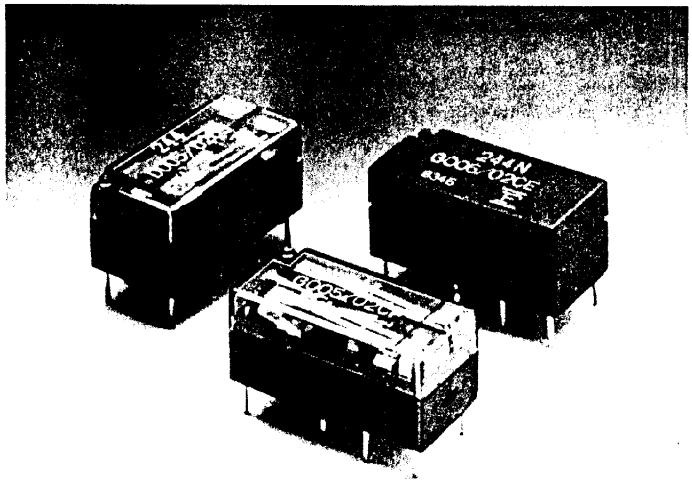


Features

- **Gold-overlay bifurcated contact**
  Contact material and shape especially suitable for signal switching assures reliability at low level switching.
- **Conforms to FCC68 standards**
  High voltage relays are also available with dielectric withstand voltage greater than 1,000V AC and surge voltage resistance greater than 1,500V.
- **Easy pattern design**
  Separate location of drive and output terminals allows easy PC board design.
- **Formed terminals for temporary mounting**
  Formed terminals enable FBR240-series relays to be mounted temporarily on a PC board.
- **Automatic mounting**
  Shipped in carrier case plastic magazine suitable for automatic mounting.

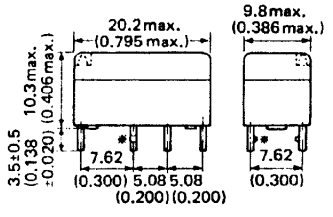
Contact Capacities

Item	DC load	AC load	Remarks
Contact rating	28V — 1A	120V — 0.5A	With resistive load
Maximum switching voltage*1	150V	220V	
Maximum switching current	2.0A	1.25A	
Maximum carrying current	2A		
Maximum switching power	30W	60VA	
Minimum applicable load (Reference)*2	02CS type . . . . 5V DC—1mA 02CT, CP type . 1V DC—1mA 02CE, CF type .0.1V DC—100μA		

*1. If the switching voltage exceeds the rated contact voltage, reduce the current. Since current values vary according to the type of load.
*2 Values when switching a resistive load at normal temperature and humidity and in a clean atmosphere. The minimum applicable load varies with the switching frequency and operating environment.

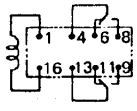
Dimensions and Schematics

Unit: mm (in.)



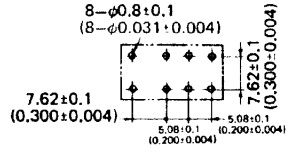
* The terminals marked with an asterisk are formed for temporary mounting on PC board.

Schematics



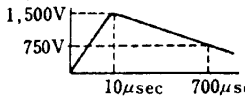
(Bottom view)

PC Board Mounting Hole Layout



Note: Terminal numbers are not shown on the relays.

