

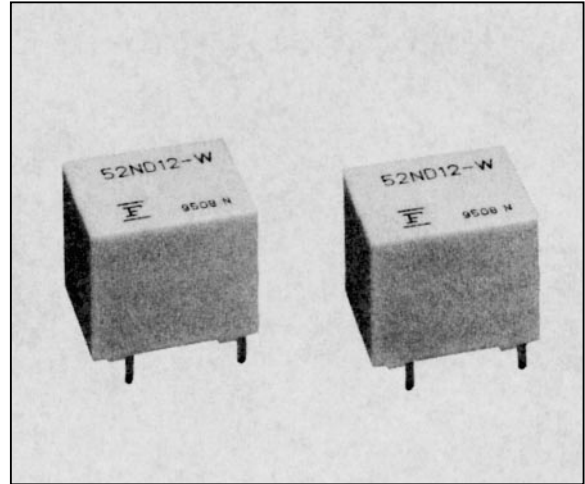
COMPACT POWER RELAY

1 POLE-20 A (FOR AUTOMOTIVE APPLICATIONS)

FBR51, 52 SERIES

■ FEATURES

- Compact, Lightweight structure
(42% the volume as compared with FBR160 relay)
- High current contact capacity
(carrying current: 35 A/10 min, 25 A/1 Hr)
- High resistance to vibration and shock
- Improved Heat Resistance and Extended Operation Range
- Two types of contact gap
(FBR51: 0.3 mm, FBR52: 0.6 mm)



■ ORDERING INFORMATION

[Example] $\frac{\text{FBR51}}{\text{(a)}} \frac{\text{N}}{\text{(b)}} \frac{\text{D12}}{\text{(c)}} - \frac{\text{W}}{\text{(d)}} \frac{\text{**}}{\text{(e)}}$

(a)	Series Name	FBR51 : Standard Type (Contact Gap 0.3 mm) FBR52 : Wider Contact Gap Type (Contact Gap 0.6 mm)
(b)	Enclosure	N : Plastic Sealed Type
(c)	Nominal Voltage	D06 : 6 VDC D09 : 9 VDC D10 : 10 VDC D12 : 12 VDC
(d)	Contact Material	W : Silver-Tin oxide indium N : Silver copper nickel
(e)	Custom Designation	To be assigned custom specification

■ SPECIFICATIONS

Item		Specifications	
Contact	Arrangement	1 Form C (SPDT)	
	Material	Silver-Tin oxide indium (-W Type) Silver copper nickel (-N Type)	
	Voltage Drop (Resistance)	Max. 100 mV (at 2 A 12 VDC)	
	Rating	14 VDC 20 A (Locked Motor Load) 14 VDC Inrush 20 A, Break 4 A (Motor Free Load)	
	Max. Carrying Current	35 A/10 min. 25 A/ 1 Hr. (25°C, Nominal Voltage)	
	Max. Inrush Current (Reference)	-W Type: 60 A -N Type: 40 A	
	Max. Switching Current (Reference)	35 A 16 VDC	
	Min. Switching Load*1 (Reference)	6 VDC 1 A	
Coil	Operating Temperature Range	-30°C~+85°C (No frost) (Refer to the CHARACTERISTIC DATA)	
	Storage Temperature Range	-40°C~+100°C (No frost)	
Time Value	Operate (at nominal voltage)	Max. 10 ms	
	Release (at nominal voltage)	Max. 5 ms	
Life	Mechanical	10 × 10 ⁶ ops. min.	
	Electrical	200 × 10 ³ ops. min. (Locked Motor Load) 400 × 10 ³ ops. min. (Motor Free Load)	
Other	Vibration Resistance	10 to 55 Hz (double amplitude of 1.5 mm)	
	Shock Resistance	Misoperation	100 m/s ² (11 ± ¹ ms)
		Endurance	1,000 m/s ² (11 ± ¹ ms)
	Unit Mass	Approx. 6 g	

