

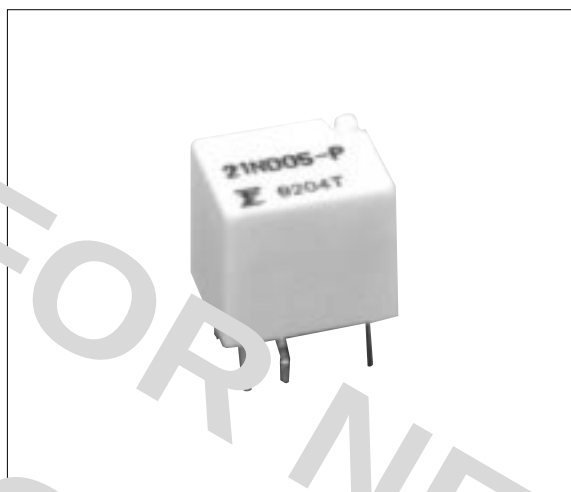
# MINIATURE RELAY

## 1 POLE—1 to 2 A (FOR SIGNAL SWITCHING)

### FBR20 SERIES

#### ■ FEATURES

- Microminiature size  
Two FBR20 Series relays can be mounted in the space required for a single FBR210 Series relay.
- 2 A carrying current
- Strong shock resistance  
Even with 500 m/s<sup>2</sup> shock, FBR20 Series relays never miss an operation.
- Easy pattern design  
Separate location of drive (coil) and output (contact) terminals allows easy PC board pattern design.
- Formed terminals for temporary mounting  
The uniquely designed terminals allow FBR20 Series relays to be mounted temporarily on PC boards.
- Conforms to FCC68.302 (high dielectric strength type)
- UL recognized (File No. E63615)
- Tube packaging



#### ■ ORDERING INFORMATION

[Example] FBR21 N D12 U - 02  
(a) (b) (c) (d) (e) (f)

|     |                                |                                                                                  |
|-----|--------------------------------|----------------------------------------------------------------------------------|
| (a) | Series Name<br>(Contact Style) | FBR21: FBR20 Series (single contact)<br>FBR22: FBR20 Series (bifurcated contact) |
| (b) | Enclosure                      | Nil: Flux free type<br>N: Plastic sealed type                                    |
| (c) | Nominal Voltage                | (Example) D03: 3 VDC<br>D05: 5 VDC<br>D12: 12 VDC (refer to the COIL DATA CHART) |
| (d) | UL Standard                    | Nil: Standard<br>U: UL114 recognized                                             |
| (e) | Contact Material               | P: Gold-overlay over palladium                                                   |
| (f) | Special Type                   | Nil: Standard<br>02: High dielectric strength type (UL C VAC)                    |

Note: The designation name is stamped on the top of the relay case as follows:

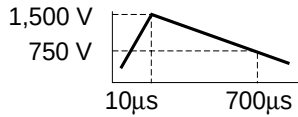
(Example) Designation ordered: FBR21D05-P  
Stamp: 21D05-P

## ■ SAFETY STANDARD AND FILE NUMBERS

UL114 (File No. E63615)

| Nominal voltage | Contact rating                                 |
|-----------------|------------------------------------------------|
| 1.5 to 24 VDC   | 1 A 24 VDC resistive<br>0.5 A 30 VAC resistive |

