

# COMPACT POWER TWIN RELAY

## 1 POLE x 2—30A (Dual relay)

### (FOR AUTOMOTIVE APPLICATIONS)

## FBR512, 522 SERIES

#### ■ FEATURES

- Two independent relays mounted in a single package
- Miniature size  
(54% of the volume of the FBR160 relays)
- High current contact capacity  
(carrying current: 35 A/10 minutes, 25 A/1 hour)
- High resistance to vibration and shock
- Improved heat resistance and extended operating range
- Two contact gap options  
(FBR510: 0.3 mm, FBR520: 0.6 mm)
- Two types of contact material



#### ■ ORDERING INFORMATION

FBR512 N D12 - W1 \*\*

[Example] —(a)— (b)— (c)— (d)— (e)—

|     |                    |                                                                                               |
|-----|--------------------|-----------------------------------------------------------------------------------------------|
| (a) | Series Name        | FBR512: Standard type (contact gap 0.3 mm)<br>FBR522: Wider contact type (contact gap 0.6 mm) |
| (b) | Enclosure          | N : Plastic sealed type                                                                       |
| (c) | Nominal Voltage    | D06 : 6 VDC<br>D09 : 9 VDC<br>D10 : 10 VDC<br>D12 : 12 VDC                                    |
| (d) | Contact Material   | W1 : Silver-tin oxide indium (high power type)                                                |
| (e) | Custom Designation | To be assigned custom specification                                                           |

# FBR512, 522 SERIES

## ■ SPECIFICATIONS

| Item       |                                    |              | Specifications                                                            |
|------------|------------------------------------|--------------|---------------------------------------------------------------------------|
|            |                                    |              | W1 contact                                                                |
| Contact    | Arrangement                        |              | 1 form C × 2 (SPDT × 2)                                                   |
|            | Material                           |              | Silver-tin oxide indium (high power type)                                 |
|            | Voltage Drop (Resistance)          |              | Maximum 100 mV (at 1 A 12 VDC)                                            |
|            | Rating                             |              | 14 VDC 25 A (locked motor load)                                           |
|            | Maximum Carrying Current*1         |              | 35 A/10 minutes, 30 A/1 hour (25°C, 100% rated coil voltage)              |
|            | Max. Inrush Current (Reference)    |              | 60 A                                                                      |
|            | Max. Switching Current (Reference) |              | 35 A 16 VDC                                                               |
|            | Min. Switching Load*2 (Reference)  |              | 1 A 6 VDC                                                                 |
| Coil       | Operating Temperature              |              | −40°C to + 85°C (no frost)                                                |
|            | 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 <sup>7</sup> operations minimum                                    |
|            | Electrical                         |              | 2 × 10 <sup>5</sup> operations minimum<br>14 VDC 25 A (locked motor load) |
| Other      | Vibration Resistance               |              | 10 to 55 Hz (double amplitude of 1.5 mm)                                  |
|            | Shock Resistance                   | Misoperation | 100 m/s <sup>2</sup>                                                      |
|            |                                    | Endurance    | 1,000 m/s <sup>2</sup>                                                    |
|            | Weight                             |              | Approximately 13 g                                                        |

\*1 Need to consider the heat from PCB when max. current is more than 10A

\*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 operating environment.

## ■ COIL DATA CHART

### 1. FBR512 SERIES

| MODEL         | Nominal voltage | Coil resistance (±10%) (at 20°C) | Must operate voltage*                  | Thermal resistance |
|---------------|-----------------|----------------------------------|----------------------------------------|--------------------|
| W1 contact    |                 |                                  |                                        |                    |
| FBR512ND06-W1 | 6 VDC           | 60 Ω                             | 3.6 VDC (at 20°C)<br>4.5 VDC (at 85°C) | 73°C/W             |
| FBR512ND09-W1 | 9 VDC           | 135 Ω                            | 5.4 VDC (at 20°C)<br>6.8 VDC (at 85°C) |                    |
| FBR512ND10-W1 | 10 VDC          | 180 Ω                            | 6.3 VDC (at 20°C)<br>7.9 VDC (at 85°C) |                    |
| FBR512ND12-W1 | 12 VDC          | 240 Ω                            | 7.3 VDC (at 20°C)<br>9.2 VDC (at 85°C) |                    |

