

FBR 51, 52 SERIES

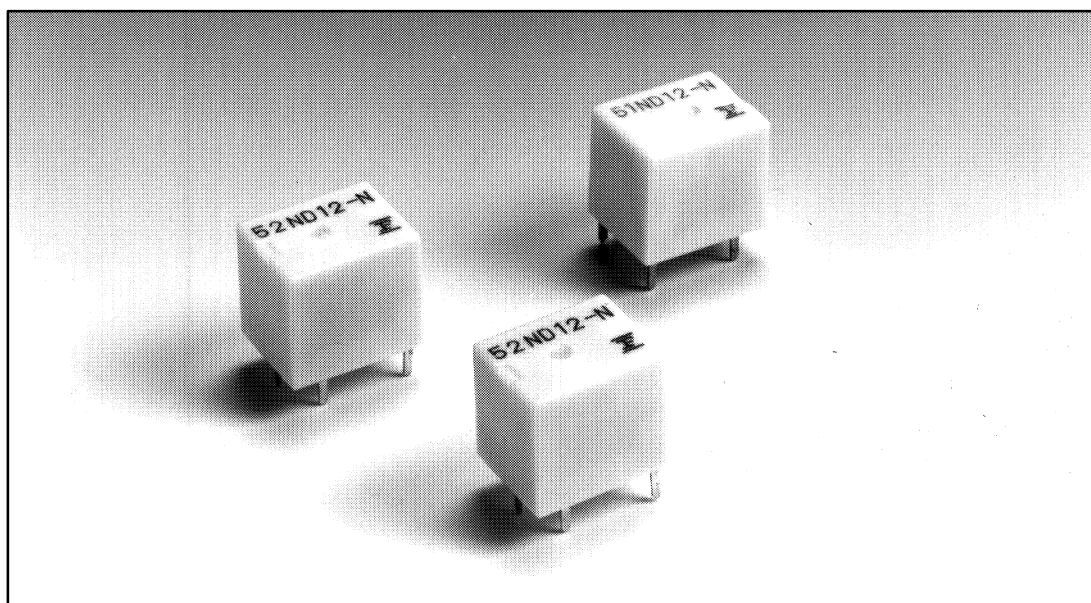
COMPACT POWER RELAY

FOR AUTOMOTIVE APPLICATIONS

Fujitsu's new compact relays offer a tremendous weight and space savings, providing an increased current handling capacity.

FEATURES

- Compact, Lightweight structure (42% the volume as compared with FBR160 relay)
- High current contact capacity (carrying current: 35A/2min, 25A/1Hr)
- High resistance to vibration and shock
- Improved Heat Resistance and Extended Operating Range
- Two types of contact gap (FBR51: 0.3 mm, FBR52: 0.6 mm)



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SPECIFICATIONS

Item	Specification
Contact Arrangement	1 form C
Contact Material	Silver-Tin oxide indium (–W type) Silver copper nickel (–N type)
Contact Voltage Drop (Contact Resistance)	100 mV Max. at 12 VDC–2 A
Vibration	No Contact Opening, No Damage: 10 G, 10 to 55Hz 1.5 mm double amplitude
Shock	No Contact Opening : 10 G Min. No Damage : 100 G Min.
Operate Time	10 ms Max. (excluding bounce time)
Release Time	5 ms Max. (excluding bounce time)
Operating Temperature Range	–40°C to +85°C
Storage Temperature Range	–40°C to +100°C
Mechanical Life	10 x 10 ⁶ Operations Minimum @ 5 Hz
Weight	6.0 Grams (approx.)