Specifications

Item	Specification
Contact arrangement	2 form C (DPDT)
Contact material	Gold-overlay silver contacts (contact symbol S or T) Gold-overlay silver-palladium contacts (contact symbol P or E) Thick gold-overlay silver-palladium contacts (contact symbol F)
Contact resistance	100 mΩ max. (measured at 6V DC, 0.1A) initial value
Insulation resistance	100 MΩ min. (at 500V DC) initial value
Dielectric withstand voltage	Standard: 500V AC for 1 minute High withstand voltage: 1,000V AC for 1 minute (between open contacts 500V AC for 1 minute)
Surge voltage resistance (for high withstand voltage types)	1,500V/10 μsec/700 μsec (between coil and contacts, between adjacent contacts) 
Static electricity capacity between contacts	2PF max. (reference value)
Vibration	No contact opening: 10 Hz to 55 Hz (1.5 mm dual amplitude) No damage: 10 Hz to 55 Hz (1.5 mm dual amplitude)
Shock	Malfunctions: 20 G (11 ms) Endurance: 100 G (11 ms)
Operate time	6 ms max. (bounce time 3 ms max.) (at rated power 500 mW to 550 mW ops.)
Release time	3 ms max. (bounce time 8 ms max.) (after rated power ops.)
Service life Mechanical	2×10^7 ops. min. (maximum switching frequency 18,000 ops./hr)
Service life Electrical	5×10^5 ops. min. (28V DC, 1A resistive load) 1×10^5 ops. min. (120V AC, 0.5A resistive load) (maximum switching frequency 1,800 ops./hr)
Operating temperature	−30°C to +70°C (See Reference Data 4 and 5.)
Operating humidity	45% to 85% RH
Weight	Approx. 4.5g

Coil Series

Type	Coil power consumption	Pickup power consumption	Coil voltage range	Pickup voltage	Remarks
Standard	Approx. 500 mW	Approx. 280 mW	3V to 48V	75% max. of rated voltage	For general use, AV and telephone equipment, and PBXs
G Series	Approx. 550 mW	Approx. 250 mW	4.5V to 48V	68% max. of rated voltage	For electronic switching system, PBXs and telephone equipment
Low power consumption (special order)*	Approx. 360 mW	Approx. 200 mW	3V to 24V	75% max. of rated voltage	For telephone and portable equipment

Note: All values in the table are measured at 20°C.
* Low power dissipation relays available on request.

Coil Ratings

• Standard types

Voltage designation	Rated coil voltage	Coil resistance (±10%)	Rated current (at rated coil voltage)	Pickup voltage	Dropout voltage (reference value)	Maximum allowable voltage	Rated power consumption	Pickup power consumption	Coil temperature rise
D003	3V DC	18Ω	Approx. 167mA	75% max. of rated coil voltage	10% min. of rated coil voltage	See Reference Data 4.	Approx. 500mW (at rated coil voltage)	Approx. 280mW max.	Approx. 45°C (at rated coil voltage)
D005	5V DC	50Ω	Approx. 100mA						
D006	6V DC	72Ω	Approx. 83mA						
D009	9V DC	162Ω	Approx. 56mA						
D012	12V DC	290Ω	Approx. 41mA						
D024	24V DC	1,150Ω	Approx. 21mA				Approx. 580 mW		Approx. 53°C
D048	48V DC	4,000Ω	Approx. 12mA						

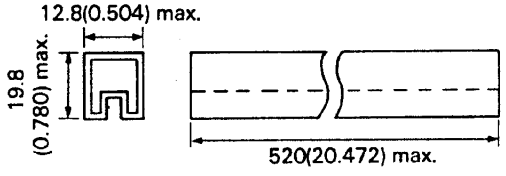
All values in the table are measured at 20°C.

• G Series

Voltage designation	Rated coil voltage	Coil resistance (±10%)	Rated current (at rated coil voltage)	Pickup voltage	Dropout voltage (reference value)	Maximum allowable voltage	Rated power consumption	Pickup power dissipation	Coil temperature rise
G005	4.5V DC	36Ω	Approx. 125mA	3.1V max.	0.2 V min.	See Reference Data 5.	Approx. 550 mW (at rated coil voltage)	Approx. 250mW max.	Approx. 50°C (at rated coil voltage)
G006	6V DC	66Ω	Approx. 91mA	4.0V max.	0.27V min.				
G009	9V DC	140Ω	Approx. 64mA	6.0V max.	0.38V min.				
G012	12V DC	280Ω	Approx. 43mA	8.1V max.	0.55V min.				
G024	24V DC	1,050Ω	Approx. 23mA	15.8V max.	1.06V min.				
G048	48V DC	4,100Ω	Approx. 11mA	30.5V max.	2.12V min.				

