

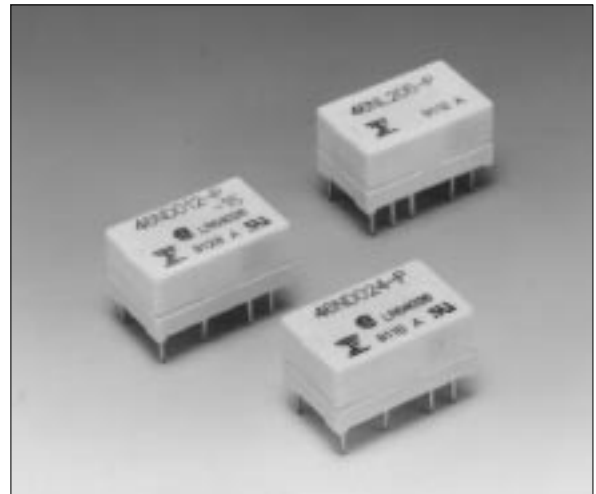
MINIATURE RELAY

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

FBR46 SERIES

■ FEATURES

- Miniature size
About 50% smaller in volume compared with the FBR240 series used mainly in communication equipment.
- High surge voltage
2,500 V minimum of surge strength (Bellcore standard), and 1,500 VAC minimum of dielectric strength between coil and contact (-15, -16 type).
- Low power consumption
85 mW of operate power (150 mW of nominal power consumption) by built-in permanent magnet.
- Shipping tube package



■ ORDERING INFORMATION

[Example] FBR46 N D 012 -P -15 -CSA
 (a) (b) (*) (c) (d) (e) (f)

(a)	Series Name	FBR46: FBR46 Series
(b)	Enclosure	N : Plastic sealed
(*)	Coil Type	D : Standard, -15, -16 (DC coil) G : 65% Operate type L1 : Single winding latching type L2 : Double winding latching type (refer to the SPECIFICATIONS)
(c)	Nominal Voltage	(Example) Standard, -15, -16 type (Example) Latching type 005: 5 VDC 05: 5 VDC 012: 12 VDC 12: 12 VDC (refer to the COIL DATA CHART)
(d)	Contact Material	-P : Gold-overlay silver-palladium
(e)	Dielectric Strength	Nil : Between coil and contacts 1,000 VAC, between contacts 750 VAC -15 : Between coil and contacts 1,500 VAC, between contacts 750 VAC -16 : Between coil and contacts 1,500 VAC, between contacts 1,000 VAC
(f)	Safety Specification	Nil : Standard (UL114 recognized) -CSA : UL114 + CSA recognized

Note: The designation name is stamped on the top of the relay case as follows:
 (Example) Designation ordered: FBR46ND012-P
 Stamp: 46ND012-P

FBR46 SERIES

■ SAFETY STANDARD AND FILE NUMBERS

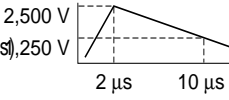
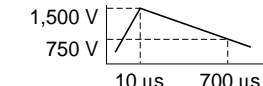
UL114 (File No. E63615)

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

Nominal voltage	Contact rating
1.5 to 24 VDC	1 A 30 VDC resistive 0.5 A 120 VAC resistive

* Excluding latching type FBR46L

■ SPECIFICATIONS

Item		D type, G type	-15 type	-16 type	Latching	
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)	0.15 to 0.2 W 0.25 W	0.2 to 0.25 W		0.2 W	
	Operate power (at 20°C)	0.085 to 0.112 0.106 W maximum	0.112 to 0.14 W maximum		0.128 W maximum	
	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 2 ms				
Insulation	Resistance (initial)	Minimum 1000 MΩ (at 500 VDC)				
	Dielectric Strength (for 1 minute)	between coil and contacts between adjacent contacts	1,000 VAC	1,500 VAC		1,000 VAC
		between open contacts	750 VAC		1,000 VAC	750 VAC
		between set-reset-coil	—			250 VAC
Surge Strength	between coil and contacts between adjacent contacts	1,500 V (at 10 × 700 μs)	 2,500 V (at 2 × 10 μs), 250 V		1,500 V (at 10 × 700 μs)	
	between open contacts	1,500 V (at 10 × 700 μs)			 750 V	

Continued

FBR46 SERIES

Item		D type, G type	-15 type	-16 type	Latching
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 2.5 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 (D type)

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
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 (±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

FBR46 SERIES

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.

