

FBR46 SERIES

■ COIL DATA CHART

1. STANDARD (D type)

MODEL	Nominal voltage	Coil resistance ($\pm 10\%$)	Nominal current (at nominal voltage) approx.	Must operate voltage*1	Must release voltage*1	Nominal power	Operate power	Coil temperature rise
FBR46ND003-P	3 VDC	60 Ω	50 mA	75% max. of nominal voltage	5% min. of nominal voltage	Approx. 150 mW (at nominal voltage)	Approx. 85 mW max.	Approx. 25 deg (at nominal voltage)
FBR46ND005-P	5 VDC	167 Ω	30 mA					
FBR46ND006-P	6 VDC	240 Ω	25 mA					
FBR46ND009-P	9 VDC	540 Ω	17 mA					
FBR46ND012-P	12 VDC	960 Ω	13 mA					
FBR46ND024-P	24 VDC	2,880 Ω	8 mA	200 mW	112 mW	30 deg		

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

2. 65% OPERATE TYPE (G type)

MODEL	Nominal voltage	Coil resistance ($\pm 10\%$)	Nominal current (at nominal voltage) approx.	Must operate voltage*1	Must release voltage*1	Nominal power	Operate power	Coil temperature rise
FBR46NG003-P	3 VDC	36 Ω	83 mA	65% max. of nominal voltage	10% min. of nominal voltage	Approx. 250 mW (at nominal voltage)	Approx. 106 mW max.	Approx. 35 deg (at nominal voltage)
FBR46NG005-P	4.5 VDC	81 Ω	56 mA					
FBR46NG006-P	6 VDC	144 Ω	41 mA					
FBR46NG009-P	9 VDC	324 Ω	27 mA					
FBR46NG012-P	12 VDC	576 Ω	20 mA					
FBR46NG024-P	24 VDC	2,304 Ω	10 mA					

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

3. HIGH DIELECTRIC STRENGTH TYPE (-15, -16 type)

MODEL		Nominal voltage	Coil resistance ($\pm 10\%$)	Nominal current (at nominal voltage) approx.	Must operate voltage*1	Must release voltage*1	Nominal power	Operate power	Coil temperature rise
-15 type	-16 type								
FBR46ND003-P-15	FBR46ND003-P-16	3 VDC	45 Ω	67 mA	75% max. of nominal voltage	5% min. of nominal voltage	Approx. 200 mW (at nominal voltage)	Approx. 112 mW max.	Approx. 30 deg (at nominal voltage)
FBR46ND005-P-15	FBR46ND005-P-16	5 VDC	125 Ω	40 mA					
FBR46ND006-P-15	FBR46ND006-P-16	6 VDC	180 Ω	33 mA					
FBR46ND009-P-15	FBR46ND009-P-16	9 VDC	405 Ω	22 mA					
FBR46ND012-P-15	FBR46ND012-P-16	12 VDC	720 Ω	17 mA					
FBR46ND024-P-15	FBR46ND024-P-16	24 VDC	2,304 Ω	10 mA	250 mW	140 mW	35 deg		

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

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■ SPECIFICATIONS



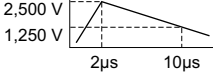
Item		Standard	-65% operate	-15 type	-16 type
Contact	Arrangement and Style	2 form C (DPDT), bifurcated			
	Material	Gold-overlay silver-palladium			
	Resistance (initial)	Maximum 100 mΩ (at 0.1 A 6 VDC)			
	Ratings (resistive)	0.5 A 120 VAC or 1 A 30 VDC			
	Maximum Carrying Current	1.25 A			
	Maximum Switching Power	60 AV or 30 W			
	Max. Switching Voltage* ¹	125 V			
	Maximum Switching Current	1 A			
	Minimum Switching load* ²	0.01 mA 10 mVDC (reference)			
	Electrostatic Capacity (reference)	Approximately 2 pF (between coil and contacts) Approximately 1 pF (between open contacts)			
Coil	Nominal power (at 20°C)	150 to 200 mW	205 mW	200 to 250 mW	
	Operate power (at 20°C)	85 to 112 mW	106 mW	112 to 114 mW	
	Operating Temperature	-30°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 ms			
	Release (at nominal voltage)	Maximum 5 ms			
Life	Mechanical	50 × 10 ⁶ operations minimum			
	Electrical (refer to the REFERENCE DATA)	DC	2 × 10 ⁵ operations minimum (at contact rating)		
		AC	1 × 10 ⁵ operations minimum (at contact rating)		
Other	Vibration Resistance	10 to 55 Hz (double amplitude of 1.5 mm)			
	Shock Resistance	Misoperation	500 m/s ² (11 ± ¹ ms)		
		Endurance	1,000 m/s ² (11 ± ¹ ms)		
	Weight	Approximately 2.5g			

