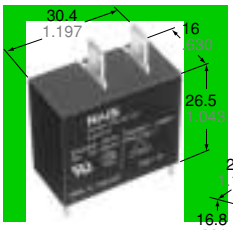
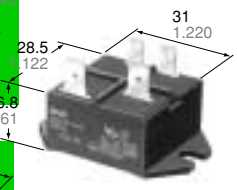
ideas for life

COMPACT POWER RELAY FOR INDUCTIVE LOAD

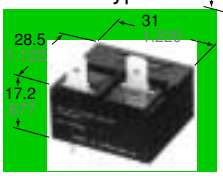
JM RELAYS



Slim TMP type



Flat TM type



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 (cosφ = 0.7) with inrush current of 70 A and steady state current of 20 A.

• 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.

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.)	Mechanical (at 180 cpm)			10^6
	Electrical Life (at 20 cpm)	Resistive load 20 A, 250 V AC (cosφ = 1)		10^5
		Inductive load	Inrush 70 A, Steady 20 A (250 V AC cosφ = 0.7)	10^5
			Inrush 80 A, Cut-off 80 A (When the motor is locked) (250 V AC cosφ = 0.7)	1.5×10^3

Coil

Nominal operating power	900 mW

#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.

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/s² {10 G}
	Destructive*6	Min. 980 m/s² {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

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: 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

TYPICAL APPLICATIONS

- 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.

ORDERING INFORMATION

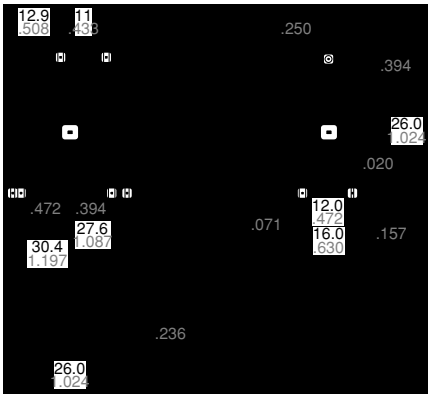
TYPES AND COIL DATA (at 20°C 68°F)

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

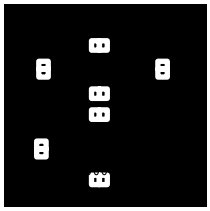
mm inch

Slim TMP type



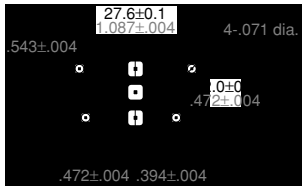
General tolerance: ±0.4 ±.016

Schematic

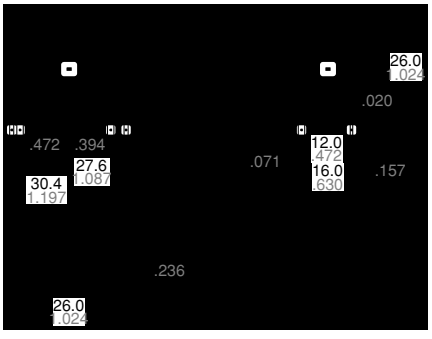


PC board pattern

(Copper-side view)



Slim PCB type

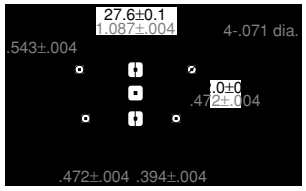


General tolerance: ±0.4 ±.016

Schematic

PC board pattern

(Copper-side view)