CONTACT CAPACITIES

Item	Specification
Contact Rating	14 VDC–20 A (LOCKED MOTOR LOAD) 14 VDC–INRUSH 20 A, BREAK 4 A (MOTOR FREE LOAD)
Maximum Carrying Current	35 A/2 min, 25A/1Hr (@ 25°C, 100% Rated Coil Voltage)
Maximum Inrush Current (Reference)	–W type : 60 A –N type : 40 A
Maximum Break Current	35 A at 16 VDC
Minimum Applicable Load (Reference)	–W type : 6 V, 1 A –N type : 6 V, 2 A

COIL RATINGS

Item		Specification			
FBR51	Rated Coil Voltage	6 VDC	9 VDC	10 VDC	12 VDC
	Coil Resistance (20 °C)	60 Ω	135 Ω	180 Ω	240 Ω
	Pick-Up Voltage (20 °C) (85 °C)	3.6 V max 4.5 V max	5.4 V max 6.8 V max	6.3 V max 7.9 V max	7.3 V max 9.2 V max
	Drop-Out Voltage (20 °C) (85 °C)	0.5 V min 0.6 V min	0.7 V min 0.8 V min	0.8 V min 0.9 V min	1.0 V min 1.2 V min
	Thermal Resistance	86°C/W			
FBR52	Rated Coil Voltage	6 VDC	9 VDC	10 VDC	12 VDC
	Coil Resistance (20 °C)	45 Ω	100 Ω	135 Ω	180 Ω
	Pick-Up Voltage (20 °C) (85 °C)	3.6 V max 4.5 V max	5.4 V max 6.8 V max	6.3 V max 7.9 V max	7.3 V max 9.2 V max
	Drop-Out Voltage (20 °C) (85 °C)	0.5 V min 0.6 V min	0.7 V min 0.8 V min	0.8 V min 0.9 V min	1.0 V min 1.2 V min
	Thermal Resistance	78°C/W			

ORDERING INFORMATION

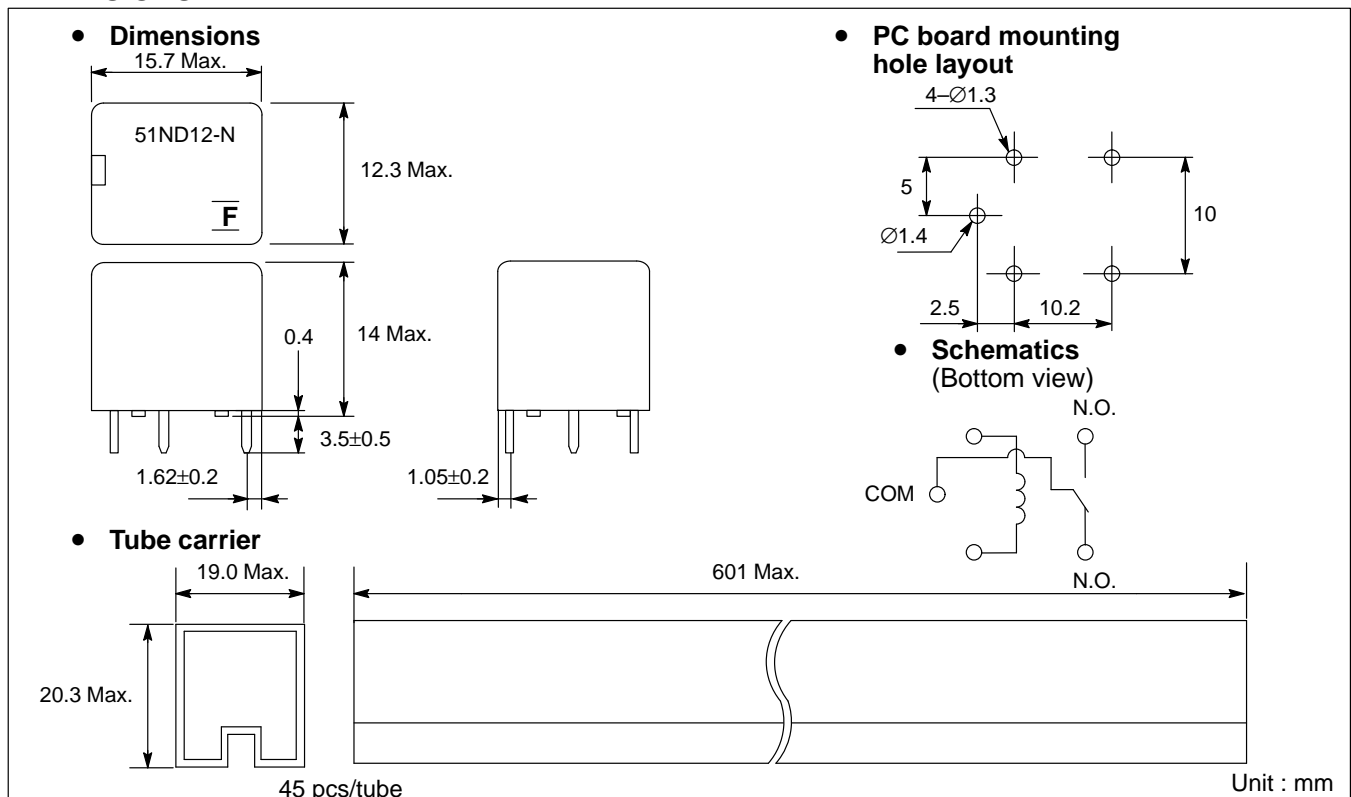
[Example] $\frac{\text{FBR51}}{\text{(a)}} \frac{\text{N}}{\text{(b)}} \frac{\text{D12}}{\text{(c)}} - \frac{\text{W}}{\text{(d)}} \frac{\square}{\text{(e)}}$

