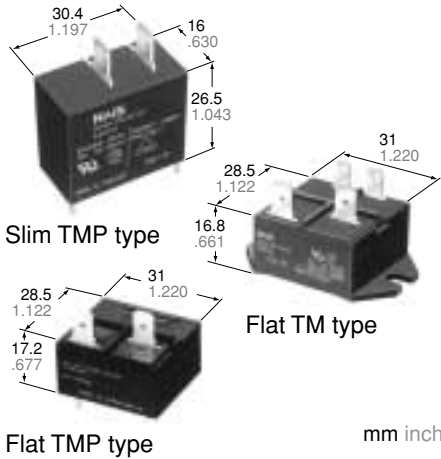


# NAIS

## 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.

Flat TMP type

mm inch

## 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  |                 |   |
| Expected life (min. ope.)                                     | Mechanical (at 180 cpm)     |   | 10 <sup>6</sup> |   |
|   | Electrical Life (at 20 cpm) | Resistive load 20 A, 250 V AC ( $\cos\phi = 1$ )                                  | 10 <sup>5</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>                                   |

### Coil

|                         |        |
|-------------------------|--------|
| Nominal operating power | 900 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  $\pm 1.2 \times 50\mu s$  according to JEC-212-1981
- \*4 Excluding contact bounce time
- \*5 Half-wave pulse of sine wave: 11ms; detection time: 10μs
- \*6 Half-wave pulse of sine wave: 6ms
- \*7 Detection time: 10μs
- \*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<br>-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 fac-similes.

Ex. JM 1a — N — Z — TMP — DC 24V

| Contact arrangement | Pickup voltage            | Classification of type         | Mounting classification   | Coil voltage             |
|---------------------|---------------------------|--------------------------------|---|--------------------------|
| 1a: 1 Form A        | N: 70% of nominal voltage | Nil: Slim type<br>Z: Flat type | TMP: TMP type<br>TM: TM type (Flat type)<br>P: PCB type (Slim type) | DC 5, 6, 9, 12, 24, 48 V |

(Notes) 1. Standard packing: Carton: 50pcs. Case: 200pcs.  
2. For Cd free contact material type, add suffix "-F".  
UL/CSA, VDE approved type is standard.

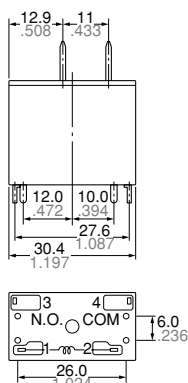
## TYPES AND COIL DATA (at 20°C 68°F)

| 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  | JM1aN-P-DC5V  | JM1aN-ZTMP-DC5V  | JM1aN-ZTM-DC5V  | 5                     | 3.5             | 0.5               | 180                           | 27.8                      | 900                         | 5.5                          |
| JM1aN-TMP-DC6V  | JM1aN-P-DC6V  | JM1aN-ZTMP-DC6V  | JM1aN-ZTM-DC6V  | 6                     | 4.2             | 0.6               | 150                           | 40                        | 900                         | 6.6                          |
| JM1aN-TMP-DC9V  | JM1aN-P-DC9V  | JM1aN-ZTMP-DC9V  | JM1aN-ZTM-DC9V  | 9                     | 6.3             | 0.9               | 100                           | 90                        | 900                         | 9.9                          |
| JM1aN-TMP-DC12V | JM1aN-P-DC12V | JM1aN-ZTMP-DC12V | JM1aN-ZTM-DC12V | 12                    | 8.4             | 1.2               | 75                            | 160                       | 900                         | 13.2                         |
| JM1aN-TMP-DC24V | JM1aN-P-DC24V | JM1aN-ZTMP-DC24V | JM1aN-ZTM-DC24V | 24                    | 16.8            | 2.4               | 37.5                          | 640                       | 900                         | 26.4                         |
| JM1aN-TMP-DC48V | JM1aN-P-DC48V | JM1aN-ZTMP-DC48V | JM1aN-ZTM-DC48V | 48                    | 33.6            | 4.8               | 18.75                         | 2,560                     | 900                         | 52.8                         |

