COMPACT HIGH POWER RELAY

1 POLE - 30A (for automotive applications)

FBR56 Series

■ FEATURES

- High power contact capacity
  (carrying current: 40 A/10 minutes, 30 A/1 hour)
- High heat resistance and extended operating voltage
- Contact gap 0.4mm
- RoHS compliant
  Please see page 7 for more information

■ PARTNUMBER INFORMATION

[Example] FBR56 N D12 - W1 - **
(a) (b) (c) (d) (e)

(a)	Relay type	FBR56 : FBR56 Series (for 12V battery, contact gap 0.4mm)
(b)	Enclosure	Nil : Flux proof N : Plastic sealed type
(c)	Coil rated voltage	D12 : 6.....12 VDC Coil rating table at page 3
(d)	Contact material	W1 : Silver-tin oxide indium Y : Silver-tin oxide
(e)	Special type	To be assigned custom specification

Actual marking does not carry the type name: "FBR"
E.g.: Ordering code: FBR56ND12-W1 Actual marking: 56ND12-W1

■ SPECIFICATION

Item			FBR56
Contact Data	Configuration		1 form C
	Material		Silver-tin oxide indium (-W1 type) Silver-tin oxide (-Y type)
	Voltage drop (resistance)		Max.100 mV at 1A, 12VDC
	Contact rating		14VDC, 30A (locked motor load) 14 VDC, Inrush 27A, break 4A (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		16VDC (reference)
	Max. switching current		40A (reference)
	Min. switching load *		6 VDC, 1A
Life	Mechanical		Min. 10 x 10^6 operations
	Electrical		Min. 100 x 10^3 operations (locked motor load) Min. 1 x 10^6 operations (motor free load)
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
Other	Vibration resistance		10 to 55Hz double amplitude 1.5mm
	Shock	Misoperation	100m/s²
		Endurance	1,000m/s²
	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.

■ COIL RATING

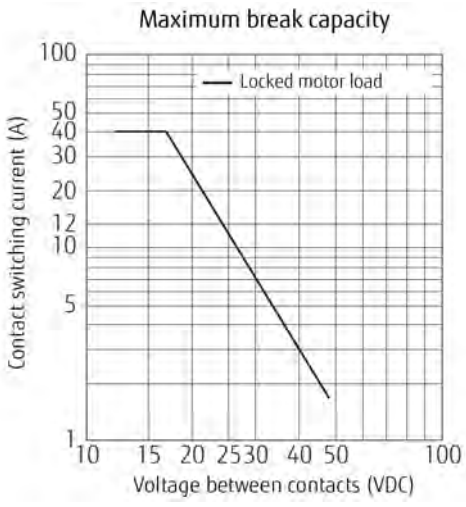
Coil Code	Rated Coil Voltage (VDC)	Coil Resistance +/- 10% (Ohm)	Must Operate Voltage (VDC) *	Must Release Voltage (VDC) *
D06	6	42	3.6 (at 20 °C)	0.5 (at 20 °C)
			4.5 (at 85 °C)	0.6 (at 85 °C)
D09	9	95	5.4 (at 20 °C)	0.7 (at 20 °C)
			6.8 (at 85 °C)	0.8 (at 85 °C)
D12	12	170	7.3 (at 20 °C)	1 (at 20 °C)
			9.2 (at 85 °C)	1.2 (at 85 °C)

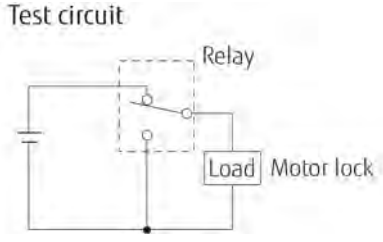
Note: All values in the table are valid for 20°C and zero contact current, unless otherwise stated.
* Specified operate values are valid for pulse wave voltage.