\* Pulse drive

# FBR512, 522 SERIES

## 2. FBR522 SERIES

| MODEL         | Nominal voltage | Coil resistance<br>( $\pm 10\%$ ) (at 20°C) | Must operate voltage*                  | Thermal resistance |
|---------------|-----------------|---------------------------------------------|----------------------------------------|--------------------|
| W1 contact    |                 |                                             |                                        |                    |
| FBR522ND06-W1 | 6 VDC           | 45 $\Omega$                                 | 3.6 VDC (at 20°C)<br>4.5 VDC (at 85°C) | 65°C/W             |
| FBR522ND09-W1 | 9 VDC           | 100 $\Omega$                                | 5.4 VDC (at 20°C)<br>6.8 VDC (at 85°C) |                    |
| FBR522ND10-W1 | 10 VDC          | 135 $\Omega$                                | 6.3 VDC (at 20°C)<br>7.9 VDC (at 85°C) |                    |
| FBR522ND12-W1 | 12 VDC          | 180 $\Omega$                                | 7.3 VDC (at 20°C)<br>9.2 VDC (at 85°C) |                    |

\* Pulse drive

## ■ SUITABLE APPLICATION

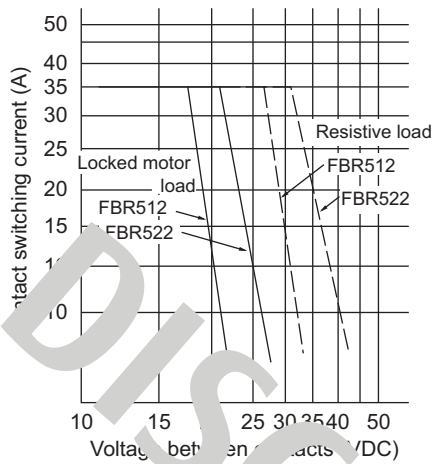
| Application                             | Normal load current<br>(12 VDC system)                  | Description                          | Recommended model (example)            |                                                |
|-----------------------------------------|---------------------------------------------------------|--------------------------------------|----------------------------------------|------------------------------------------------|
|                                         |                                                         |                                      | For 16 V or less<br>motor load voltage | For instantaneous<br>20 V or more load voltage |
| Power Windows                           | 20 to 25 A<br>(switching at motor locking)              | forward and reverse<br>motor control | FBR512N□ -W1                           | FBR522N□ -W1                                   |
| Automatic Door Lock                     | 18 to 25 A<br>(switching at motor locking)              | forward and reverse<br>motor control | FBR512N□ -W1                           | FBR522N□ -W1                                   |
| Automatic Antenna                       | 8 to 12 A (INRUSH)<br>break 2 A maximum<br>(motor-free) | forward and reverse<br>motor control | FBR512N□ -W1                           |                                                |
| Intermittent Wipers<br>(Front and Rear) | 15 to 30 A<br>break 2 to 8 A<br>(motor-free)            | forward only                         | FBR512N□ -W1                           | FBR522N□ -W1                                   |
| Tilt-Lock Wheel                         | 20 A<br>(switching at motor locking)                    | forward and reverse<br>motor control | FBR512N□ -W1                           | FBR522N□ -W1                                   |
| Power Seat                              | 20 to 30 A<br>(switching at motor locking)              | forward and reverse<br>motor control | FBR512N□ -W1                           | FBR522N□ -W1                                   |
| Sunroof                                 | 20 to 30 A<br>(switching at motor locking)              | forward and reverse<br>motor control | FBR512N□ -W1                           | FBR522N□ -W1                                   |

- For the load condition where higher voltage would be encountered during contact break, FBR522 series with wider contact gap is recommended.

