

COMPACT HIGH POWER RELAY

1 POLE—12 A (28 VDC) (FOR 24 V BATTERY AUTOMOTIVE APPLICATIONS)

FBR57 SERIES

RoHS compliant

■ FEATURES

- High power contact capacity
(carrying current: 40 A/2 minutes, 30 A/1 hour)
- Suitable for controlling 24 V motors in trucks and other large vehicles
- High heat resistance and extended operating voltage
- RoHS compliant since date code: 0627
Please see page 7 for more information



■ ORDERING INFORMATION

[Example] FBR57 N D24 – W **
 (a) (b) (c) (d) (e)

(a)	Series Name	FBR57 : FBR57 Series relay for 24 V battery (contact gap 0.8 mm)
(b)	Enclosure	N : Plastic sealed type
(c)	Nominal Voltage	D24 : 24 VDC
(d)	Contact Material	W: Silver-tin oxide indium N: Silver copper nickel
(e)	Custom Designation	To be assigned custom specification

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■ SPECIFICATIONS

Item		Specifications	
Contact	Arrangement	1 form C	
	Material	Silver-tin oxide indium (-W type) Silver copper nickel (-N type)	
	Voltage Drop (resistance)	Maximum 100 mV (at 2 A 12 VDC)	
	Ratings	28 VDC 12 A (locked motor load) 28 VDC inrush 15 A, break 2.5 A (motor free load)	
	Maximum Carrying Current	40 A/2 minutes, 30 A/1 hour (25°C, 100% rated coil voltage)	
	Maximum Inrush Current	-W type: 60 A (reference) -N Type: 40 A	
	Maximum Switching Current	12 A 28 VDC (reference)	
	Minimum Switching Load*1	-W type: 6 VDC, 1 A -N type: 6 VDC, 2 A (reference)	
Coil	Operating Temperature	-40°C to +85°C (no frost) (refer to the CHARACTERISTIC DATA)	
	Storage Temperature	-40°C to +100°C (no frost)	
Time Value	Operate (at nominal voltage)	Maximum 10 ms	
	Release (at nominal voltage)	Maximum 5 ms	
Life	Mechanical	1 × 10 ⁶ operations minimum	
	Electrical	1 × 10 ⁵ operations minimum (locked motor load) 5 × 10 ⁵ operations minimum (motor free load)	
Other	Vibration Resistance	10 to 55 Hz (double amplitude of 1.5 mm)	
	Shock Resistance	Misoperation	100 m/s ²
		Endurance	1,000 m/s ²

*1 Values when switching a resistive load at normal room temperature and humidity, and in a clean environment.
The minimum switching load varies with the switching frequency and operating environment.

■ COIL DATA CHART

MODEL		Nominal voltage	Coil resistance (±10%) (at 20°C)	Must operate voltage	Thermal resistance
W contact	N contact				
FBR57ND24-W	FBR57ND24-N	24 VDC	384 Ω	14.4 VDC (at 20°C) 18.0 VDC (at 85°C)	67°C/W

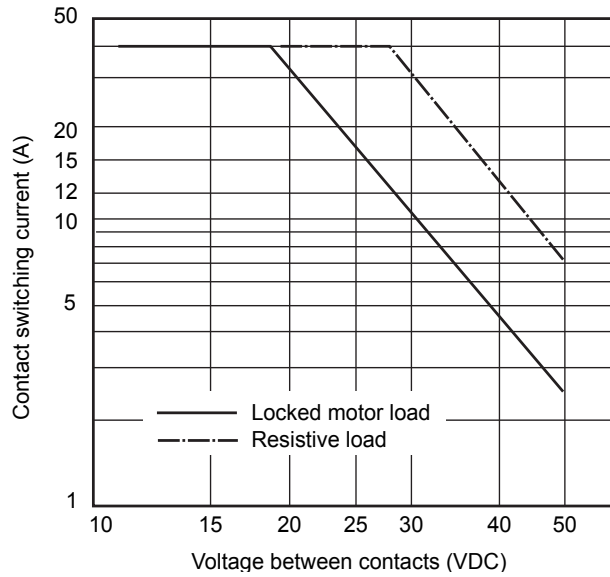
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■ PRINCIPAL APPLICATIONS

