

COMPACT HIGH POWER RELAY

1 POLE – 30A (28VDC)

(For 24V battery automotive applications)

FBR57 Series

■ FEATURES

- High power contact capacity
(carrying current: 40 A/10 minutes, 30 A/1 hour)
- Suitable for controlling 24 V motors in trucks and other large vehicles
- High heat resistance and extended operating voltage
- Contact gap 0.8mm
- RoHS compliant



■ PARTNUMBER INFORMATION

[Example] FBR57 N D24 - W1 - **
 (a) (b) (c) (d) (e)

(a)	Relay type	FBR57	: FBR57 Series
(b)	Enclosure	N	: Plastic sealed type
(c)	Coil rated voltage	D24	: 24 VDC Coil rating table at page 2
(d)	Contact material	W1 Y	: Silver-tin oxide indium : Silver-tin oxide
(e)	Special type	To be assigned custom specification	

Actual marking does not carry the type name: "FBR"
 E.g.: Ordering code: FBR57ND24-W1 Actual marking: 57ND24-W1

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■ SPECIFICATIONS

Item	Specification		
Contact data	Configuration		1 form C
	Material		Silver-tin oxide indium (-W1 type) Silver-tin oxide (-Y type)
	Voltage drop		Max. 100 mV at 1A, 12VDC
	Contact rating		28VDC, 12A (locked motor load) 28VDC, Inrush 15A, break 2.5A (motor free load)
	Max. carrying current		40A/10 minutes, 30A/1 hour (25°C, 100% rated coil voltage)
	Max. inrush current		70A (reference)
	Max. switching voltage		28VDC (reference)
	Max. switching current		12A (reference)
	Min. switching load *		6 VDC, 1A
Coil data	Operating temperature range		-40°C to +85°C (no frost)
	Storage temperature range		40°C to +100°C (no frost)
Timing data	Operate (at nominal voltage)		Max. 10 ms
	Release (at nominal voltage)		Max. 5 ms
Life	Mechanical		Min. 10 x 10 ⁶ operations
	Electrical		Min. 100 x 10 ³ operations (locked motor load) Min. 500 x 10 ³ operations (motor free load)
Others	Vibration resistance	Misoperation	10 to 200Hz, acceleration 44m/s ² (4.5G), constant acceleration
		Endurance	10 to 200Hz, acceleration 44m/s ² (4.5G), constant acceleration
	Shock resistance	Misoperation	100m/s ²
		Endurance	1,000m/s ²
	Weight		Approximately 9.4 g

* Minimum switching loads mentioned above are reference values. Please perform the confirmation test with actual load before production since reference values may vary according to switching frequencies, environmental conditions and expected reliability levels.

Note: Care shall be taken on the heat generated on PC board when maximum carrying current exceeds 10A. Please perform the confirmation test with actual conditions.

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■ COIL DATA

Coil Code	Rated Coil Voltage (VDC)	Coil Resistance $\pm 10\%$ (Ω)	Must Operate Voltage* (VDC)	Must Release Voltage* (VDC)
D24	24	384	14.4 (at 20°C) 18 (at 85°C)	1.9 (at 20°C) 2.4 (at 85°C)

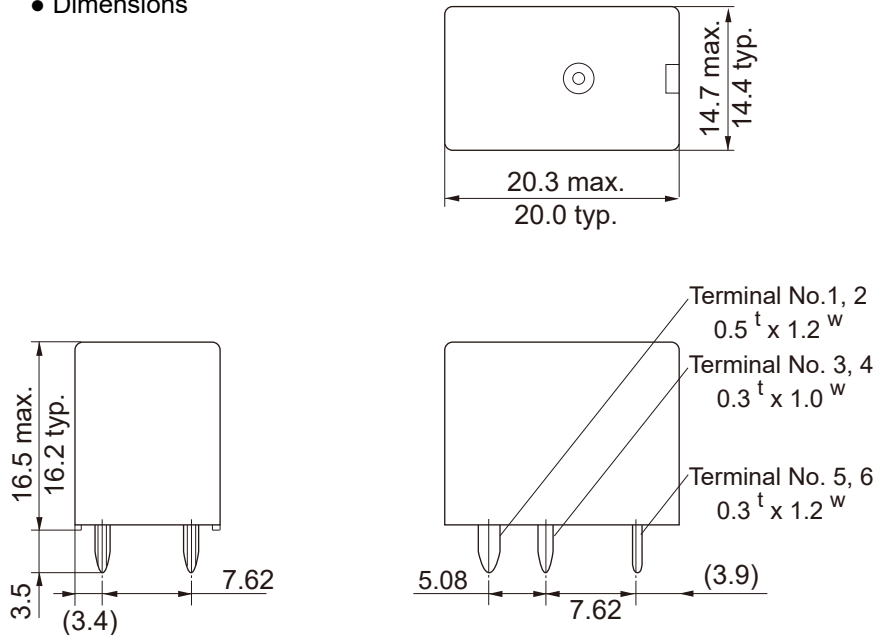
Note: All values in the table are valid for 20°C and zero contact current, unless otherwise stated.

