POWER RELAY

1 POLE—3, 5, 10 A

FBR160 SERIES

■ FEATURES

- Compact with high power (3 A to 10 A)
- 6 types of contact materials available for home electronics and automotive applications
- Design conforms to the following safety standards
  UL114 No. E63615
  UL508 No. E63614
  CSA No. LR64026
  Japan Electric Appliance Control Law (150–300 V)
- For automatic assembly
  Tube packaging suitable for automatic insertion equipment is available

■ ORDERING INFORMATION

[Example] FBR16 (a) 1 (b) S (c) E (d) D (e) 012 (f) UH (g) –CSA (h) –*** (i) –S (j)

(a)	Series Name	FBR16: FBR160 Series		
(b)	Contact Arrangement	1 : 1 form C (SPDT) 3 : 1 form A (SPST-NO)		
(c)	Enclosure	S : Flux free N : Plastic sealed		
(d)	Coil Rating	E : Nominal power 0.36 W type C : Nominal power 0.5 W type (refer to the SPECIFICATIONS)		
(e)	Coil	D : DC Coil		
(f)	Nominal Voltage	(Example) 012: 12 VDC coil 024: 24 VDC coil (refer to the COIL DATA CHART)		
(g)	UL Standard and Contact Material	UL 114 recognized	UL508 recognized	Material / Rating
		U	R	Silver (3A)
		UK	RK	Silver-cadmium oxide (3 A)
		UH	RH	Silver-cadmium oxide (5 A)
		UW	RW	Silver tin oxide alloy (5 A)
		UHB	RHB	Silver-cadmium oxide (AC 10 A)
		UWB	RWB	Silver tin oxide alloy (DC 10 A

(Continued)

(h)	CSA Standard	No designation: standard -CSA: CSA recognized (g) specifies UL 114 or UL 508
(i)	Custom Designation	Suffix number for custom design
(j)	Package Style	Nil : Standard tray -S : Tube carrier

Note: The designation name is stamped on the top of the relay case as follows:
(Example) Designation ordered: FBR161NED012-H
Stamp: 161NED012-H

■ SAFETY STANDARD AND FILE NUMBERS

UL 114 (File No. E63615)
UL 508 (File No. E63614)
C22.2, No. 14 (File No. LR40304, LR61320 or LR64026)

Nominal voltage	Type (contact material)	Contact rating	
5 to 24 VDC	Silver (no designation) Silver-cadmium oxide (-K)	3 A 1/10 HP	120 VAC/ 30 VDC resistive 120 VAC
	Silver-cadmium oxide(-H)	5 A 1/6 HP	120 VAC/30 VDC resistive 120 VAC
	Silver tin oxide alloy (-W)		
	Silver tin oxide alloy (-WB)	10 A (N.O.) 7 A (N.C.) 10 A 1/8 HP	120 VAC/250 VAC resistive 30 VDC resistive 120 VAC/250 VAC
	Silver-cadmium oxide (-HB)		

