

# POWER RELAY

## 1 POLE—3, 5, 10 A (Medium Load Control)

### 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   1   S   E   D   012   UH   -CSA   -\*\*\*   -S  
                   (a)    (b)   (c)   (d)   (e)   (f)   (g)   (h)   (i)   (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 : 360 mW type C : 500 mW 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 UK UH UW UHB UWB	R RK RH RW RHB RWB	Silver (3A) Silver-cadmium oxide (3 A) Silver-cadmium oxide (5 A) Silver tin oxide alloy (5 A) Silver-cadmium oxide (AC 10 A) Silver tin oxide alloy (DC 10 A)

(Continued)

# FBR160 SERIES

(h)	CSA Standard	Nil : Non- CSA -CSA: CSA recognized, but only UL 114 or UL 508 types
(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

## ■ COIL RATINGS

### 1. E (360 mW Coil type)

MODEL				Nominal voltage	Coil resistance ( $\pm 10\%$ )	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 $\Omega$	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 $\Omega$	60 mA					
FBR161SED009 □	FBR161NED009 □	FBR163SED009 □	FBR163SED009 □	9 VDC	225 $\Omega$	40 mA					
FBR161SED012 □	FBR161NED012 □	FBR163SED012 □	FBR163SED012 □	12 VDC	400 $\Omega$	30 mA					
FBR161SED024 □	FBR161NED024 □	FBR163SED024 □	FBR163SED024 □	24 VDC	1,600 $\Omega$	15 mA					

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

### 2. C (50 mW Coil type)

MODEL				Nominal voltage	Coil resistance ( $\pm 10\%$ )	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 $\Omega$	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 $\Omega$	83 mA					
FBR161SCD009 □	FBR161NCD009 □	FBR163SCD009 □	FBR163SCD009 □	9 VDC	162 $\Omega$	56 mA					
FBR161SCD012 □	FBR161NCD012 □	FBR163SCD012 □	FBR163SCD012 □	12 VDC	288 $\Omega$	42 mA					
FBR161SCD024 □	FBR161NCD024 □	FBR163SCD024 □	FBR163SCD024 □	24 VDC	1,152 $\Omega$	21 mA					
FBR161SCD048 □	FBR161NCD048 □	FBR163SCD048 □	FBR163SCD048 □	48 VDC	4,600 $\Omega$	10 mA					

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

# FBR160 SERIES

## ■ 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		5 A 120 VAC		10 A 120 VAC (N.O.) 7 A 120 VAC (N.C.)		
		3 A 28 VDC		5 A 28 VDC		5 A 28 VDC		10 A 28 VDC
	Maximum Carrying Current	5 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* <sup>1</sup>	250 VAC or 125 VDC						
	Minimum Switching Load* <sup>2</sup>	0.3 W (30 mA 5 V)			0.3 W (50 mA 5 VDC)		0.5 W (10 mA 5 VDC) 0.5 W (10 mA 5 VDC)	
Coil	Nominal Power	Approx. 360 mW (E coil type)/0.5 W (C coil type) (at 20°C)						
	Operating Temperature	-30°C to +80°C (no frost) * <sup>3</sup>						
	Operate Humidity	45 to 85% RH						
Time Value	Operate (at nominal voltage)	Maximum 10 msec						
	Release (at nominal voltage)	Maximum 5 msec						
Life	Mechanical	1 × 10 <sup>7</sup> operations minimum						
	Electrical (refer to the REFERENCE DATA)	DC	1 × 10 <sup>5</sup> operations minimum (at contact rating)					
		AC	1 × 10 <sup>5</sup> operations minimum (at contact rating)					
Other	Vibration Resistance	10 to 55 Hz (double amplitude of 1.5mm)						
	Shock Resistance	No contact opening	100 m/s <sup>2</sup> (11 ±1ms)					
		No damage	1,000 m/m <sup>2</sup> (6 ±1ms)					
	Weight	Approximately 11 g						

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

\*<sup>2</sup> 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.

\*<sup>3</sup> Based on UL Class A coil insulation system.

## ■ INSULATION

Item	FBR160 Series
Resistance (500VDC)	Min. 100MΩ
Dielectric Strength	Open contacts: 500VAC 1 min. Coil and contacts: 1,500VAC 1 min.

