

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 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.
*: 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 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.
*: 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* ¹ | 250 VAC or 125 VDC | | | | | | |
| | Minimum Switching Load* ² | 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) * ³ | | | | | | |
| | 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 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 55 Hz (double amplitude of 1.5mm) | | | | | | |
| | 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.

■ INSULATION

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

■ 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 |

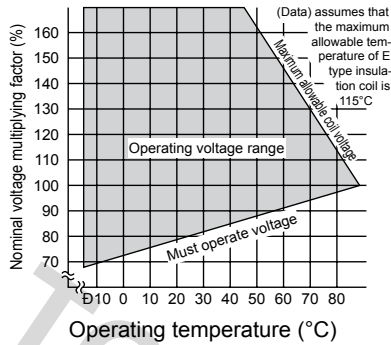
Also complies with VDE

TO BE DISCONTINUED

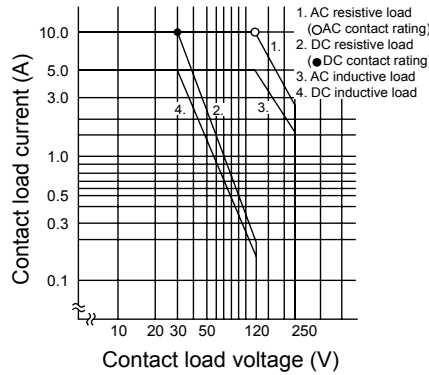
FBR160 SERIES

CHARACTERISTIC DATA

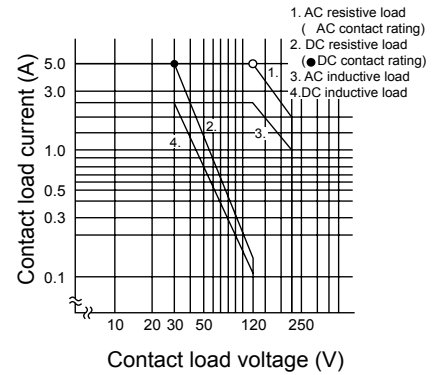
Range of operation temperature and voltage
E type [0.36 W type]



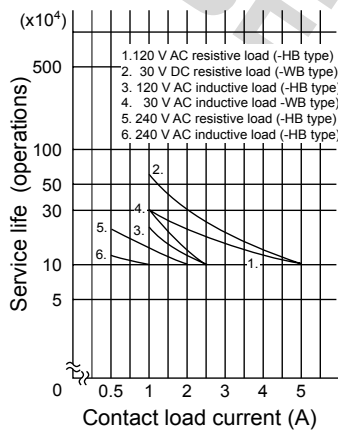
Maximum switching capacity (10 A type)



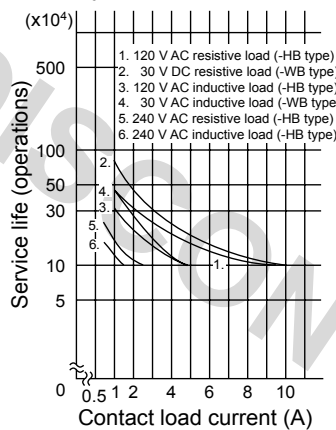
Maximum switching capacity (5 A type)



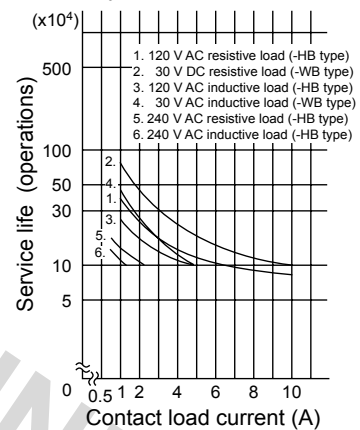
Life curve (5 A type)



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

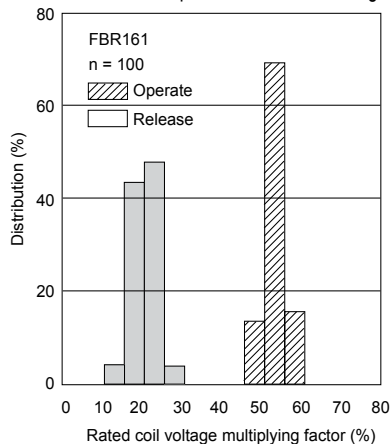


Life curve
(10 A type, break side (N.C.))