■ SPECIFICATIONS

Item			—	-K	-H	-W	-HB	-WB
Contact	Arrangement and Style		1 form C or 1 form A, single contact					
	Material		Silver	Silver-cadmium oxide		Silver tin oxide alloy	Silver-cadmium oxide	Silver tin oxide alloy
	Resistance (initial)		Maximum 100 mΩ (silver contact at 0.5 A 6 VDC/other contacts at 1 A 6 VDC)					
	Ratings (resistive load)		3 A 120 VAC 3 A 28 VDC		5 A 120 VAC 5 A 28 VDC	5 A 28 VDC	10 A 120 VAC (N.O.) 7 A 120 VAC (N.C.)	10 A 28 VDC
	Maximum Carrying Current		5 A				10 A	10 A
	Maximum Switching Power		360 VA or 84 W		600 VA or 140 W	140 W	1,200 VA	280 W
	Max. Switching Voltage*1		250 VAC or 125 VDC					
	Minimum Switching Load*2		0.3 W (30 mA 5 V)			0.3 W (50 mA 5 V)	0.5 W (100 mA 5 V)	0.5 W (100 mA 5 V)
Coil	Nominal Power		Approx. 0.36 W (E coil type)/0.5 W (C coil type) (at 20°C)					
	Operating Temperature		–30°C to +80°C (no frost) *3					
	Operate Humidity		45 to 85% RH					
Time Value	Operate (at nominal voltage)		Maximum 10 msec					
	Release (at nominal voltage)		Maximum 5 msec					
Insulation	Resistance (initial)		Minimum 100 MΩ (at 500 VDC)					
	Dielectric Strength	Between coil and contacts	1,500 VAC 1 minute					
		Between open contacts	500 VAC 1 minute					
	Surge Strength		3,500 V (at 1.2 × 50 μs)					
Life	Mechanical		1×10^7 operations minimum					
	Electrical (refer to the REFERENCE DATA)	DC	1×10^5 operations minimum (at contact rating)					
		AC	1×10^5 operations minimum (at contact rating)					
Other	Vibration Resistance		10 to 300 Hz (double amplitude of 3.3 mm)					
	Shock Resistance	No contact opening	100 m/s^2 (11 ±1ms)					
		No damage	1,000 m/m^2 (6 ±1ms)					
	Weight		Approximately 11 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.

*3 Based on UL Class A coil insulation system.

■ COIL RATINGS

1. E (0.36 WATT COIL TYPE)

MODEL				Nominal voltage	Coil resistance (±10%)	Nominal current (at nominal voltage) approx.	Must operate voltage	Must release voltage	Maximum allowable voltage	Nominal power	Coil temperature rise
1 Form C type		1 Form A type									
Flux free	Plastic sealed	Flux free	Plastic sealed								
FBR161SED005□	FBR161NED005□	FBR163SED005□	FBR163SED005□	5 VDC	70 Ω	71 mA	80% max. of nominal voltage	10% min. of nominal voltage	210% of nominal voltage	Approx. 360 mW (at nominal voltage)	Approx. 30 deg (at nominal voltage)
FBR161SED006□	FBR161NED006□	FBR163SED006□	FBR163SED006□	6 VDC	100 Ω	60 mA					
FBR161SED009□	FBR161NED009□	FBR163SED009□	FBR163SED009□	9 VDC	225 Ω	40 mA					
FBR161SED012□	FBR161NED012□	FBR163SED012□	FBR163SED012□	12 VDC	400 Ω	30 mA					
FBR161SED024□	FBR161NED024□	FBR163SED024□	FBR163SED024□	24 VDC	1,600 Ω	15 mA					

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

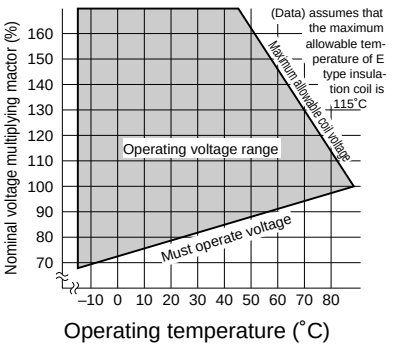
2. C (0.5 WATT COIL TYPE)

MODEL				Nominal voltage	Coil resistance (±10%)	Nominal current (at nominal voltage) approx.	Must operate voltage	Must release voltage	Maximum allowable voltage	Nominal power	Coil temperature rise
1 Form C type		1 Form A type									
Flux free	Plastic sealed	Flux free	Plastic sealed								
FBR161SCD005□	FBR161NCD005□	FBR163SCD005□	FBR163SCD005□	5 VDC	50 Ω	100 mA	75% max. of nominal voltage	10% min. of nominal voltage	210% of nominal voltage	Approx. 500 mW (at nominal voltage)	Approx. 35 deg (at nominal voltage)
FBR161SCD006□	FBR161NCD006□	FBR163SCD006□	FBR163SCD006□	6 VDC	72 Ω	83 mA					
FBR161SCD009□	FBR161NCD009□	FBR163SCD009□	FBR163SCD009□	9 VDC	162 Ω	56 mA					
FBR161SCD012□	FBR161NCD012□	FBR163SCD012□	FBR163SCD012□	12 VDC	288 Ω	42 mA					
FBR161SCD024□	FBR161NCD024□	FBR163SCD024□	FBR163SCD024□	24 VDC	1,152 Ω	21 mA					
FBR161SCD048□	FBR161NCD048□	FBR163SCD048□	FBR163SCD048□	48 VDC	4,600 Ω	10 mA					

