

# COMPACT HIGH POWER RELAY

## 1 POLE—30 A

### (FOR AUTOMOTIVE APPLICATIONS)

## FBR56 SERIES

RoHS compliant

#### ■ FEATURES

- High power contact capacity  
(carrying current: 40 A/10 minutes, 30 A/1 hour)
- High heat resistance and extended operating voltage
- RoHS compliant since date code: 0627  
Please see page 8 for more information



#### ■ ORDERING INFORMATION

[Example]  $\frac{\text{FBR56}}{\text{(a)}} \frac{\text{N}}{\text{(b)}} \frac{\text{D12}}{\text{(c)}} - \frac{\text{W1}}{\text{(d)}} \frac{\text{**}}{\text{(e)}}$

(a)	Series Name	FBR56 : FBR56 Series relay for 12 V battery (contact gap 0.4 mm)
(b)	Enclosure	N : Plastic sealed type
(c)	Nominal Voltage	D06 : 6 VDC D09 : 9 VDC D12 : 12 VDC
(d)	Contact Material	W1: Silver-tin oxide indium Y: Silver-tin oxide
(e)	Custom Designation	To be assigned custom specification

# FBR56 SERIES

## ■ SPECIFICATIONS

Item		Specifications	
Contact	Arrangement	1 form C	
	Material	Silver-tin oxide indium (-W1 type), silver tin oxide (-Y type)	
	Voltage Drop (resistance)	Maximum 100 mV (at 1A, 12VDC)	
	Ratings	14 VDC 30 A (locked motor load) 14 VDC inrush 27A, break 4A (motor free load)	
	Maximum Carrying Current	40A/10 minutes, 30A/1 hour (25°C, 100% rated coil voltage)	
	Maximum Inrush Current	70A (reference)	
	Maximum Switching Current	40A, 16VDC (reference)	
	Minimum Switching Load*1	6VDC, 1A	
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	10 × 10 <sup>6</sup> operations minimum	
	Electrical	100 × 10 <sup>3</sup> operations minimum (locked motor load) 1 × 10 <sup>6</sup> operations minimum (motor free 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 9.4 g

\*1 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

MODEL		Nominal voltage	Coil resistance (±10%) (at 20°C)	Must operate voltage	Release voltage
W1 contact	Y contact				
FBR56ND06-W1	FBR56ND06-Y	6 VDC	42 Ω	3.6 VDC (at 20°C) 4.5 VDC (at 85°C)	0.5VDC(at 20°C) 0.6 VDC (at 85°C)
FBR56ND09-W1	FBR56ND09-Y	9 VDC	95 Ω	5.4 VDC (at 20°C) 6.8 VDC (at 85°C)	0.7 VDC (at 20°C) 0.8 VDC (at 85°C)
FBR56ND12-W1	FBR56ND12-Y	12 VDC	170 Ω	7.3 VDC (at 20°C) 9.2 VDC (at 85°C)	1.0 VDC (at 20°C) 1.2 VDC (at 85°C)