*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.

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■ INSULATION

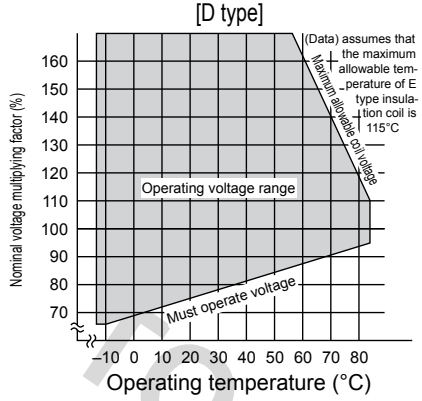
Item	Standard	65% operate	-15 type	-16 type
Resistance (initial) (500 VDC)	Minimum 1,000 MΩ 1 min.			
Dielectric Strength	open contacts 720VAC - 1 min. coil and contact adjacent contact 1,000 VAC - 1min.		open contacts 750VAC coil and contact adjacent contact 1,500 VAC - 1min.	open contacts 1,000VAC - 1min. coil and contact adjacent contact 1,500 VAC - 1min.
Surge Voltage	non-conducted terminals 1,500V 10 x 700μs standard wave 		open contact 1,500V 10 x 700μs standard wave 	coil and contact adjacent contact 2,500V 2 x 10μs standard wave 

■ SAFETY STANDARDS

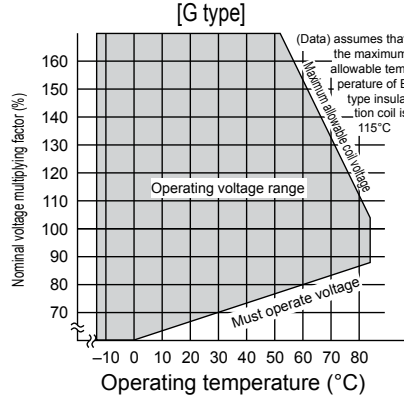
Type	Compliance	Contact rating
UL	UL 114 E63615	Flammability: UL 94-V0 (plastics) 0.3A, 250VAC (resistive) 1A, 30VDC
CSA	C22.2 No. 14 LR 40304, LR 64026	

CHARACTERISTIC DATA

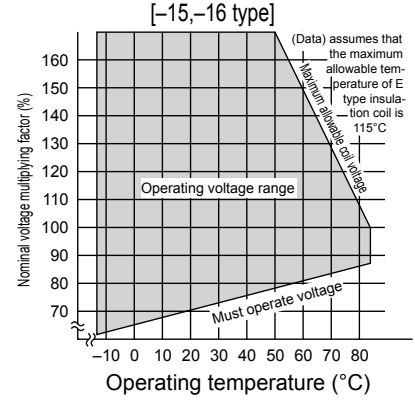
Range of operation temperature and voltage



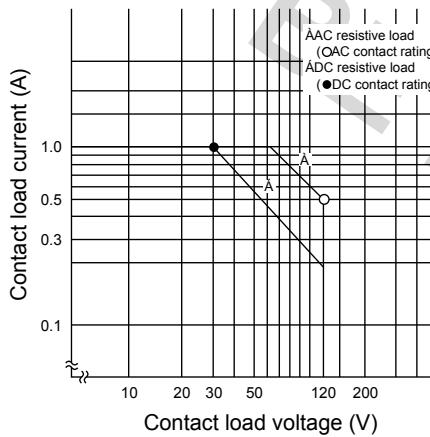
Range of operation temperature and voltage