■ PRINCIPAL APPLICATIONS

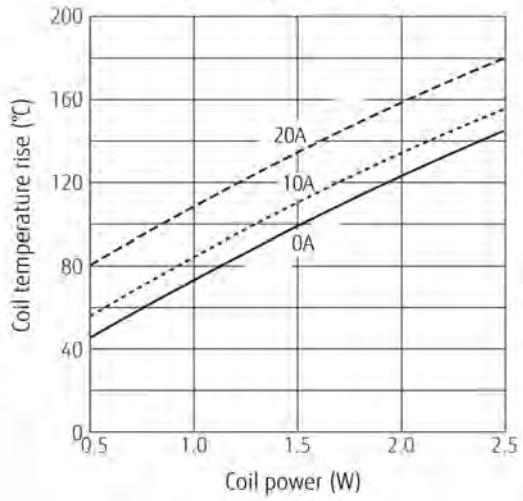
Application		Normal load current	Life x 10^3	Recommended model (Example)
For 12V battery	Power windows	20A tot 30A (switching at motor locking)	100	FBR56N ( ) -Y
	Automatic door lock	18A to 30A / 4 to 5 door (switching at motor locking)	100	FBR56N ( ) - Y
	Intermittent wipers	Inrush 15A to 30A Break 2A to 8A (motor free)	300	FBR56N ( ) - W1
	Tilt-lock wheel	Inrush 15A Break 2.5A (motor free)	100	FBR56N ( ) - Y
	Sunroof	20A to 30A (switching at motor locking)	100	FBR56N ( ) - Y
	Others	Car audio system, etc.	-	FBR56N ( ) - Y

■ CHARACTERISTIC DATA

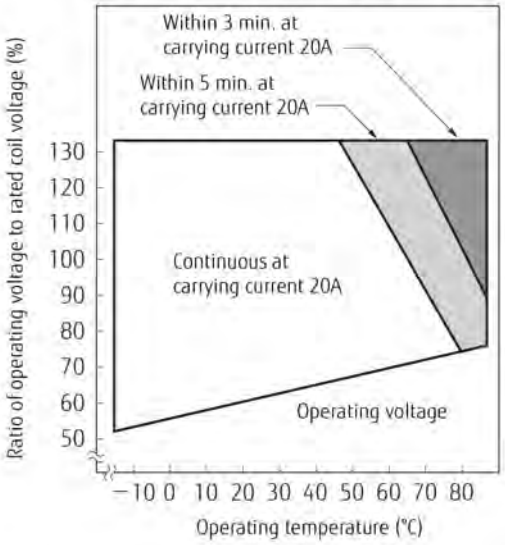




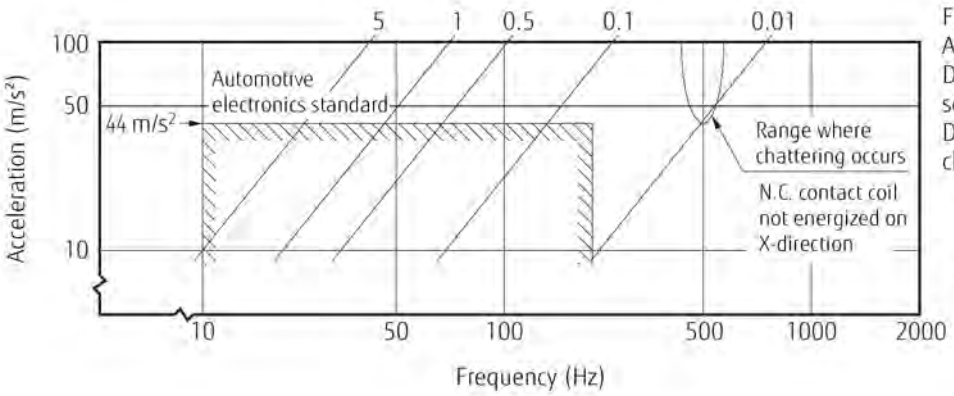
Coil temperature rise



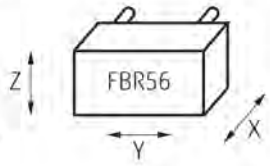
Operating coil voltage range (example)



