

# SILENT TWIN RELAY FOR AUTOMOTIVE APPLICATIONS

## 1POLE X 2, H-BRIDGE, 25A

### FTR-P2 SERIES

#### ■ FEATURES

- Low operating sound  
An original silent mechanism decreases the propagation of operating sound when mounted on a PCB. (Average sound pressure: 50dB at 5 cm).
- Compact, high density package  
350 mm<sup>2</sup> mounting area. (11% less than the FBR 510 series non-quiet twin relay).
- High sensitivity, low power consumption  
(nominal power consumption: 450 mW).
- High capacity  
Heat dissipation is high due to a single cover structure.
- Ease of PCB layout  
The FTR-P2 incorporates internal H-Bridge connections typically used in reversing applications. All terminals are on the perimeter.
- High breaking capability.  
In addition to the standard gap product (0.3 mm), a higher gap product (0.6 mm), suitable for over voltage breaking can be supplied.
- Typical applications  
Power window, Doorlock, Power seat, Wiper (for H-Bridge circuit)



#### ■ ORDERING INFORMATION

[Example]     $\frac{\text{FTR-P2}}{\text{(a)}}$      $\frac{\text{C}}{\text{(b)}}$      $\frac{\text{N}}{\text{(c)}}$      $\frac{\text{012}}{\text{(d)}}$      $\frac{\text{W1}}{\text{(e)}}$      $\frac{\text{**}}{\text{(f)}}$

(a)	Series Name	FTR-P2 : FTR-P2 Series
(b)	Contact Arrangement	C : 1 FormC x 2
(c)	Contact Gap	N : 0.3 mm gap P : 0.6mm gap
(d)	Nominal Voltage	009: 9 VDC                      010: 10 VDC                      012: 12 VDC
(e)	Contact Material	W1 : Silver-Tin-Oxide-Indium Oxide
(f)	Special product specification	Symbol to specify special specification product

Note: The part number is stamped on the relay cover as in the following example:

(Example)    Ordering part number: FTR-P2CN012W1  
                  Stamped part number: P2CN012W1

# FTR-P2 SERIES

## ■ SPECIFICATIONS

Item		Specification	Remark	
Contact	Arrangement	1 FormC x 2 in H-Bridge		
	Material	Silver-Tin Oxide-Indium Oxide		
	Voltage drop	100 m maximum	Measured at 2A, 12 VDC	
	Contact rating	DC 14V, 25A (motor locked)		
	Maximum Carrying Current	25 A/ 1 hour (25 C, nominal voltage applied to coil)		
	Minimum Load*	6V 1A	Reference value	
Coil	Operating Temperature Range	-40° C to +85° C	No frost	
	Storage Temperature Range	-40° C to +100° C		
Time	Operate (at nominal voltage)	10 ms maximum	When nominal coil voltage is applied to coil, or removed, no diode.	
	Release (at nominal voltage)	5 ms maximum		
Life	Mechanical	10 million operations minimum		
	Electrical	100K operations minimum	At contact rating	
Other	Vibration resistance (Operational)		10-55Hz, 1.5mm double amplitude	= 9.13G @55Hz
	Shock resistance	Operational	100 m/s <sup>2</sup> minimum (10G)	
		No Damage	1000 m/s <sup>2</sup> minimum (100G)	
	Weight		Approximately 13 grams	
Average sound pressure		Approximately 50 dB at 5 cm	A weighting	

\*This is the standard value of the minimum load level. This value may differ depending on the switching frequency, environmental conditions and target reliability standard. We recommend to check this value by an actual load prior to use.

## ■ COIL DATA

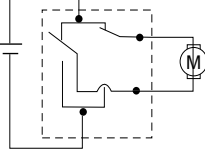
Product Name	Nominal Coil Voltage	Coil Resistance* (±10%)	Power Consumption at nominal coil voltage*	Must Operate Voltage*	Must Release Voltage
FTR-P2CN009W1	DC 9V	180Ω	450mW	5.5V (20° ) 6.9 V (85° )	0.72
FTR-P2CN010W1	DC 10V	220Ω	455mW	6.3V (20° ) 7.9 V (85° )	0.8
FTR-P2CN012W1	DC 12V	320Ω	450mW	7.3V (20° ) 9.2V (85° )	0.96

## CHARACTERISTIC DATA

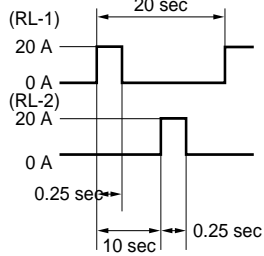
### 1. LIFE TEST (EXAMPLES)

