

COMPACT HIGH POWER RELAY

1 POLE – 25A (For automotive applications)

FBR51 Latching Series

■ FEATURES

- Magnetically latched PCB relay
- Increased ambient temperature range up to 125°C
- Two coils with set and reset function
- Reflow soldering capable
- Two types of contact materials
- RoHS compliant



■ PARTNUMBER INFORMATION

[Example] $\frac{\text{FBR51}}{\text{(a)}} \quad \frac{\text{N}}{\text{(b)}} \quad \frac{\text{L}}{\text{(c)}} \quad \frac{\text{2}}{\text{(d)}} \quad \frac{\text{10}}{\text{(e)}} \quad \frac{\text{- W1}}{\text{(f)}} \quad \frac{\text{- RW}}{\text{(g)}}$

(a)	Relay type	FBR51	: FBR51 Series
(b)	Enclosure	N	: Plastic sealed type
(c)	Operating function	L	: Latching type
(d)	Coil type	2	: Double coil
(e)	Coil rated voltage	10	: 10VDC
(f)	Contact material	W1 E	: AgSnO ₂ In : AgNi
(g)	Mounting process	Nil RW	: Standard : Through hole reflow (THR)

* E (AgNi) versions used for special low current applications that require lower contact resistance (dark current applications)

Actual markings does not carry the type name: "FBR"

E.g.: Ordering code: FBR51NL210-W1-RW Actual marking: 51NL210-W1-RW

FBR51 Latching Series

■ SPECIFICATIONS

Item		FBR51		Remarks/Conditions
		W1 contact	E contact	
Contact data	Configuration	1 form C		
	Material	AgSnO ₂ In	AgNi	
	Voltage drop	Max. 100 mV at 1A, 12VDC	Max. 100 mV at 2A, 12VDC	
	Contact rating	25A at 14VDC		Locked motor load
	Max. carrying current	30A / 1 hour		25°C, 100% rated coil voltage
	Max. switching voltage	16VDC		Reference
	Max. switching current	35A		Reference
	Min. switching load *	1A 6VDC	0.1A 5VDC	Reference
Coil	Operating ambient temperature range	-40°C to +125°C		No frost
Timing data	Set / reset	Max. 5 ms (without bounce)		At nominal voltage
Life	Mechanical	Min. 1 x 10 ⁶ operations		
	Electrical	Min. 200 x 10 ³ operations 14VDC 25A (Locked motor load)	Min. 50 x 10 ³ operations, 14VDC 25A (Locked motor load)	
Insulation **	Insulation resistance		Min. 100MΩ at 500VDC	
	Dielectric withstanding voltage	Open contacts	500VAC (50/60Hz), 1 minute	
		Coil contact	500VAC (50/60Hz), 1 minute	
Others	Vibration resistance	Misoperation	10 to 200Hz, acceleration 44m/s ² (4.5G) maximum	
		Endurance	10 to 200Hz, acceleration 44m/s ² (4.5G) maximum	
	Shock resistance	Misoperation	100m/s ² (11 ± 1ms)	
		Endurance	1,000m/s ² (6 ± 1ms)	
	Sealing		Plastic sealed RT III	
	Dimensions / weight		12.1 x 15.5 x 13.7 mm / approx. 6g	

* : 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.

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.

** : Values of insulation are under 20°C ± 15°C, 65 ± 20%.

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■ COIL DATA

Coil Code	Coil Resistance ± 10% (Ω)	Set Voltage* (VDC)	Reset Voltage* (VDC)
10	P90	+6.3 (20°C) +8.9(125°C)	-
	S90	-	+6.3 (20°C) +8.9(125°C)

P: Set coil
S: Reset coil

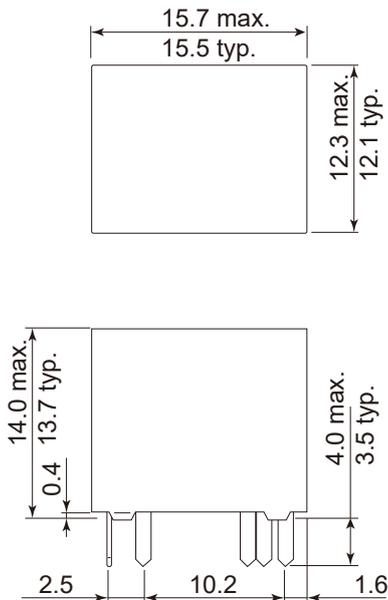
Note: All values in the table are valid at 20°C and zero contact current, unless otherwise specified.

*: Specified operate values are valid for pulse wave voltage.