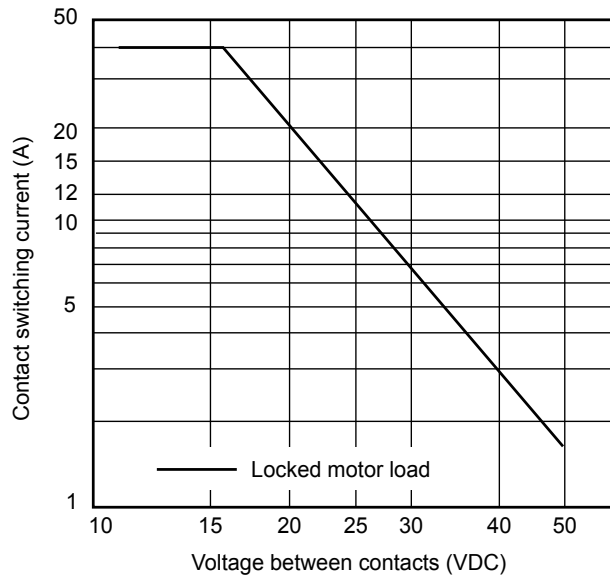
# FBR56 SERIES

## ■ PRINCIPAL APPLICATIONS

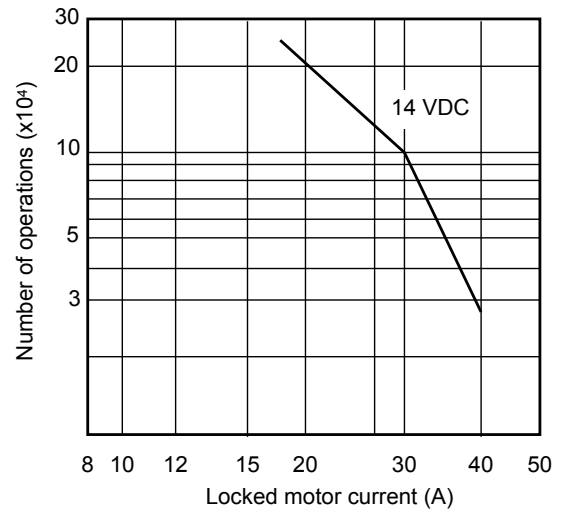
Application		Normal load current	Life x 10 <sup>3</sup>	Recommended model (Example)
For 12 V battery	Power Windows	20 to 30 A (switching at motor locking)	100	FBR56N□-Y
	Automatic Door Lock	18 to 30 A/4 to 5 door (switching at motor locking)	100	FBR56N□-Y
	Intermittent Wipers	INRUSH 15 to 30 A BREAK 2 to 8 A (motor free)	300	FBR56N□-W1
	Tilt-Lock Wheel	INRUSH 15 A BREAK 2.5 A (motor free)	100	FBR56N□-Y
	Sunroof	20 to 30 A (switching at motor locking)	100	FBR56N□-Y
	Others	Car audio system, etc.	—	FBR56N□-Y

## ■ CHARACTERISTIC DATA

### 1. MAXIMUM BREAK CAPACITY



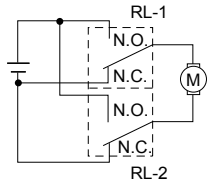
### 2. LIFE



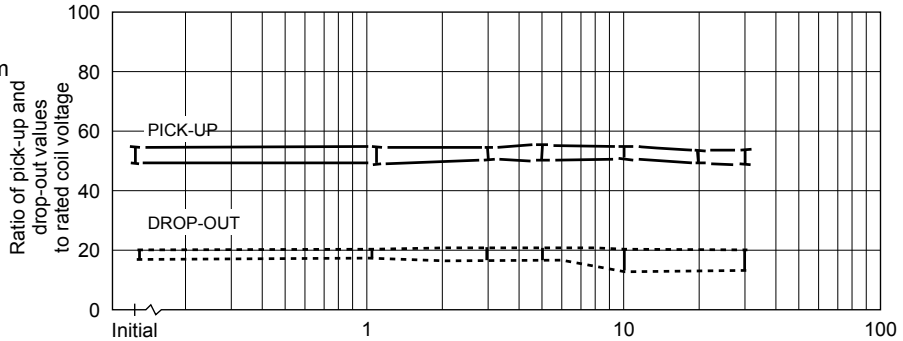
# FBR56 SERIES

## 3. LIFE TEST (EXAMPLE)

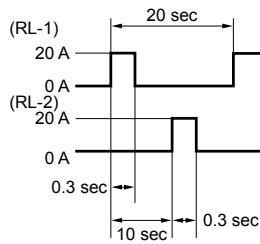
- Test item  
14 V DC-20 A  
Motor lock  
200,000 operations minimum  
(FBR56 □-W1 type)
- Test circuit