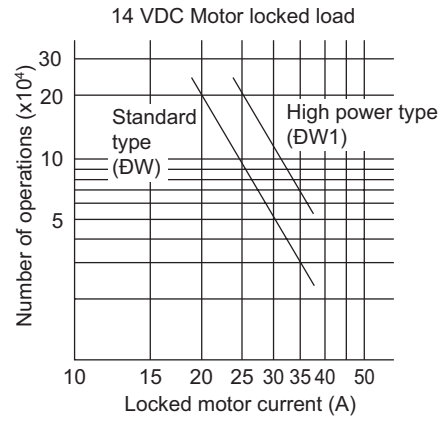
# FBR512, 522 SERIES

## ■ CHARACTERISTIC DATA

### 1. MAXIMUM BREAK CAPACITY



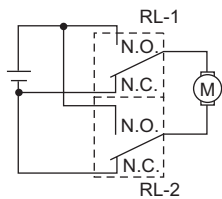
### 2. LIFE



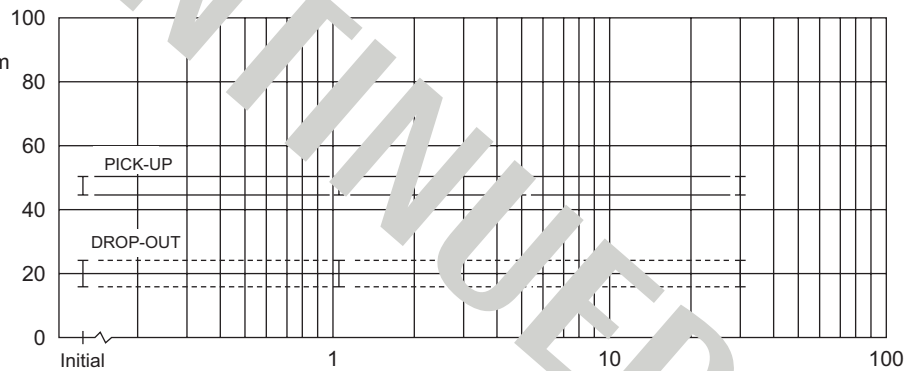
### 3. LIFE TEST (EXAMPLE)

- Test item  
14 V DC-20 A  
Motor lock  
200,000 operations minimum  
(FBR512 □-W type)