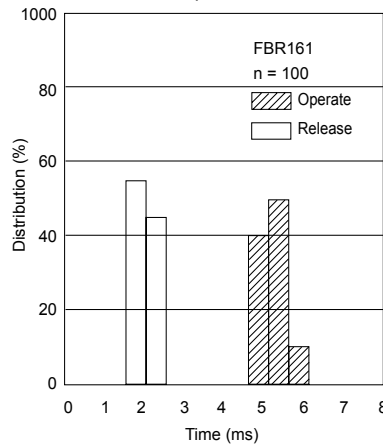


REFERENCE DATA

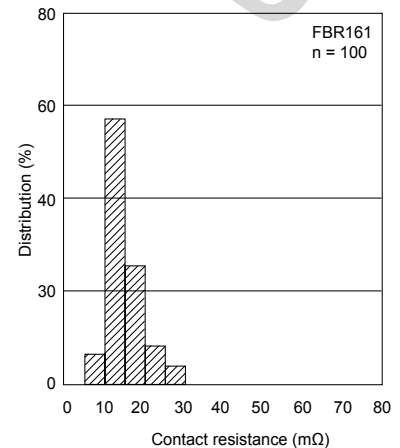
Distribution of operate and release voltage



Distribution of operate and release time



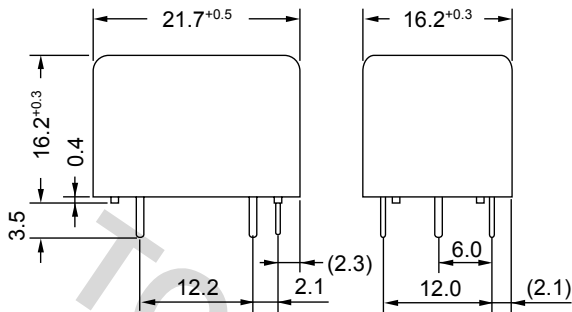
Distribution of contact resistance



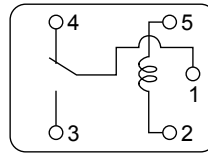
FBR160 SERIES

■ DIMENSIONS

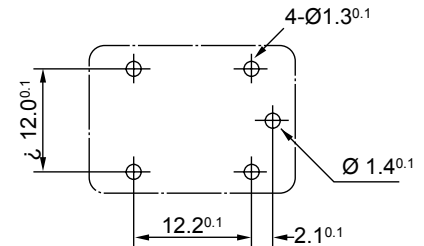
● Dimensions



● Schematic (BOTTOM VIEW)

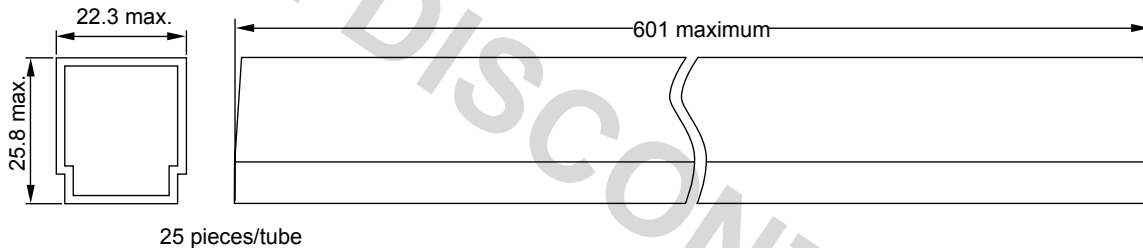


● PC board mounting hole layout (BOTTOM VIEW)



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

● Tube carrier



Unit: mm

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