# FBR160 SERIES

## ■ SAFETY STANDARD AND FILE NUMBERS

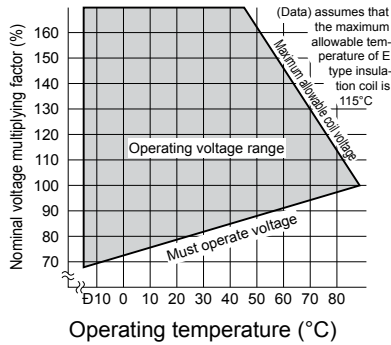
Type	Compliance	Contact rating
UL	UL 114 E 63615 (U, UK, UH, UW, UHB, UWB)  UL 508 E 63614 (R, RK, RH, RW, RHB, RWB)	Flammability: UL 94-V0 (plastics) [U, UK, R, RK] 3A, 120VAC/30VDC (resistive) 1/10 HP, 120VAC [UH, UW, RH, RW] 5A, 120 VAC/30VDC (resistive) 1/6 HP, 120VAC [UHB, UWB, RHB, RWB]
CSA	C22.2 No. 14 LR 40304, LR61320 or LR 64026 (U, UK, UH, UW, UHB, UWB, R, RK, RH, RW, RHB, RWB)	10A, 250 VAC/125VAC (N.O. resistive) 7A, 250 VAC / 125VAC (N.C. resistive) 10A, 30 VDC (resistive) 1/8HP, 250VAC/125VAC

Also complies with VDE

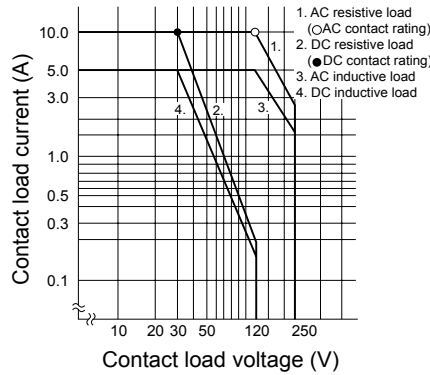
# FBR160 SERIES

## CHARACTERISTIC DATA

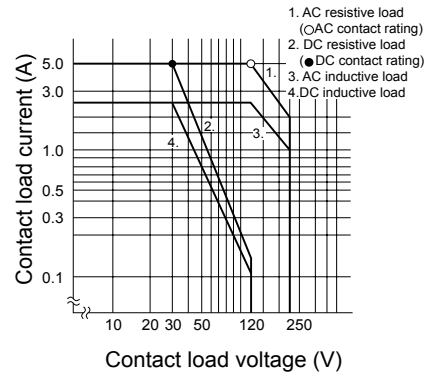
Range of operation temperature and voltage  
E type [0.36 W type]



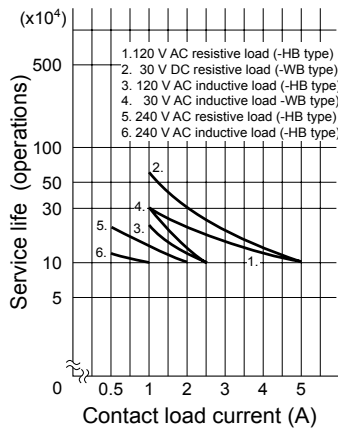
Maximum switching capacity (10 A type)



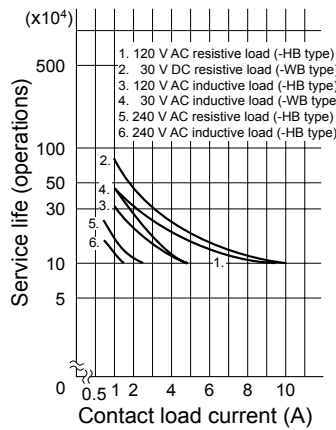
Maximum switching capacity (5 A type)



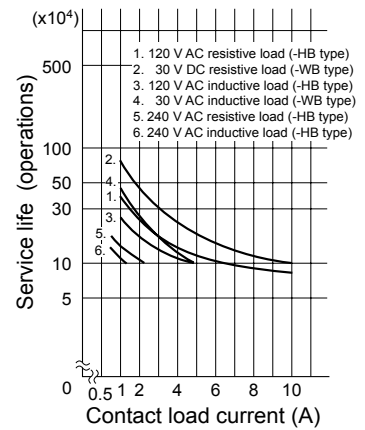
Life curve (5 A type)