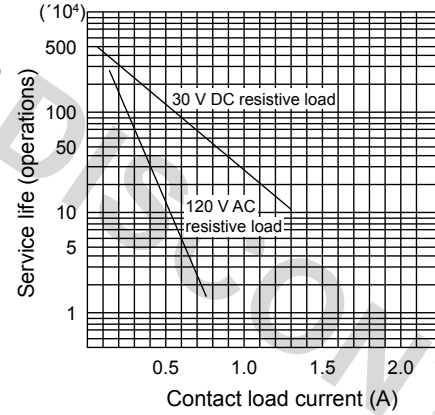
Range of operation temperature and voltage



Maximum switching capacity

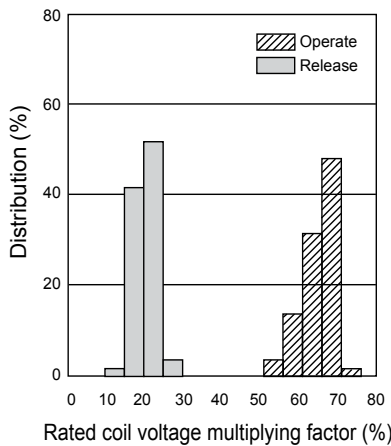


Life curve

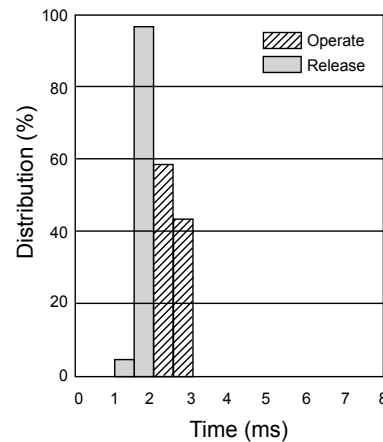


REFERENCE DATA

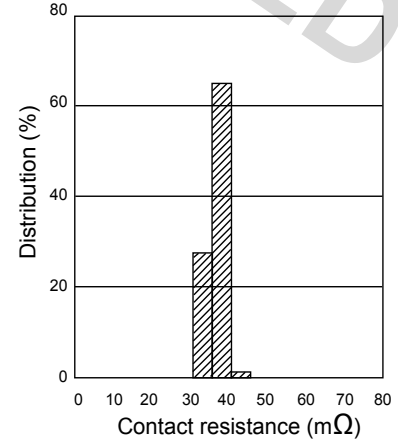
Distribution of operate and release voltage



Distribution of operate and release time



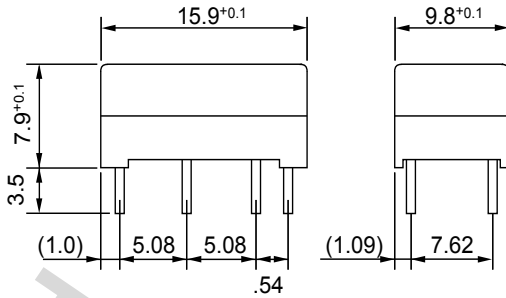
Distribution of contact resistance



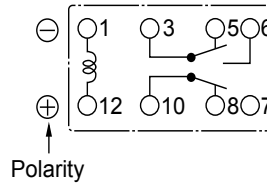
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■ DIMENSIONS

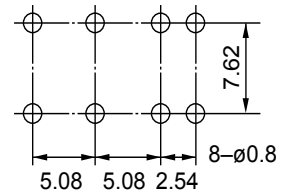
■ Dimensions



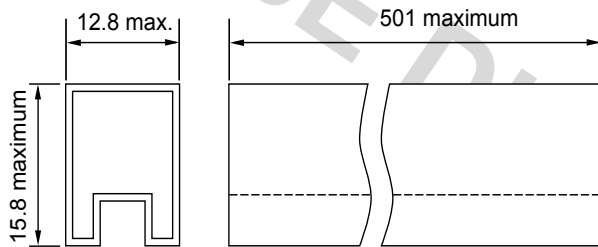
■ Schematics (BOTTOM VIEW)



