April 1995
Edition 2.1

DATA SHEET

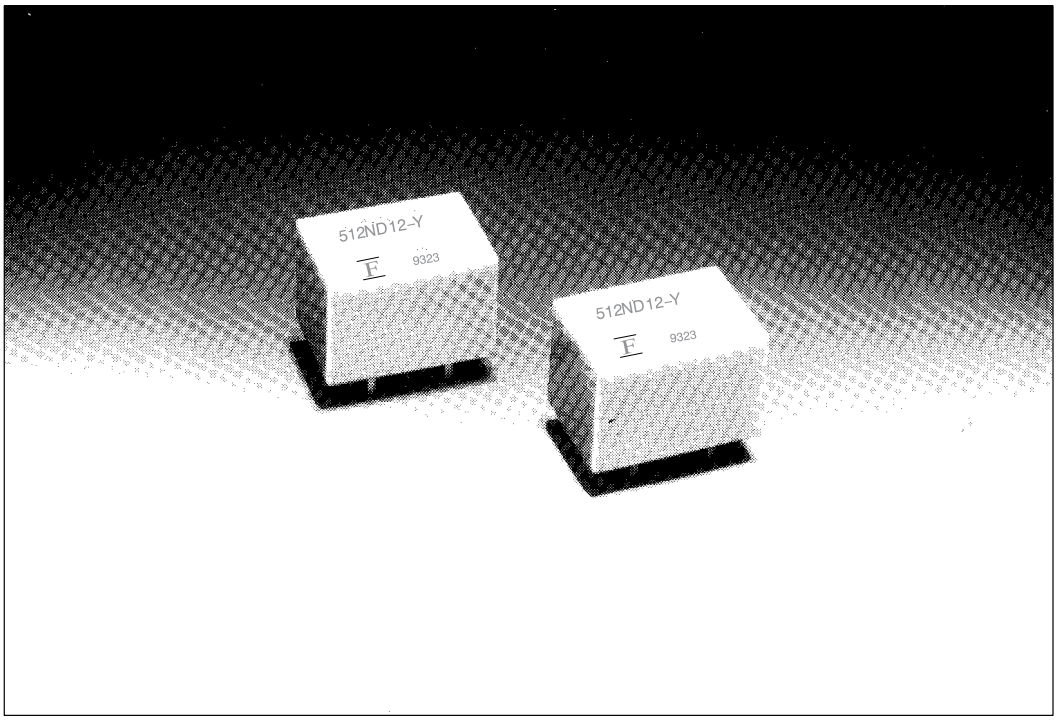
# FBR510, 520 SERIES

## HIGH POWER MINI TWIN RELAY FOR AUTOMOTIVE APPLICATIONS

- Fujitsu's new high power mini twin relay offers a significant weight and space savings while providing increased current handling capacity. The FBR510, 520 consists of two independent relays (FBR50' S) mounted in a single package. (1 form C x 2)

### FEATURES

- Two independent relays mounted in a single package
- Miniature size (54% the volume as compared with two FBR160 relays)
- High power contact capacity (25 AMPS carrying current)
- High heat resistance coil
- Two types of contact gap (FBR510 : 0.3 mm, FBR520 : 0.6 mm)



## SPECIFICATIONS

| Item | Specification |
|---|---|
| Contact Arrangement | 1 form C x 2 |
| Contact Material | Silver–Tin oxide indium |
| Contact Voltage Drop (Contact Resistance) | 100 mV Max. at 12 VDC–2 A |
| Vibration | No Contact Opening, No Damage:<br>10 G, 10 to 55 Hz 1.5 mm dual amplitude |
| Shock | No Contact Opening : 10 G Min.<br>No Damage : 100 G Min. |
| Operate Time | 10 ms Max. (excluding bounce time) |
| Release Time | 5 ms Max. (excluding bounce time) |
| Operating Temperature Range | –40°C to +85°C |
| Storage Temperature Range | –40°C to +100°C |
| Mechanical Life | 10 x $10^6$ Operations Minimum @ 5 Hz |
| Weight | 13.0 Grams (approx.) |