## ■ SPECIFICATIONS

| Item       |                                           | Single contact type                                                                          | Bifurcated contact type                                                                   |
|------------|-------------------------------------------|----------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|
| Contact    | Arrangement                               | 1 form C (SPDT)                                                                              |                                                                                           |
|            | Material                                  | Gold-overlay silver-palladium                                                                |                                                                                           |
|            | Resistance (initial)                      | Maximum 100 mΩ (at 0.1 A 6 VDC)                                                              |                                                                                           |
|            | Rating (resistive)                        | 0.5 A 120 VAC or 1 A 24 VDC (resistive load)                                                 |                                                                                           |
|            | Maximum Carrying Current                  | 2 A                                                                                          |                                                                                           |
|            | Maximum Switching Power                   | 60 VA or 24 W                                                                                |                                                                                           |
|            | Maximum Switching Voltage*1               | 125 V                                                                                        |                                                                                           |
|            | Maximum Switching Current                 | 1 A                                                                                          |                                                                                           |
|            | Minimum Switching Load*2 (reference)      | Plastic sealed 1 mA 1V<br>Flux free 1 mA 5V                                                  | Plastic sealed 0.1V 100μA<br>Flux free 1V, 1mA                                            |
|            | Capacitance (reference)                   | Approximately 2 pF (between coil and contacts)<br>Approximately 1 pF (between open contacts) |                                                                                           |
| Coil       | Nominal Power (at 20°C)                   | Approximately 0.3 W                                                                          |                                                                                           |
|            | Operate Power (at 20°C)                   | Approximately 0.192 W maximum                                                                |                                                                                           |
|            | Operating Temperature                     | -30°C to +65°C (no frost) (refer to the CHARACTERISTIC DATA)                                 |                                                                                           |
|            | Operating Humidity                        | 45 to 85%RH                                                                                  |                                                                                           |
| Time Value | Operate (at nominal voltage)              | Maximum 5 ms                                                                                 |                                                                                           |
|            | Release (at nominal voltage)              | Maximum 2 ms                                                                                 |                                                                                           |
| Insulation | Resistance (initial)                      | Minimum 100 MΩ (at 500 VDC)                                                                  |                                                                                           |
|            | Dielectric Strength                       | Between coil and contacts                                                                    | 500 VAC for 1 minute (standard)<br>1,000 VAC for 1 minute (high dielectric strength type) |
|            |                                           | Between open contacts                                                                        | 500 VAC 1 minute                                                                          |
|            | Surge Strength (high dielectric strength) | 1,500 V (10 × 700 μs)<br>(between coil and contacts)                                         |      |
| Life       | Mechanical                                | 5 × 10 <sup>6</sup> operations minimum                                                       |                                                                                           |
|            | Electrical (refer to the REFERENCE DATA)  | 2 × 10 <sup>5</sup> operations minimum (at contact rating)                                   |                                                                                           |
| Other      | Vibration Resistance                      |                                                                                              | 10 to 55 Hz (double amplitude of 3.0 mm)                                                  |
|            | Shock Resistance                          | Misoperation                                                                                 | 500 m/s <sup>2</sup> (11±1 ms)                                                            |
|            |                                           | Endurance                                                                                    | 1,000 m/s <sup>2</sup> (11±1 ms)                                                          |
|            | Weight                                    |                                                                                              | Approximately 1.7 g                                                                       |

\*1 If the switching voltage exceeds the rated contact voltage, reduce the current. The current values vary according to the type of load.

\*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 operation environment.

