

COMPACT HIGH POWER RELAY

1 POLE - 30A (for automotive applications)

FBR56 Series

■ **FEATURES**

- High power contact capacity
(carrying current: 40 A/10 minutes, 30 A/1 hour)
 - High heat resistance and extended operating voltage
 - Contact gap 0.4mm
 - RoHS compliant
- Please see page 7 for more information



■ **PARTNUMBER INFORMATION**

[Example] FBR56 N D12 - W1 - **
 (a) (b) (c) (d) (e)

| | | |
|-----|--------------------|---|
| (a) | Relay type | FBR56 : FBR56 Series (for 12V battery, contact gap 0.4mm) |
| (b) | Enclosure | Nil : Flux proof N : Plastic sealed type |
| (c) | Coil rated voltage | D12 : 6.....12 VDC Coil rating table at page 3 |
| (d) | Contact material | W1 : Silver-tin oxide indium Y : Silver-tin oxide |
| (e) | Special type | To be assigned custom specification |

Actual marking does not carry the type name: "FBR"
 E.g.: Ordering code: FBR56ND12-W1 Actual marking: 56ND12-W1

FBR56 SERIES

■ SPECIFICATION

| Item | FBR56 | | |
|--------------|------------------------------|---------------------|--|
| Contact Data | Configuration | | 1 form C |
| | Material | | Silver-tin oxide indium (-W1 type) Silver-tin oxide (-Y type) |
| | Voltage drop (resistance) | | Max.100 mV at 1A, 12VDC |
| | Contact rating | | 14VDC, 30A (locked motor load) 14 VDC, Inrush 27A, break 4A (motor free load) |
| | Max. carrying current | | 40A/10 minutes, 30A/1 hour (25 °C, 100% rated coil voltage) |
| | Max. inrush current | | 70A (reference) |
| | Max. switching voltage | | 16VDC (reference) |
| | Max. switching current | | 40A (reference) |
| | Min. switching load * | | 6 VDC, 1A |
| Life | Mechanical | | Min. 10 x 10 ⁶ operations |
| | Electrical | | Min. 100 x 10 ³ operations (locked motor load) Min. 1 x 10 ⁶ operations (motor free load) |
| Coil Data | Operating temperature range | | -40 °C to +85 °C (no frost) |
| | Storage temperature range | | -40 °C to +100 °C (no frost) |
| Timing Data | Operate (at nominal voltage) | | Max. 10 ms |
| | Release (at nominal voltage) | | Max. 5 ms |
| Other | Vibration resistance | | 10 to 55Hz double amplitude 1.5mm |
| | Shock | Misoperation | 100m/s ² |
| | | Endurance | 1,000m/s ² |
| Weight | | Approximately 9.4 g | |

* Minimum switching loads mentioned above are reference values. Please perform the confirmation test with actual load before production since reference values may vary according to switching frequencies, environmental conditions and expected reliability levels.

FBR56 SERIES

■ COIL RATING

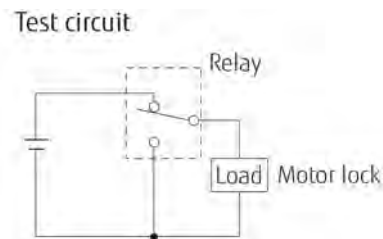
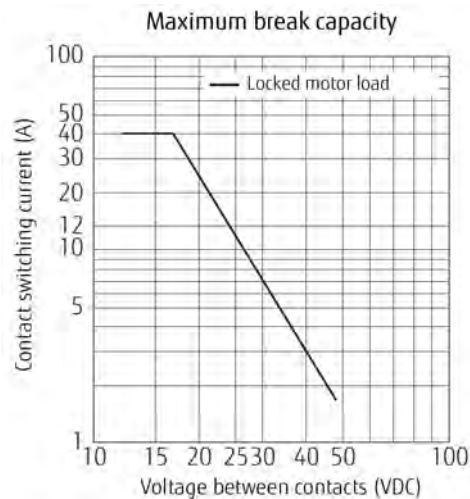
| Coil Code | Rated Coil Voltage (VDC) | Coil Resistance +/- 10% (Ohm) | Must Operate Voltage (VDC) * | Must Release Voltage (VDC) * |
|-----------|--------------------------|-------------------------------|------------------------------|------------------------------|
| D06 | 6 | 42 | 3.6 (at 20 °C) | 0.5 (at 20 °C) |
| | | | 4.5 (at 85 °C) | 0.6 (at 85 °C) |
| D09 | 9 | 95 | 5.4 (at 20 °C) | 0.7 (at 20 °C) |
| | | | 6.8 (at 85 °C) | 0.8 (at 85 °C) |
| D12 | 12 | 170 | 7.3 (at 20 °C) | 1 (at 20 °C) |
| | | | 9.2 (at 85 °C) | 1.2 (at 85 °C) |