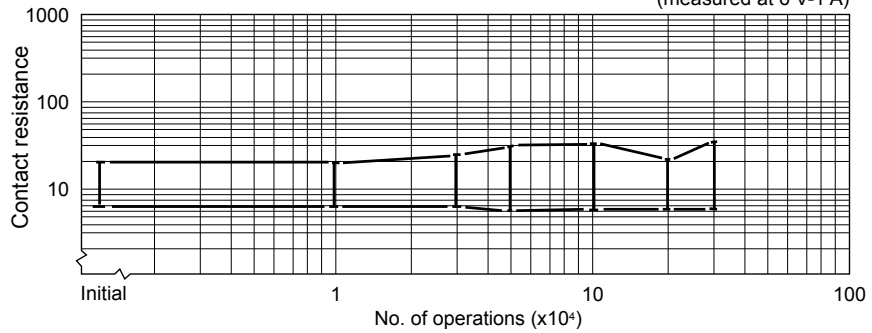
- Shift of pick-up and drop-out voltage



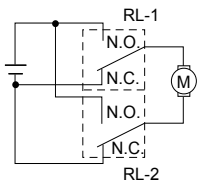
- Current wave form



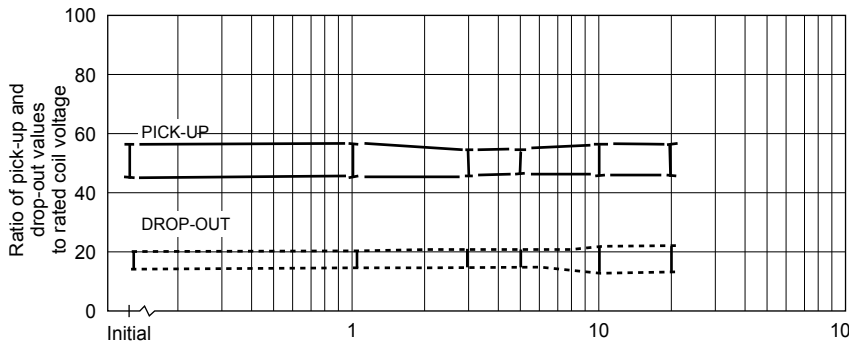
- Shift of contact resistance



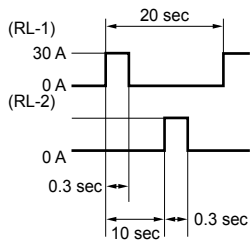
- Test item  
14 V DC-30 A  
Motor lock  
100,000 operations minimum  
(FBR56 □-W1 type)
- Test circuit



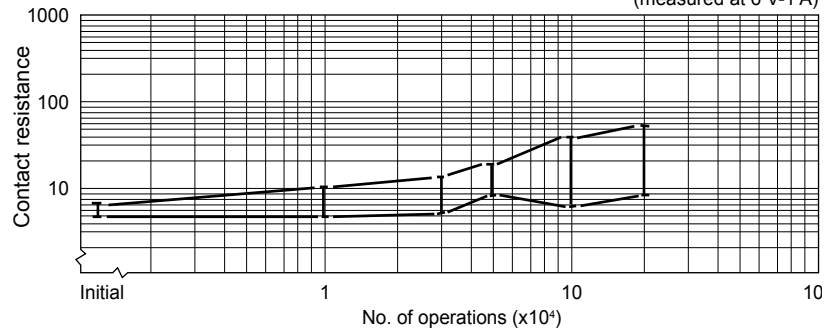
- Shift of pick-up and drop-out voltage



- Current wave form



- Shift of contact resistance



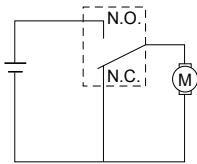
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# FBR56 SERIES

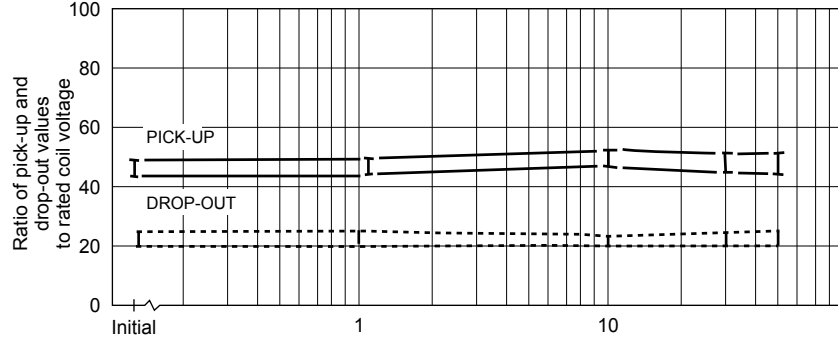
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- Test item  
14V DC- 27A INRUSH 4A break  
Motor free  
400,000 operations minimum  
(FBR56 □-W1 type)