## CONTACT CAPACITIES

| Item | Specification |
|---|---|
| Contact Rating | 14 VDC–20 A (LOCKED MOTOR LOAD)<br>14 VDC–INRUSH 20 A, BREAK 4 A (MOTOR FREE LOAD) |
| Maximum Carrying Current | 35 A/2 min, 25A/1Hr (@ 25°C, 100% Rated Coil Voltage) |
| Maximum Inrush Current (Reference) | 60 A |
| Maximum Break Current | 35 A at 16 VDC |
| Minimum Applicable Load (Reference) | 6 V, 1 A |

## COIL RATINGS

| Item | | Specification | | | |
|---|---|---|---|---|---|
| FBR512 | Rated Coil Voltage | 6 VDC | 9 VDC | 10 VDC | 12 VDC |
| | Coil Resistance (20 °C) | 60 Ω | 135 Ω | 180 Ω | 240 Ω |
| | Pick–Up Voltage<br>(20 °C)<br>(85 °C) | 3.6 V max<br>4.5 V max | 5.4 V max<br>6.8 V max | 6.3 V max<br>7.9 V max | 7.3 V max<br>9.2 V max |
| | Drop–Out Voltage<br>(20 °C)<br>(85 °C) | 0.5 V min<br>0.6 V min | 0.7 V min<br>0.8 V min | 0.8 V min<br>0.9 V min | 1.0 V min<br>1.2 V min |
| | Thermal Resistance | 86°C/W | | | |
| FBR522 | Rated Coil Voltage | 6 VDC | 9 VDC | 10 VDC | 12 VDC |
| | Coil Resistance (20 °C) | 45 Ω | 100 Ω | 135 Ω | 180 Ω |
| | Pick–Up Voltage<br>(20 °C)<br>(85 °C) | 3.6 V max<br>4.5 V max | 5.4 V max<br>6.8 V max | 6.3 V max<br>7.9 V max | 7.3 V max<br>9.2 V max |
| | Drop–Out Voltage<br>(20 °C)<br>(85 °C) | 0.5 V min<br>0.6 V min | 0.7 V min<br>0.8 V min | 0.8 V min<br>0.9 V min | 1.0 V min<br>1.2 V min |
| | Thermal Resistance | 78°C/W | | | |

## ORDERING INFORMATION

**[Example]** FBR512 (a) N (b) D12 (c) – W (d) □ (e)

| | | |
|---|---|---|
| (a) | Series Name | FBR512 : Standard Type (Contact Gap 0.3 mm)<br>FBR522 : Wider Contact Gap Type (Contact Gap 0.6 mm) |
| (b) | Structure | N : For Automated Soldering + Immersion Cleaning (sealed case) |
| (c) | Rated Coil Voltage | ND06 : 6 VDC<br>ND09 : 9 VDC<br>ND10 : 10 VDC<br>ND12 : 12 VDC |
| (d) | Contact Material | –W : Silver–Tin oxide indium |
| (e) | Custom Designation | To be assigned custom specification |

## PART NUMBER LIST

| Series Name | Rated Coil Voltage (VDC) | Part Number |
|---|---|---|
| FBR512 Series (Contact Gap 0.3 mm) | 6<br>9<br>10<br>12 | FBR512ND06–W<br>FBR512ND09–W<br>FBR512ND10–W<br>FBR512ND12–W |
| FBR522 Series (Contact Gap 0.6 mm) | 6<br>9<br>10<br>12 | FBR522ND06–W<br>FBR522ND09–W<br>FBR522ND10–W<br>FBR522ND12–W |

