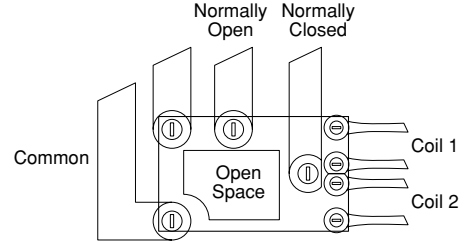


mm inch

FEATURES

- 7 Amp Steady/30 Amp Inrush current capability
- Simple footprint enables ease of PC board layout



RoHS Directive compatibility information
<http://www.nais-e.com/>

SPECIFICATIONS

Contact		Arrangement	
Contact material		1 Form C×2 (H bridge)	
Initial contact resistance (Initial) (By voltage drop 6 V DC 1 A)		Ag alloy (Cadmium free)	
Initial contact voltage drop		Typ. 6 mΩ (N.O.) Typ. 9 mΩ (N.C.)	
Nominal switching capacity		Max. 0.2 V (at 20 A)	
Rating	Max. carrying current	N.O.: 20A 14 V DC N.C.: 10A 14 V DC	
		30 A (2 minutes), 20 A (1 hour) (coil applied voltage: 12 V, at 20°C) 25 A (2 minutes), 15 A (1 hour) (coil applied voltage: 12 V, at 85°C)	
	Min. switching capacity#1	1 A 12 V DC	
Expected life (min. ope.)	Mechanical (at 120 cpm)		10 ⁶
	Electrical	resistive load	Min.10 ⁵
		7 A 14 V DC, Inrush 30 A (Motor load)	2×10 ⁵
		20 A 14 V DC (Motor lock)	Min.5×10 ⁴

Coil		Nominal operating power	
		640 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 (at rated load)		120 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	1,000 Vrms for 1 min.
Operate time*3 (at nominal voltage)		Max. 10 ms (initial)
Release time*3 (at nominal voltage)		Max. 10 ms (initial)
Shock resistance	Functional*4	Min. 100 m/s ² {10 G}
	Destructive*5	Min. 1,000 m/s ² {100 G}
Vibration resistance	Functional*6	Approx. 44.1 m/s ² {4.5 G}, 10 Hz to 100 Hz
	Destructive*7	Approx. 44.1 m/s ² {4.5 G}, 10 Hz to 500 Hz
Conditions for operation, transport and storage*8 (Not freezing and condensing at low temperature)	Ambient temp.	-40°C to +85°C -40°F to +185°F
	Humidity	5%R.H. to 85%R.H.
Mass	Standard type	Approx. 15 g .529 oz

Remarks

*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 Time of vibration for each direction;

X, Y, direction: 2 hours

Z direction: 4 hours



*8 Refer to Conditions for operation, transport and storage mentioned in AMBIENT ENVIRONMENT.

Please inquire if you will be using the relay in a high temperature atmosphere (110°C 230°F).

TYPICAL APPLICATIONS

- Power windows
- Auto door lock
- Electrically powered sunroof
- Electrically powered mirrors
- Powered seats
- Lift gates
- Slide door closers, etc.
(for DC motor forward/
reverse control circuits)

ORDERING INFORMATION

Ex. CF -

Contact arrangement	Coil voltage(DC)
1 Form C × 2	12 V

Standard packing: Carton: 35pcs.; Case: 700pcs.

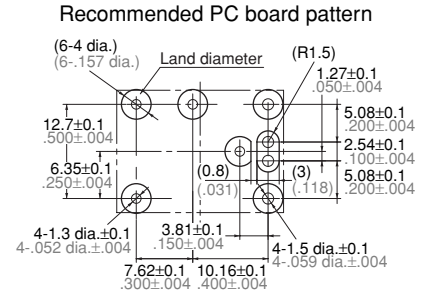
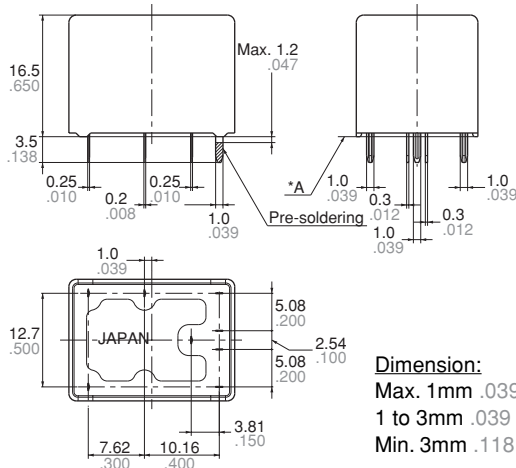
TYPES AND COIL DATA (at 20°C 68°F)

Part No.	Nominal voltage, V DC	Pick-up voltage, V DC (Initial)	Drop-out voltage, V DC (Initial)	Coil resistance, Ω	Nominal operating current, mA	Nominal operating Power, mW	Usable voltage range, VDC
CF2-12V	12	Max. 7.2	Min. 1.0	225±10%	53.3±10%	640	10 to 16

* Other pick-up voltage types are also available. Please contact us for details.

