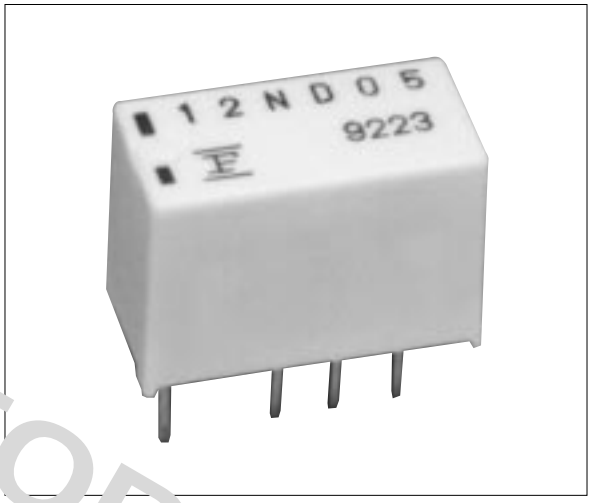
FUJITSU THE POSSIBILITIES ARE INFINITE

MINIATURE RELAY

2 POLES—1 to 2 A (FOR SIGNAL SWITCHING)

FBR12 SERIES

■ FEATURES



- Super miniature size: 0.2 inch × 0.1 inch grid, 12 pin DIP
  Up to 50% less volume and board area than previous generation telecom relay.
- Slim type for high density mounting
- Conforms to Bellcore TR-NWT-001089 and FCC Part 68 requirements
- UL recognized and CSA certified
- Low power consumption
- Conforms to IEC 950 (W type only)
  – 2.5 mm clearance and creepage between coil and contacts
  –5000 V surge strength between coil and contacts (2x10 μs surge wave)
  –2000 Vrms dielectric strength between coil and contacts
  –UL 1950 and IEC950 (approval in process)

■ ORDERING INFORMATION

[Example] FBR12 N D 12 –P –** (–CSA)
(a) (b) (c) (d) (e) (f) (g)

(a)	Series Name	FBR12 : FBR12 Series
(b)	Enclosure / Coil Power	N : Standard (plastic sealed type) W : High dielectric strength type (plastic sealed type) H : High sensitivity type
(c)	Coil Type	D : DC coil
(d)	Nominal Voltage	Refer to the COIL DATA CHART
(e)	Contact Material	Nil : Gold-overlay silver-nickel –P : Gold-overlay silver-palladium
(f)	Custom Designation	To be assigned custom specification
(g)	CSA Standard	–CSA : UL 114 + CSA recognized –CSA : UL1950 + CSA (under application)

Note: The designation name is stamped on the top of the relay case as follows:
(Example) Designation ordered: FBR12ND05
Stamp: 12ND05

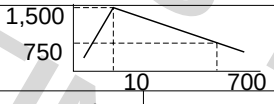
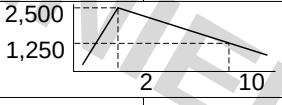
■ SAFETY STANDARD AND FILE NUMBERS

UL508, 1950, 114 (File No. E63615)

C22.2 No. 0, No. 14 (File No. LR40304 or LR64026)

Nominal coil voltage	Contact rating
3 to 24 VDC	0.5 A 125 VDC resistive 2 A 30 VDC resistive 0.3 A 110 VAC resistive