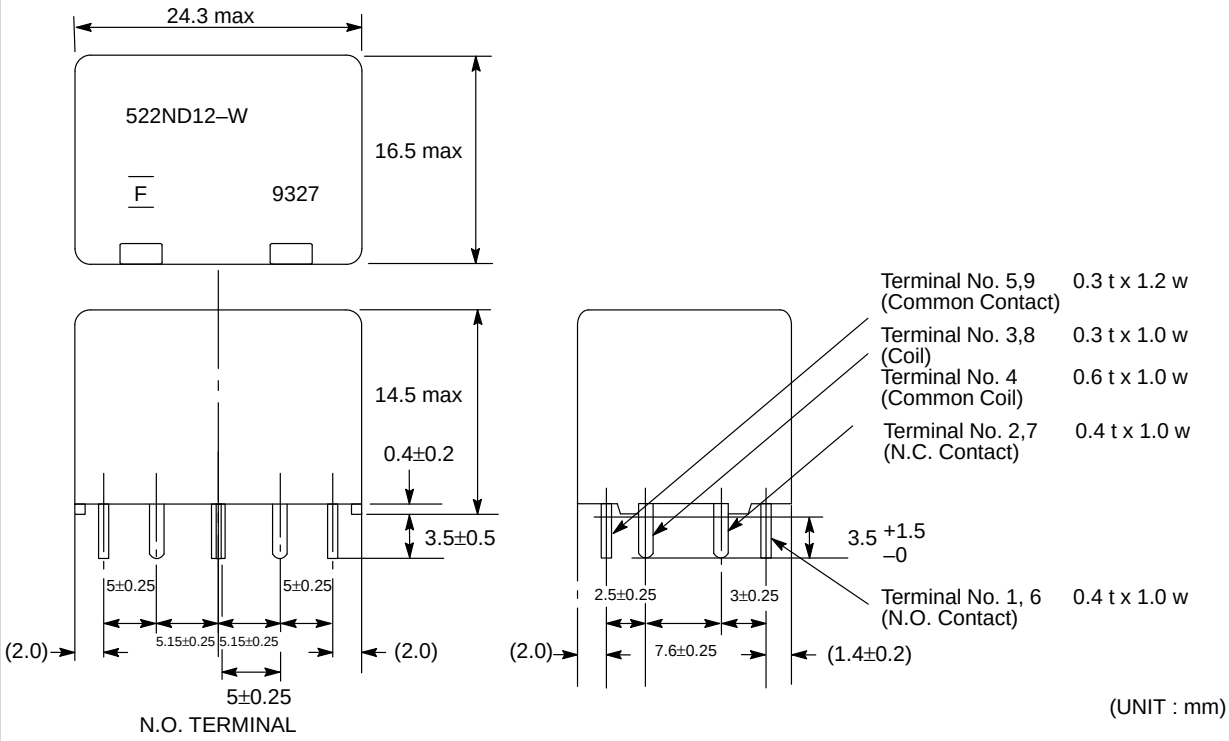
## PRINCIPAL APPLICATINS

| Application | Normal Load Current (12 VDC System) | Description | Recommenable Part Number exp. | |
|---|---|---|---|---|
| | | | For 16 V or less motor load voltage | For instantaneous 20 V or more load voltage |
| Power Windows | 20 to 25 A (switching at motor locking) | Forward and Reverse Motor Control | FBR512N□–W | FBR522N□–W |
| Automatic Door Lock | 18 to 25 A (switching at motor locking) | Forward and Reverse Motor Control | FBR512N□–W | FBR522N□–W |
| Automatic Antenna | 18 to 12 A (INRUSH)<br>Break 2 A Max.<br>(motor–free) | Forward and Reverse Motor Control | FBR512N□–W | |
| Adjustable Door Mirror | 3 to 5 A (switching at motor locking) | Forward and Reverse Motor Control | FBR512N□–W | |
| Intermittent Wipers | 15 to 30 A<br>Break 2 to 8 A<br>(motor–free) | Forward Only | FBR512N□–W | FBR522N□–W |
| Tilt–Lock Wheel | 20 A<br>Break 5 A<br>(some with motor–locking) | Forward and Reverse Motor Control | FBR512N□–W | FBR522N□–W |
| Sunroof | 20 to 30 A (switching at motor locking) | Forward and Reverse Motor Control | FBR512N□–W | FBR522N□–W |

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

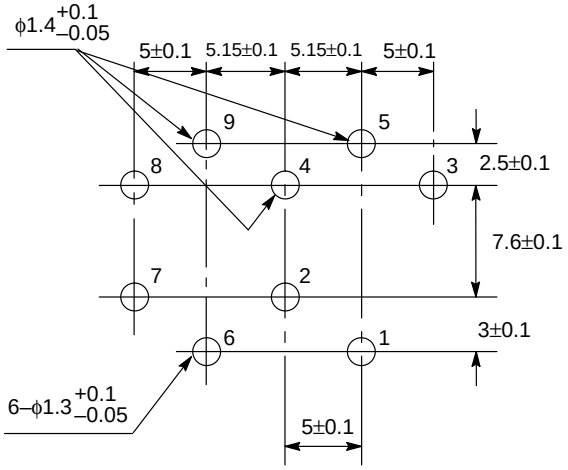
## DIMENSIONS

- **Dimensions**

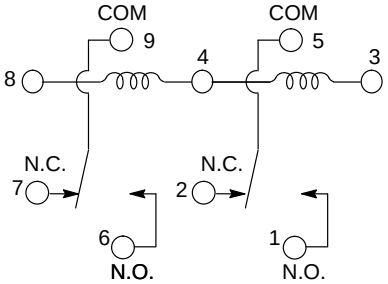



(UNIT : mm)