Note: All values in the table are valid for 20°C and zero contact current, unless otherwise stated.
* Specified operate values are valid for pulse wave voltage.

■ PRINCIPAL APPLICATIONS

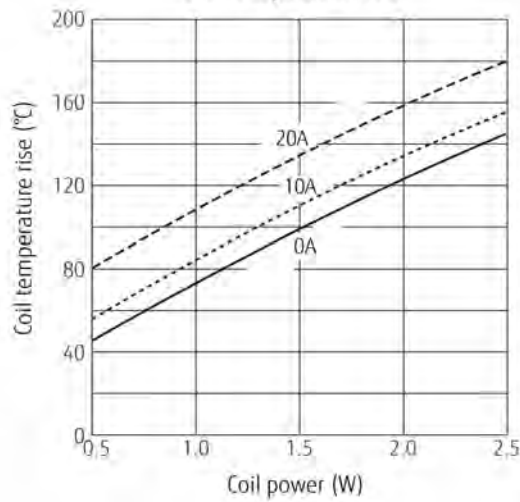
| Application | | Normal load current | Life x 10 ³ | Recommended model (Example) |
|-----------------|---------------------|---|------------------------|-----------------------------|
| For 12V battery | Power windows | 20A tot 30A (switching at motor locking) | 100 | FBR56N () -Y |
| | Automatic door lock | 18A to 30A / 4 to 5 door (switching at motor locking) | 100 | FBR56N () - Y |
| | Intermittent wipers | Inrush 15A to 30A Break 2A to 8A (motor free) | 300 | FBR56N () - W1 |
| | Tilt-lock wheel | Inrush 15A Break 2.5A (motor free) | 100 | FBR56N () - Y |
| | Sunroof | 20A to 30A (switching at motor locking) | 100 | FBR56N () - Y |
| | Others | Car audio system, etc. | - | FBR56N () - Y |

■ CHARACTERISTIC DATA

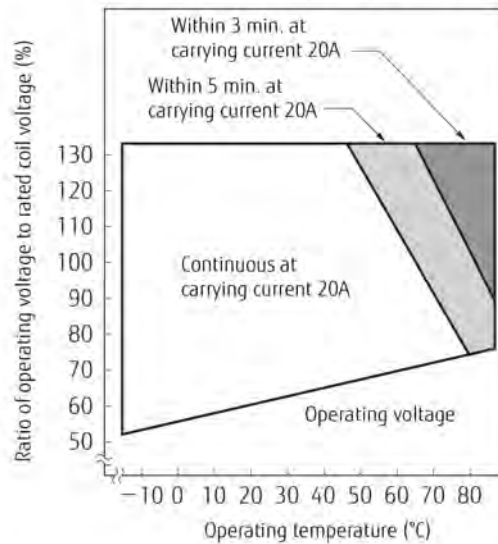


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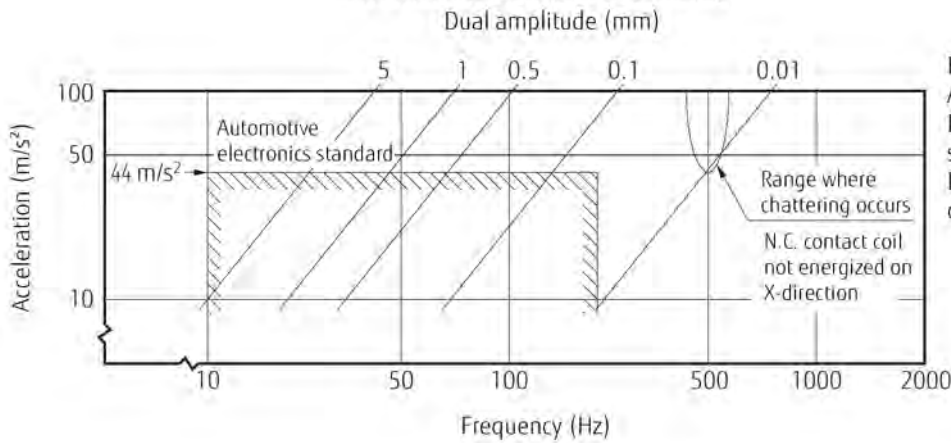
Coil temperature rise