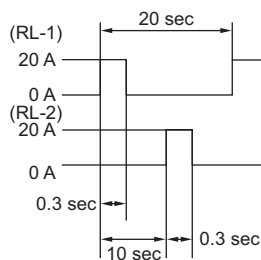
- Test circuit



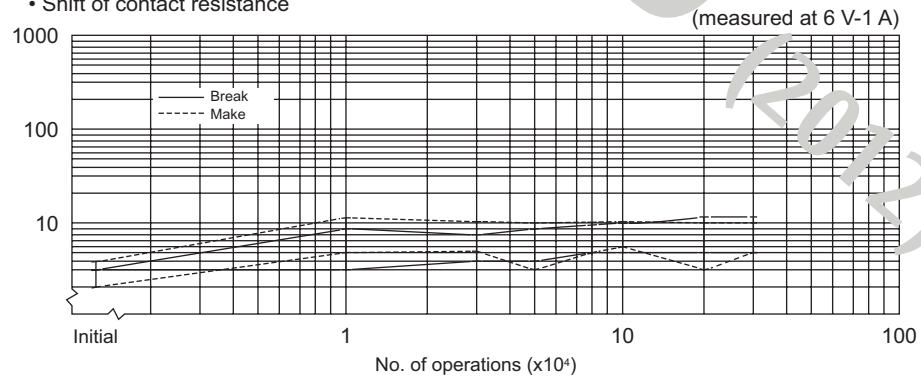
- Shift of pick-up and drop-out voltage



- Current wave form

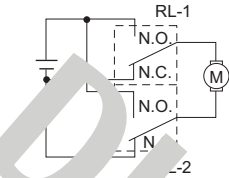


- Shift of contact resistance

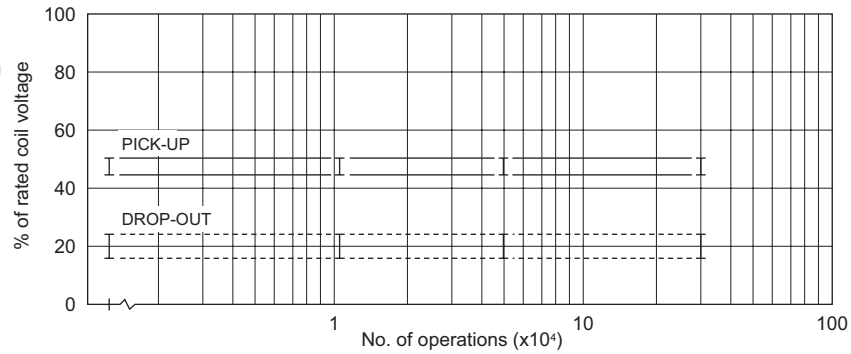


# FBR512, 522 SERIES

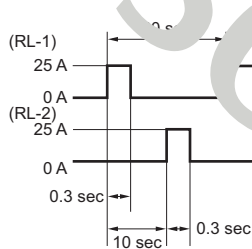
- Test item  
14 V DC-25 A  
Motor lock  
200,000 operations minimum  
(FBR512 □-W1 type)
- Test circuit