(a)	Series Name	FBR51 : Standard Type (Contact Gap 0.3 mm) FBR52 : Wider Contact Gap Type (Contact Gap 0.6 mm)
(b)	Structure	N : For Automated Soldering + Immersion Cleaning (sealed case)
(c)	Rated Coil Voltage	ND06 : 6 VDC ND09 : 9 VDC ND10 : 10 VDC ND12 : 12 VDC
(d)	Contact Material	-W : Silver-Tin oxide indium -N : Silver copper nickel
(e)	Custom Designation	To be assigned custom specification

PART NUMBER LIST

Series Name	Rated Coil Voltage (VDC)	Contact Material	
		W-Type	N-Type
FBR51 Series (Contact Gap 0.3 mm)	6	FBR51ND06-W	FBR51ND06-N
	9	FBR51ND09-W	FBR51ND09-N
	10	FBR51ND10-W	FBR51ND10-N
	12	FBR51ND12-W	FBR51ND12-N
FBR52 Series (Contact Gap 0.6 mm)	6	FBR52ND06-W	FBR52ND06-N
	9	FBR52ND09-W	FBR52ND09-N
	10	FBR52ND10-W	FBR52ND10-N
	12	FBR52ND12-W	FBR52ND12-N

DIMENSIONS



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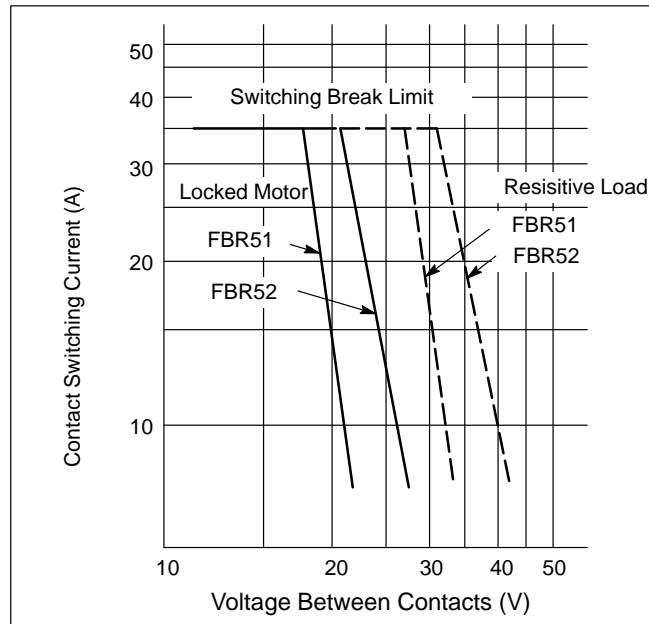
PRINCIPAL APPLICATIONS