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

FBR51,52 SERIES

■ COIL DATA CHART

1. FBR51 Series

MODEL		Nominal Voltage	Coil resistance (±10%) (at 20°C)	Must Operate Voltage	Thermal Resistance
W contact	N contact				
FBR51ND06-W	FBR51ND06-N	6 VDC	60 Ω	3.6 VDC (at 20°C) 4.5 VDC (at 85°C)	73°C/W
FBR51ND09-W	FBR51ND09-N	9 VDC	135 Ω	5.4 VDC (at 20°C) 6.8 VDC (at 85°C)	
FBR51ND10-W	FBR51ND10-N	10 VDC	180 Ω	6.3 VDC (at 20°C) 7.9 VDC (at 85°C)	
FBR51ND12-W	FBR51ND12-N	12 VDC	240 Ω	7.3 VDC (at 20°C) 9.0 VDC (at 85°C)	

2. FBR52 Series

MODEL		Nominal Voltage	Coil resistance (±10%) (at 20°C)	Must Operate Voltage	Thermal Resistance
W contact	N contact				
FBR52ND06-W	FBR52ND06-N	6 VDC	45 Ω	3.6 VDC (at 20°C) 4.5 VDC (at 85°C)	65°C/W
FBR52ND09-W	FBR52ND09-N	9 VDC	100 Ω	5.4 VDC (at 20°C) 6.8 VDC (at 85°C)	
FBR52ND10-W	FBR52ND10-N	10 VDC	135 Ω	6.3 VDC (at 20°C) 7.9 VDC (at 85°C)	
FBR52ND12-W	FBR52ND12-N	12 VDC	180 Ω	7.3 VDC (at 20°C) 9.0 VDC (at 85°C)	

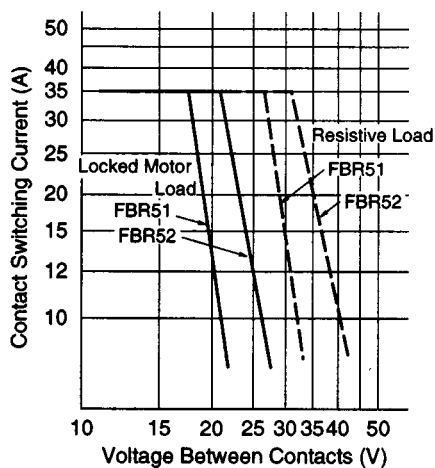
■ SUITABLE APPLICATION

Application	Normal Load Current (12 VDC System)	Description	Recommendable Model (Example)	
			For 16 V or less motor load voltage	For instantaneous 20 V or more load voltage
Power Winows	20 to 25 A (switching at motor locking)	Forward and Reverse Motor Control	FBR51N□ -W	FBR52N□ -W
Automatic Door Lock	18 to 25 A (switching at motor locking)	Forward and Reverse Motor Control	FBR51N□ -W	FBR52N□ -W
Intermittent Wipers	15 to 30 A Break 2 to 8 A (motor-free)	Forward Only	FBR51N□ -N	FBR52N□ -N
Tilt-Lock Wheel	20 A (switching at motor locking)	Forward and Reverse Motor Control	FBR51N□ -W	FBR52N□ -W
Sunroof	20 to 30 A (switching at motor locking)	Forward and Reverse Motor Control	FBR51N□ -W	FBR52N□ -W
Adjustable Door Mirror	3 to 5 A (switching at motor locking)	Forward and Reverse Motor Control	FBR51N□ -W	
Automatic Antenna	8 to 12 A (INRUSH) Break 2 A Max. (motor-free)	Forward and Reverse Motor Control	FBR51N□ -W	
Auto-Cruise	2 to 3 A	Power Shutoff and Solenoid	FBR51N□ -W	
Others	Car Audio System, etc.			