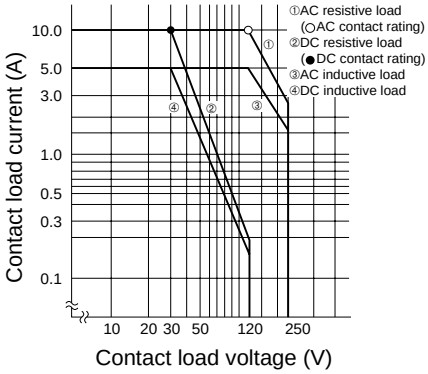
Note: All values in the table are measured at 20°C.

■ CHARACTERISTIC DATA

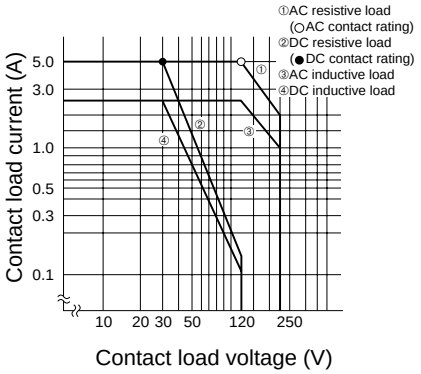
Range of operation temperature and voltage
E type [0.36 W type]



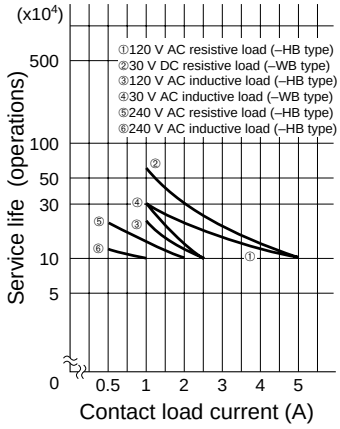
Maximum switching capacity (10 A type)



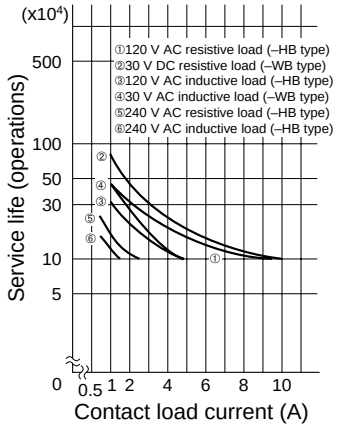
Maximum switching capacity (5 A type)



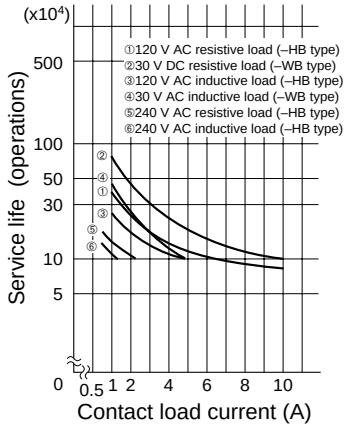
Life curve (5 A type)



Life curve
(10 A type, make side (N.O.))