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

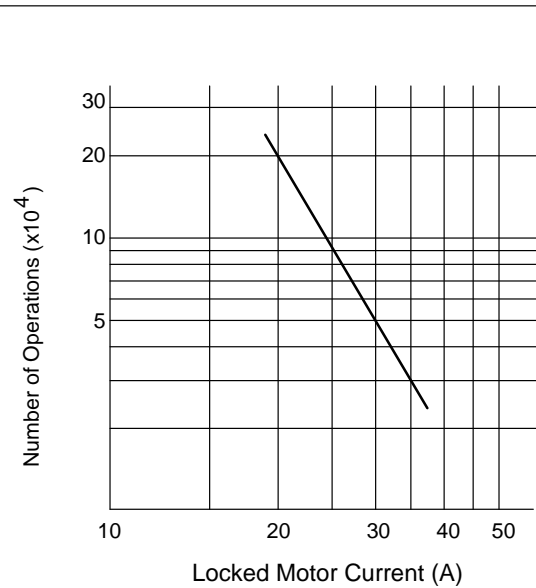
- For the load condition where higher voltage would be encountered during contact break, FBR52 series with wider contact gap is recommended.
- N contact type is recommended for applications which require long durability and –W contact type is for high inrush current load applications.

DATA

(1) MAXIMUM BREAK CAPACITY



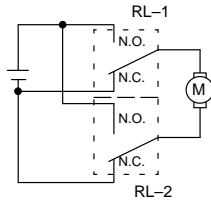
(2) LIFE



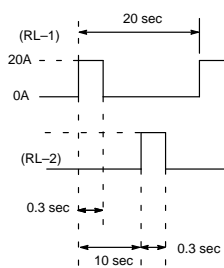
(3) LIFE TEST (EXAMPLE)