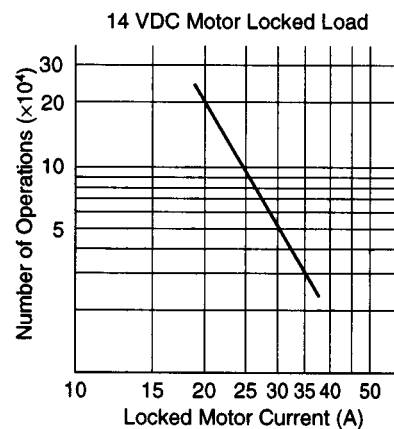
- For the load condition where higher voltage would be encountered during contact break, FBR52 series with wider contact gap is recommended.
- -N contact type is recommended for applications which require long durability and -W contact type is for high inrush current load applications.

■ CHARACTERISTIC DATA

1. MAXIMUM BREAK CAPACITY



2. LIFE

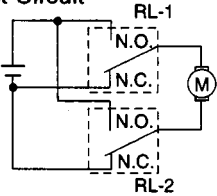


FBR51,52 SERIES

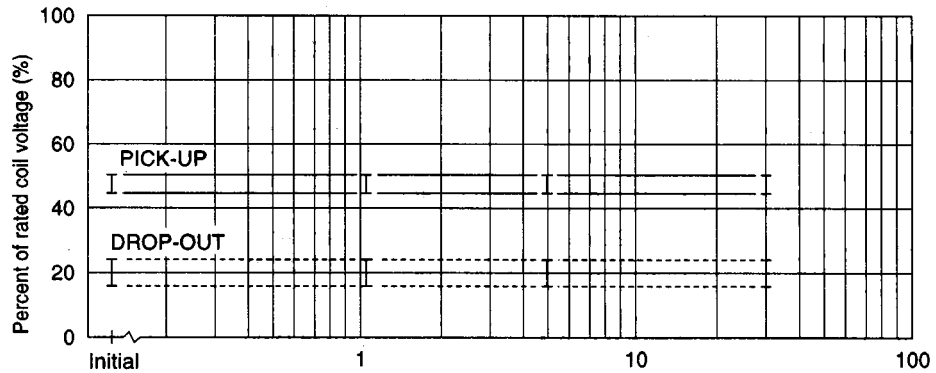
3. LIFE TEST (EXAMPLE)

- Test Item
14 V DC-20 A
Motor Lock
200,000 ops,MIN.
(FBR52□-W type)

• Test Circuit

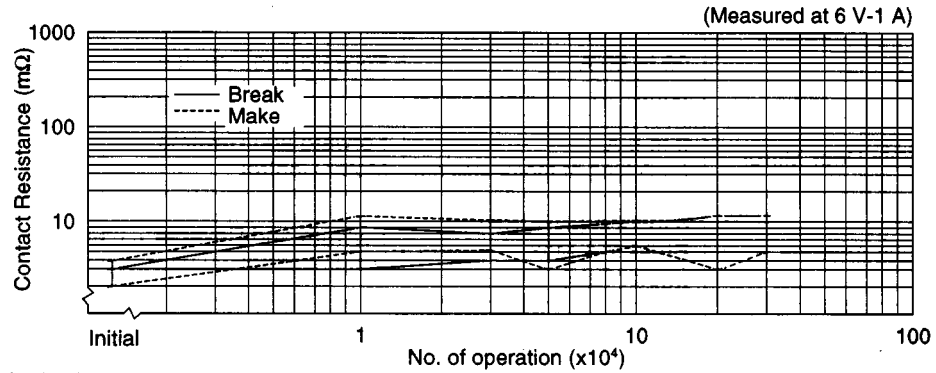
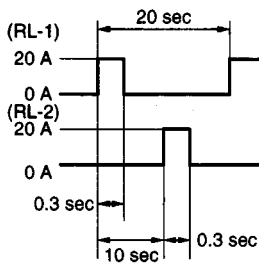