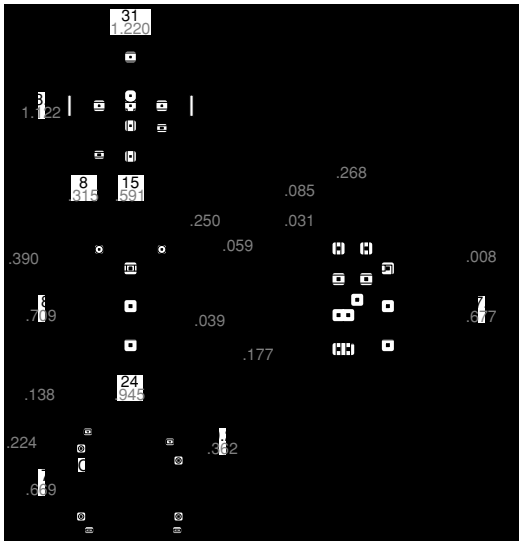


Tolerance: ±0.1 ±.004

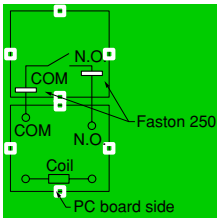
JM

Flat TMP type

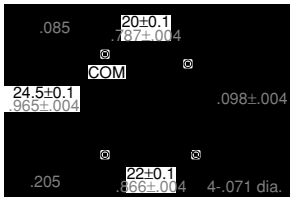
mm inch



Schematic



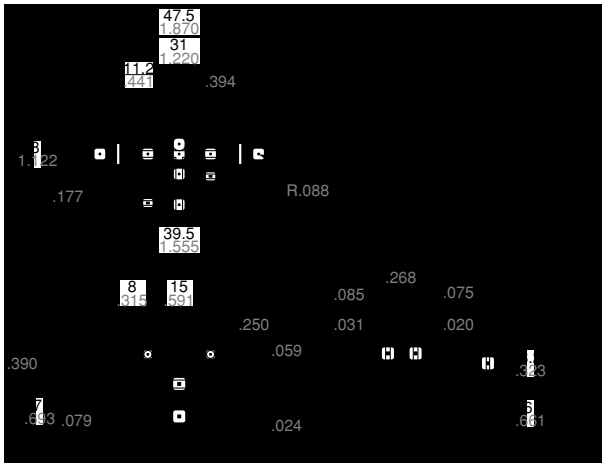
PC board pattern (Bottom view)



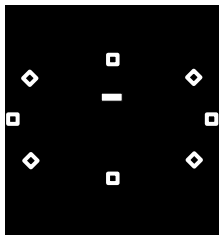
General tolerance: ±0.4 ±.016

Tolerance: ±0.1 ±.004

Flat TM type



Schematic



Panel cutout

General tolerance: ±0.4 ±.016

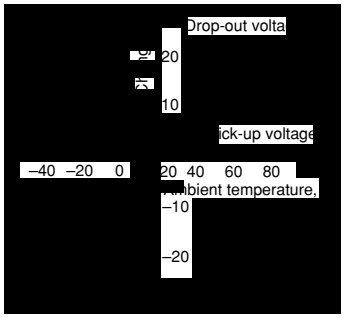
REFERENCE DATA

1. Coil temperature rise

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

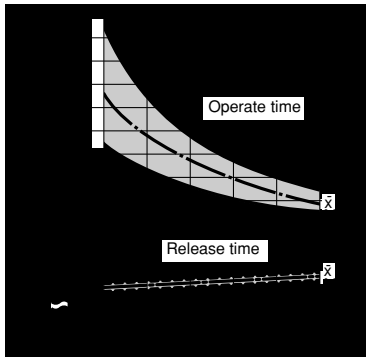
2. Ambient temperature characteristics

Sample: JM1aN-TMP-DC24V, 5 pcs.



3. Operate/release time

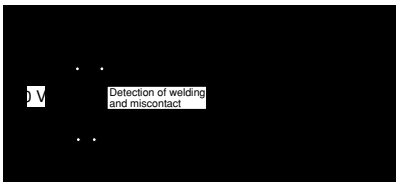
Sample: JM1aN-TMP-DC24V, 5 pcs.



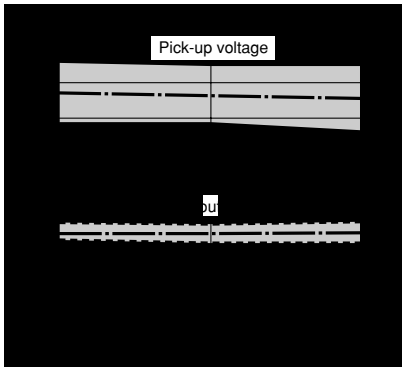
4. Life curve

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



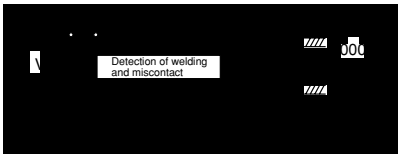
Change of pick-up and drop-out voltage



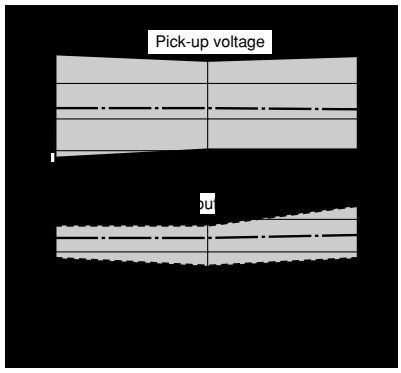
Contact welding: 0 time
Miscontact: 0 time

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



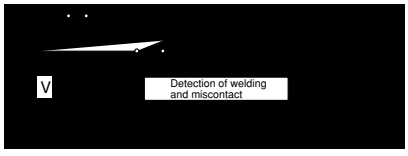
Change of pick-up and drop-out voltage



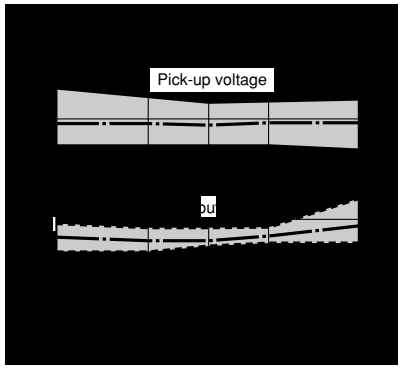
Contact welding: 0 time
Miscontact: 0 time

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 cosφ = 0.7 (0.3 s),
steady 20A pf = 0.9,
250V AC compressor dummy
(Overload) 80A cosφ = 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