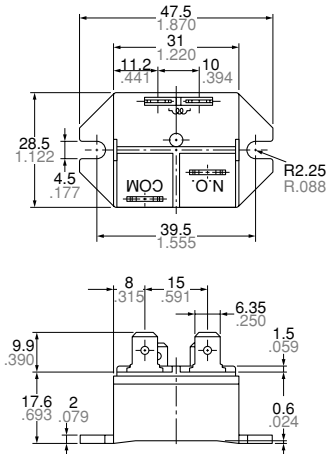
PC board pattern (Bottom view)



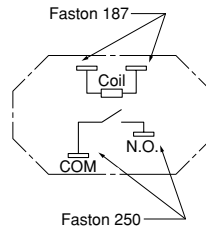
General tolerance: ±0.4 ±0.16

Tolerance: ±0.1 ±0.04

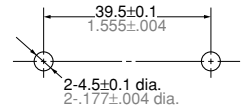
Flat TM type



Schematic



Panel cutout

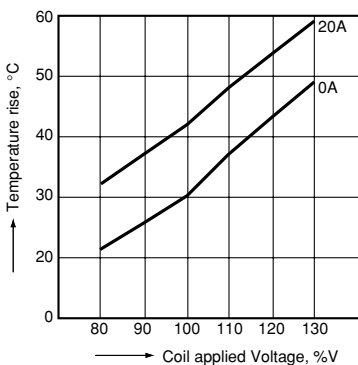


General tolerance: ±0.4 ±0.16

REFERENCE DATA

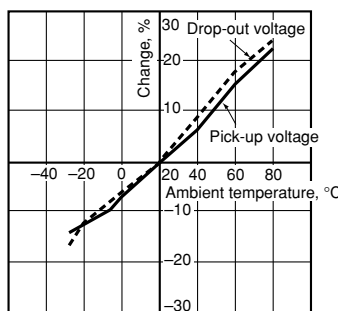
1. Coil temperature rise

Place to be measured: Inside of coil  
Ambient temperature: 25°C 77°F



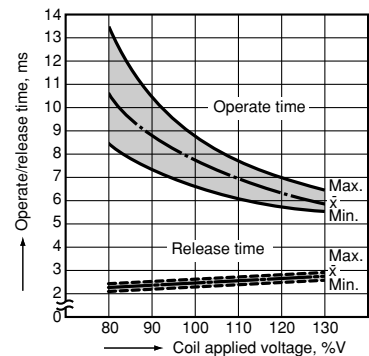
2. Ambient temperature characteristics

Sample: JM1aN-TMP-DC24V, 5 pcs.

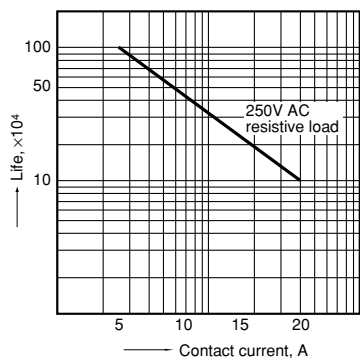


3. Operate/release time

Sample: JM1aN-TMP-DC24V, 5 pcs.

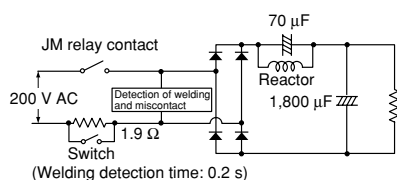


4. Life curve



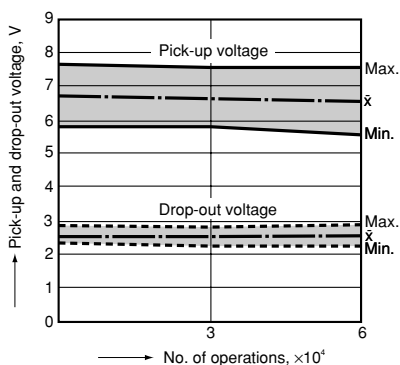
5-(1). 200 V AC electrical life test (200 V AC inverter dummy load)

Sample: JM1aN-TMP-DC12V, 6 pcs.  
 Load: Inrush 108 A, Steady 15 A,  
 Inverter dummy 200 V AC  
 Switching frequency: ON 5 s, OFF 5 s  
 Circuit



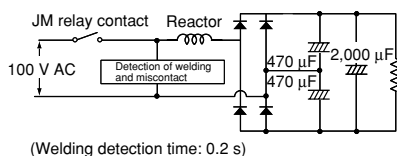
Change of pick-up and drop-out voltage

Contact welding: 0 time  
 Miscontact: 0 time



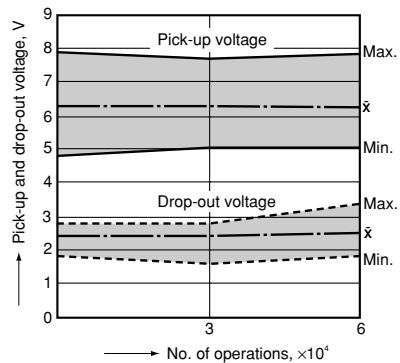
5-(2). 100 V AC electrical life test (100 V AC inverter dummy load)

Sample: JM1aN-TMP-DC12V, 20 pcs.  
 Load: Inrush 224 A, Steady 20A,  
 Inverter dummy 100 V AC  
 Switching frequency: ON 10 s, OFF 10 s  
 Circuit



Change of pick-up and drop-out voltage

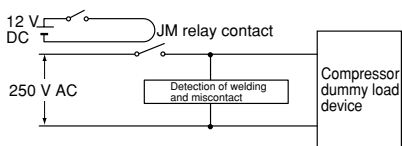
Contact welding: 0 time  
 Miscontact: 0 time



5-(3). Inrush 70 A, Steady 20 A, 250 V AC compressor dummy load

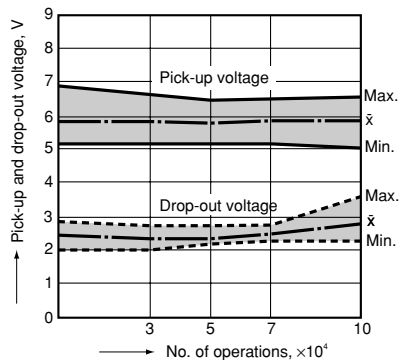
Sample: JM1aN-TMP-DC12V, 6 pcs.  
 Load: (Endurance) inrush 70 A  $\cos\phi = 0.7$  (0.3 s),  
 steady 20A  $\text{pf} = 0.9$ ,  
 250V AC compressor dummy  
 (Overload) 80A  $\cos\phi = 0.7$ , 250 V AC  
 No. of operations: (Endurance)  $10^5$  times  
 (Overload) 1,000 times (after  
 endurance test)  
 Switching frequency: (Endurance) ON 1.5 s,  
 OFF 1.5 s  
 (Overload) ON 3 s,  
 OFF 2 min., 57 s

Circuit (endurance)



Change of pick-up and drop-out voltage

Contact welding: 0 time  
 Miscontact: 0 time



**For Cautions for Use, see Relay Technical Information**