DIMENSIONS

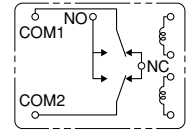
mm inch



Dimension:	General tolerance
Max. 1mm .039 inch:	±0.1 ±.004
1 to 3mm .039 to .118 inch:	±0.2 ±.008
Min. 3mm .118 inch:	±0.3 ±.012

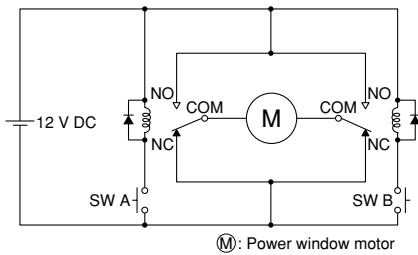
* Dimensions (thickness and width) of terminal specified in this catalog is measured before pre-soldering. Intervals between terminals is measured at A surface level.

Schematic



EXAMPLE OF CIRCUITS

Forward/reverse control circuits of DC motor for power window

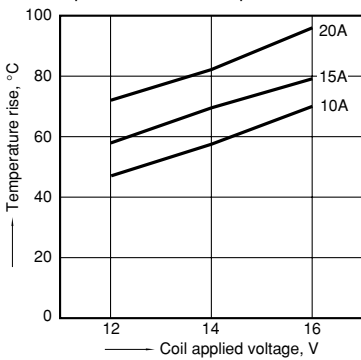


SW A	SW B	Motor
OFF	OFF	Stop
ON	OFF	Forward
OFF	ON	Reverse

REFERENCE DATA

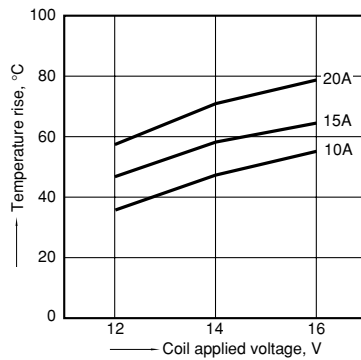
1-(1). Coil temperature rise (at room temperature)

Sample: CF2-12V, 6pcs.
Measured portion: Inside the coil
Contact carrying current: 10A, 15A, 20A
Ambient temperature: Room temperature

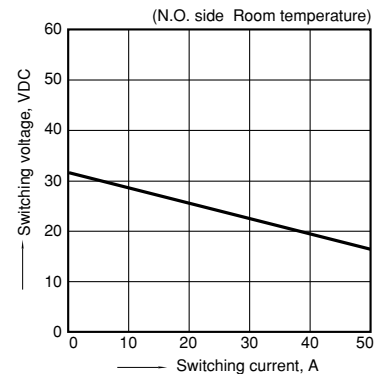


1-(2). Coil temperature rise (at 85°C 185°F)

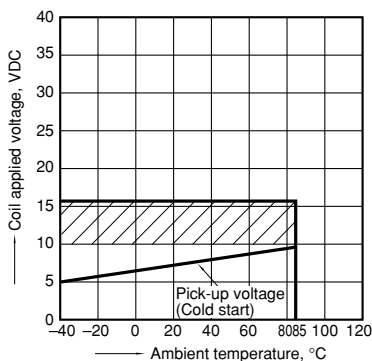
Sample: CF2-12V, 6pcs.
Measured portion: Inside the coil
Contact carrying current: 10A, 15A, 20A
Ambient temperature: 85°C 185°F



2. Max. switching capability (Resistive load, initial)

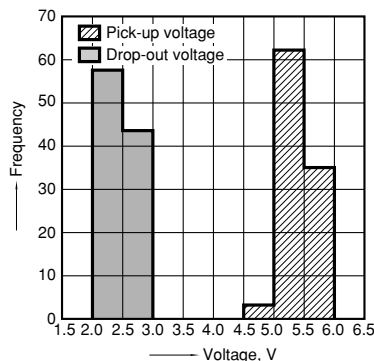


3. Ambient temperature and operating temperature range



4. Distribution of pick-up and drop-out voltage

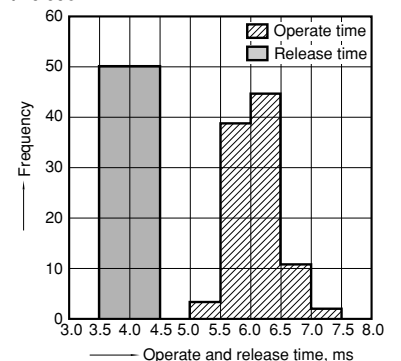
Sample: CF2-12V, 100pcs.



