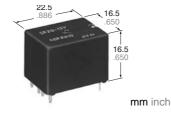


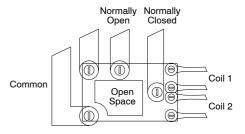
TWIN POWER AUTOMOTIVE RELAY

CF RELAYS



FEATURES

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



SPECIFICATIONS

ent		1 Form C×2 (H bridge)	
aterial		AgSnO ₂ type	
		Max. 50 mΩ	
Initial contact voltage drop		Max. 0.2 V (at 20 A)	
Nominal s capacity	witching	N.O.: 20A 14 V DC N.C.: 10A 14 V DC	
Max. switching power		140 W	
Max. swite	hing voltage	16 V DC	
Max. make current		10 A (Continuous), 30 A (within 1 min.; coil applied voltage: 12 V, at 20°C)	
Max. carrying current		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	
Mechanical (at 120 cpm)		106	
Electrical	resistive load	Min.10⁵	
	7 A 14 V DC, Inrush 30 A (Motor load)	2×10 ⁵	
	20 A 14 V DC (Motor lock)	Min.5×10 ⁴	
	aterial act resistan e drop 6 V I act voltage Nominal s capacity Max. switc Max. switc Max. make Max. carry Min. switcl Mechanica	aterial act resistance drop 6 V DC 1 A) act voltage drop Nominal switching capacity Max. switching power Max. switching voltage Max. make current Max. carrying current Min. switching capacity#1 Mechanical (at 120 cpm) Electrical T A 14 V DC, Inrush 30 A (Motor load) 20 A 14 V DC	

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.

TYPICAL APPLICATIONS

- · Power windows
- · Auto door lock

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

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.

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Characteristics

Max. operating speed (at rated load)			6 cpm
Initial insulation resistance*1		Min. 100 M Ω (at 500 V DC)	
Initial breakdown			1,000 Vrms for 1 min.
voltage*2			1,000 Vrms for 1 min.
Operate time*3 (at nominal voltage)		Max. 10 ms	
Release time*3 (at nominal voltage)		Max. 10 ms	
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/s2 {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 Sta		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: 10 μs

*5 Half-wave pulse of sine wave: 6ms

*6 Detection time: 10µs

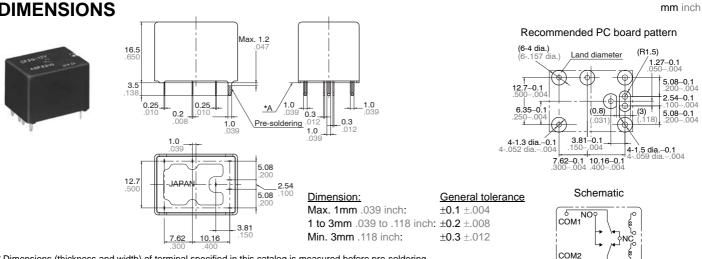
- *7 Time of vibration for each direction;
 - X, Y, direction: 2 hours
 - Z direction: 4 hours İz
- *8 Refer to 6. Conditions for operation, transport and storage mentioned in AMBIENT ENVIRONMENT (p. 19, Relay Technical Information).

ORDERING INFORMATION

Ex. CF 2	— 12 V		
Contact arrangement	Coil voltage(DC)		
1 Form C × 2	12 V		
Standard packing: Tube: 35pcs.; Outer carton: 700pcs.			

DIMENSIONS

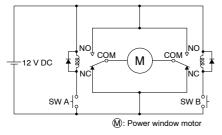
CF



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

EXAMPLE OF CIRCUITS

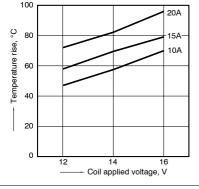
Forward/reverse control circuits of DC motor for power window



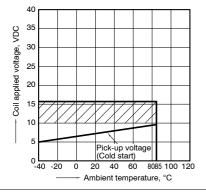
SW A SW B Motor OFF OFF Stop ON OFF Forward OFF ON Reverse

REFERENCE DATA

1-(1). Coil temperature rise (at room temperature) Sample: CF2-12V, 6pcs. Measured potion: Inside the coil Contact carrying current: 10A, 15A, 20A Ambient temperature: Room temperature

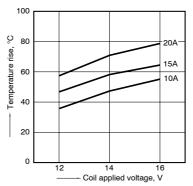


3. Ambient temperature and operating temperature range

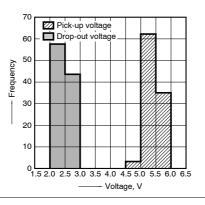


1-(2). Coil temperature rise (at 85°C 185°F) Sample: CF2-12V, 6pcs. Measured potion: Inside the coil Contact carrying current: 10A, 15A, 20A

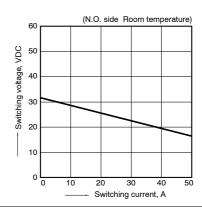
Ambient temperature: 85°C 185°F



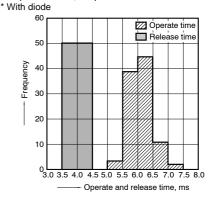
4. Distribution of pick-up and drop-out voltage Sample: CF2-12V, 100pcs.



2. Max. switching capability (Resistive load)



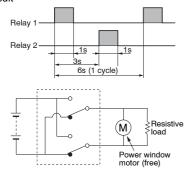
5. Distribution of operate and release time Sample: CF2-12V, 100pcs.



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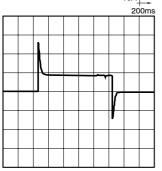
6-(1). Electrical life test (Motor free) Sample: CF2-12V, 3pcs. Load: Inrush current: 30A, Steady current: 7A,

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

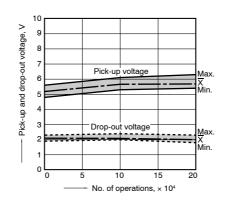


Load current waveform

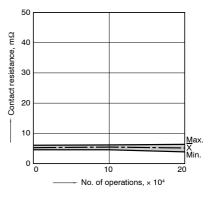
Inrush current: 27A, Steady current: 8.4A Brake current: 15A



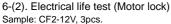
Change of pick-up and drop-out voltage



Change of contact resistance

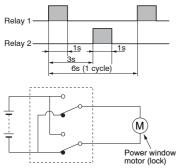


Change of pick-up and drop-out voltage



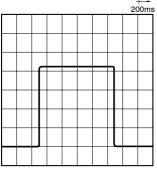
Load: 20A 14V DC,

Power window motor actual load (lock condition) Switching frequency: (ON:OFF = 1s:5s) Ambient temperature: Room temperature Circuit

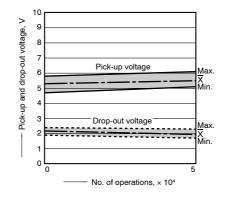


Load current waveform

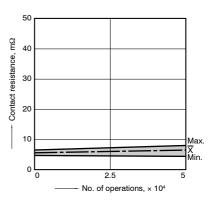
Steady current: 21A 14V DC



5A







For Cautions for Use, see Relay Technical Information.