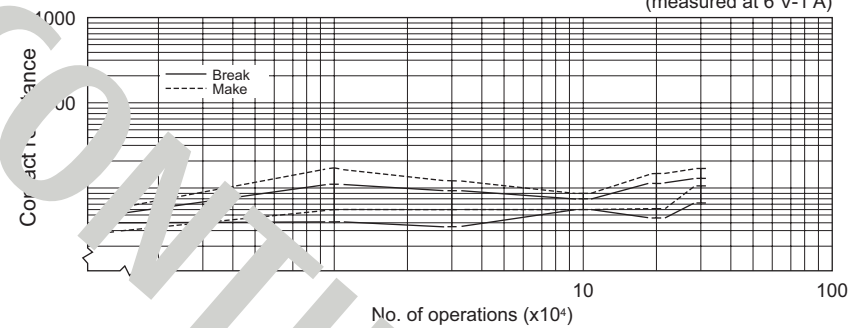
- Shift of pick-up and drop-out voltage



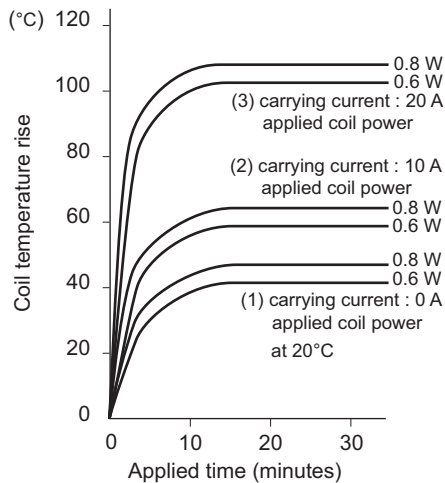
- Current wave form



- Shift of contact resistance



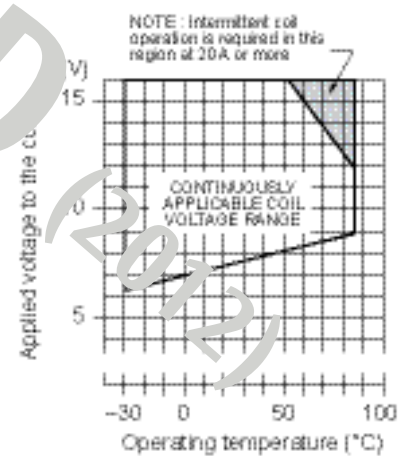
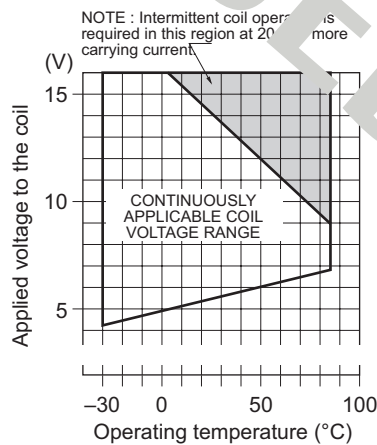
## 4. COIL TEMPERATURE RISE



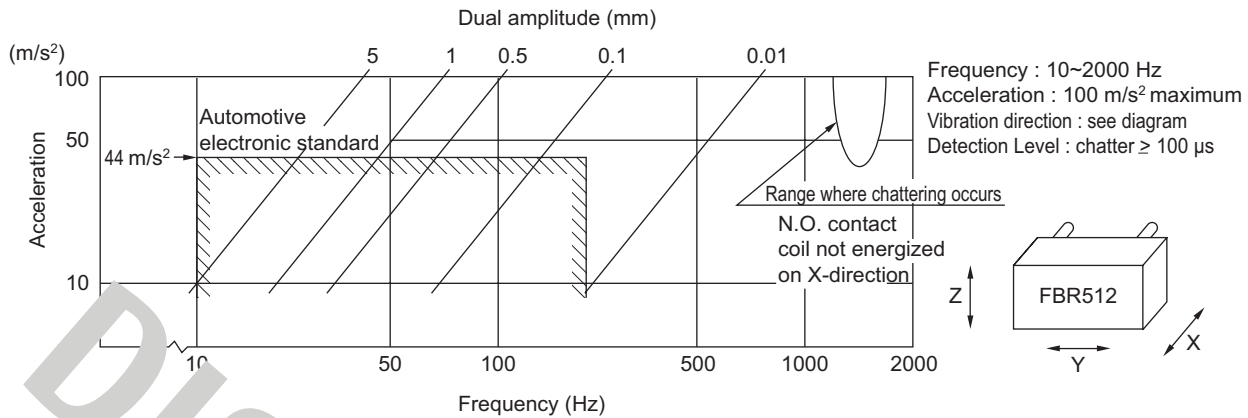
## 5. OPERATING COIL VOLTAGE RANGE (EXAMPLE)

[ FBR512ND09-W ]

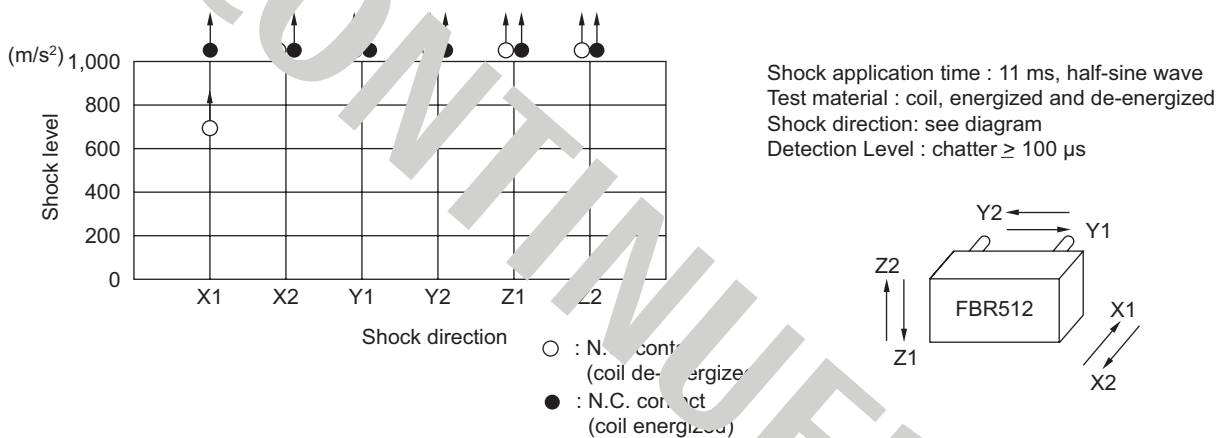
[ FBR512ND12-W ]