4. LATCHING TYPE (L1, L2 type)

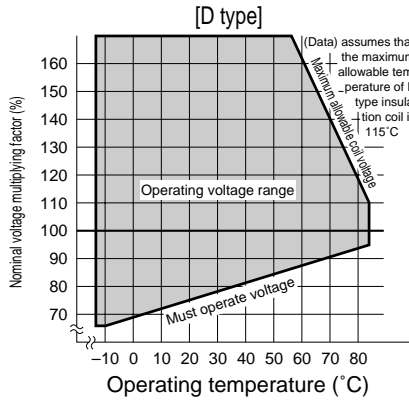
MODEL		Nominal voltage	Coil resistance ($\pm 10\%$)	Nominal current (at nominal voltage) approx.	Must operate voltage*1	Must release voltage*1	Nominal power	Operate power
Single winding latching type	Double winding latching type							
FBR46NL103-P	FBR46NL203-P	3 VDC	45 Ω	67 mA	80% max. of nominal voltage	80% max. of nominal voltage	Approx. 200 mW (at nominal voltage)	Approx. 128 mW max.
FBR46NL105-P	FBR46NL205-P	5 VDC	125 Ω	40 mA				
FBR46NL106-P	FBR46NL206-P	6 VDC	180 Ω	33 mA				
FBR46NL109-P	FBR46NL209-P	9 VDC	405 Ω	22 mA				
FBR46NL112-P	FBR46NL212-P	12 VDC	720 Ω	17 mA				

*1: Specified values are subject to pulse wave voltage.

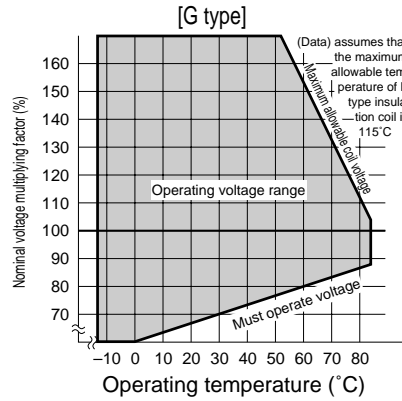
Note: All values in the table are measured at 20°C.

CHARACTERISTIC DATA

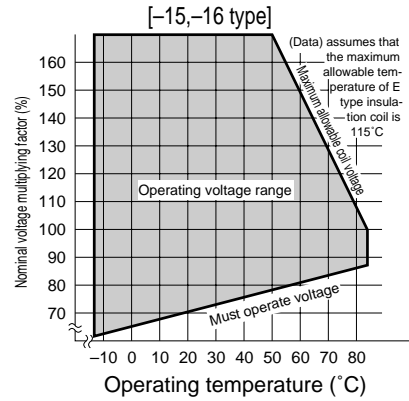
Range of operation temperature and voltage



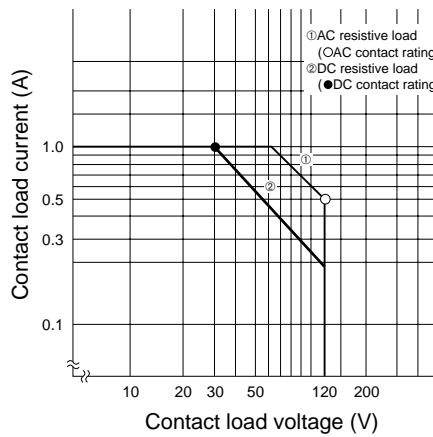
Range of operation temperature and voltage



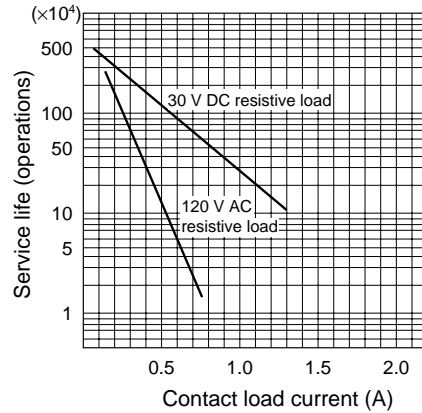
Range of operation temperature and voltage