Note: Please use at rated coil voltage. Please refer to characteristic data and set up adequate voltage in case of use.

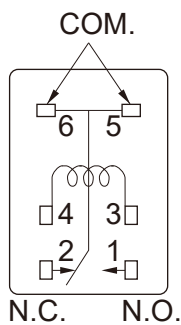
* Specified operate values are valid for pulse wave voltage.

■ DIMENSIONS

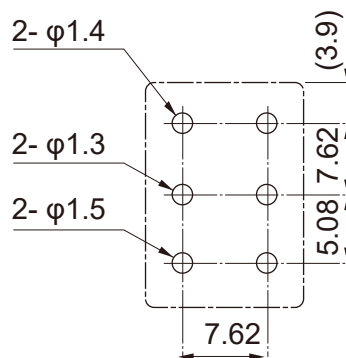
● Dimensions



● Schematics (Bottom view)



● PC board mounting hole layout (Bottom view)



* Dimensions of the terminals do not include thickness of pre-solder.

* Tolerance of PC board mounting hole layout : ± 0.1 unless otherwise specified.

* Dimensions do not include tolerances. Please ask specification in case you need tolerances.

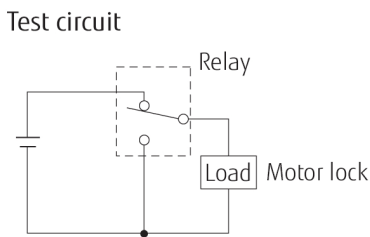
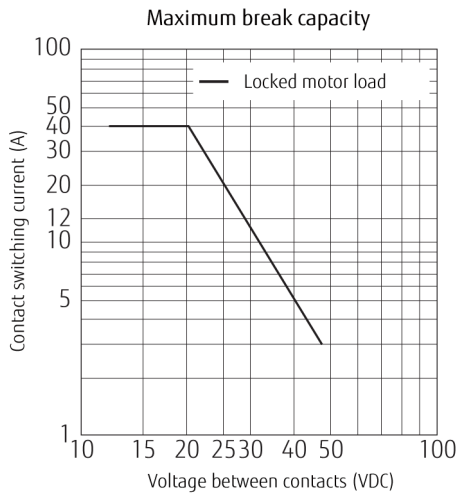
Unit:mm

(): Reference

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■ CHARACTERISTIC DATA

(Characteristic data is not guaranteed value but measured values of samples from production line.)



Life test (example)

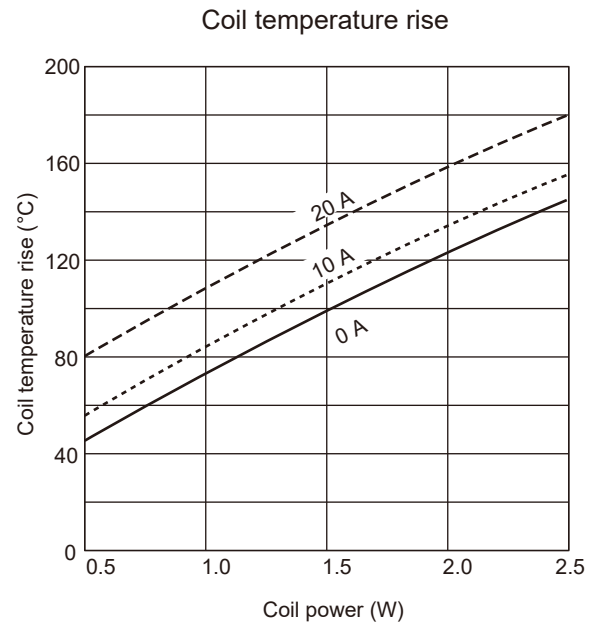
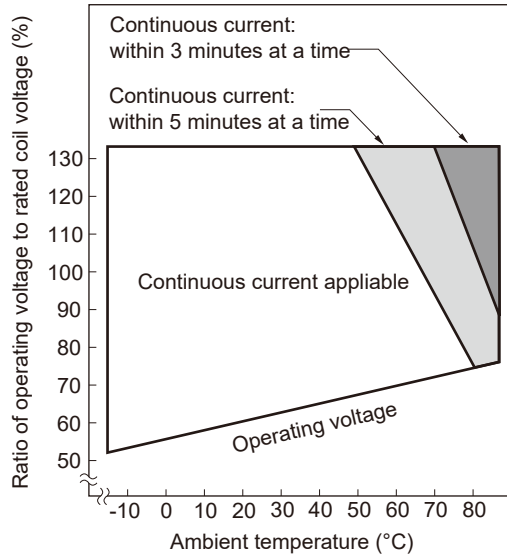
(1) Motor lock