■ SPECIFICATIONS

Item			Standard (Gold-overlay silver-nickel)		-P type (Gold-overlay silver-palladium)	
			Standard	High dielectric strength type	Standard	High dielectric strength type
Contact	Arrangement		2 form C (DPDT)			
	Material		Gold-overlay silver-nickel		Gold-overlay silver-palladium	
	Style		Bifurcated			
	Resistance (initial)		Maximum 100 mΩ (at 0.1 A 6 VDC)			
	Rating (resistive)		0.5 A 125 VAC or 1 A 30 VDC			
	Maximum Carrying Current		2 A (at 20°C)			
	Maximum Switching Power		62.5 VA or 60 W			
	Max. Switching Voltage*1		250 VAC or 220 VDC			
	Maximum Switching Current		2 A			
	Minimum Switching Load*2		10 μA 10 VDC (reference)			
	Capacitance (at 10 kHz)		Approximately 1.0 pF (between open contacts, adjacent contacts) Approximately1.0 pF (between coil and contacts)			
Coil	Nominal power (at 20°C)		Approximately 0.14 to 0.2 W	Approximately 0.23 to 0.25 W	Approximately 0.14 to 0.2 W	Approximately 0.23 to 0.25 W
	Operate power (at 20°C)		Approximately 0.08 to 0.112 W	Approximately 0.13 to 0.14 W	Approximately 0.08 to 0.112 W	Approximately 0.13 to 0.14 W
	Thermal Resistance at Continuous Thermal Load		Approximately 115°C/W			
	Operating Temperature		–40°C to +85°C (no frost) (refer to the CHARACTERISTIC DATA)			
	Operating Humidity		45 to 85%RH			
Time Value	Operate (at nominal voltage)		Maximum 4 msec.			
	Release (at nominal voltage)		Maximum 4 msec.			
	Max. Switching Frequency		Mechanical 3 Hz or electrical 0.5 Hz (at contact rating)			
Insulation	Resistance (initial)		Minimum 1000 MΩ (at 500 VDC)			
	Dielectric Strength	between open contacts	1,000 VAC 1 minimum 			
		adjacent contacts				
		between coil and contacts	1,500 VAC 1 min.	2,000 VAC 1 min.	1,500 VAC 1 min.	2,000 VAC 1 min.
	Surge Strength	between open contacts, adjacent contacts	1,500 V 10 × 700 μs 			
		between coil and contacts	2,500 V 2 × 10 μs	5,000 V 2 × 10 μs	2,500 V 2 × 10 μs	5,000 V 2 × 10 μs
Life	Mechanical		1×10^8 operations minimum			
	Electrical (at contact rating)	DC	2×10^5 operations minimum		5×10^5 operations minimum	
		AC	1×10^5 operations minimum		200×10^3 operations minimum	
Other	Vibration Resistance	Misoperation	10 to 55 Hz (double amplitude of 3.3 mm)			
		Endurance	10 to 55 Hz (double amplitude of 5.0 mm)			
	Shock Resistance	Misoperation	500 m/s^2 (11±^{1} ms)			
		Endurance	1,000 m/s^2 (6 ±^{1} ms)			
	Weight		Approx. 1.5 g	Approx. 1.9 g	Approx. 1.5 g	Approx. 1.9 g

*1 If the switching voltage exceeds the rated contact voltage, reduce the current. The current values vary according to the type of load.

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

■ SPECIFICATIONS

Item				High Sensitive Type	
				Standard (Gold-overlay silver-nickel)	-P type (Gold-overlay silver-palladium)
Contact	Arrangement			2 form C (DPDT)	
	Material			Gold-overlay silver-nickel	Gold-overlay silver-palladium
	Style			Bifurcated	
	Resistance (initial)			Maximum 100 mΩ (at 0.1 A 6 VDC)	
	Rating (resistive)			0.3 A 125 VAC or 1 A 30 VDC	
	Maximum Carrying Current			2 A (at 20°C)	
	Maximum Switching Power			62.5 VA or 30 W	
	Max. Switching Voltage*1			250 VAC or 220 VDC	
	Maximum Switching Current			2 A	
	Minimum Switching Load*2			10m VDC - 10μ A	
	Capacitance (at 10 kHz)			Approximately 1.0 pF (between open contacts, adjacent contacts) Approximately1.0 pF (between coil and contacts)	
Coil	Nominal power (at 20°C)			Approximately 50mW	
	Operate power (at 20°C)			Approximately 40m W	
	Operating Temperature			–40°C to +70°C (no frost) (refer to the CHARACTERISTIC DATA)	
	Operating Humidity			45 to 85%RH	
Time Value	Operate (at nominal voltage)			Maximum 5 msec.	
	Release (at nominal voltage)			Maximum 5 msec.	
Insulation	Resistance (initial)			Minimum 1000 MΩ (at 500 VDC)	
	Dielectric Strength	between open contacts		750 VAC 1 minute	
		adjacent contacts			
		between coil and contacts		1,500 VAC 1 minutes	
	Surge Strength	between open contacts, adjacent contacts		1,500 V 10 × 700 μs	
		between coil and contacts		2,500 V 2 × 10 μs	
Life	Mechanical			1 x 10^8 operations minimum	
	Electrical (at contact rating)		DC	2 × 10^5 operations minimum	5 × 10^5 operations minimum
			AC	1 × 10^5 operations minimum	200 × 10^3 operations minimum
Other	Vibration Resistance	Misoperation		10 to 55 Hz (double amplitude of 3.3` mm)	
		Endurance		10 to 55 Hz (double amplitude of 5.0 mm)	
	Shock Resistance	Misoperation		500 m/s^2 (11±1 ms)	
		Endurance		1,000 m/s^2 (6 ±1 ms)	
	Weight			Approx. 1.9 g	

*1 If the switching voltage exceeds the rated contact voltage, reduce the current. The current values vary according to the type of load.