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

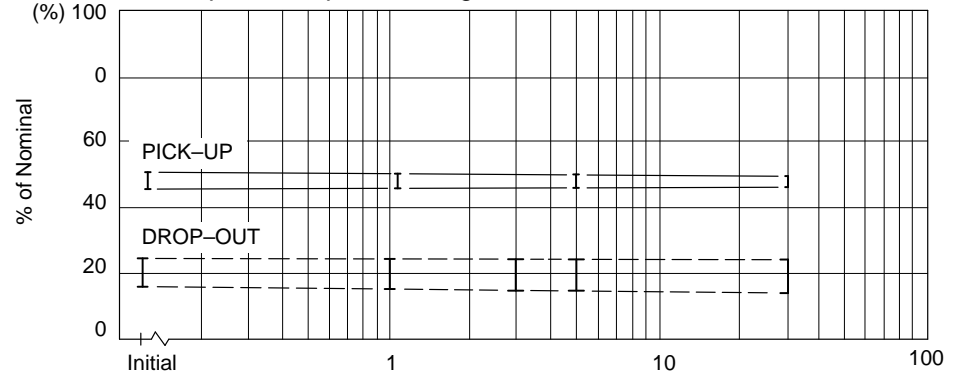
Test Circuit



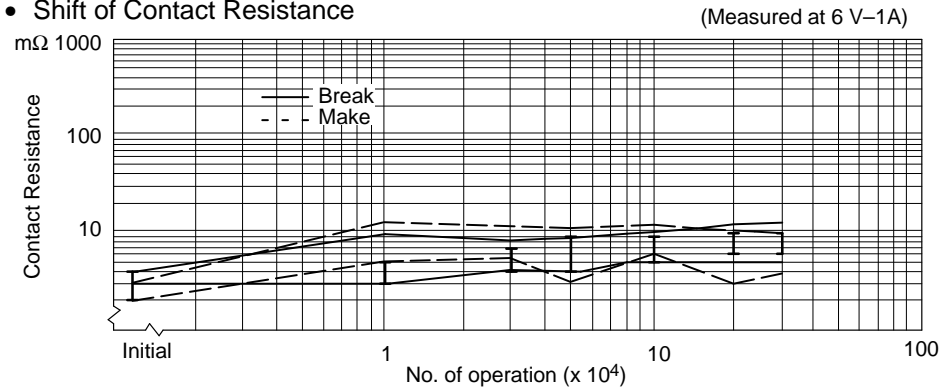
Current Wave Form



Shift of Pick-up and Drop-out Voltage

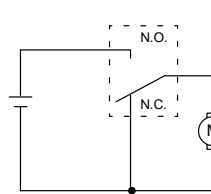


Shift of Contact Resistance

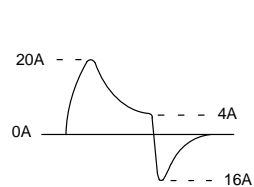


- Test Item
14 VDC-20A INRUSH
Motor Free
400,000 ops, MIN.
(FBR51□-N type)