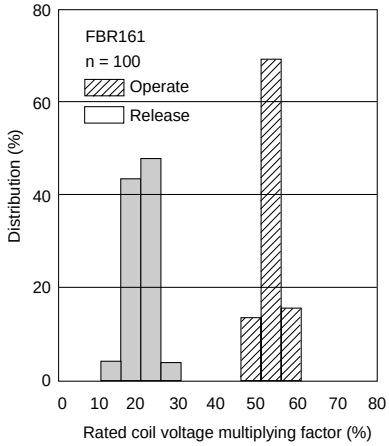


Life curve
(10 A type, breake side (N.C.))

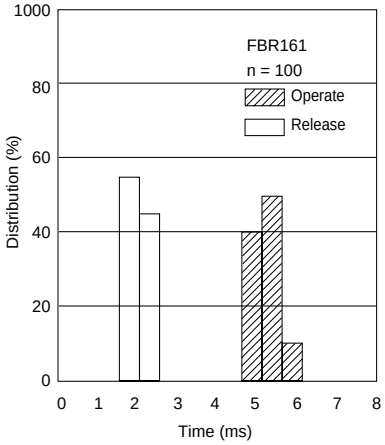


■ REFERENCE DATA

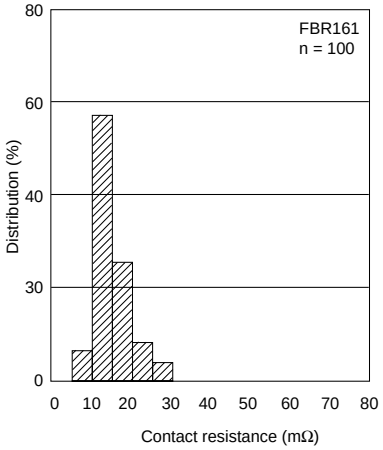
Distribution of operate and release voltage



Distribution of operate and release time

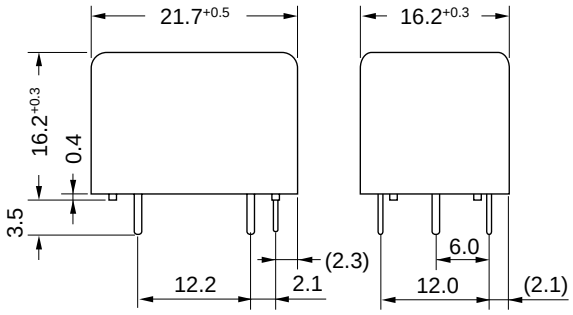


Distribution of contact resistance

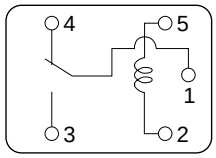


■ DIMENSIONS

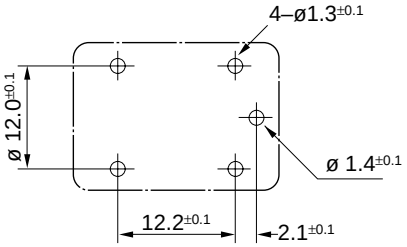
● Dimensions



● Schematic
(BOTTOM VIEW)

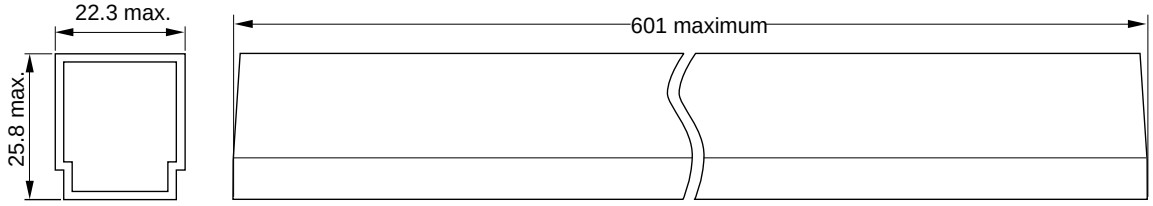


● PC board mounting hole layout
(BOTTOM VIEW)



Note : For 1 form A type, terminal No.4 is removed.

● Tube carrier



25 pieces/tube

Unit: mm

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