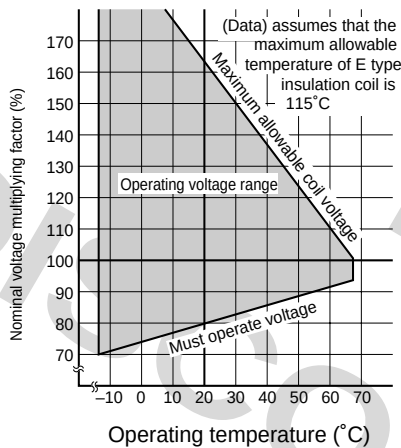
## COIL DATA CHART

| MODEL               |                |                         |                | Nominal voltage | Coil resistance<br>±10% | Nominal current<br>(at nominal voltage)<br>approx. | Must operate voltage              | Must release voltage             | Maximum allowable voltage     | Nominal power                                | Coil temperature rise                        |
|---------------------|----------------|-------------------------|----------------|-----------------|-------------------------|----------------------------------------------------|-----------------------------------|----------------------------------|-------------------------------|----------------------------------------------|----------------------------------------------|
| Single contact type |                | Bifurcated contact type |                |                 |                         |                                                    |                                   |                                  |                               |                                              |                                              |
| Flux free           | Plastic sealed | Flux free               | Plastic sealed |                 |                         |                                                    |                                   |                                  |                               |                                              |                                              |
| FBR21D01-P          | FBR21ND01-P    | FBR22D01-P              | FBR22ND01-P    | 1.5 VDC         | 7.5 W                   | 200 mA                                             | 80% max.<br>of nominal<br>voltage | 5% min.<br>of nominal<br>voltage | 160% of<br>nominal<br>voltage | Approx.<br>300 mW<br>(at nominal<br>voltage) | Approx.<br>45 deg<br>(at nominal<br>voltage) |
| FBR21D03-P          | FBR21ND03-P    | FBR22D03-P              | FBR22ND03-P    | 3 VDC           | 30 W                    | 100 mA                                             |                                   |                                  |                               |                                              |                                              |
| FBR21D05-P          | FBR21ND05-P    | FBR22D05-P              | FBR22ND05-P    | 5 VDC           | 83 W                    | 60 mA                                              |                                   |                                  |                               |                                              |                                              |
| FBR21D06-P          | FBR21ND06-P    | FBR22D06-P              | FBR22ND06-P    | 6 VDC           | 120 W                   | 50 mA                                              |                                   |                                  |                               |                                              |                                              |
| FBR21D09-P          | FBR21ND09-P    | FBR22D09-P              | FBR22ND09-P    | 9 VDC           | 270 W                   | 33 mA                                              |                                   |                                  |                               |                                              |                                              |
| FBR21D12-P          | FBR21ND12-P    | FBR22D12-P              | FBR22ND12-P    | 12 VDC          | 480 W                   | 25 mA                                              |                                   |                                  |                               |                                              |                                              |
| FBR21D18-P          | FBR21ND18-P    | FBR22D18-P              | FBR22ND18-P    | 18 VDC          | 1,080 W                 | 17 mA                                              |                                   |                                  |                               |                                              |                                              |
| FBR21D24-P          | FBR21ND24-P    | FBR22D24-P              | FBR22ND24-P    | 24 VDC          | 1,920 W                 | 12.5 mA                                            |                                   |                                  |                               |                                              |                                              |

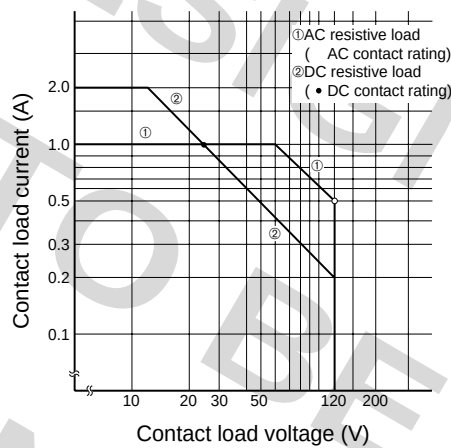
Note: All values in the table are measured at 20°C.

## CHARACTERISTIC DATA

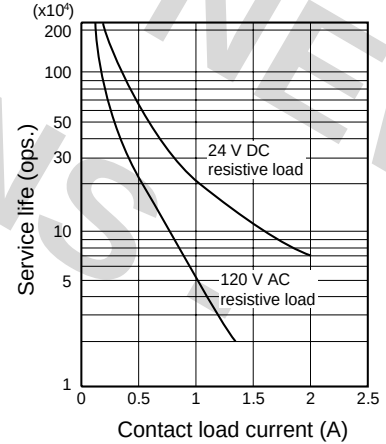
Range of operation temperature and voltage