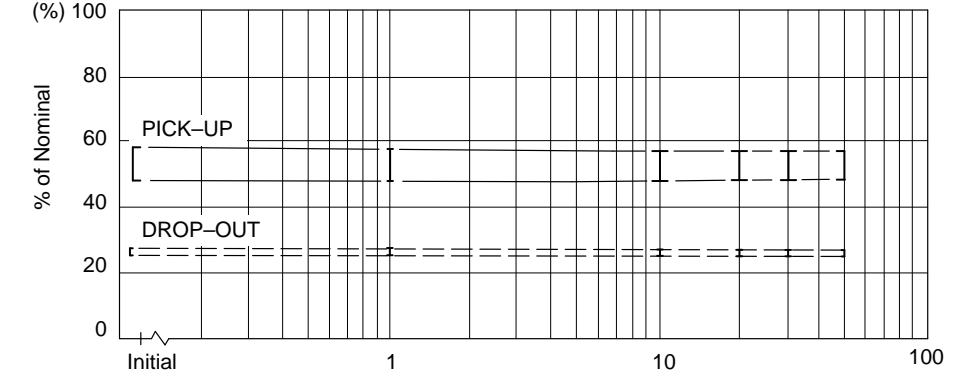
Test Circuit



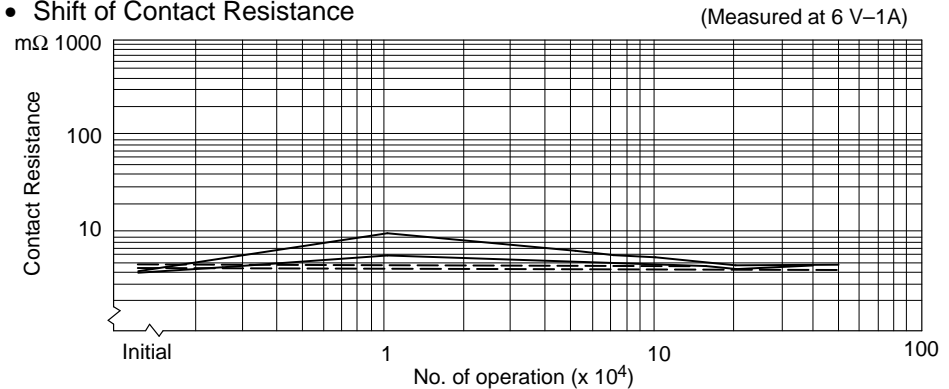
Current Wave Form



Shift of Pick-up and Drop-out Voltage

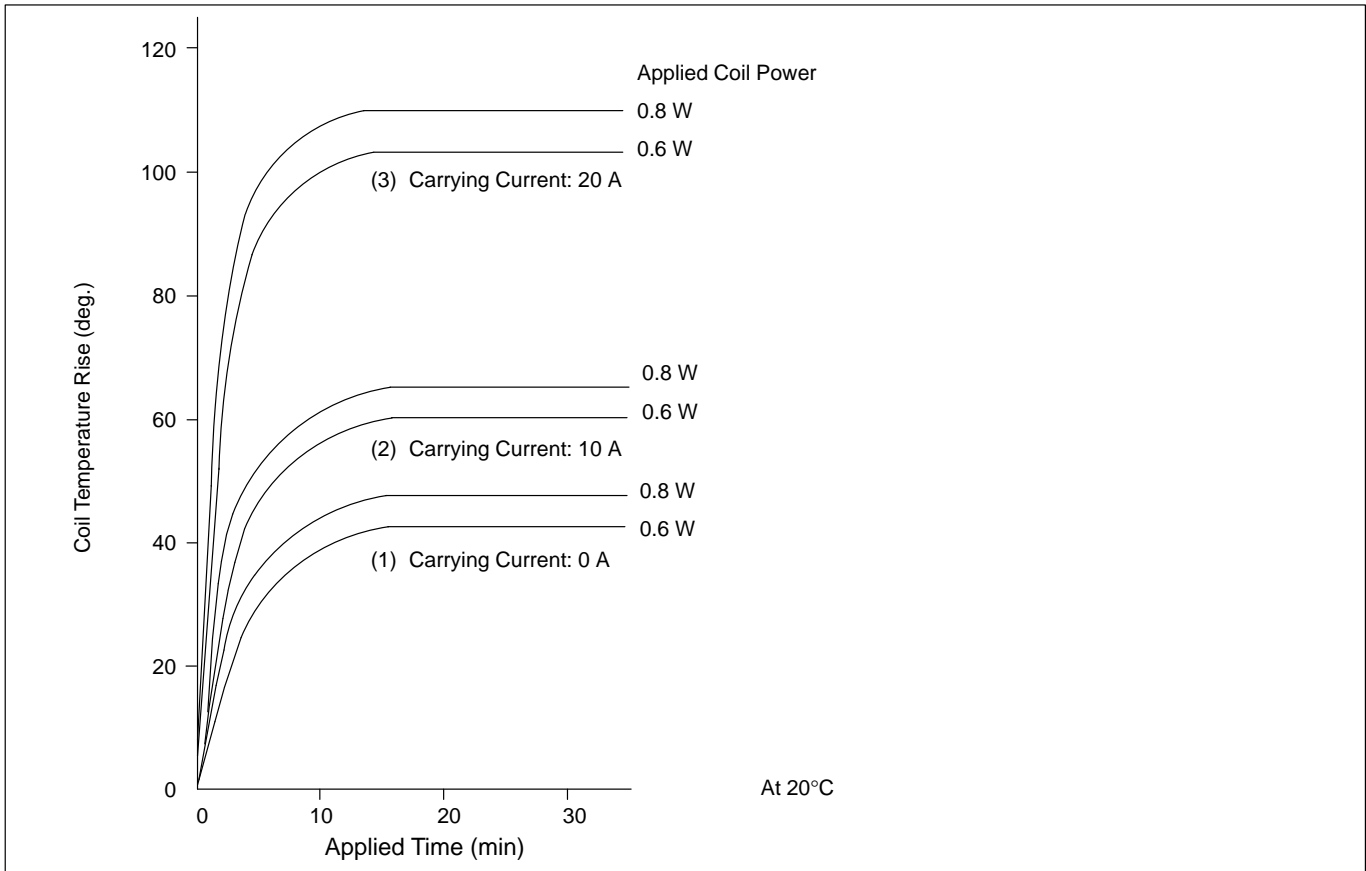