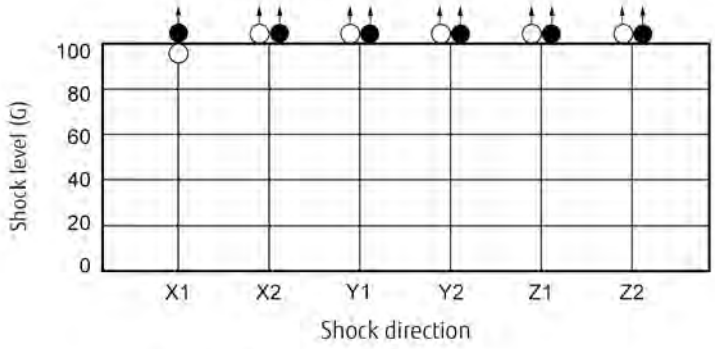
Vibration resistance characteristics



Frequency: 10~2000 Hz
Acceleration: 100 m/s² max.
Direction of vibration; see diagram below
Detection level: chatter > 100 μs



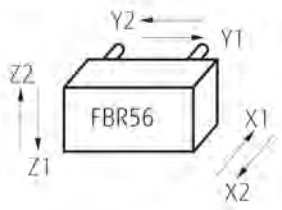
Shock resistance characteristics



All directions ≥ 1,000 m/s²

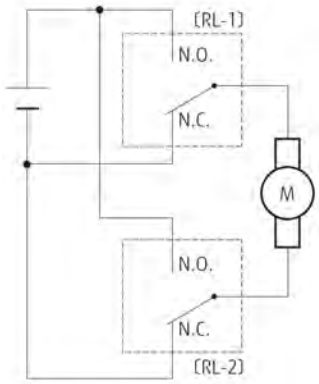
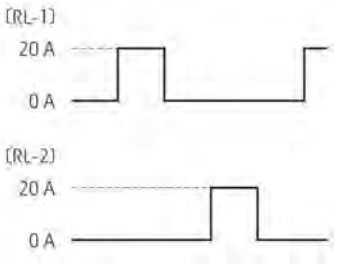
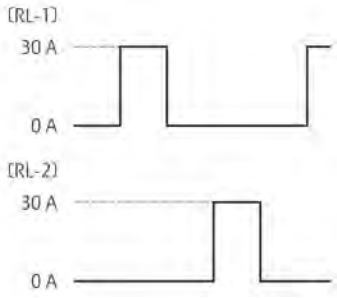
Shock application time: 11ms, half-sine wave
Test condition: coil energized and de-energized
Shock direction: see diagram below
Detection level: chatter > 100 μs

○ : N.C. contact (coil de-energized)
● : N.O. contact (coil energized)

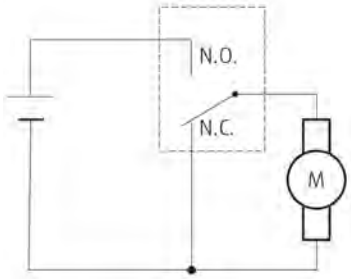
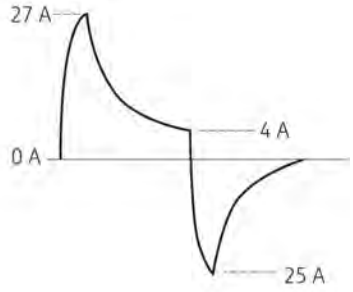


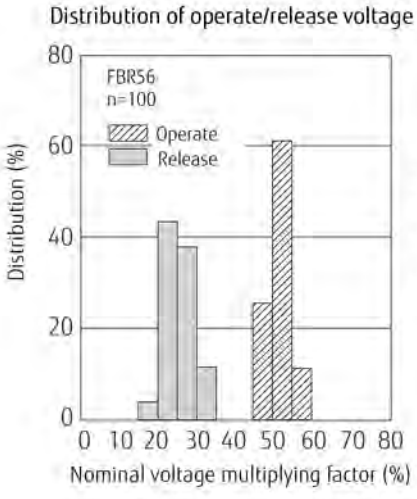
Life test (example)