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

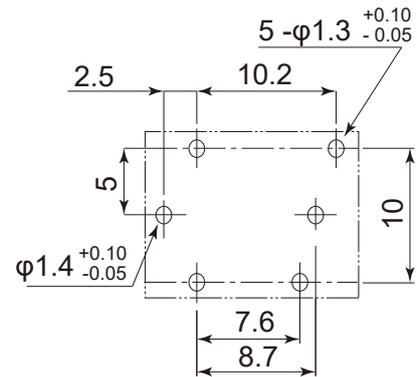
■ DIMENSIONS

● Dimensions



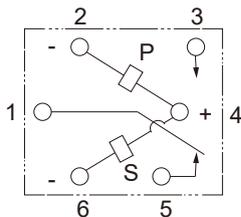
Dimensions of the terminals do not include thickness of pre-solder.

● PC Board Mounting Hole Layout (Bottom view)



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

● Schematics (Bottom view)



Schematic above is in reset condition.

Coil polarity: Please see right.

■ COIL POLARITY

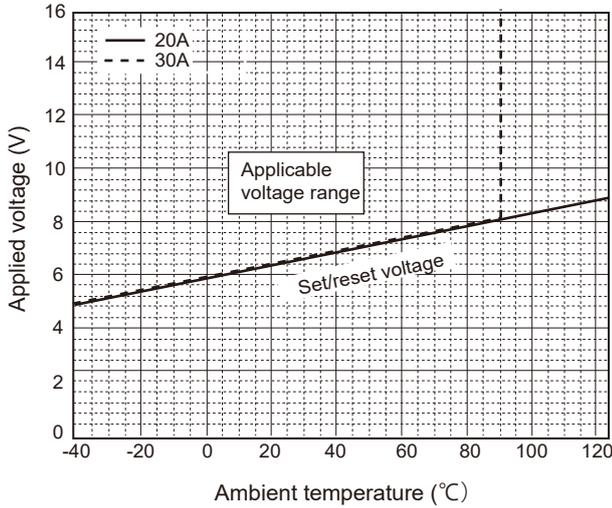
Terminal Number	2	4	6
Set	-	+	
Reset		+	-

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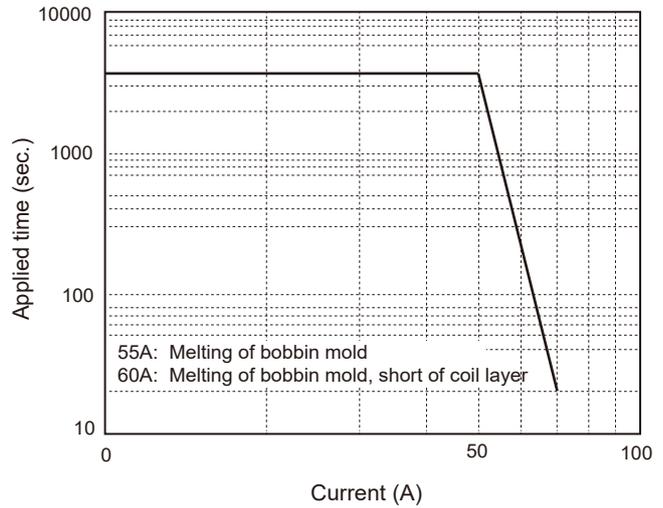
CHARACTERISTIC DATA (Reference)