Operating coil voltage range (example)

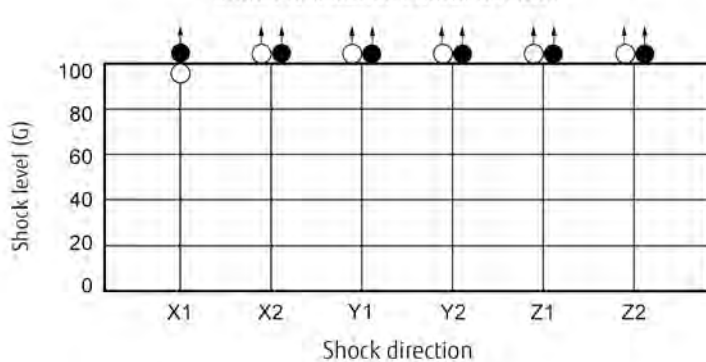


Vibration resistance characteristics



Frequency: 10~2000 Hz
 Acceleration: 100 m/s² max.
 Direction of vibration;
 see diagram below
 Detection level:
 chatter > 100 μs

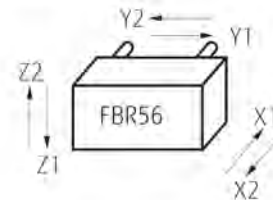
Shock resistance characteristics



Shock application time: 11ms, half-sine wave
 Test condition: coil energized and de-energized
 Shock direction: see diagram below.
 Detection level: chatter > 100 μs

- : N.C. contact (coil de-energized)
- : N.O. contact (coil energized)

All directions ≥ 1,000 m/s²



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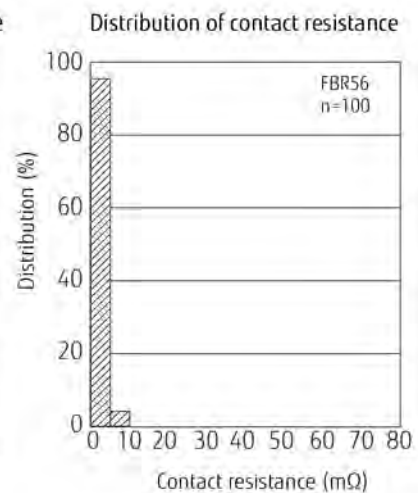
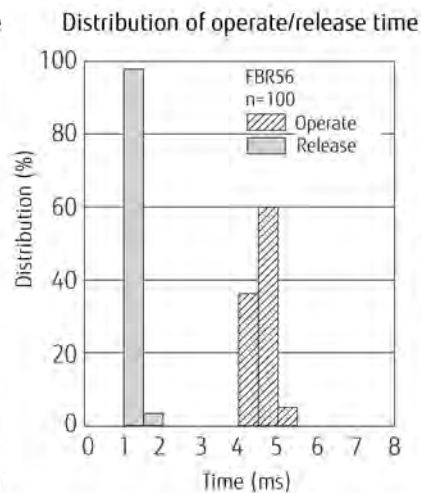
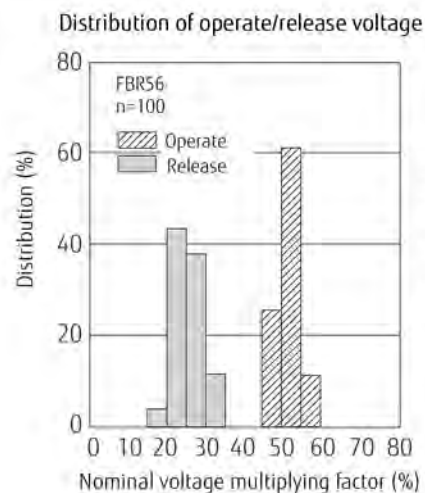
Life test (example)