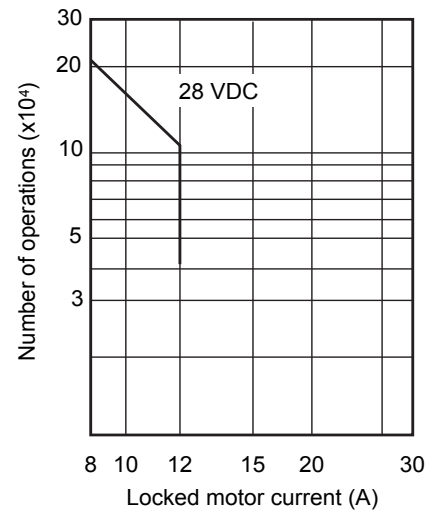
Application		Normal load current	Life x 10 ³	Recommended model (example)
For 24 V battery	Power Windows	10 to 12 A (switching at motor locking)	100	FBR57N□-W
	Automatic Door Lock	5 A/2 door (switching at motor locking)	100	FBR57N□-W
	Intermittent Wipers	INRUSH 15 to 30 A BREAK 2 to 8 (motor free)	300	FBR57N□-N

■ CHARACTERISTIC DATA

1. MAXIMUM BREAK CAPACITY



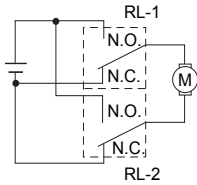
2. LIFE



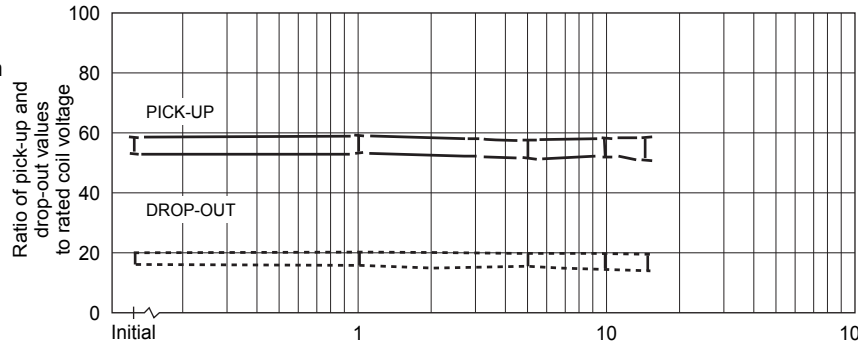
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3. LIFE TEST (EXAMPLE)

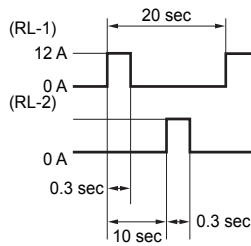
- Test item
28 V DC-12 A INRUSH
Motor lock
100,000 operations minimum
(FBR57 □-W type)
- Test circuit