## DIMENSIONS

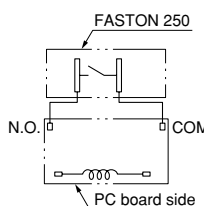
mm inch

Slim TMP type

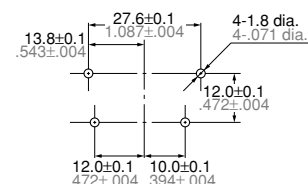


General tolerance: ±0.4 ±.016

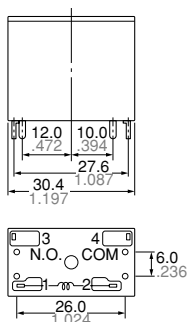
Schematic



PC board pattern (Copper-side view)

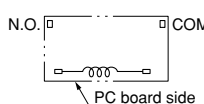


Slim PCB type

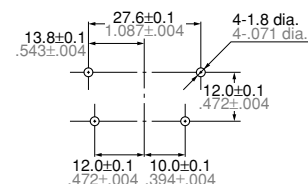


General tolerance: ±0.4 ±.016

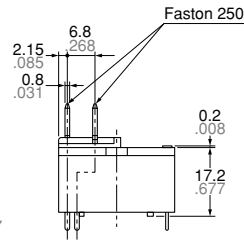
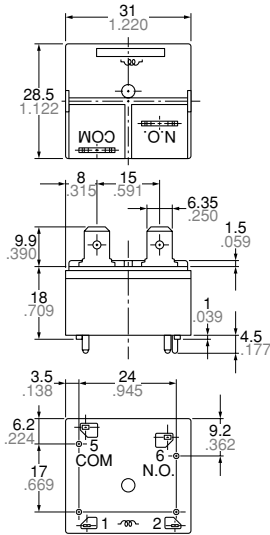
Schematic



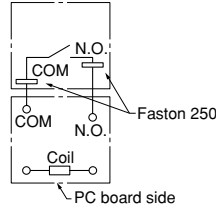
PC board pattern (Copper-side view)



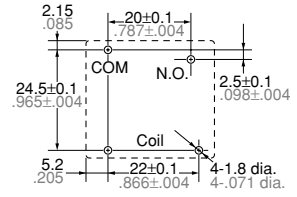
Tolerance: ±0.1 ±.004



Schematic



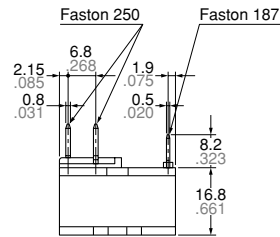
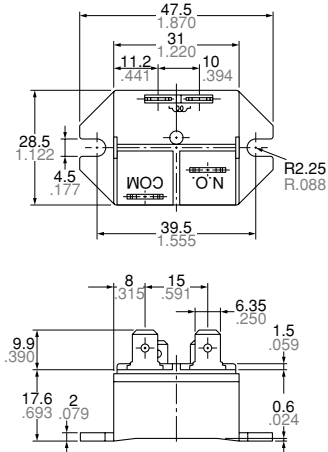
PC board pattern (Bottom view)