• Shift of Pick-up Drop-out Voltage



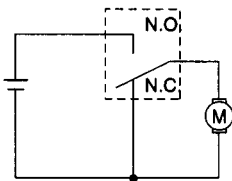
• Shift of Contact Resistance

• Current Wave Form

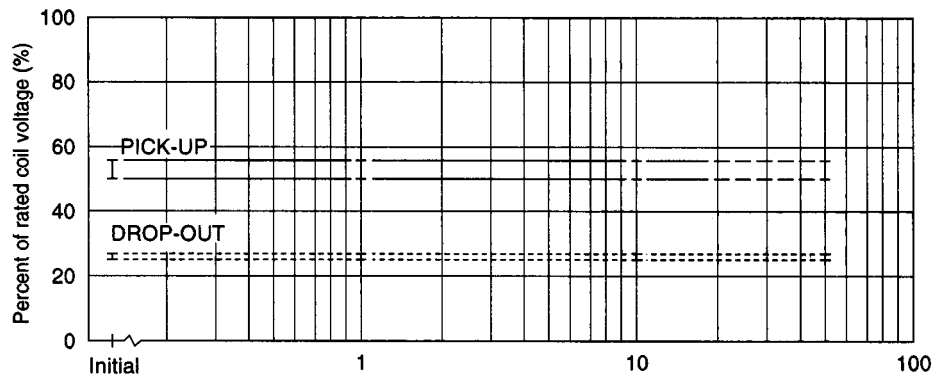


- Test Item
14 V DC-20 A
Motor Free
400,000 ops,MIN.
(FBR51□-W type)

• Test Circuit

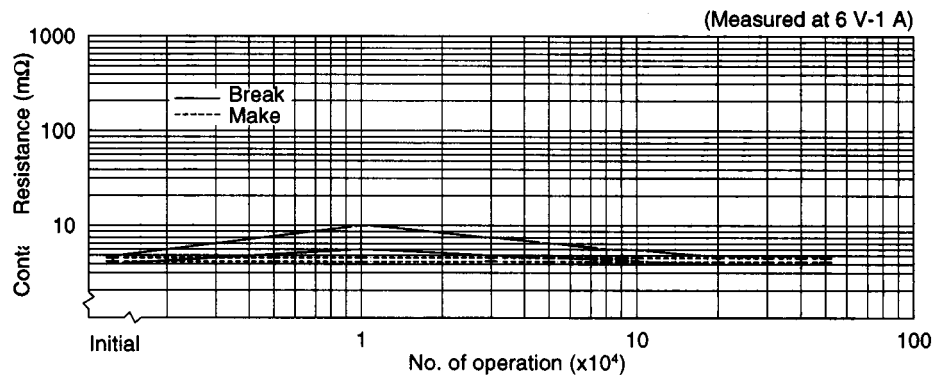
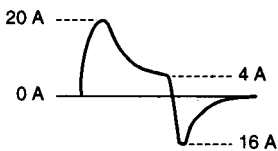