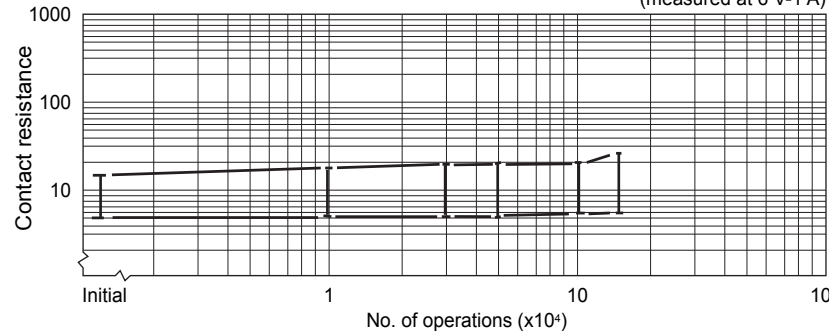
- Shift of pick-up and drop-out voltage



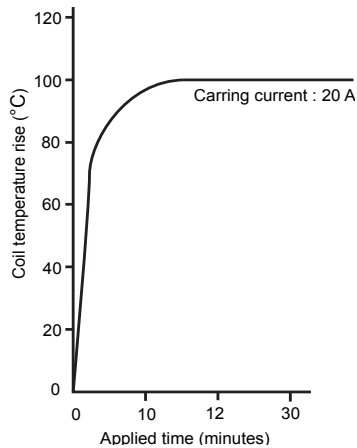
- Current wave form



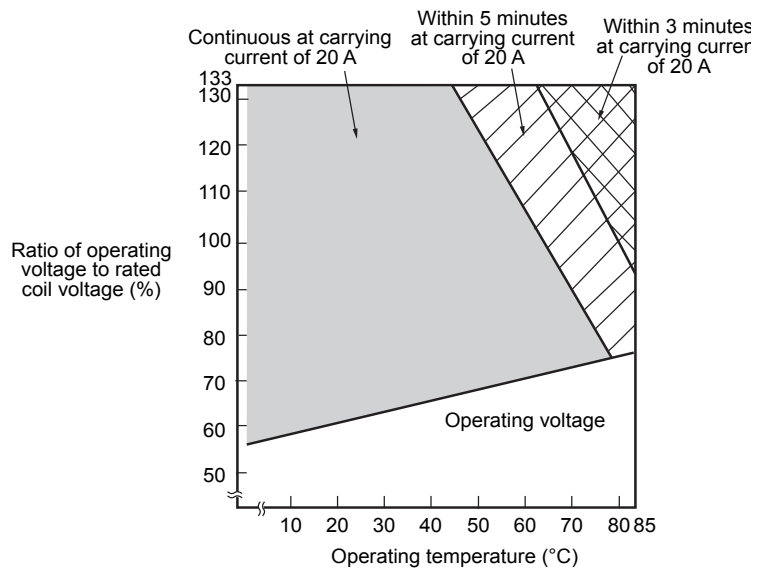
- Shift of contact resistance



4. COIL TEMPERATURE RISE

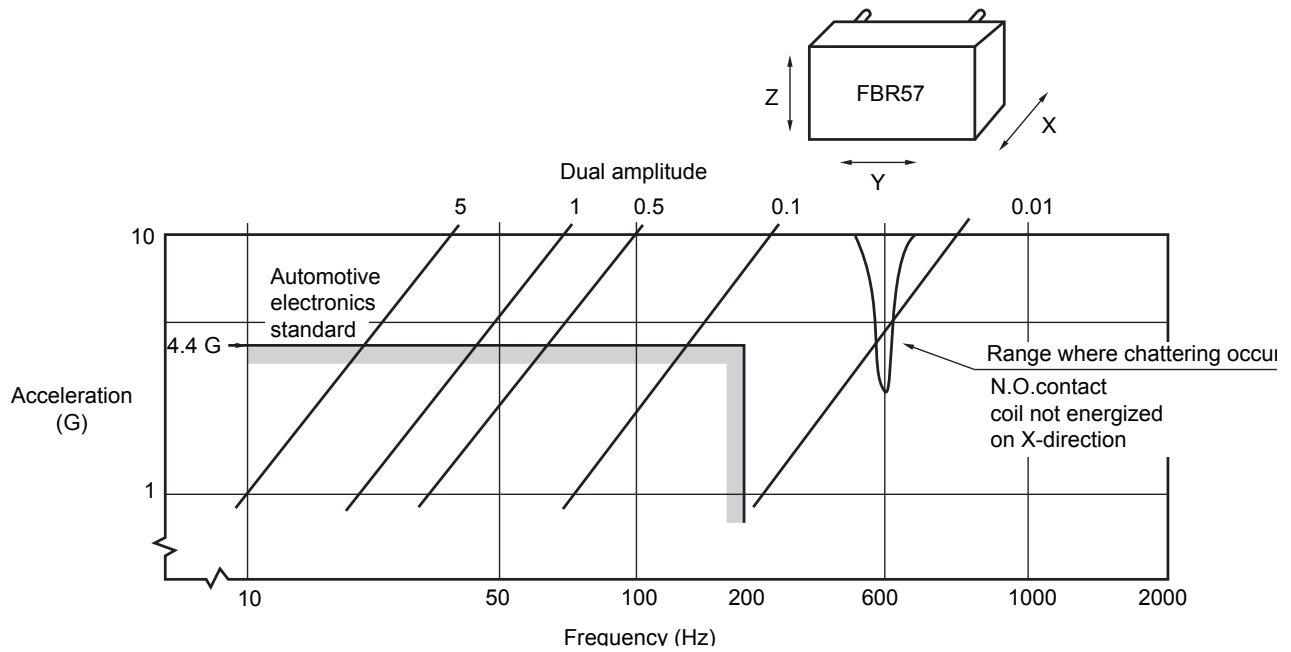