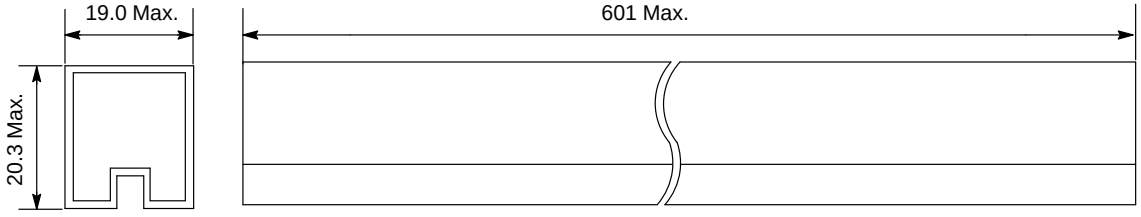
- **PC board mounting hole layout**
  **(View from PC board soldering surface)**




- **Schematics**
  (Bottom view)




- **Tube carrier**

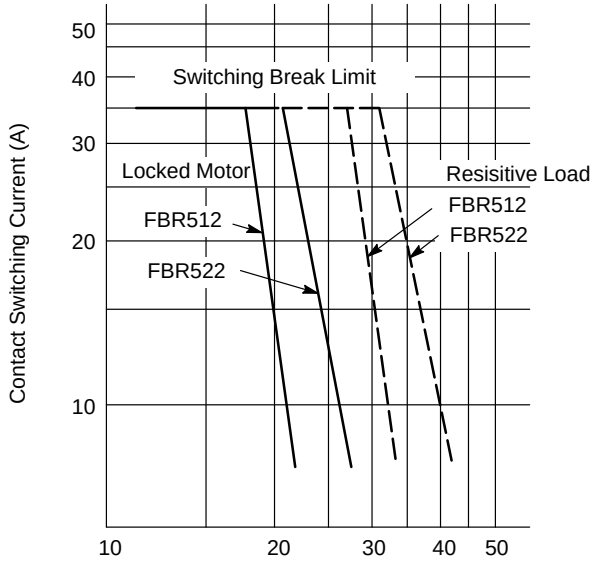



20 pcs/tube

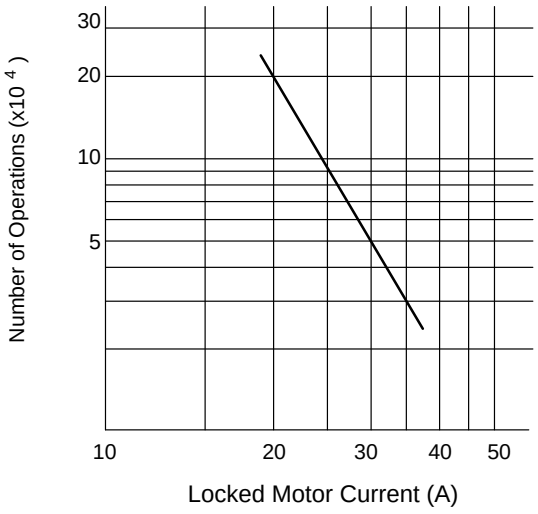
Unit : mm

## DATA

### (1) MAXIMUM BREAK CAPACITY




### (2) LIFE



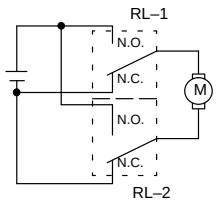

### (3) LIFE TEST (EXAMPLE)

- Test Item

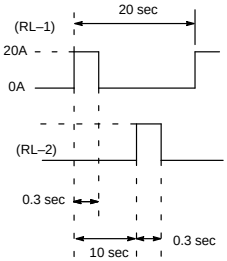
  14 VDC–20A
  Motor Lock
  200,000 ops, MIN.