• Shift of Pick-up Drop-out Voltage



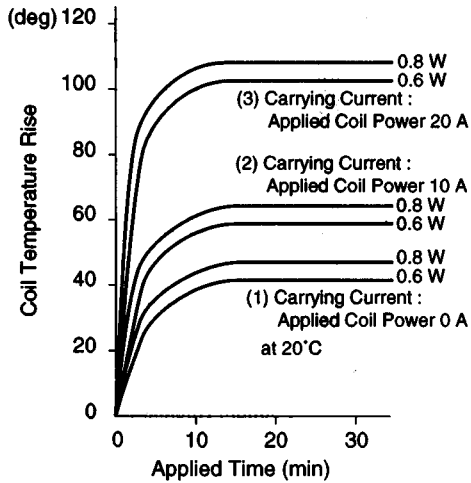
• Shift of Contact Resistance

• Current Wave Form

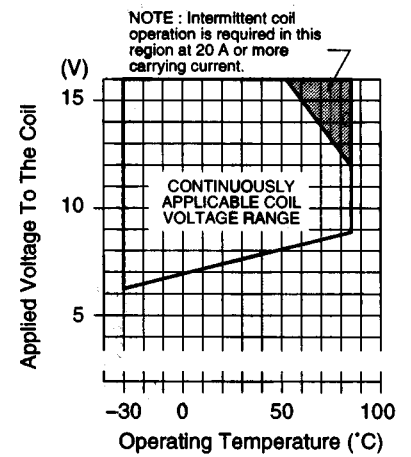
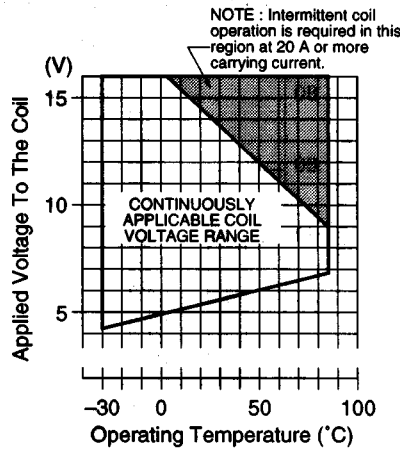


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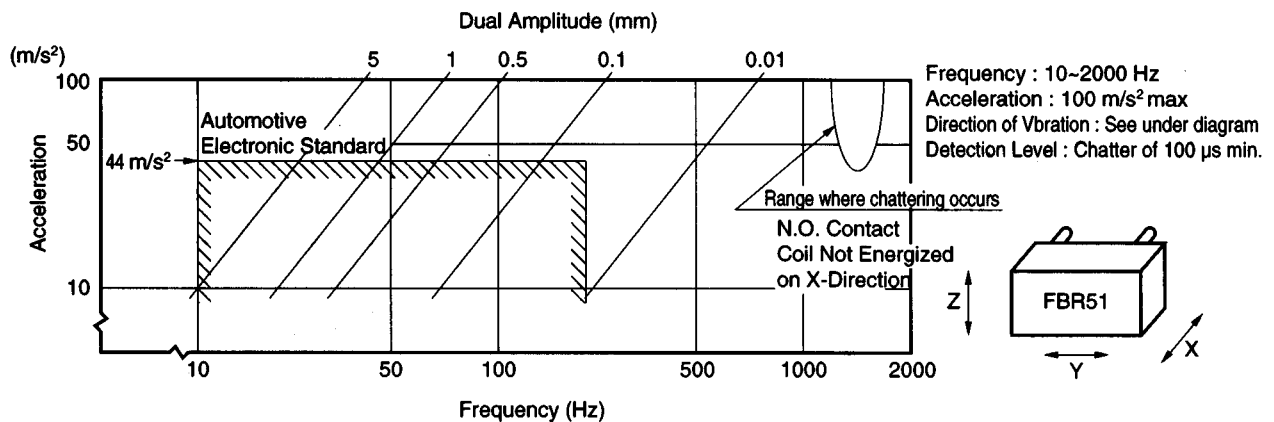
4. COIL TEMPERATURE RISE



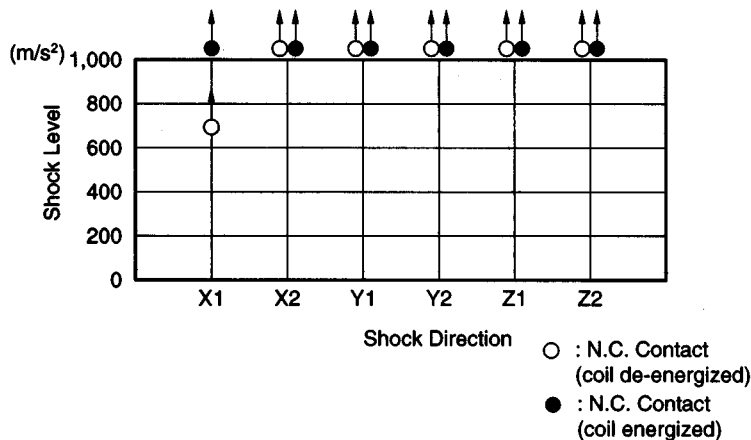
5. OPERATING COIL VOLTAGE RANGE (EXAMPLE)