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

■ COIL DATA CHART

1.STANDARD

MODEL		Nominal voltage	Coil resistance (±10%)	Nominal current (at nominal voltage) approx.	Must operate voltage*1	Must operate voltage*1	Nominal power	Operate power	Coil temperature rise
Standard	-P type								
FBR12ND03	FBR12ND03-P	3 VDC	64.3 Ω	46 mA	75% max. of nominal voltage	10% min. of nominal voltage	Approx. 0.14 W (at nominal voltage)	Approx. 0.08 W Max.	Approx. 20 deg Max. (at nominal voltage)
FBR12ND04	FBR12ND04-P	4.5 VDC	145 Ω	31 mA					
FBR12ND05	FBR12ND05-P	5 VDC	178 Ω	28 mA					
FBR12ND06	FBR12ND06-P	6 VDC	257 Ω	23 mA					
FBR12ND09	FBR12ND09-P	9 VDC	579 Ω	15 mA					
FBR12ND12	FBR12ND12-P	12 VDC	1,028 Ω	11 mA					
FBR12ND24	FBR12ND24-P	24 VDC	2,880 Ω	8 mA			0.2 W	0.112 W	30 deg

*1: Specified values are subject to pulse wave voltage.
Note: All values in the table are measured at 20°C.

2.HIGH DIELECTRIC STRENGTH

MODEL		Nominal voltage	Coil resistance (±10%)	Nominal current (at nominal voltage) approx.	Must operate voltage*1	Must release voltage*1	Nominal power	Operate power	Coil temperature rise
Standard	-P type								
FBR12WD03	FBR12WD03-P	3 VDC	39 Ω	77 mA	75% max. of nominal voltage	10% min. of nominal voltage	Approx. 0.23 W (at nominal voltage)	Approx. 0.13 W Max.	Approx. 30 deg (at nominal voltage)
FBR12WD04	FBR12WD04-P	4.5 VDC	88 Ω	51 mA					
FBR12WD05	FBR12WD05-P	5 VDC	108 Ω	46 mA					
FBR12WD06	FBR12WD06-P	6 VDC	156 Ω	38 mA					
FBR12WD09	FBR12WD09-P	9 VDC	352 Ω	25 mA					
FBR12WD12	FBR12WD12-P	12 VDC	626 Ω	19 mA					
FBR12WD24	FBR12WD24-P	24 VDC	2,304 Ω	10 mA			0.25 W	0.14 W	33 deg

*1: Specified values are subject to pulse wave voltage.
Note: All values in the table are measured at 20°C.

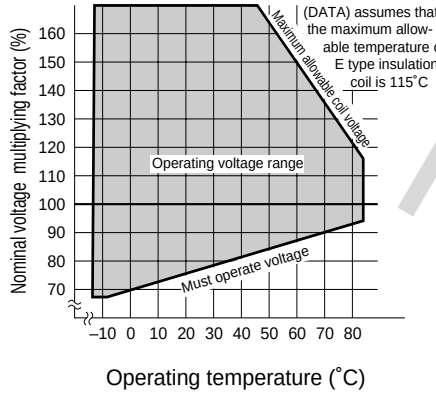
3. HIGH SENSITIVITY TYPE

MODEL		Nominal voltage	Coil resistance (±10%)	Must operate voltage*1	Must release voltage*1	Nominal power	Operate power	Coil temperature rise
Standard	-P type							
FBR12HD03	FBR12HD03-P	3 VDC	180 Ω	80% max. of nominal voltage	10% min. of nominal voltage	Approx. 0.05 W (at nominal voltage)	Approx. 0.04 W Max.	Approx. 4 deg (at nominal voltage)
FBR12HD04	FBR12HD04-P	4.5 VDC	405 Ω					
FBR12HD05	FBR12HD05-P	5 VDC	500 Ω					
FBR12HD06	FBR12HD06-P	6 VDC	720 Ω					
FBR12HD09	FBR12HD09-P	9 VDC	1,620 Ω					
FBR12HD12	FBR12HD12-P	12 VDC	2,880 Ω					

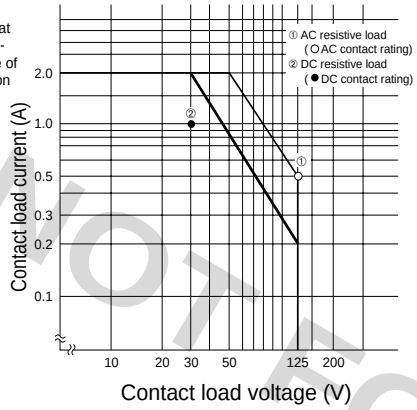
*1: Specified values are subject to pulse wave voltage.
Note: All values in the table are measured at 20°C.