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

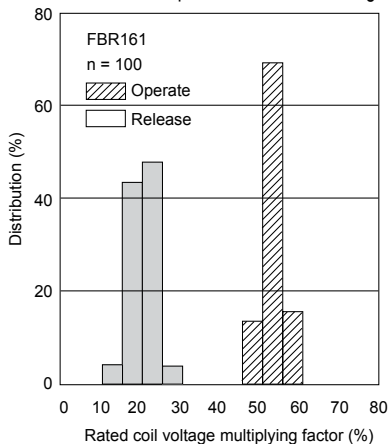


Life curve (10 A type, break side (N.C.))

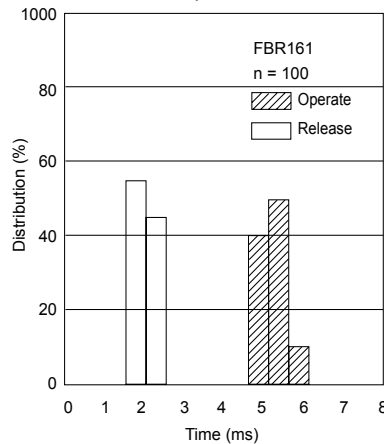


## REFERENCE DATA

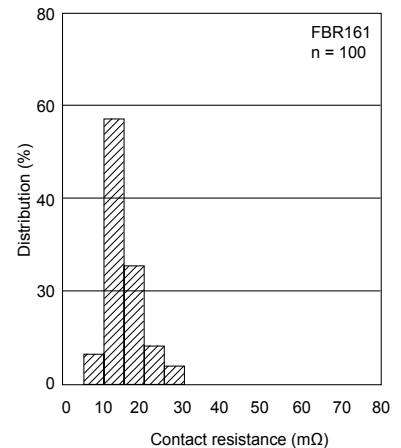
Distribution of operate and release voltage



Distribution of operate and release time



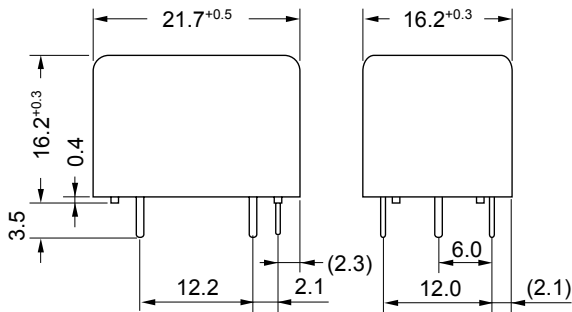
Distribution of contact resistance



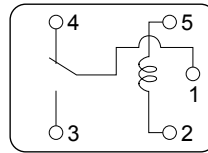
# FBR160 SERIES

## ■ DIMENSIONS

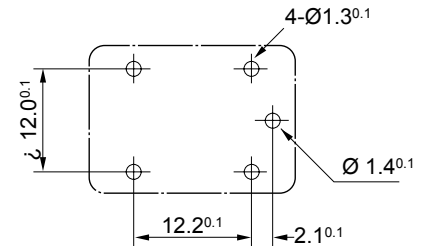
### ● Dimensions



### ● Schematic (BOTTOM VIEW)

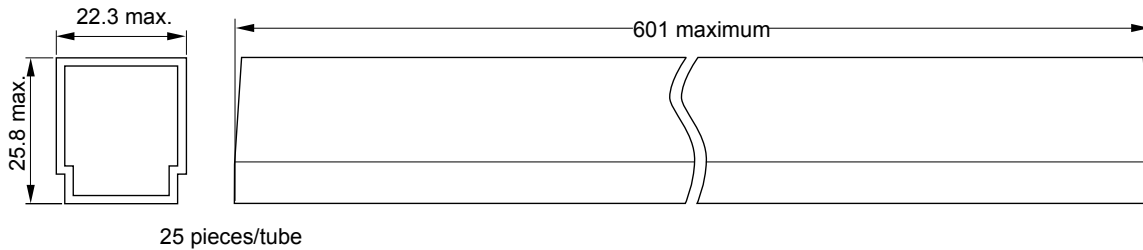


### ● PC board mounting hole layout (BOTTOM VIEW)



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

### ● Tube carrier



25 pieces/tube

Unit: mm

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