Maximum switching capacity

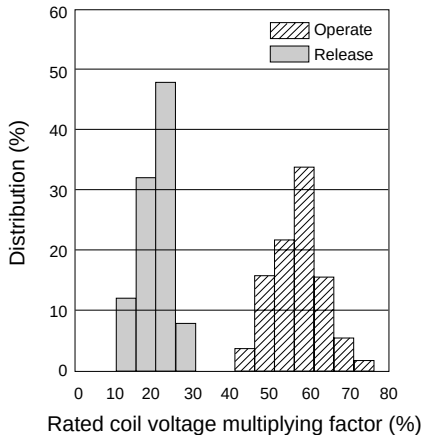


Life curve

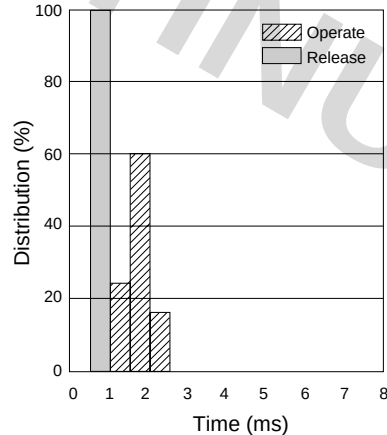


## REFERENCE DATA

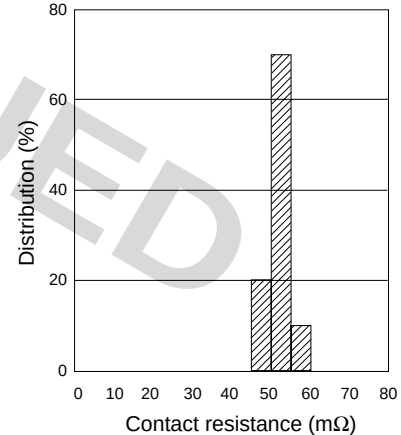
Distribution of operate and release voltage



Distribution of operate and release time

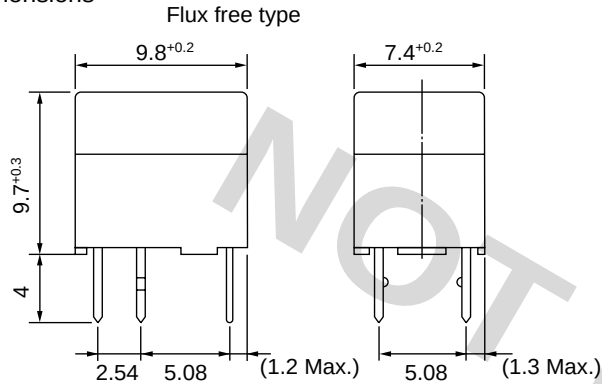


Distribution of contact resistance

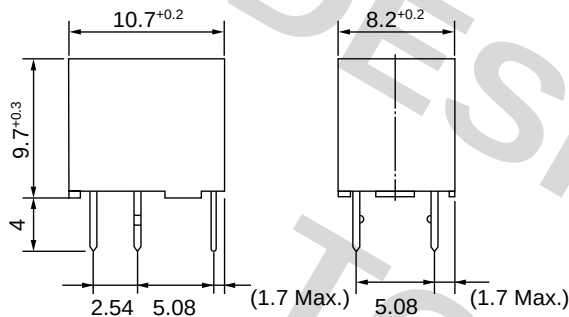


## ■ DIMENSIONS

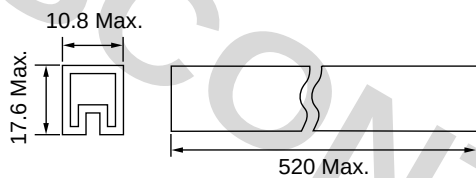
### ●Dimensions



### Plastic sealed type

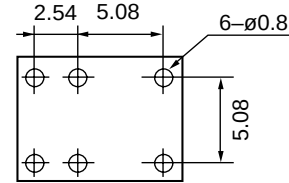


### ●Tube carrier

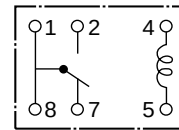


Flux free type:50pcs/Tube  
Plastic sealed type:40pcs/Tube

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



### ●Schematics (BOTTOM VIEW)



Unit: mm

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