5. Distribution of operate and release time

Sample: CF2-12V, 100pcs.

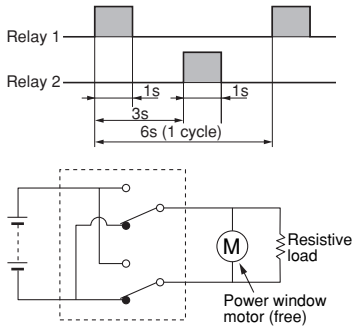
* With diode



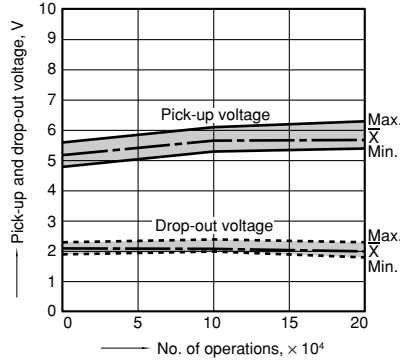
6-(1). Electrical life test (Motor free)

Sample: CF2-12V, 3pcs.
 Load: Inrush current: 30A, Steady current: 7A,
 Power window motor actual load (free condition)
 Switching frequency: (ON:OFF = 1s:5s)
 Ambient temperature: Room temperature

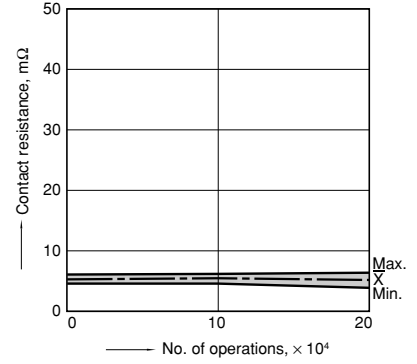
Circuit



Change of pick-up and drop-out voltage

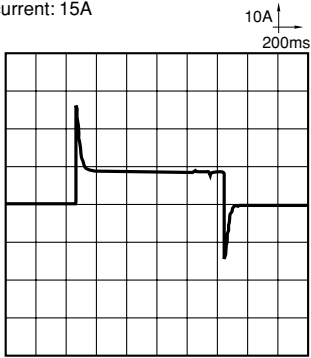


Change of contact resistance



Load current waveform

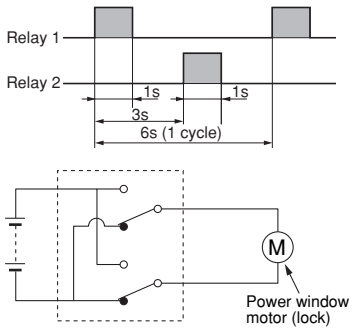
Inrush current: 27A, Steady current: 8.4A
 Brake current: 15A



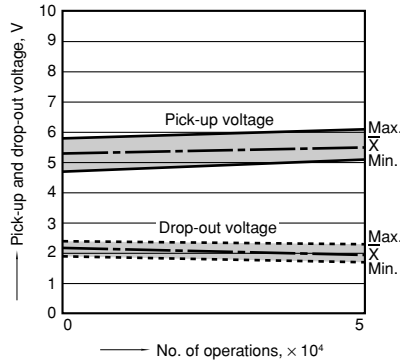
6-(2). Electrical life test (Motor lock)

Sample: CF2-12V, 3pcs.
 Load: 20A 14V DC,
 Power window motor actual load (lock condition)
 Switching frequency: (ON:OFF = 1s:5s)
 Ambient temperature: Room temperature

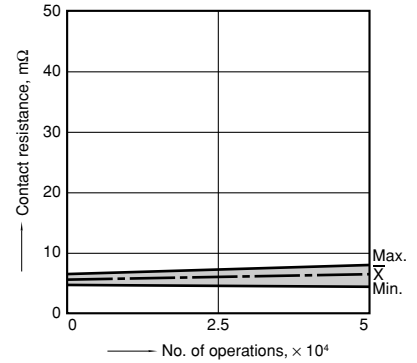
Circuit



Change of pick-up and drop-out voltage

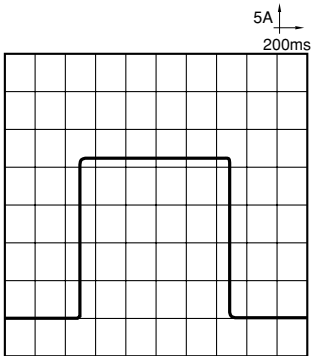


Change of contact resistance



Load current waveform

Inrush current: 27A, Steady current: 8.4A
 Brake current: 15A



For Cautions for Use, see Relay Technical Information.