POWER RELAY

1 POLE—15 to 25 A (FOR AUTOMOTIVE APPLICATIONS)

FBR161,166 Series

■ FEATURES

- Suitable for automotive applications such as motor load controls, door locks, power windows, wipers, etc.
- Variety of contact materials covering wide current switching in range of 15 A to 25 A (at 14 VDC)
- FBR166 series with high conductive spring and improved break performance is also available

■ ORDERING INFORMATION

● FBR161 Series

[Example] FBR161 (a) S (b) E (c) D012 (d) – W (e) ** (f) ** (g)

(a)	Series Name	FBR161: 1 form C FBR161 Series
(b)	Enclosure	S : Flux free type N : Plastic sealed type
(c)	Coil Type	E : Nominal power 0.36 to 0.38 W C : Nominal power 0.45 to 0.5 W
(d)	Nominal Voltage	D012 : 12 VDC (example)
(e)	Contact Material	C : Silver copper (15 A maximum) W : Silver-tin oxide indium (20 A maximum) WB : Silver-tin oxide indium (25 A maximum)
(f)	Custom Designation	Custom specification to be assigned
(g)	Package Style	Nil : Standard tray -S : Tube carrier

● FBR166 Series

[Example] FBR166 (a) S (b) CD009 (c) – WB (d) ** (e) – ** (f)

(a)	Series Name	FBR166: 1 form C FBR166 Series
(b)	Enclosure	S : Flux free type N : Plastic sealed type
(c)	Nominal Voltage	CD009 : 9 VDC (example)
(d)	Contact Material	WB : Silver-tin oxide indium (25 A maximum)
(e)	Custom Designation	Custom specification to be assigned
(f)	Package Style	Nil : Standard tray -S : Tube carrier

■ SPECIFICATIONS

Item			Specifications
Contact	Arrangement		1 Form C (SPDT)
	Material		C : Silver copper (15 A maximum) W : Silver-tin oxide indium (20 A maximum) WB : Silver-tin oxide indium (25 A maximum)
	Voltage Drop (resistance)		Maximum 100 mV (at 1 A 6 VDC)
	Maximum Carrying Current		Contact C and W type: 17 A/1 hour, 5 A (continuously) Contact WB type : 25 A/1 hour, 10 A (continuously) (25°C,100% rated coil voltage)
	Maximum Switching Current		15 A 16 VDC (silver copper: C type) 20 A 16 VDC (silver-tin oxide indium : W type) 25 A 16 VDC (silver-tin oxide indium: WB type)
Coil	Operating Temperature		–40°C to + 85°C (no frost) (refer to the CHARACTERISTIC DATA)
	Storage Temperature		–40°C to + 100°C (no frost)
Time Value	Operate (at nominal voltage)		Maximum 10 ms
	Release (at nominal voltage)		Maximum 5 ms
Life	Mechanical		1×10^7 operations minimum
	Electrical		FBR160 Series: 1×10^5 operations minimum FBR166 Series: 2×10^5 operations minimum (14 VDC, maximum switching current, resistive load) (refer to the CHARACTERISTIC DATA)
Other	Vibration Resistance		10 to 55 Hz (double amplitude of 1.5 mm)
	Shock Resistance	Misoperation	100 m/s^2 (11 $\pm^1$ ms)
		Endurance	1,000 m/s^2 (11 $\pm^1$ ms)
	Weight		Approximately 11 g