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

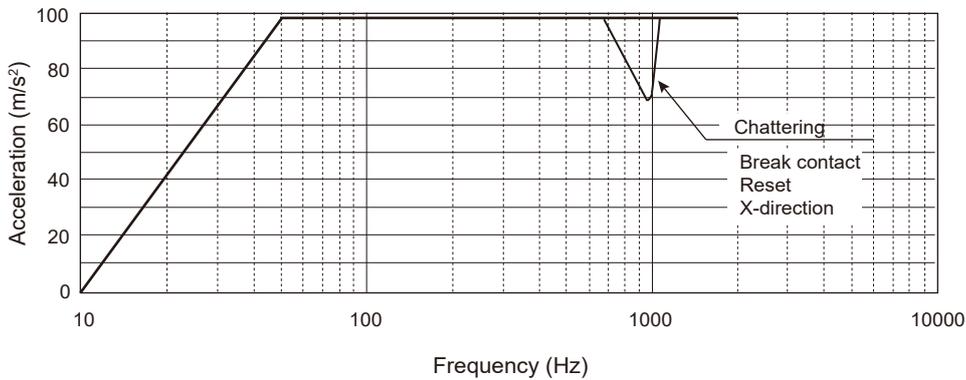
Operating range



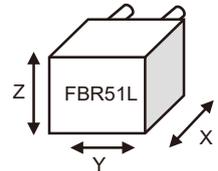
Contact current capacity



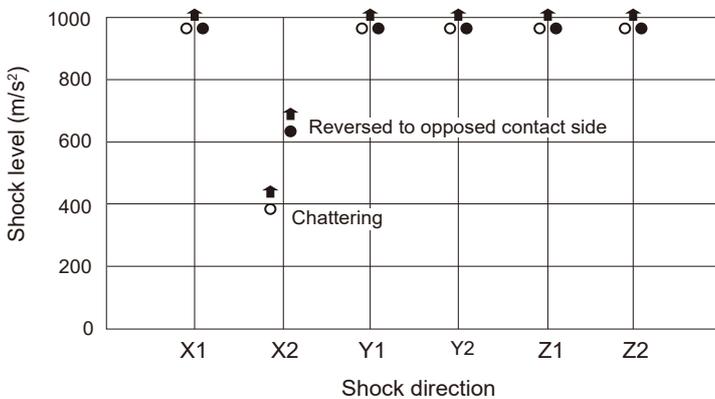
Vibration resistance characteristics



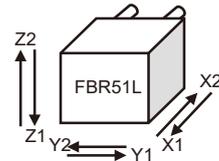
Frequency: 10 to 2000Hz
 Acceleration: 98m/s² max.
 Shock direction: See diagram below
 Detection level: Chatter > 1ms



Shock resistance characteristics



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



● : Reversed from reset to set
 ○ : Break contact (reset)
 Make contact: Min. 980m/s² at all directions

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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 not available with standard type.
- 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.

Notes for latching relays

- Latching relays are shipped in the state set, but state may change due to shock during transportation or mounting. Before using the relays, it is advisable to bring the relays in necessary state (set or reset) and program a circuit sequence. Otherwise, it will or will not operate simultaneously with power activation.
- Please connect relay coils according to specified polarity.
- Do not apply voltage to both set coil and reset coil at a time.

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

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

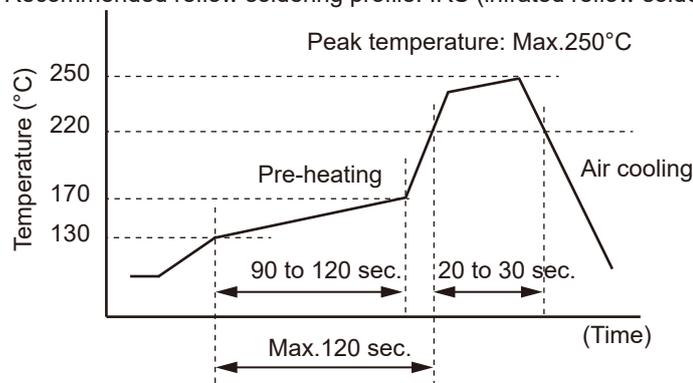
Temperature: Maximum 350-360°C

Duration: Maximum 3 sec.

Reflow Solder Condition:

(Applicable only for reflow capable type)

Recommended reflow soldering profile: IRS (infrared reflow soldering)



Important notes for reflow soldering

- Temperature shall be measured at PC board upper surface.
- Temperature at PC board upper surface may be changed depending on size of PC board, components mounted on the PC board and/or heating method. Please perform the confirmation test with actual PC board.
- This reflow condition is applicable only for reflow-capable relays. Do not reflow reflow-incapable relays.
- Recommended solder for assembly: Sn-3.0 Ag -0.5 Cu.

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.

Contact

Japan

FCL COMPONENTS LIMITED
Shinagawa Seaside Park Tower
12-4, Higashi-shinagawa 4-chome,
Tokyo 140 0002, Japan
Tel: +81-3-3450-1682
Email: fcl-contact@cs.fcl-components.com

North and South America

FCL COMPONENTS AMERICA, INC.
2055 Gateway Place Suite 480,
San Jose, CA 95110 USA
Tel: +1-408-745-4900
Email: fcai.components@fcl-components.com

Europe

FCL COMPONENTS EUROPE B.V.
Diamantlaan 25
2132 WV Hoofddorp, Netherlands
Tel: +31-23-556-0910
Email: info.fceu@cs.fcl-components.com

Asia Pacific

FCL COMPONENTS ASIA PTE LTD.
No. 20 Harbour Drive, #07-01B
Singapore 117612
Tel: +65-6375-8560
Email: fcal@fcl-components.com

China

FCL COMPONENTS (SHANGHAI) CO., LTD.
Unit 1105, Central Park - Jing An,
No.329 Heng Feng Road, Shanghai 200070,
China
Tel: +86-21-3253 0998
Email: fcsh@fcl-components.com

Web: www.fcl-components.com/en/

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