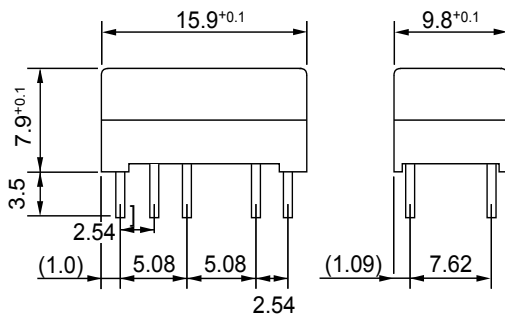
■ PC board mounting hole layout (BOTTOM VIEW)



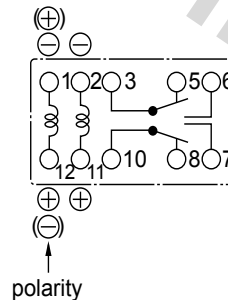
■ Tube carrier



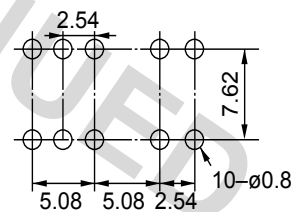
■ Dimensions (Latching type)



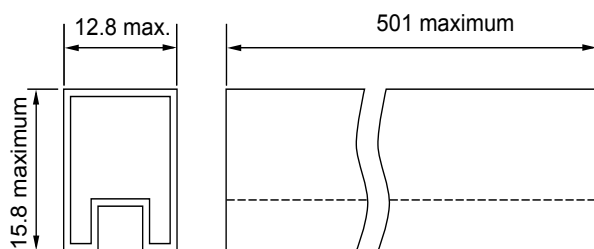
■ Schematics (BOTTOM VIEW)



■ PC board mounting hole layout (BOTTOM VIEW)



■ Tube carrier



Note: ·No 2, 11 terminals are for double winding latching type only.
 ·(⊕)(⊖) are reset polarity for single winding latching type.
 ·The terminal number is not shown on the relay.

Unit: mm

RoHS Compliance and Lead Free Relay Information

1. General Information

- Relays produced after the specific date code that is indicated on each data sheet are lead-free now. Most of our signal and power relays are lead-free. Please refer to Lead-Free Status Info. (<http://www.fujitsu.com/us/downloads/MICRO/fcai/relays/lead-free-letter.pdf>)
 - Lead free solder paste currently used in relays is Sn-3.0Ag-0.5Cu.
 - All signal and most power relays also comply with RoHS. Please refer to individual data sheets. Relays that are RoHS compliant do not contain the 5 hazardous materials that are restricted by RoHS directive (lead, mercury, chromium IV, PBB, PBDE).
 - It has been verified that using lead-free relays in lead assembly process will not cause any problems (compatible).
 - "LF" is marked on each outer and inner carton. (No marking on individual relays).
 - To avoid leaded relays (for lead-free sample, etc.) please consult with area sales office.
 - We will ship leaded relays as long as the leaded relay inventory exists.
- Note: Cadmium was exempted from RoHS on October 21, 2005. (Amendment to Directive 2002/95/EC)

2. Recommended Lead Free Solder Profile

- Recommended solder paste Sn-3.0Ag-0.5Cu.

Reflow Solder condition

Flow Solder condition:

Pre-heating: maximum 120°C
Soldering: dip within 5 sec. at
260°C solder bath

Solder by Soldering Iron:

Soldering Iron
Temperature: maximum 360°C
Duration: maximum 3 sec.

We highly recommend that you confirm your actual solder conditions

3. Moisture Sensitivity

- Moisture Sensitivity Level standard is not applicable to electromechanical relays.

4. Tin Whisker

- Dipped SnAgCu solder is known as low risk tin whisker. No considerable length whisker was found by our in house test.

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