Shift of Contact Resistance

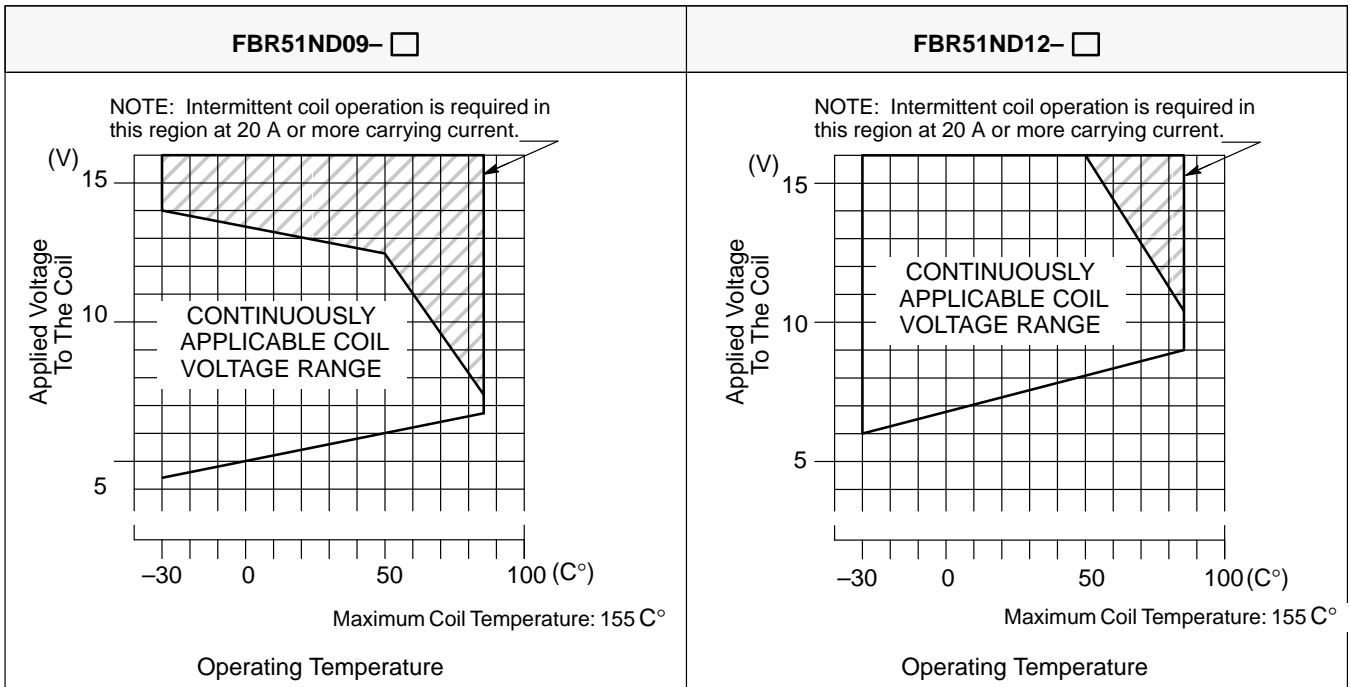


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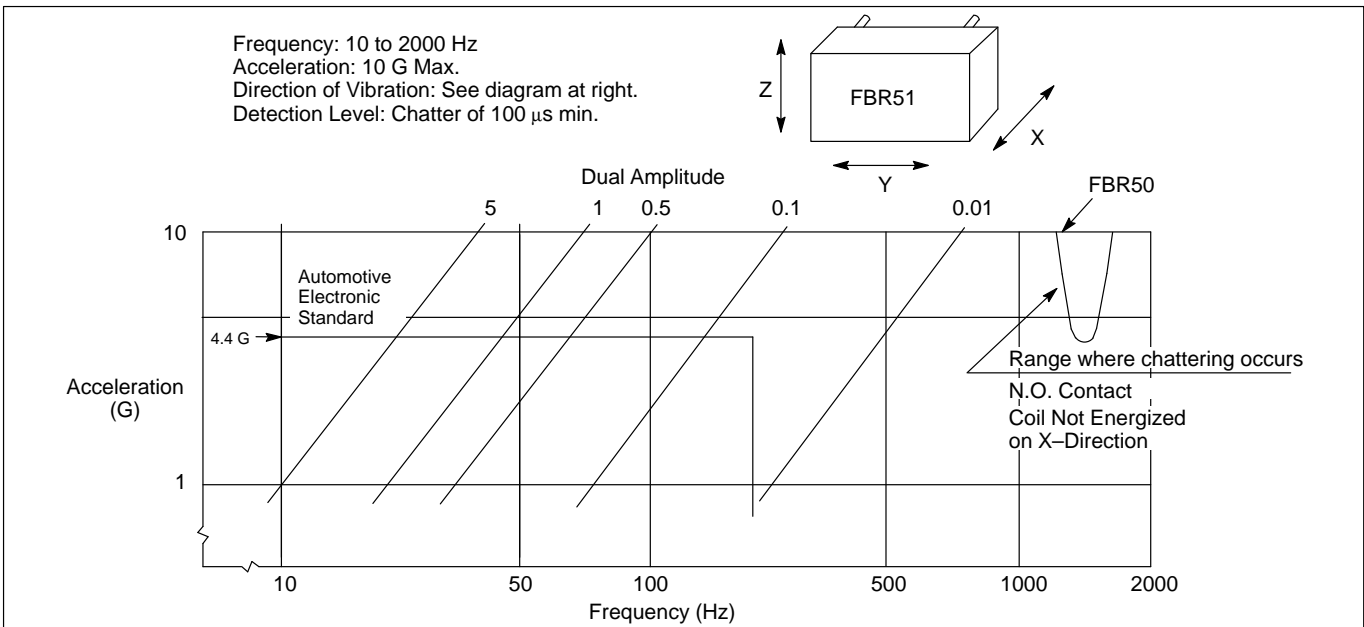
(4) COIL TEMPERATURE RISE