- Test item  
14 V DC-25 A  
Motor Lock  
100K operations  
minimum

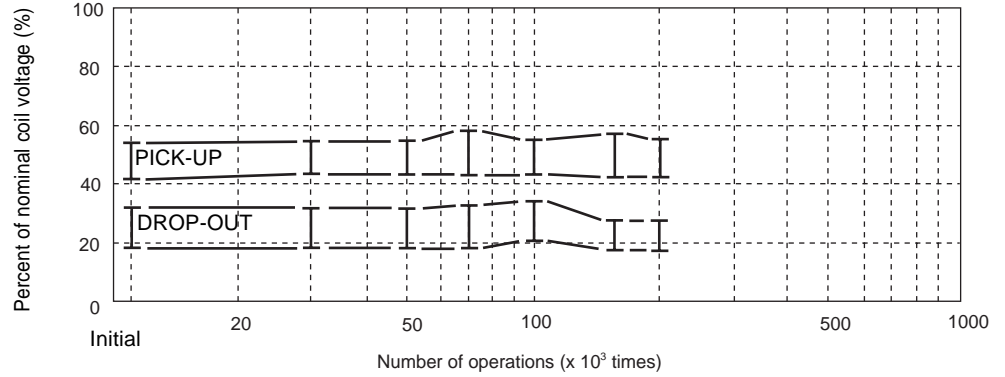
- Test circuit



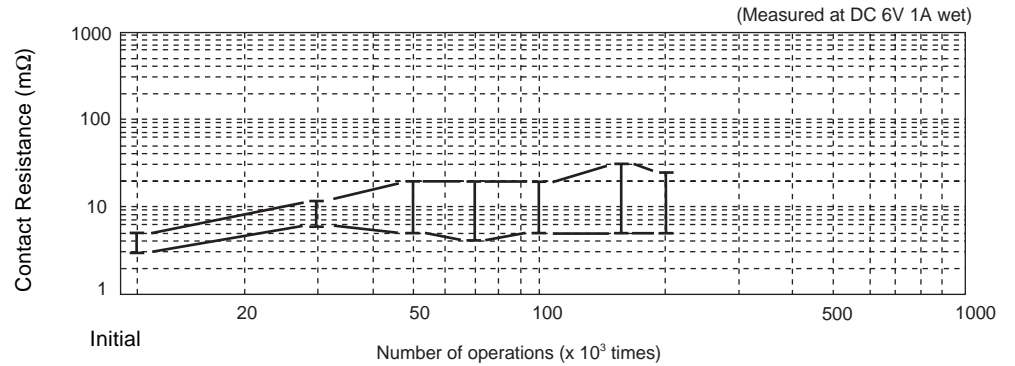
- Current wave form



- Shift of pick-up drop-out voltage

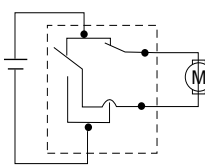


- Change in contact resistance



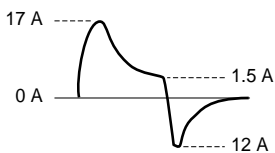
- Test item  
14 V DC,  
inrush current: 17A  
motor free  
300K operations minimum  
0.25 seconds ON,  
9.75 seconds OFF

- Test circuit

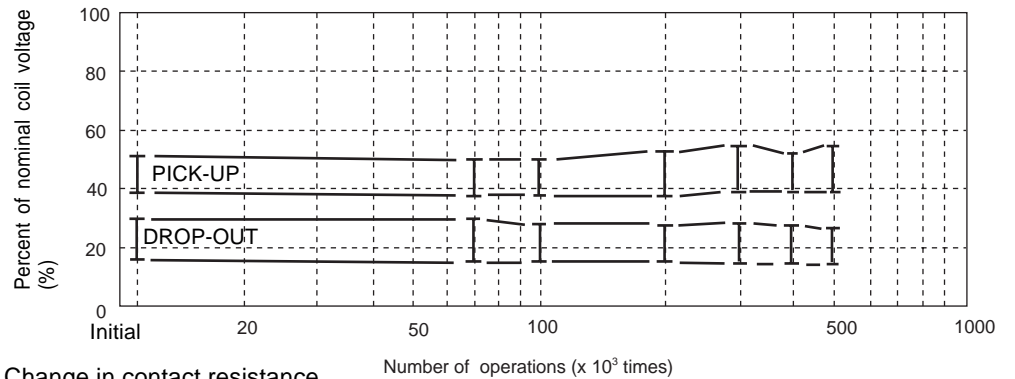


- Notes: 1. Test was done on one side of twin relay  
2. NC contacts provide dynamic brake circuits