■ CHARACTERISTIC DATA

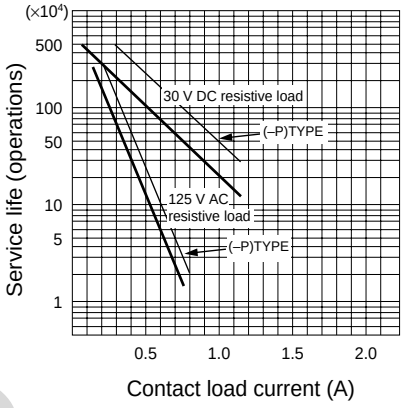
Range of operation temperature and voltage



Maximum switching capacity

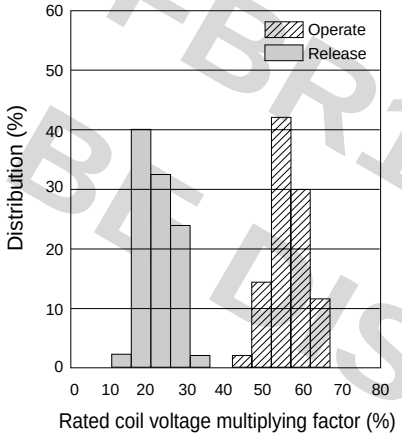


Life curve

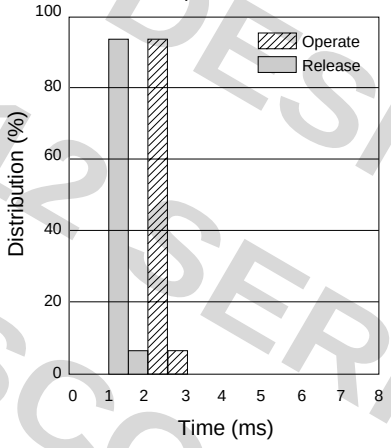


■ REFERENCE DATA

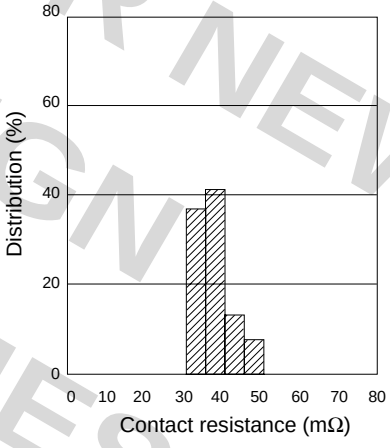
Distribution of operate and release voltage



Distribution of operate and release time

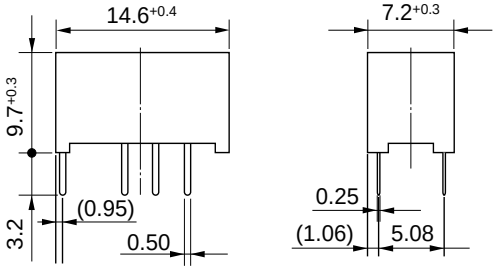


Distribution of contact resistance

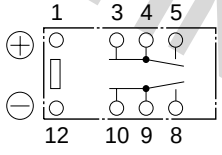


■ DIMENSIONS

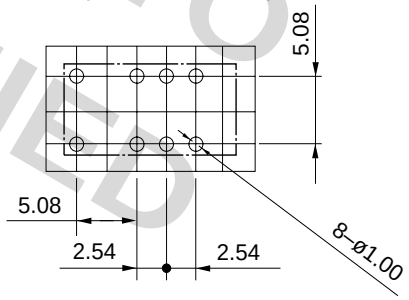
●Dimensions



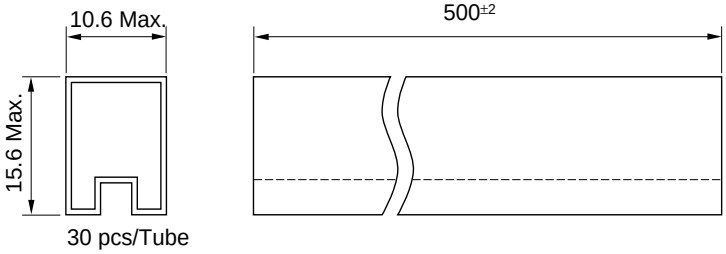
●Schematics
(BOTTOM VIEW)



●PC board mounting hole layout
(BOTTOM VIEW)



●Tube carrier



30 pcs/Tube

Unit: mm

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