Test item	Test circuit	Current wave form
12A, 28VDC Motor lock 100,000 operations minimum Contact material: Silver tin oxide indium	<p>The test circuit for Motor lock life test shows a DC power source connected to a relay. The relay's common terminal is connected to the positive terminal of the power source. The relay's normally open (N.O.) contact is connected to a motor (M). The other side of the motor is connected back to the negative terminal of the power source. The relay is labeled with [RL-1] and [RL-2] for the two sets of contacts.</p>	<p>The current wave form for Motor lock life test shows two waveforms, [RL-1] and [RL-2]. Both waveforms show a current of 12 A during the 'on' state and 0 A during the 'off' state. The waveforms are square waves, indicating a constant current during the on-state.</p>

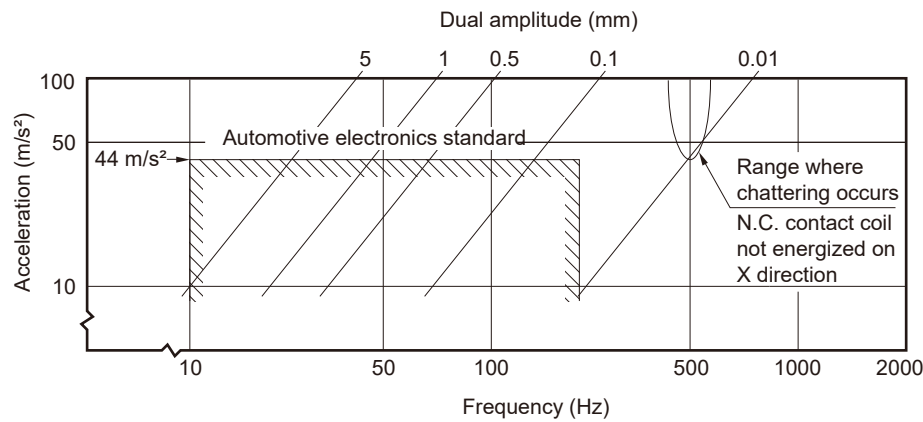
(2) Motor free

Test item	Test circuit	Current wave form
Inrush 15A, Idle 2.5A 28VDC Motor free 500,000 operations minimum Contact material: Silver tin oxide indium	<p>The test circuit for Motor free life test shows a DC power source connected to a relay. The relay's common terminal is connected to the positive terminal of the power source. The relay's normally open (N.O.) contact is connected to a motor (M). The other side of the motor is connected back to the negative terminal of the power source. The relay is labeled with [RL-1] and [RL-2] for the two sets of contacts.</p>	<p>The current wave form for Motor free life test shows a single waveform. It starts at 0 A, rises to a peak of 15 A (inrush current), and then settles to a steady-state value of 2.5 A (idle current). The waveform is a smooth curve, indicating a gradual increase in current during the inrush phase.</p>