All values in the table are measured at 20°C.

• Stick Dimensions



25 pieces per package

Part Numbers

[Example] **FBR244** (N) D 003 / 02 C S (-B -** -NL)
(A) (B) (C) (D) (E) (F) (G) (H) (I)

(A) Series name
FBR244: FBR240 Series

(B) Construction
No designation: Automatic soldering
N: Automatic soldering + immersion-cleanable N type

(C) Coil ratings
D: Standard type
G: G Series
See Coil Ratings table for details.

(D) Rated coil voltage
(Example) **003:** 3V use
012: 12V use
See Coil Ratings table for details.

(E) Contact arrangement
02C: 2 form C

(F) Contact shape and material
T: Bifurcated contact, gold-overlay silver
E: Bifurcated contact, gold-overlay silver-palladium
F: Bifurcated contact, thick gold-overlay silver-palladium
S: Single contact, gold-overlay silver
P: Single contact, gold-overlay silver-palladium

(G) Cover material
No designation: Smoke brown cover (flammability grade UL 94V-2)
(All N Series relays have black covers with flammability grade UL 94V-0.)
–B: Black cover
(flammability grade UL94V-0)

(H) Special specifications
No designation: Standard
–2: High withstand voltage (1,000V AC)
Other features such as low power dissipation are available on request.

(I) Safety standards
No designation: Standard
–UL: UL recognized
–CSA: UL, CSA recognized

Note: The designation name is stamped on the top of the relay case as follows.
(Example) Designation ordered: **FBR244 D012/02CE**
Stamp: **244 D012/02CE**

Series Table

• Standard

Contact		Rated coil voltage (VDC)	Part number
Form	Material		
Bifurcated contact	Gold-overlay silver	3	FBR244(N)D003/02CT
		5	FBR244(N)D005/02CT
		6	FBR244(N)D006/02CT
		9	FBR244(N)D009/02CT
		12	FBR244(N)D012/02CT
		24	FBR244(N)D024/02CT
	Gold-overlay silver-palladium	3	FBR244(N)D003/02CE
		5	FBR244(N)D005/02CE
		6	FBR244(N)D006/02CE
		9	FBR244(N)D009/02CE
		12	FBR244(N)D012/02CE
		24	FBR244(N)D024/02CE
Single contact	Gold-overlay silver	3	FBR244(N)D003/02CS
		5	FBR244(N)D005/02CS
		6	FBR244(N)D006/02CS
		9	FBR244(N)D009/02CS
		12	FBR244(N)D012/02CS
		24	FBR244(N)D024/02CS
	Gold-overlay silver-palladium	3	FBR244(N)D003/02CP
		5	FBR244(N)D005/02CP
		6	FBR244(N)D006/02CP
		9	FBR244(N)D009/02CP
		12	FBR244(N)D012/02CP
		24	FBR244(N)D024/02CP

