

POWER RELAY

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

FBR161,166 Series

RoHS compliant

■ 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
- RoHS compliant since date code: 0626
Please see page 9 for more information
- FBR161 Series



■ ORDERING INFORMATION

[Example] $\frac{\text{FBR161}}{\text{(a)}} \frac{\text{S}}{\text{(b)}} \frac{\text{E}}{\text{(c)}} \frac{\text{D012}}{\text{(d)}} - \frac{\text{W}}{\text{(e)}} \frac{\text{**}}{\text{(f)}} \frac{\text{**}}{\text{(g)}}$

(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] $\frac{\text{FBR166}}{\text{(a)}} \frac{\text{S}}{\text{(b)}} \frac{\text{CD009}}{\text{(c)}} - \frac{\text{WB}}{\text{(d)}} \frac{\text{**}}{\text{(e)}} - \frac{\text{**}}{\text{(f)}}$

(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

FBR161,166 SERIES

■ 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 ±1 ms)
		Endurance	1,000 m/s ² (11 ±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.

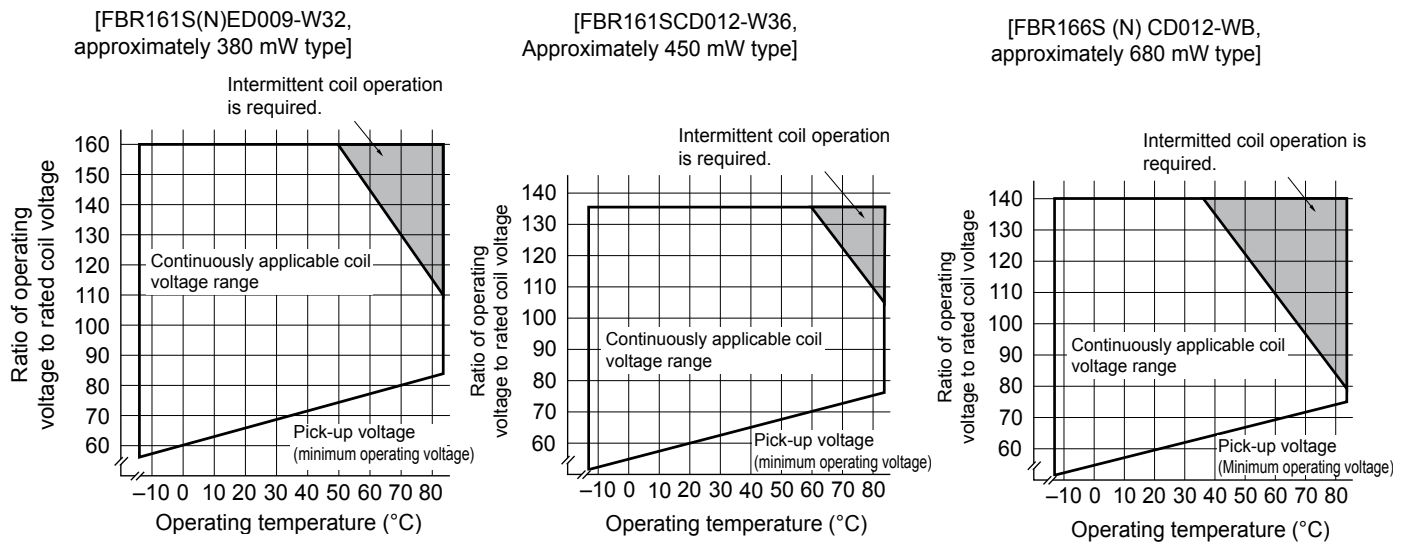
FBR161,166 SERIES

CHARACTERISTIC DATA

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

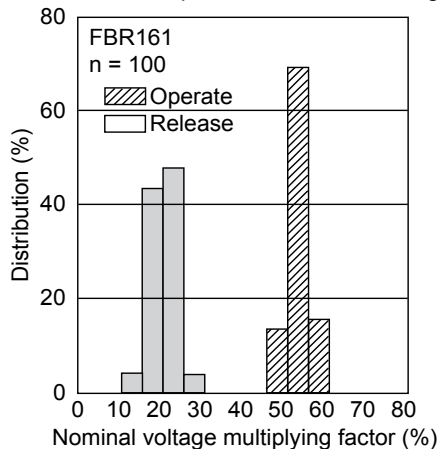
- Wiper motor (free, 16 VDC inrush 20 A, break 2 A) : more than 3×10^5 operations (FBR160-W, silver tin oxide alloy)
- Wiper motor (free, 14 VDC inrush 25 A, break 5 A) : more than 5×10^5 operations (FBR160-WB, silver tin oxide alloy)
- Door lock motor (stall, 14 VDC inrush -25 A) : more than 1×10^5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

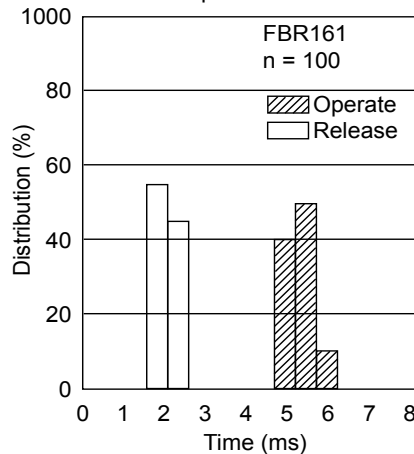


REFERENCE DATA

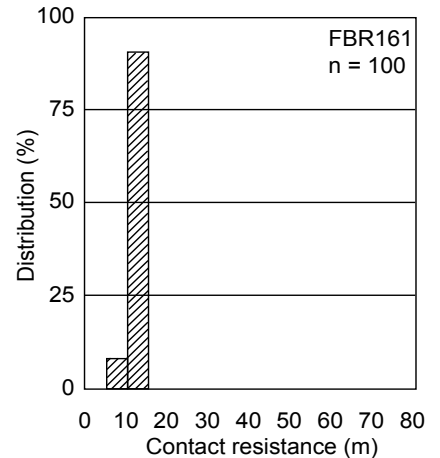
Distribution of operate and release voltage