5. OPERATING COIL VOLTAGE RANGE (EXAMPLE)

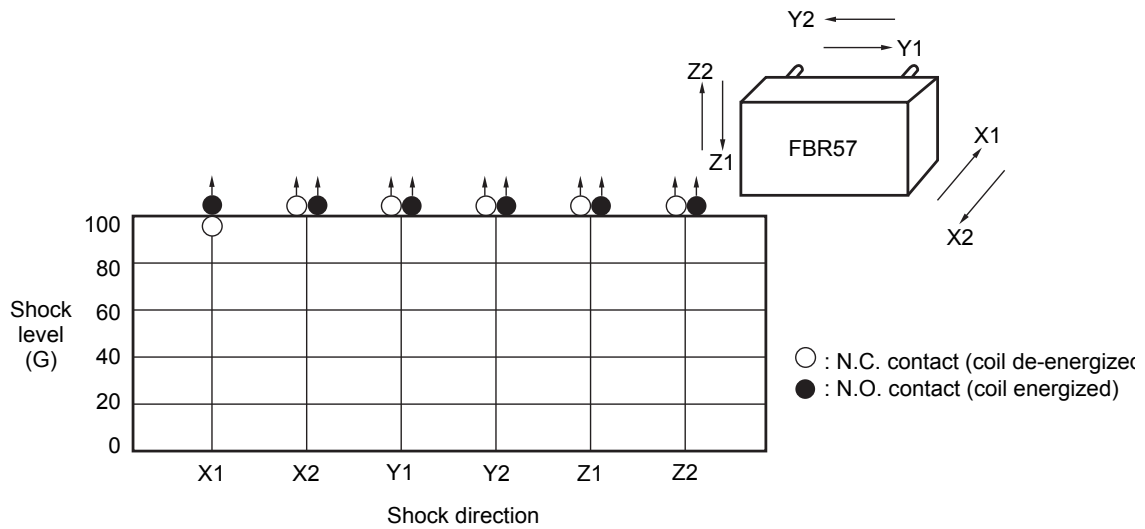


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6. VIBRATION RESISTANCE CHARACTERISTICS

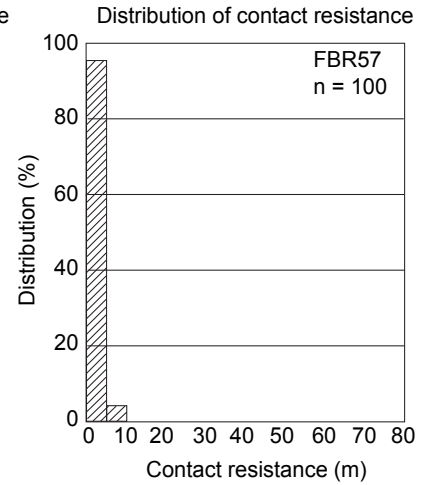
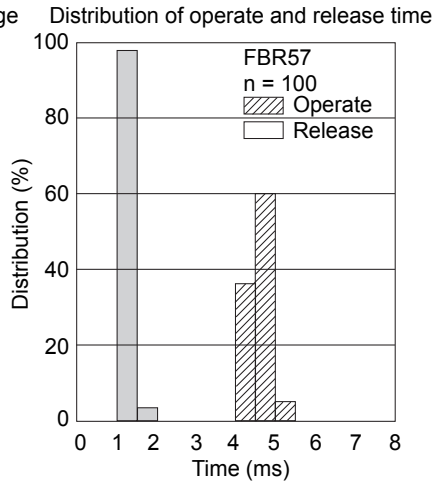
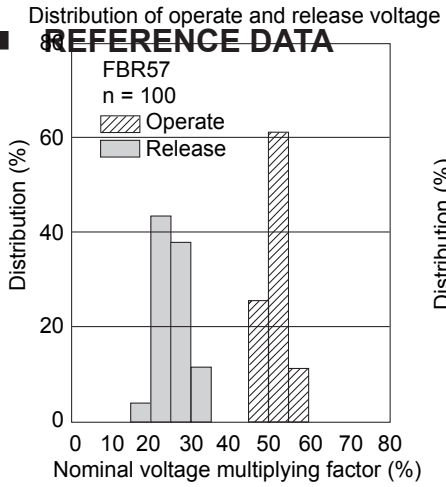