  (FBR512□–W Type)

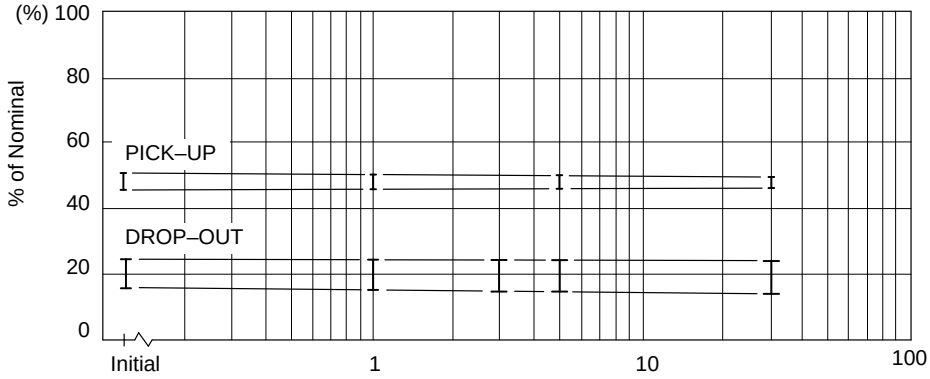
- Test Circuit




- Current Wave Form

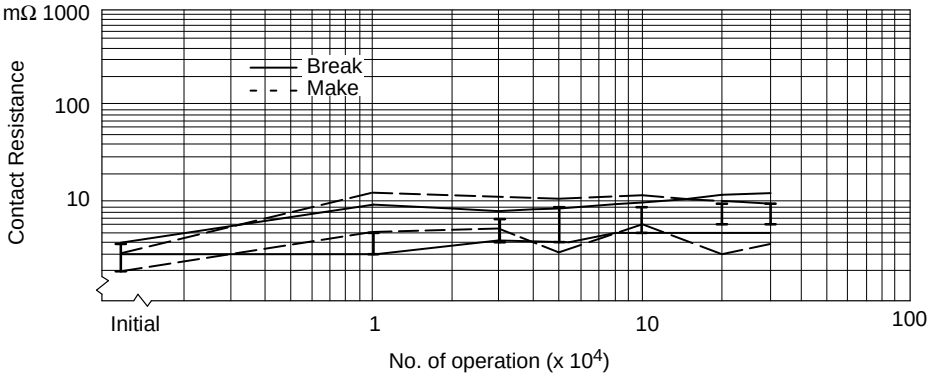



- Shift of Pick–up and Drop–out Voltage

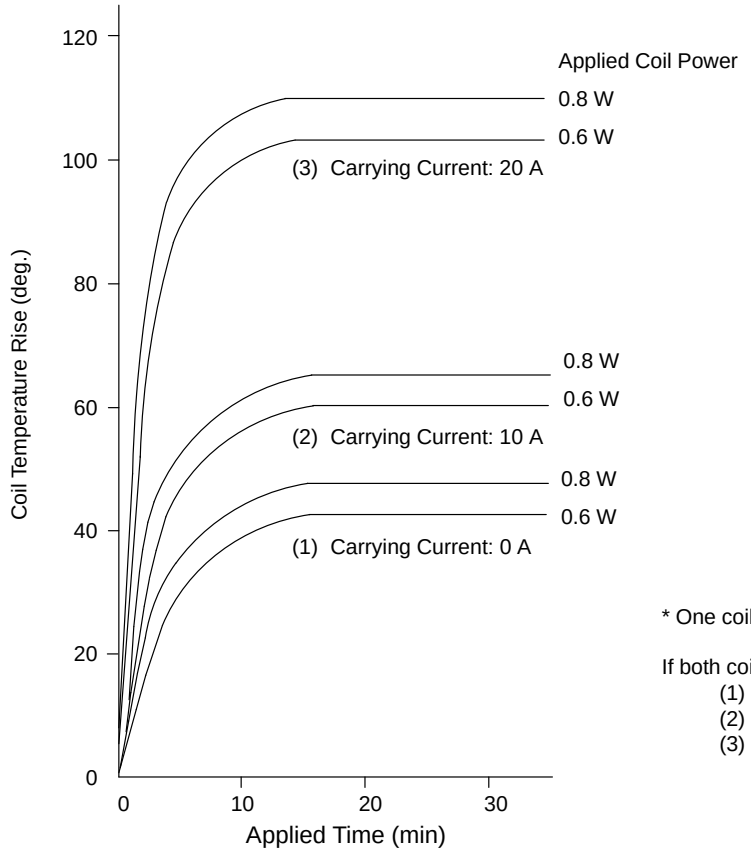



- Shift of Contact Resistance

(Measured at 6 V–1A)