Maximum switching capacity

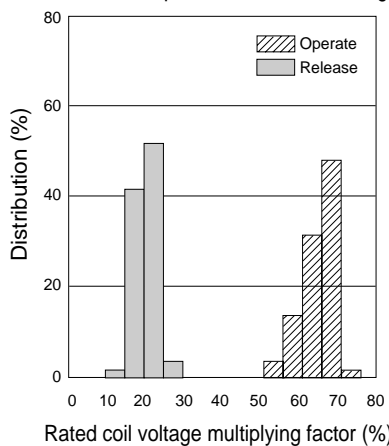


Life curve

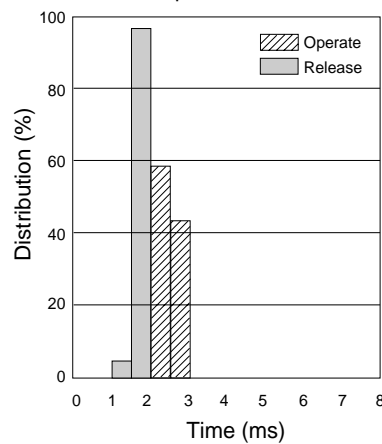


REFERENCE DATA

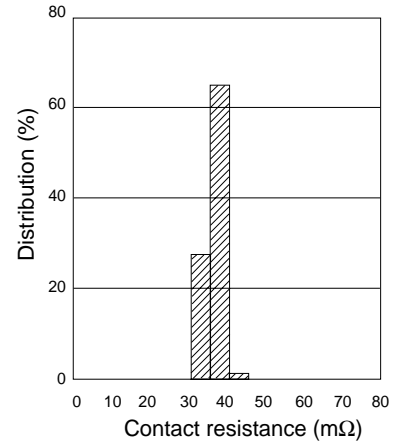
Distribution of operate and release voltage



Distribution of operate and release time



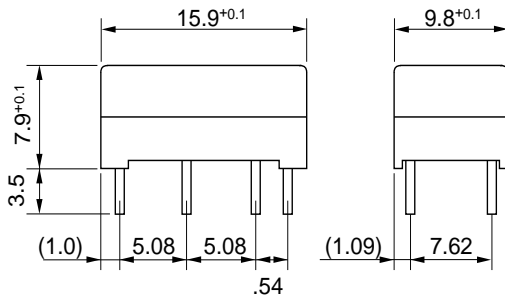
Distribution of contact resistance



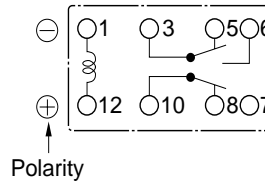
FBR46 SERIES

■ DIMENSIONS

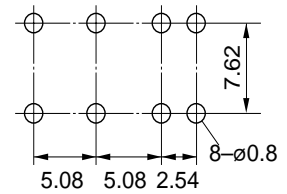
● Dimensions



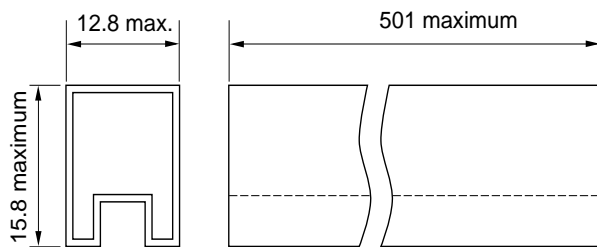
● Schematics (BOTTOM VIEW)



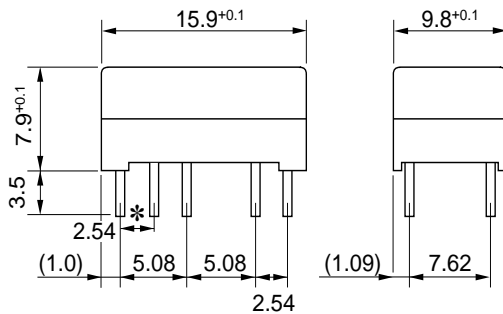
● PC board mounting hole layout (BOTTOM VIEW)



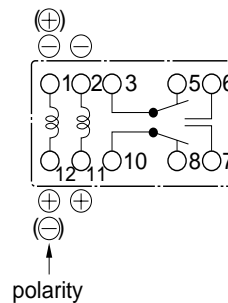
● Tube carrier



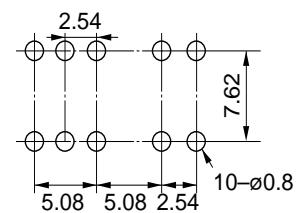
● Dimensions (Latching type)



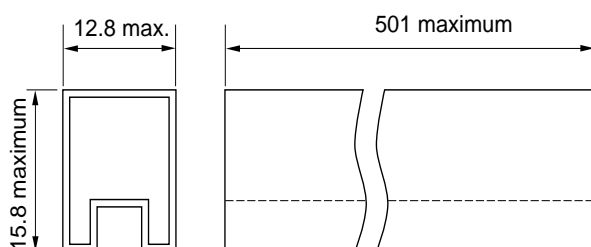
● Schematics (BOTTOM VIEW)



● 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

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