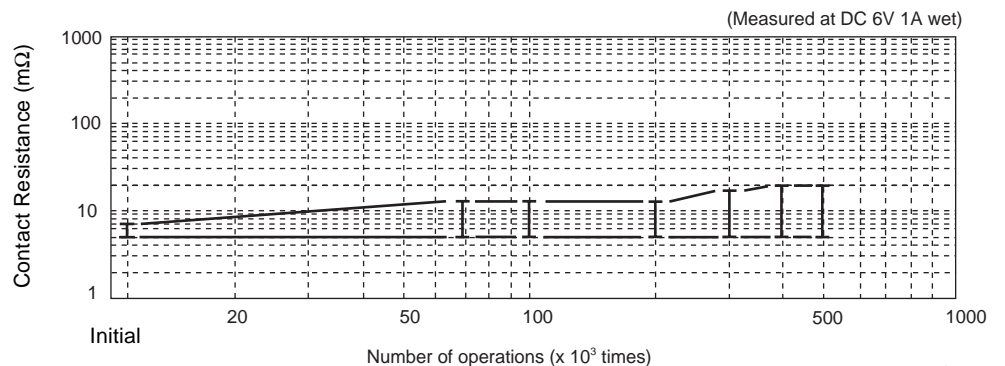
- Current wave form



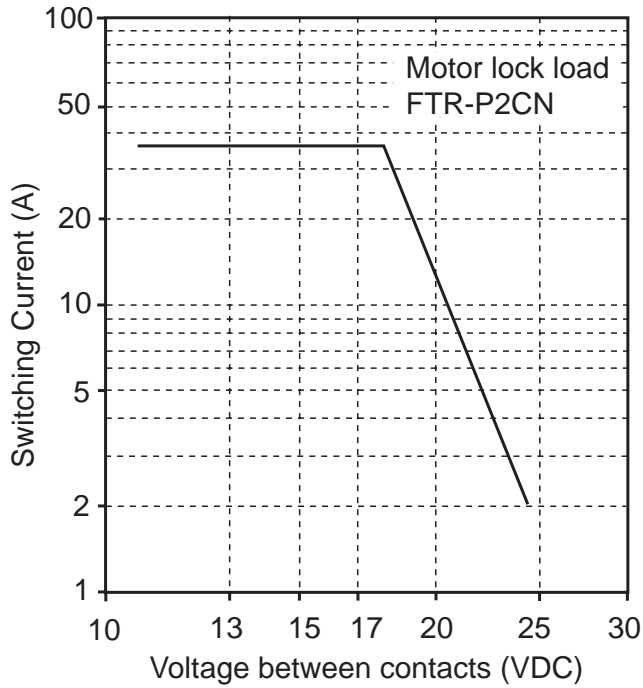
- Change in pick-up drop-out voltage



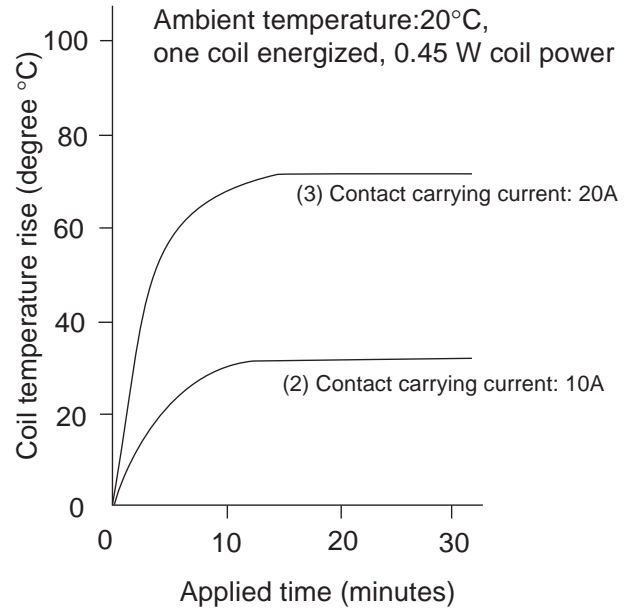
- Change in contact resistance



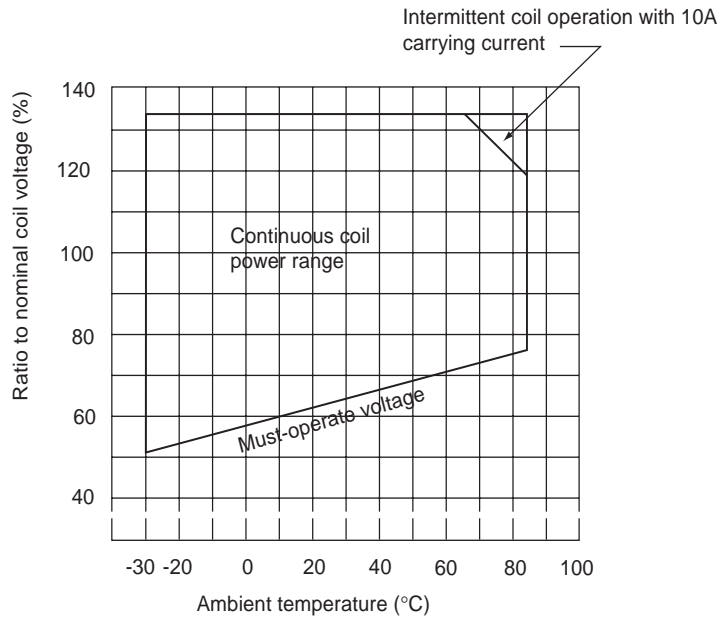
## 2. MAXIMUM BREAK CAPACITY



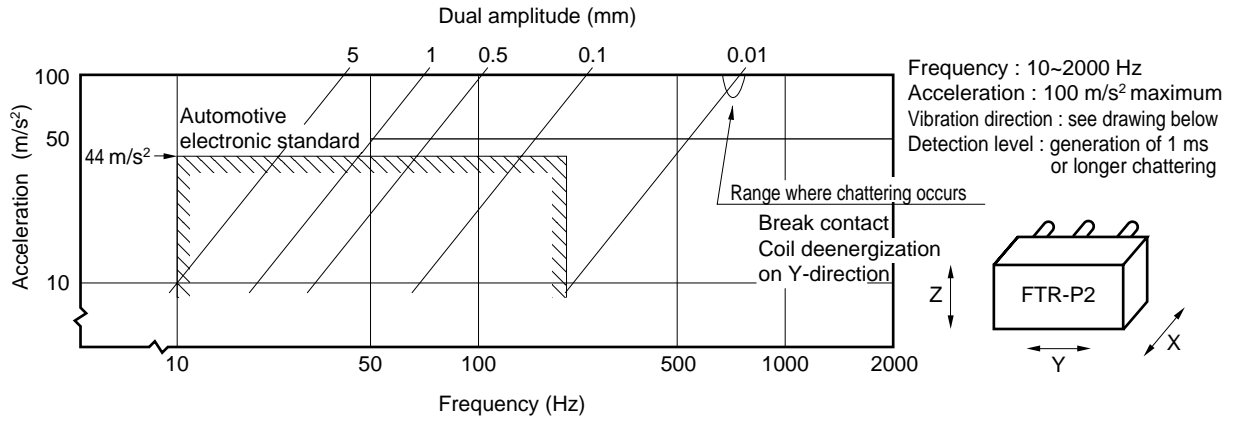