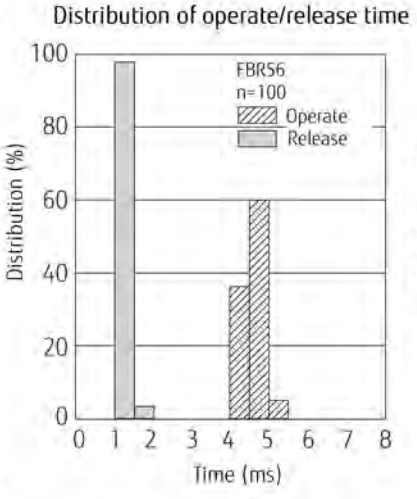
(1) Motor lock

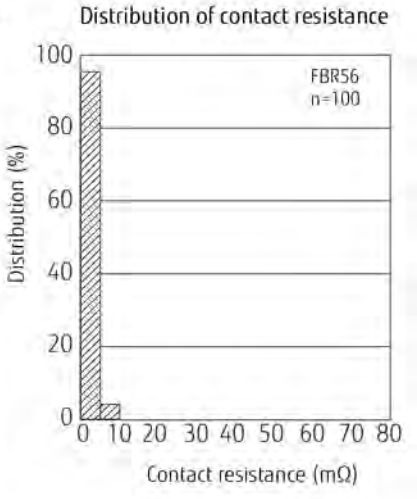
Test item	Test circuit	Current wave form
20A, 14VDC Motor lock 200,000 operations minimun Contact material: Silver tin oxide indium		
30A, 14VDC Motor lock 100,000 operations minimum Contact material: Silver tin oxide indium		

(2) Motor free

Test item	Test circuit	Current wave form
Inrush 27A, Idle 4A 14VDC Motor free 100,000 operations minimum Contact material: Silver tin oxide indium		

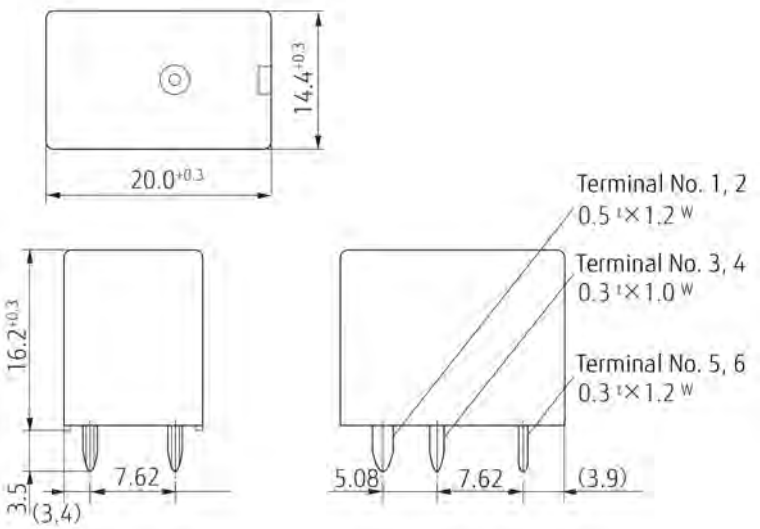




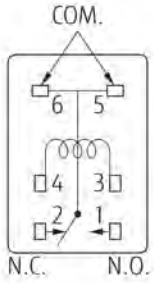


■ DIMENSIONS

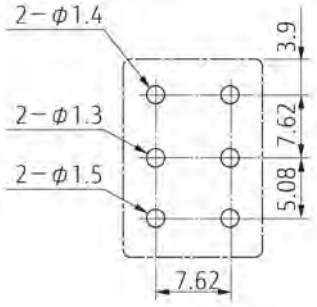
■ Dimensions



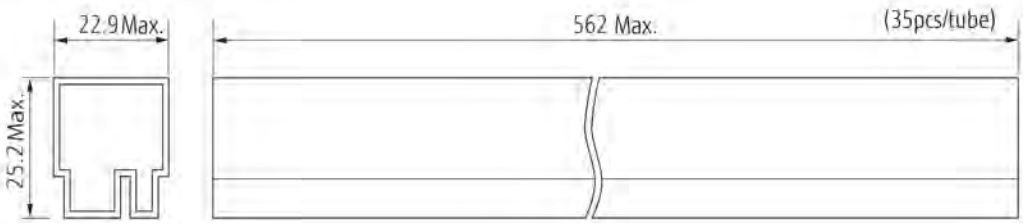
● Schematics
(BOTTOM VIEW)



● PC board mounting hole layout
(BOTTOM VIEW)



● Tube carrier



Unit: mm

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 340-360˚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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