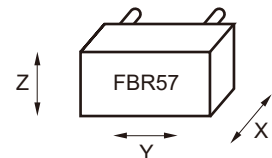
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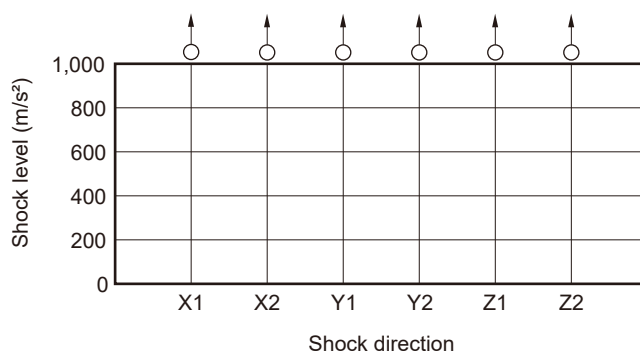
Vibration resistance characteristics



Frequency: 10 ~ 2000Hz
Acceleration: 100m/s² max.
Direction of vibration:
See diagram below
Detection level: Chatter >1ms

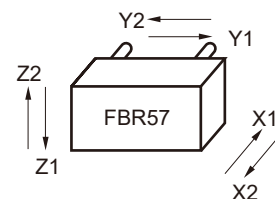


Shock resistance characteristics

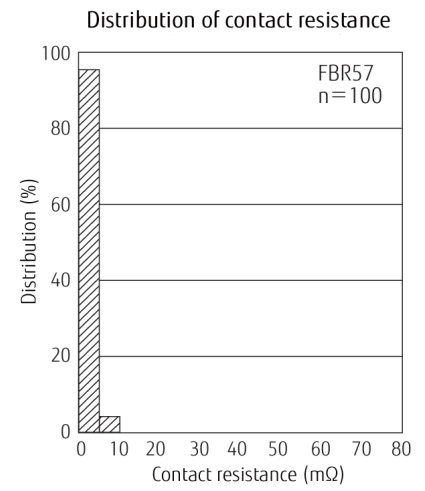
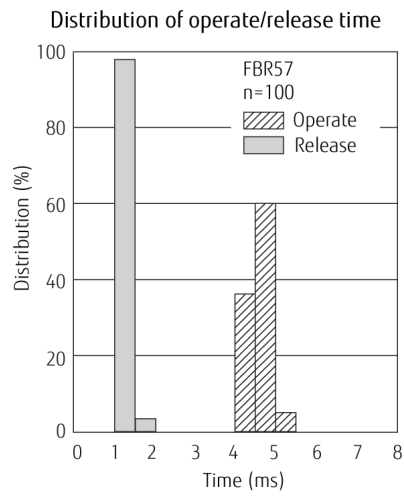
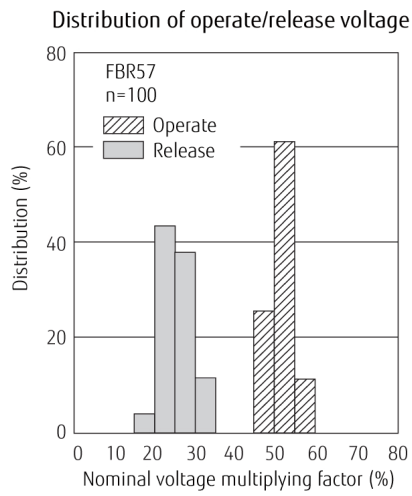


○ All directions: Min. 1,000m/s²

Shock application time: 6±1ms, half-sine wave
Test conditions: Coil energized and de-energized
Shock direction: See diagram below
Detection level: Chatter >1ms



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CAUTIONS

- All values mentioned in this datasheet are provided under ideal conditions. Please perform the confirmation test before actual use.
- Reflow soldering is prohibited.
- Do not use relays in the atmosphere with sulfide gas, chloride gas or nitric oxide. Contact resistance may increase.
- Do not use silicon or silicon-containing product or materials near relays. It may cause contact failure.

GENERAL INFORMATION

1. ROHS Compliance

- All relays produced by FCL Components are compliant with RoHS directive 2011/65/EU, including commission delegated directive 2015/863.

2. Recommended lead free solder condition

- Lead free solder plating on relay terminals is Sn-3.0Ag-0.5Cu, unless otherwise specified. This material has been verified to be compatible with PbSn assembly process.
- Recommended solder for assembly: Sn-3.0Ag-0.5Cu.

Flow Solder Condition:

Pre-Heating: Maximum 120°C within 90 sec.

Soldering: Dip within 5 sec. at 255°C±5°C solder bath

Relay must be cooled by air immediately after soldering

Solder by Soldering Iron:

Soldering Iron: 30-60W

Temperature: Maximum 350-360°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, unless otherwise indicated.

4. Tin Whiskers

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

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