■ COIL RATINGS

MODEL		Nominal voltage	Coil resistance voltage ±10%	Must operate voltage (+20°C)	Must operate voltage (+80°C)	Operating voltage (reference)	Nominal power	Contact material	Thermal resistance
FBR161 Series	FBR161S (N) ED009-W32	9 VDC*	210Ω	6.0 V	7.4 V	6.0 V to 14.0 V	Approx. 380 mW	Silver tin indium oxide	84°C/W
	FBR161S (N) ED009-W12	9 VDC*	225Ω	6.5 V	8.0 V	6.5 V to 14.0 V	Approx. 360 mW	Silver tin indium oxide	83°C/W
	FBR161S (N) ED009-WB38	9 VDC*	225Ω	6.3 V	8.0 V	6.5 V to 16.0 V	Approx. 360 mW	Silver tin indium oxide	
	FBR161S (N) CD012-C36	12 VDC	320Ω	7.3 V	9.0 V	7.3 V to 15.5 V	Approx. 450 mW	Silver copper	78°C/W
	FBR161S (N) CD012-W36	12 VDC	320Ω	7.3 V	9.0 V	7.3 V to 15.0 V	Approx. 450 mW	Silver tin indium oxide	
	FBR161S (N) CD012-W31	12 VDC	290Ω	7.3 V	9.0 V	7.3 V to 15.5 V	Approx. 500 mW	Silver tin indium oxide	76°C/W
FBR166 Series	FBR166S (N) CD009-WB	9 VDC*	120Ω	6.3 V	7.8 V	6.3 V to 14.0 V	Approx. 670 mW	Silver tin indium oxide	67°C/W
	FBR166S (N) CD012-WB	12 VDC	210Ω	7.3 V	9.0 V	7.3 V to 14.0 V	Approx. 680 mW	Silver tin indium oxide	

* For typical 12 VDC automotive applications.

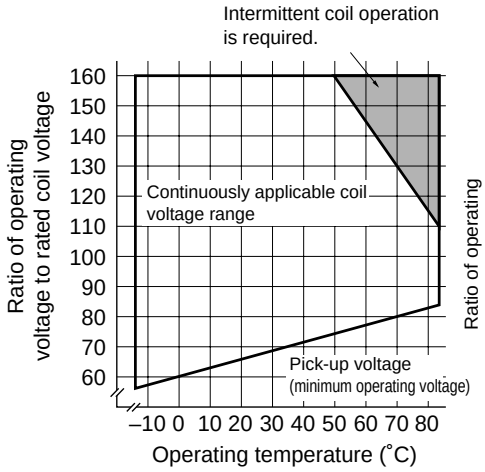
■ CHARACTERISTIC DATA

1. SERVICE LIFE WITH ACTUAL MOTOR LOAD TEST (example)

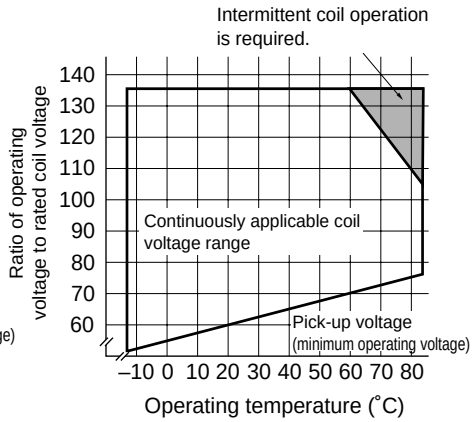
- Wiper motor (free, 16 VDC inrush 20 A, break 2 A) : more than 3×10^5 operations (FBR160-W, silver tin oxide alloy)
- Wiper motor (free, 14 VDC inrush 25 A, break 5 A) : more than 5×10^5 operations (FBR160-WB, silver tin oxide alloy)
- Door lock motor (stall, 14 VDC inrush -25 A) : more than 1×10^5 operations (FBR160-W, silver tin oxide alloy)
- Door lock motor (stall, 14 VDC inrush -25 A) : more than 2×10^5 operations (FBR166)

2. OPERATING COIL VOLTAGE (example)

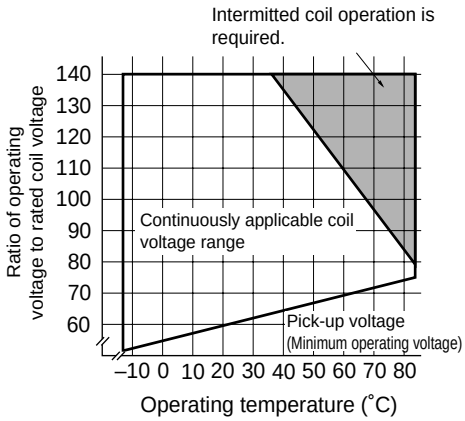
[FBR161S(N)ED009-W32, approximately 380 mW type]