7. SHOCK RESISTANCE CHARACTERISTICS



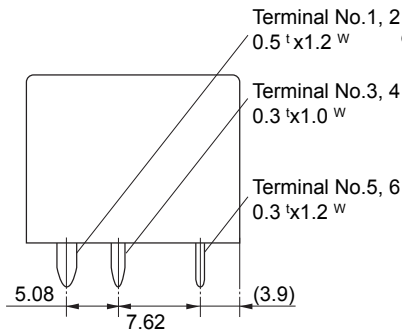
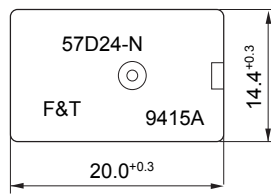
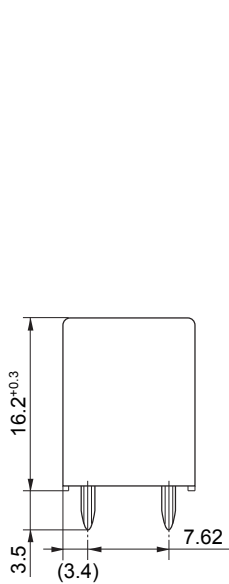
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REFERENCE DATA

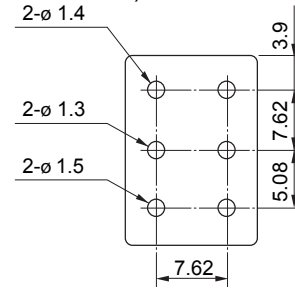


DIMENSIONS

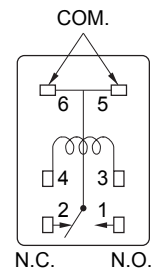
Dimensions



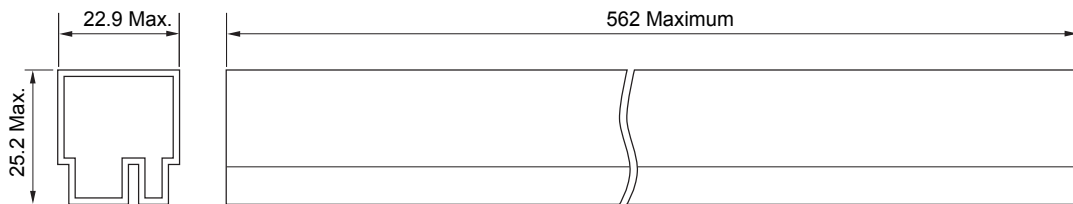
PC board mounting hole layout (BOTTOM VIEW)



Schematic (BOTTOM VIEW)



Tube carrier



35 pieces/tube

Unit : mm

RoHS Compliance and Lead Free Relay Information

1. General Information

- Relays produced after the specific date code that is indicated on each data sheet are lead-free now. Most of our signal and power relays are lead-free. Please refer to Lead-Free Status Info. (<http://www.fujitsu.com/us/downloads/MICRO/fcai/relays/lead-free-letter.pdf>)
- Lead free solder paste currently used in relays is Sn-3.0Ag-0.5Cu.
- All signal and most power relays also comply with RoHS. Please refer to individual data sheets. Relays that are RoHS compliant do not contain the 5 hazardous materials that are restricted by RoHS directive (lead, mercury, chromium IV, PBB, PBDE).
- It has been verified that using lead-free relays in leaded assembly process will not cause any problems (compatible).
- "LF" is marked on each outer and inner carton. (No marking on individual relays).
- To avoid leaded relays (for lead-free sample, etc.) please consult with area sales office.
- We will ship leaded relays as long as the leaded relay inventory exists.

Note: Cadmium was exempted from RoHS on October 21, 2005. (Amendment to Directive 2002/95/EC)

2. Recommended Lead Free Solder Profile

- Recommended solder paste Sn-3.0Ag-0.5Cu.

Reflow Solder condition

Flow Solder condition:

Pre-heating: maximum 120°C
Soldering: dip within 5 sec. at
260°C solder bath

Solder by Soldering Iron:

Soldering Iron
Temperature: maximum 360°C
Duration: maximum 3 sec.

We highly recommend that you confirm your actual solder conditions

3. Moisture Sensitivity

- Moisture Sensitivity Level standard is not applicable to electromechanical relays.

4. Tin Whisker

- Dipped SnAgCu solder is known as low risk tin whisker. No considerable length whisker was found by our in house test.

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