### (4) COIL TEMPERATURE RISE

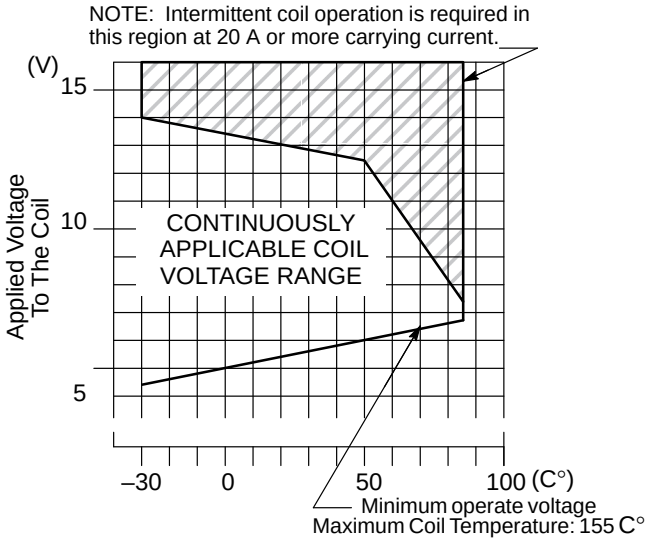



* One coil energized at 20°C

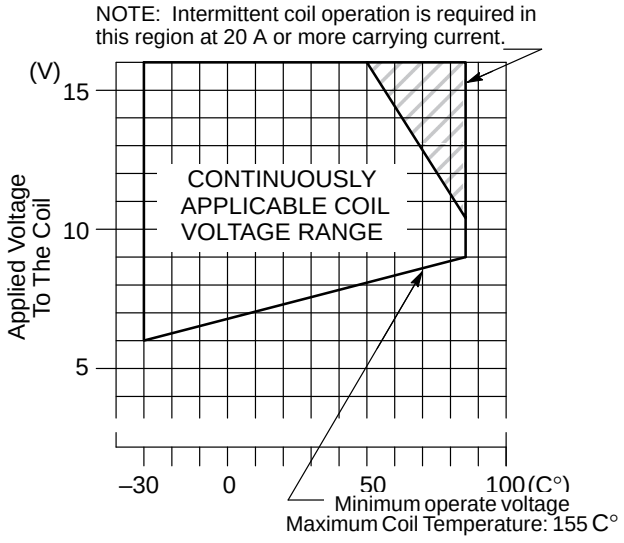
If both coils are energized, temperature rise will increase by
(1) 5°C (0 A carrying current)
(2) 20°C (10 A carrying current)
(3) 40°C (20 A carrying current)