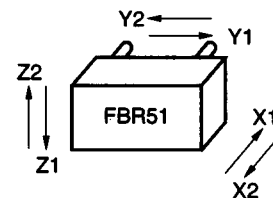
6. VIBRATION RESISTANCE CHARACTERISTICS



7. SHOCK RESISTANCE CHARACTERISTICS

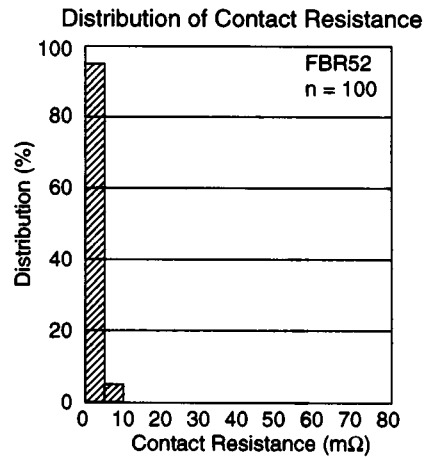
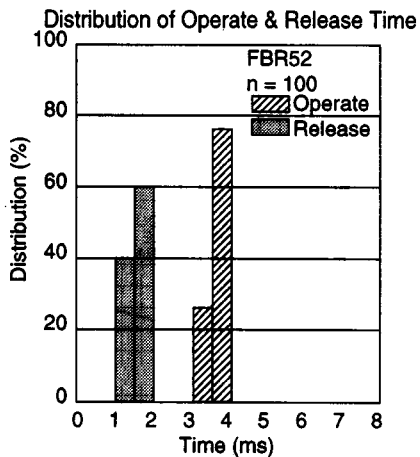
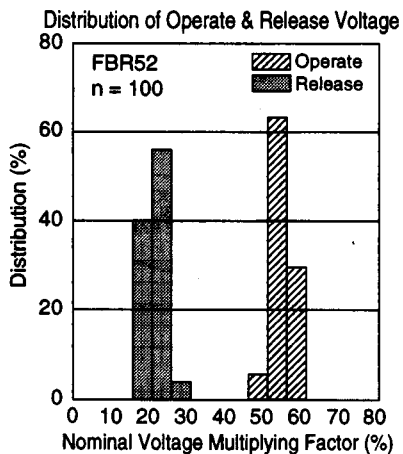


Shock Application Time : 11 ms, Half-Sine Wave
Test Material : Coil, Energized and De-Energized
Shock Direction : Set under diagram
Detection Level : Chatter of 100 μ s min.



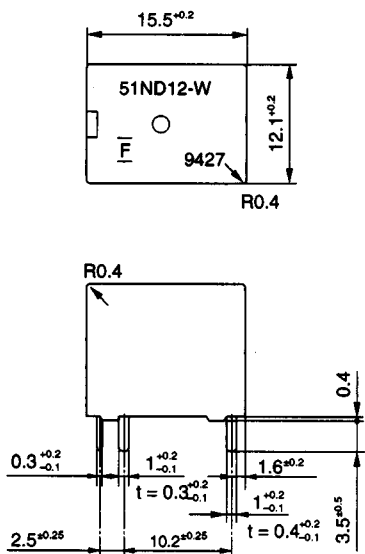
FBR51,52 SERIES

REFERENCE DATA

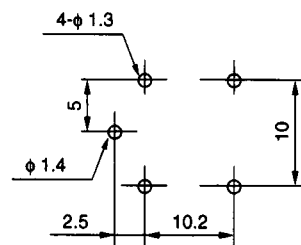


DIMENSIONS

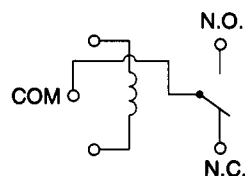
Dimensions



PC board mounting hole layout (BOTTOM VIEW)



Schematics (BOTTOM VIEW)



Tube carrier