[FBR161SCD012-W36, Approximately 450 mW type]

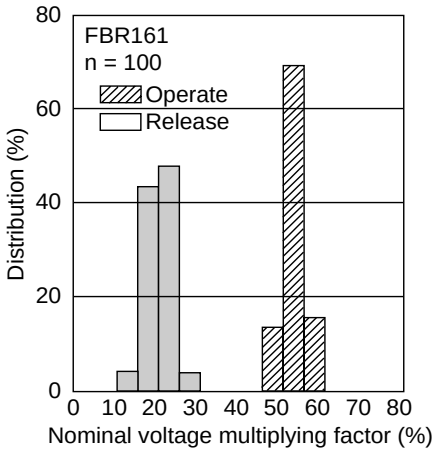


[FBR166S (N) CD012-WB, approximately 680 mW type]

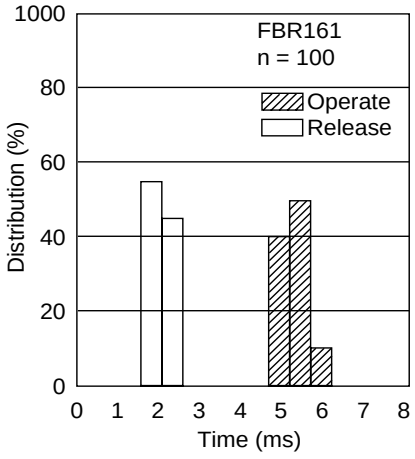


■ REFERENCE DATA

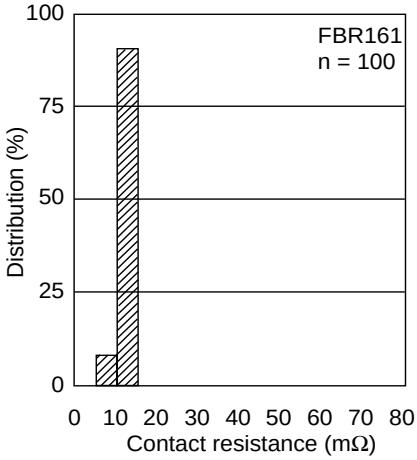
Distribution of operate and release voltage



Distribution of operate and release time

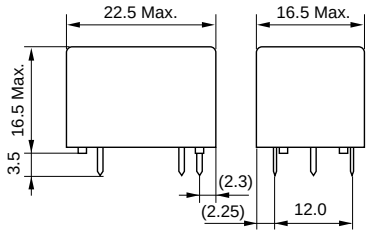


Distribution of contact resistance

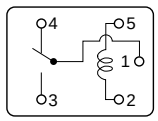


■ DIMENSIONS

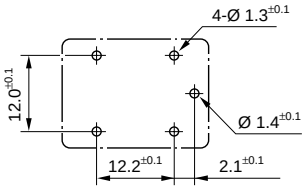
● Dimensions



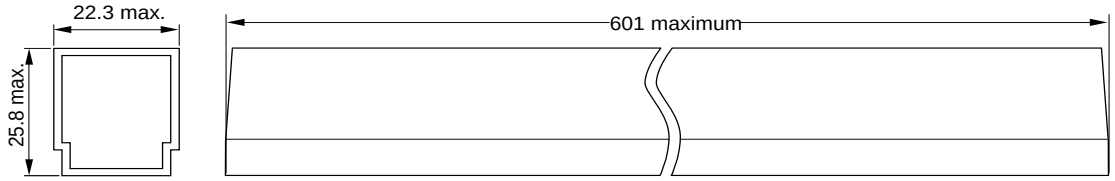
● Schematic
(BOTTOM VIEW)



● PC board mounting hole layout
(BOTTOM VIEW)



● Tube carrier



25 pieces/tube

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