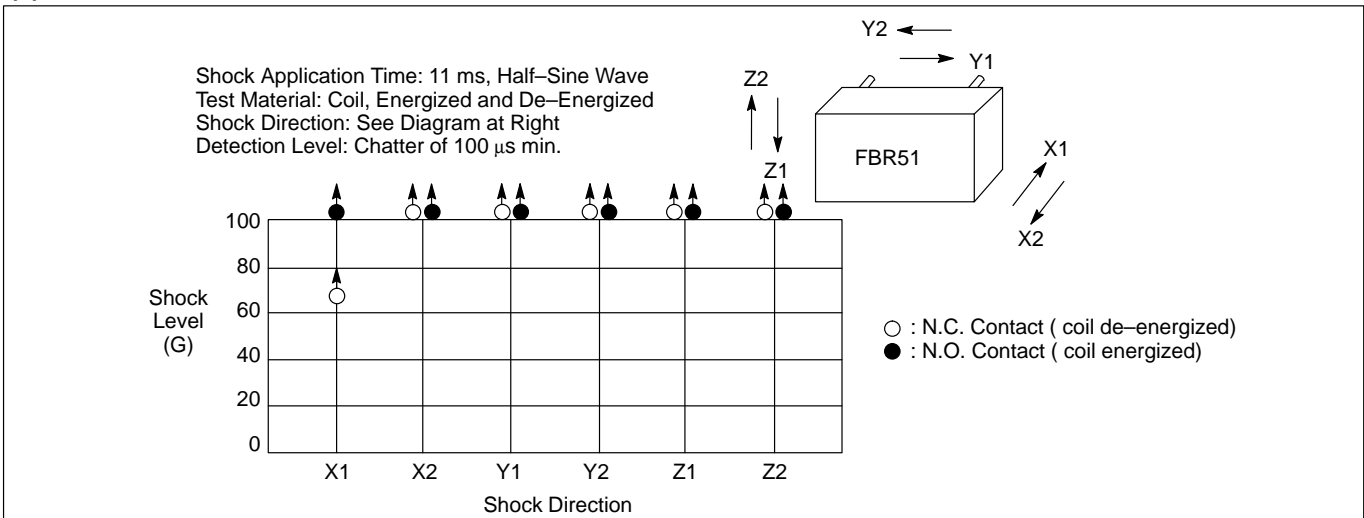
(5) OPERATING COIL VOLTAGE RANGE (EXAMPLE)



(6) VIBRATION RESISTANCE CHARACTERISTICS



(7) SHOCK RESISTANCE CHARACTERISTICS



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Circuit diagrams utilizing Fujitsu products are included as a means of illustrating typical relay applications. Complete Information sufficient for construction purposes is not necessarily given.

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