### (5) OPERATING COIL VOLTAGE RANGE (EXAMPLE)

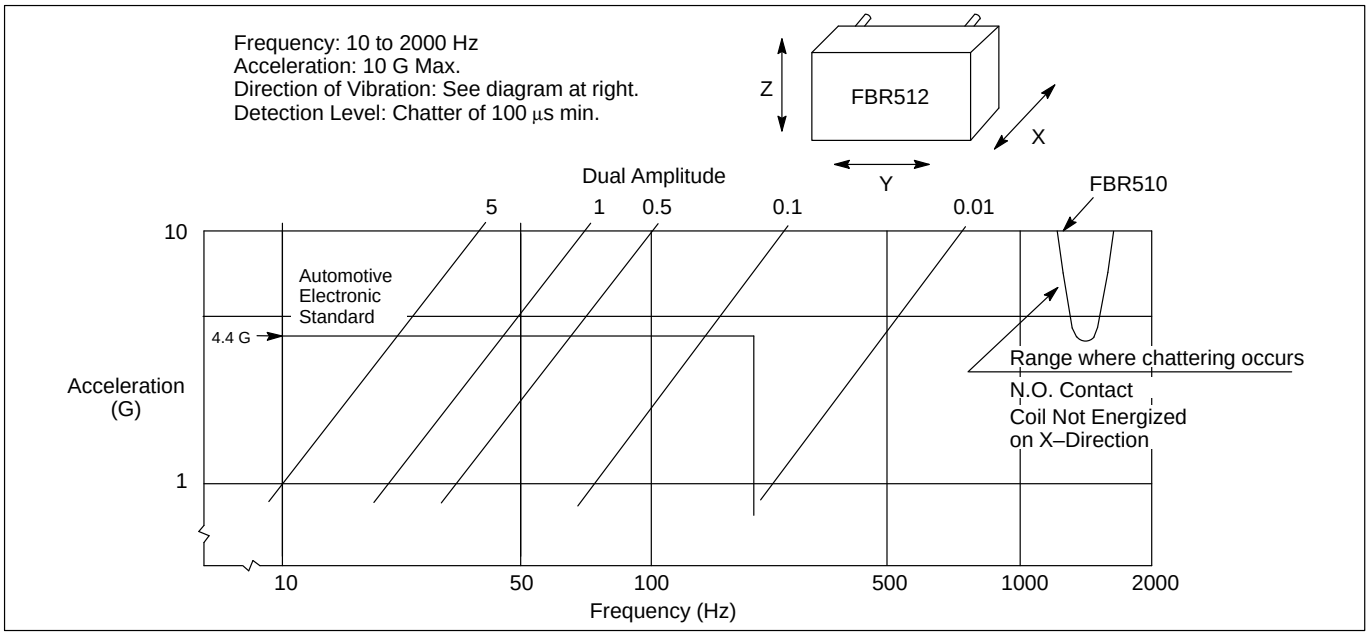
**FBR512ND09–W**



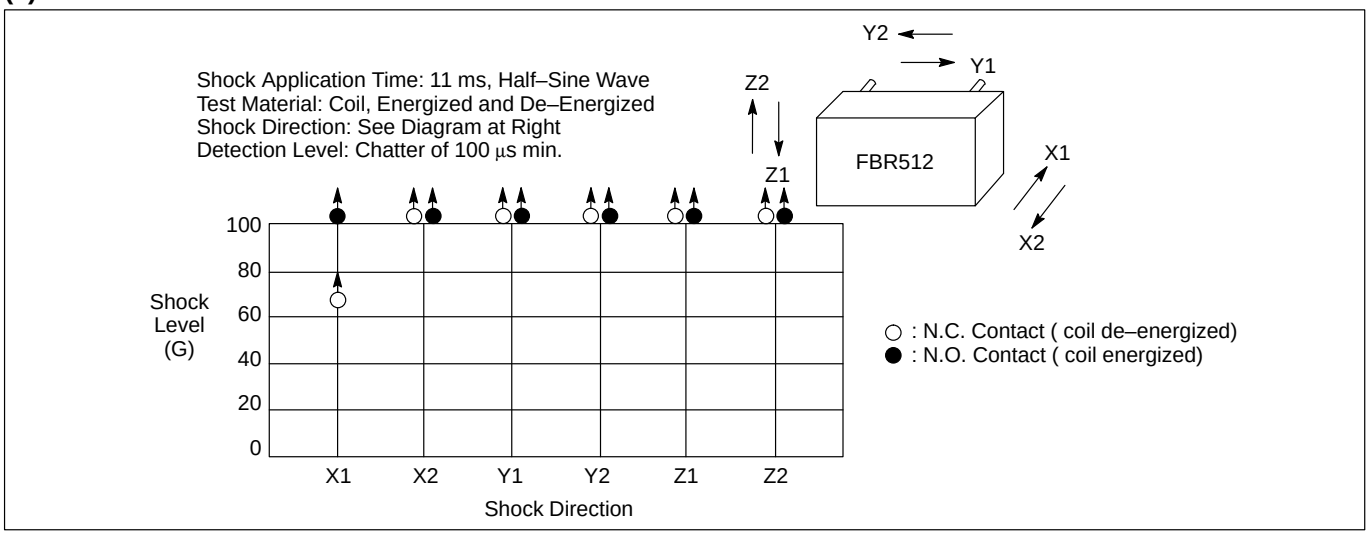

**FBR512ND12–W**



## (6) VIBRATION RESISTANCE CHARACTERISTICS




## (7) SHOCK RESISTANCE CHARACTERISTICS






Circuit diagrams utilizing Fujitsu products are included as a means of illustrating typical relay applications. Complete Information sufficient for construction purposes is not necessarily given.

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