(1) Motor lock

| Test item | Test circuit | Current wave form |
|--|--------------|-------------------|
| 20A, 14VDC Motor lock 200,000 operations minimum Contact material: Silver tin oxide indium | | |
| 30A, 14VDC Motor lock 100,000 operations minimum Contact material: Silver tin oxide indium | | |

(2) Motor free

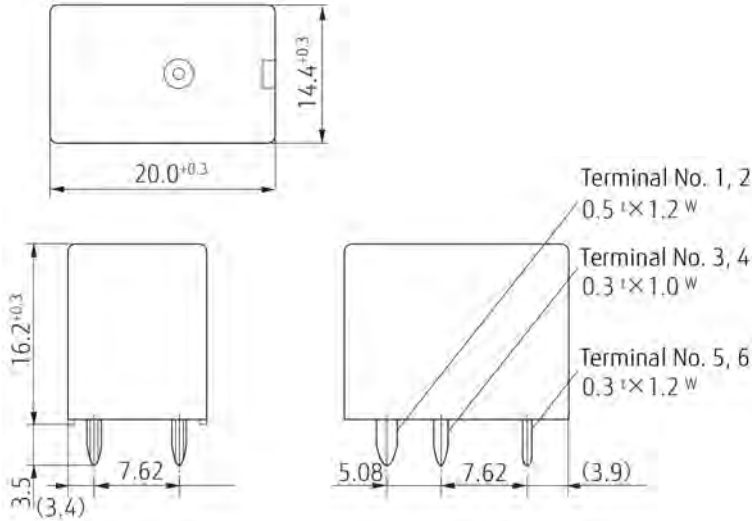
| Test item | Test circuit | Current wave form |
|--|--------------|-------------------|
| Inrush 27A, Idle 4A 14VDC Motor free 100,000 operations minimum Contact material: Silver tin oxide indium | | |



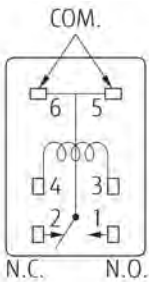
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■ DIMENSIONS

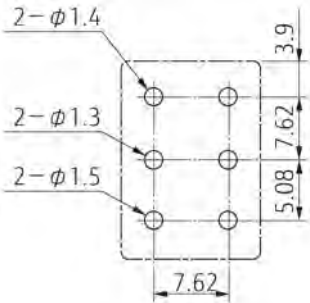
● Dimensions



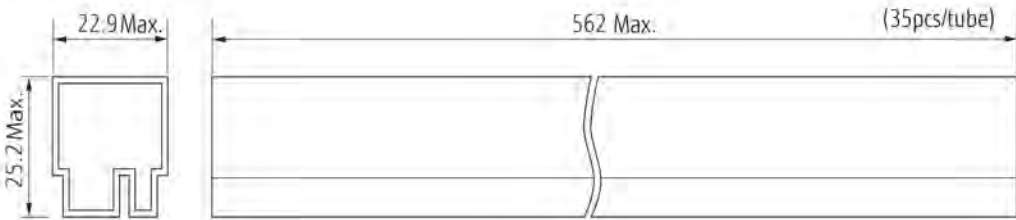
● Schematics (BOTTOM VIEW)



● PC board mounting hole layout (BOTTOM VIEW)



● Tube carrier



Unit: mm

RoHS Compliance and Lead Free Information

1. General Information

- All relays produced by Fujitsu Components are compliant with RoHS directive 2011/65/EU including amendments.
- Cadmium as used in electrical contacts is exempted from the RoHS directives. As per Annex III of directive 2011/65/EU.
- All relays are lead-free. Please refer to Lead-Free Status Info for older date codes at: <http://www.fujitsu.com/downloads/MICRO/fcai/relays/lead-free-letter.pdf>
- Lead free solder plating on relay terminals is Sn-3.0Ag-0.5Cu, unless otherwise specified. This material has been verified to be compatible with PbSn assembly process.

2. Recommended Lead Free Solder Condition

Flow Solder condition:

Pre-heating: maximum 120°C
Soldering: dip within 5 sec at
255°C ± 5°C solder bath
Relay must be cooled by air immediately
after soldering

Solder by Soldering Iron:

Soldering Iron 30-60W
Temperature: maximum 350-360°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, unless otherwise indicated.

4. Tin Whiskers

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

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