Distribution of operate and release time



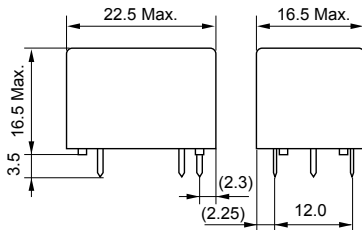
Distribution of contact resistance



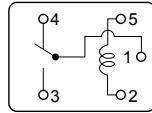
FBR161,166 SERIES

■ DIMENSIONS

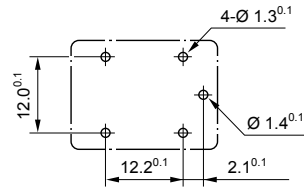
● Dimensions



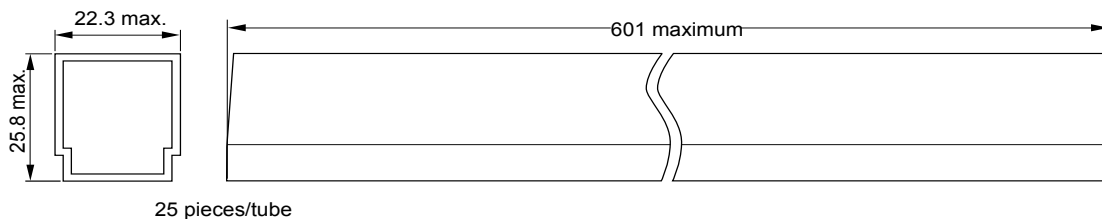
● Schematic (BOTTOM VIEW)



● PC board mounting hole layout (BOTTOM VIEW)



● Tube carrier



RoHS Compliance and Lead Free Relay Information

1. General Information

- Relays produced after the specific date code that is indicated on each data sheet are lead-free now. Most of our signal and power relays are lead-free. Please refer to Lead-Free Status Info. (<http://www.fujitsu.com/us/downloads/MICRO/fcai/relays/lead-free-letter.pdf>)
- Lead free solder paste currently used in relays is Sn-3.0Ag-0.5Cu.
- All signal and most power relays also comply with RoHS. Please refer to individual data sheets. Relays that are RoHS compliant do not contain the 5 hazardous materials that are restricted by RoHS directive (lead, mercury, chromium IV, PBB, PBDE).
- It has been verified that using lead-free relays in leaded assembly process will not cause any problems (compatible).
- "LF" is marked on each outer and inner carton. (No marking on individual relays).
- To avoid leaded relays (for lead-free sample, etc.) please consult with area sales office.
- We will ship leaded relays as long as the leaded relay inventory exists.

Note: Cadmium was exempted from RoHS on October 21, 2005. (Amendment to Directive 2002/95/EC)

2. Recommended Lead Free Solder Profile

- Recommended solder paste Sn-3.0Ag-0.5Cu.

Reflow Solder condition

Flow Solder condition:

Pre-heating: maximum 120°C
Soldering: dip within 5 sec. at
260°C solder bath

Solder by Soldering Iron:

Soldering Iron
Temperature: maximum 360°C
Duration: maximum 3 sec.

We highly recommend that you confirm your actual solder conditions

3. Moisture Sensitivity

- Moisture Sensitivity Level standard is not applicable to electromechanical relays.

4. Tin Whisker

- Dipped SnAgCu solder is known as low risk tin whisker. No considerable length whisker was found by our in house test.

Fujitsu Components International Headquarter Offices

Japan

Fujitsu Component Limited
Gotanda-Chuo Building
3-5, Higashigotanda 2-chome, Shinagawa-ku
Tokyo 141 8630, Japan
Tel: (81-3) 5449-7010
Fax: (81-3) 5449-2626
Email: promothq@fcl.fujitsu.com
Web: www.fcl.fujitsu.com

North and South America

Fujitsu Components America, Inc.
250 E. Caribbean Drive
Sunnyvale, CA 94089 U.S.A.
Tel: (1-408) 745-4900
Fax: (1-408) 745-4970
Email: components@us.fujitsu.com
Web: <http://www.fujitsu.com/us/services/edevice/components/>

Europe

Fujitsu Components Europe B.V.
Diamantlaan 25
2132 WV Hoofddorp
Netherlands
Tel: (31-23) 5560910
Fax: (31-23) 5560950
Email: info@fceu.fujitsu.com
Web: emea.fujitsu.com/components/

Asia Pacific

Fujitsu Components Asia Ltd.
102E Pasir Panjang Road
#01-01 Citilink Warehouse Complex
Singapore 118529
Tel: (65) 6375-8560
Fax: (65) 6273-3021
Email: fcal@fcal.fujitsu.com
Web: <http://www.fujitsu.com/sg/services/micro/components/>

©2006 Fujitsu Components America, Inc. All rights reserved. All trademarks or registered trademarks are the property of their respective owners.

Fujitsu Components America or its affiliates do not warrant that the content of datasheet is error free. In a continuing effort to improve our products Fujitsu Components America, Inc. or its affiliates reserve the right to change specifications/datasheets without prior notice.
Rev. July 26/2006