## 3. COIL TEMPERATURE RISE



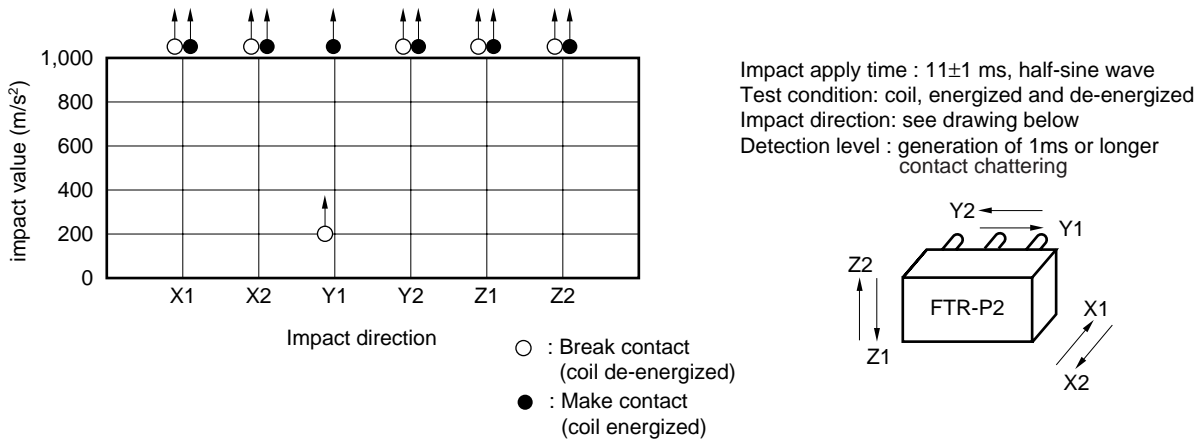
## 4. OPERATING COIL VOLTAGE RANGE



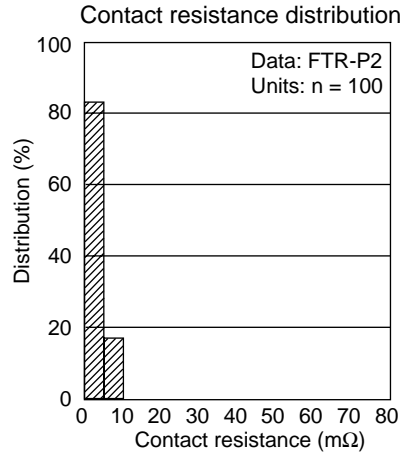
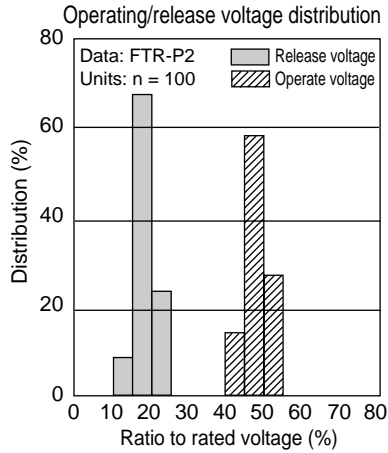
## 5. VIBRATION RESISTANCE CHARACTERISTICS



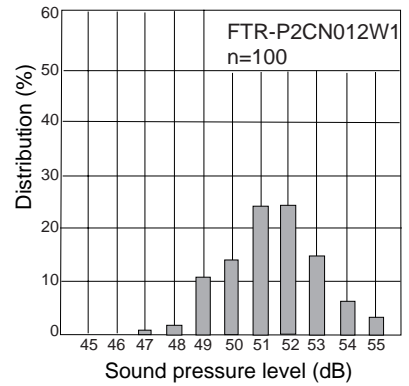
## 6. SHOCK RESISTANCE CHARACTERISTIC



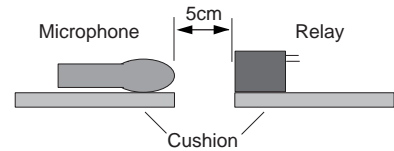