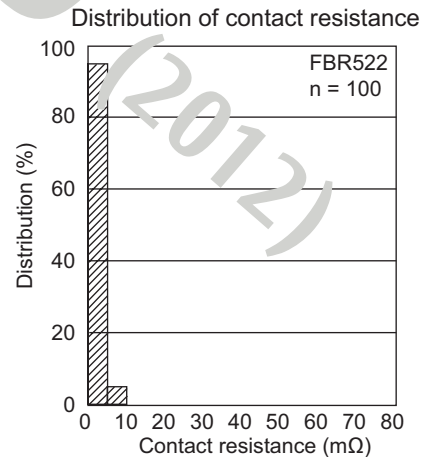
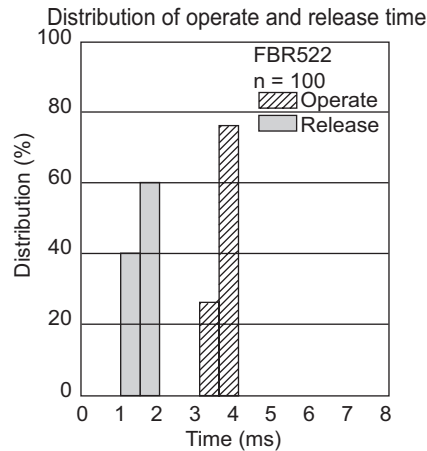
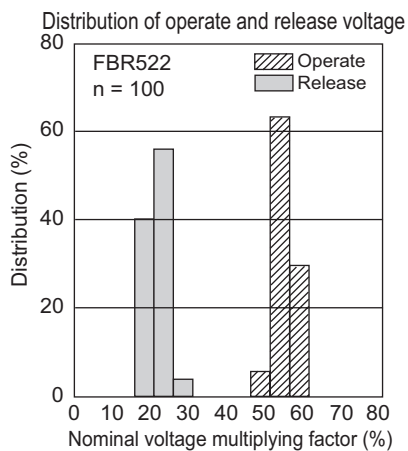
## 6. VIBRATION RESISTANCE CHARACTERISTICS



## 7. SHOCK RESISTANCE CHARACTERISTICS



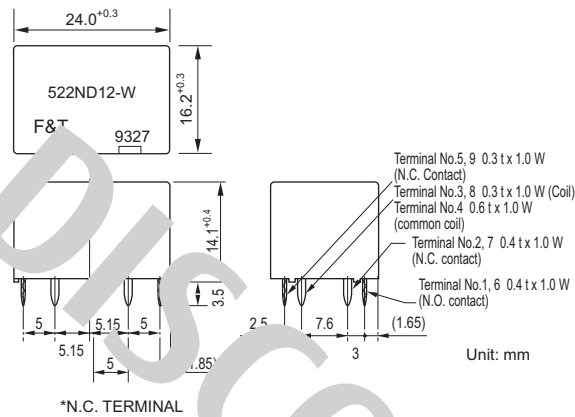
## ■ REFERENCE DATA



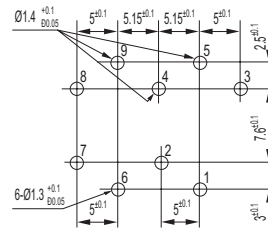
# FBR512, 522 SERIES

## DIMENSIONS

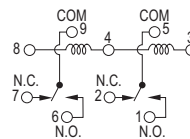
### Dimensions



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



### Schematic (BOTTOM VIEW)



### Tube carrier



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