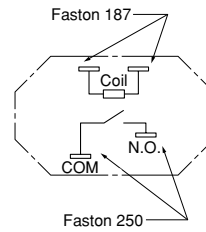
General tolerance:  $\pm 0.4 \pm 0.16$

Tolerance:  $\pm 0.1 \pm 0.04$

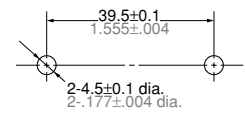
Flat TM type



Schematic



Panel cutout

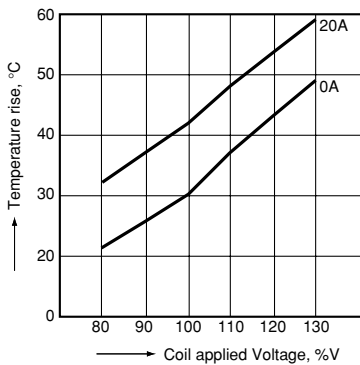


General tolerance:  $\pm 0.4 \pm 0.16$

REFERENCE DATA

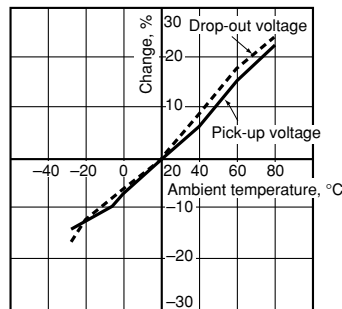
1. Coil temperature rise

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



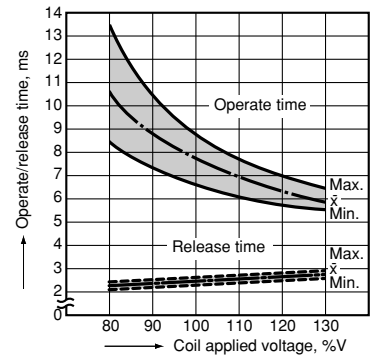
2. Ambient temperature characteristics

Sample: JM1aN-TMP-DC24V, 5 pcs.

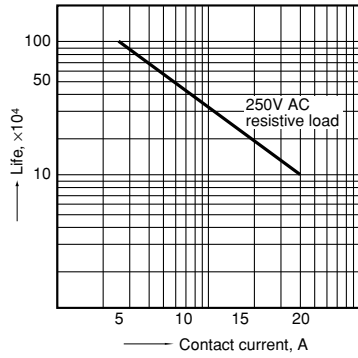


3. Operate/release time

Sample: JM1aN-TMP-DC24V, 5 pcs.

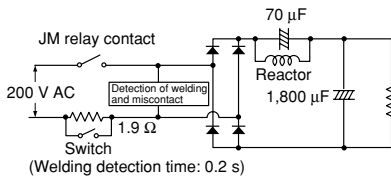


4. Life curve



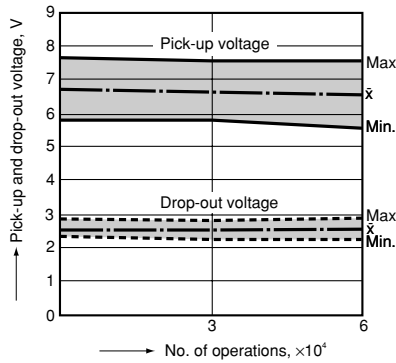
5-(1). 200 V AC electrical life test (200 V AC inverter dummy load)

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



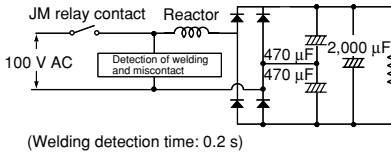
Change of pick-up and drop-out voltage

Contact welding: 0 time  
 Miscontact: 0 time



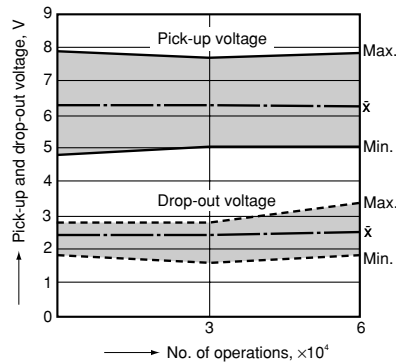
5-(2). 100 V AC electrical life test (100 V AC inverter dummy load)

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

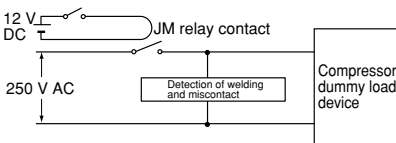
Contact welding: 0 time  
 Miscontact: 0 time



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

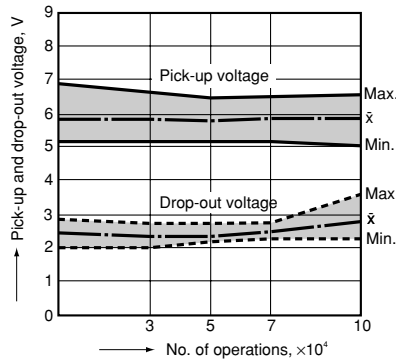
Sample: JM1aN-TMP-DC12V, 6 pcs.  
 Load: (Endurance) inrush 70 A  $\cos\phi = 0.7$  (0.3 s), steady 20A  $pf = 0.9$ ,  
 250V AC compressor dummy  
 (Overload) 80A  $\cos\phi = 0.7$ , 250 V AC  
 No. of operations: (Endurance)  $10^5$  times  
 (Overload) 1,000 times (after endurance test)  
 Switching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