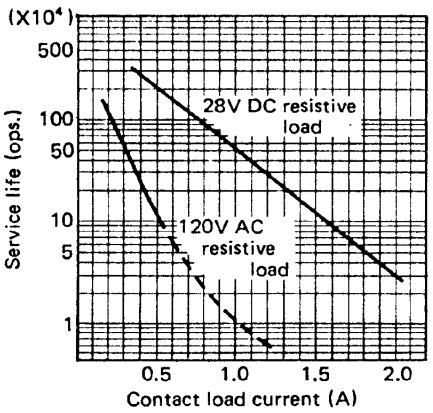
• G Series

Contact		Rated coil voltage (VDC)	Part number
Form	Material		
Bifurcated contact	Gold-overlay silver-palladium	4.5	FBR244(N)G005/02CE
		6	FBR244(N)G006/02CE
		9	FBR244(N)G009/02CE
		12	FBR244(N)G012/02CE
		24	FBR244(N)G024/02CE
		48	FBR244(N)G048/02CE
	Thick gold-overlay silver-palladium	4.5	FBR244(N)G005/02CF
		6	FBR244(N)G006/02CF
		9	FBR244(N)G009/02CF
		12	FBR244(N)G012/02CF
		24	FBR244(N)G024/02CF
		48	FBR244(N)G048/02CF
Single contact	Gold-overlay silver-palladium	4.5	FBR244(N)G005/02CP
		6	FBR244(N)G006/02CP
		9	FBR244(N)G009/02CP
		12	FBR244(N)G012/02CP
		24	FBR244(N)G024/02CP
		48	FBR244(N)G048/02CP

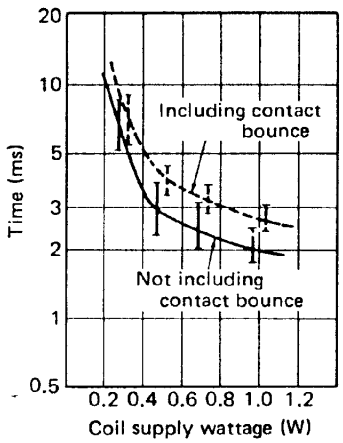
(The 02CF type is suitable for large-capacity electronic switching systems requiring high reliability (a long service life).)

Reference Data

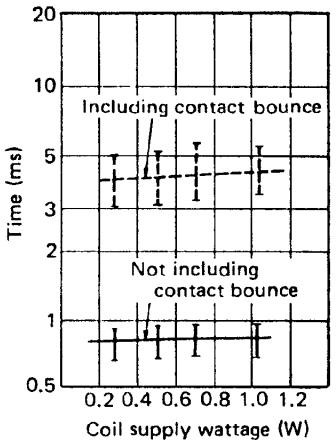
1. Service life curve



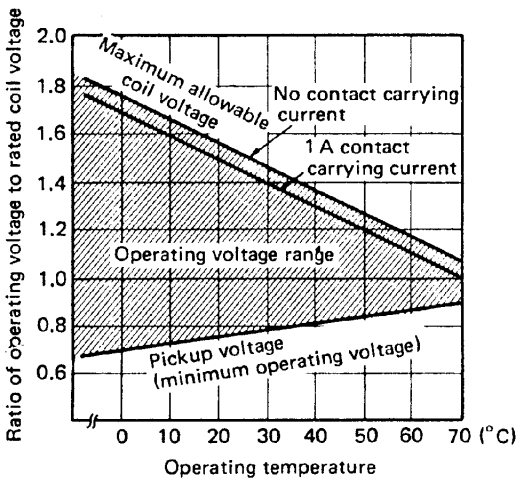
2. Operate time



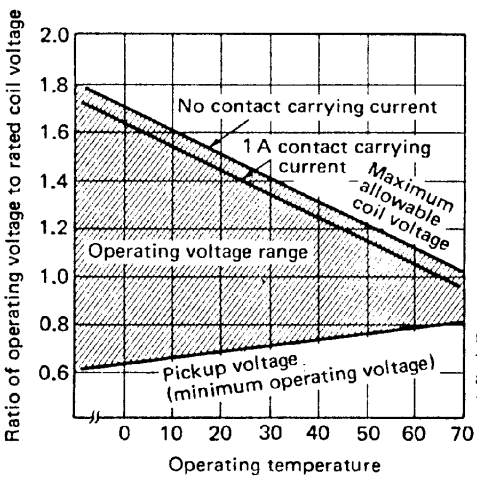
3. Release time



4. Operating temperature and operating voltage range (Standard)



5. Operating temperature and operating voltage range (G Series)



Note:
Data assumes that the maximum allowable temperature is 115°C, and is not applicable to hot start.