## REFERENCE DATA



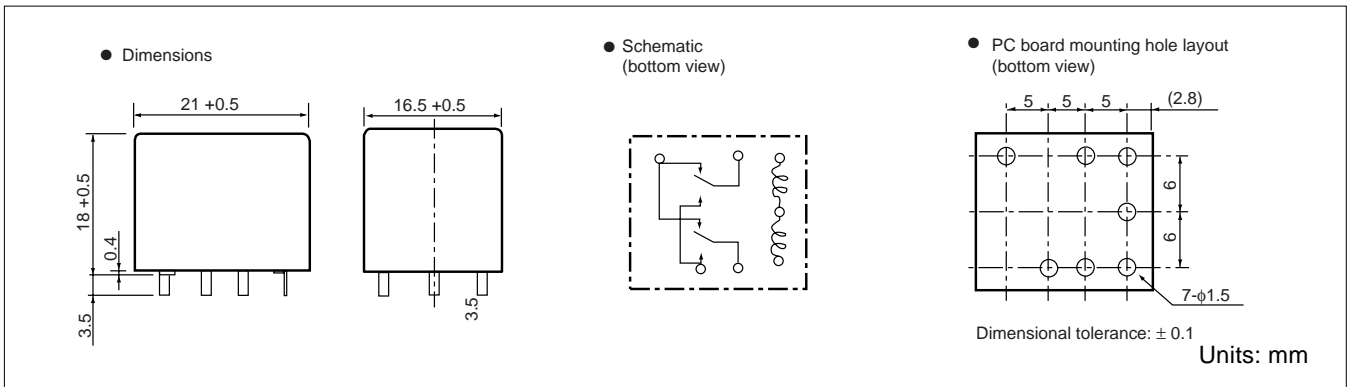
Distribution of sound pressure (with diode)



Method of acoustic noise measure  
Measuring condition: Distance from 5 cm,  
relay operation at 10Hz  
Tester: Noise tester Ryon NA-61, A range



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