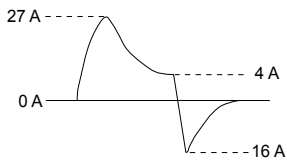
• Test circuit



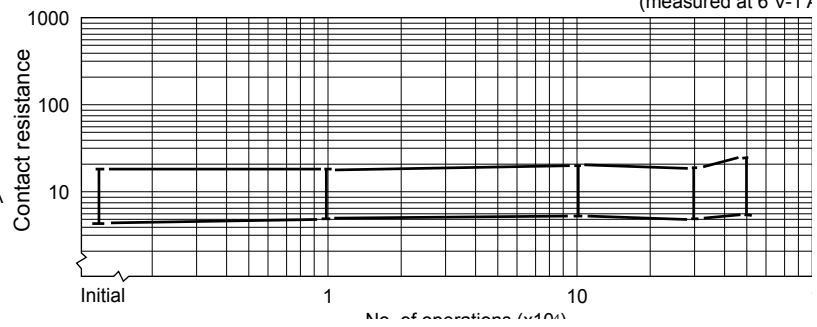
• Shift of pick-up and drop-out voltage



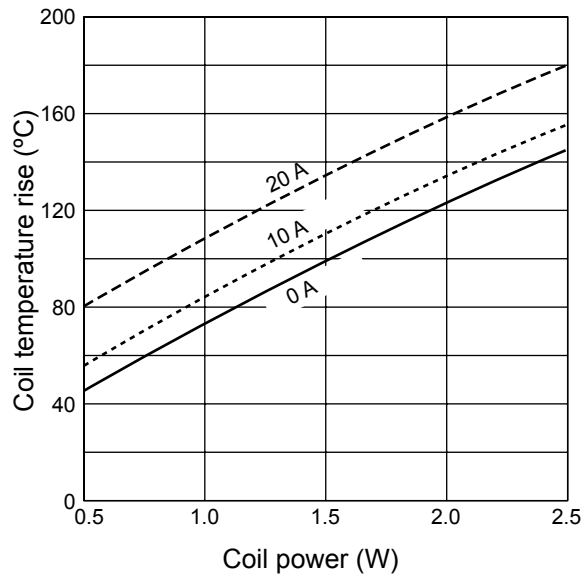
• Current wave form



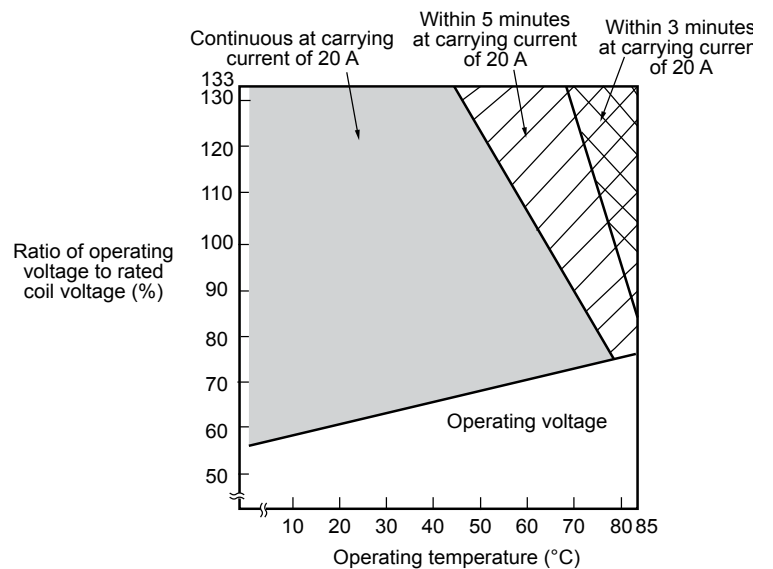
• Shift of contact resistance



## 4. COIL TEMPERATURE RISE

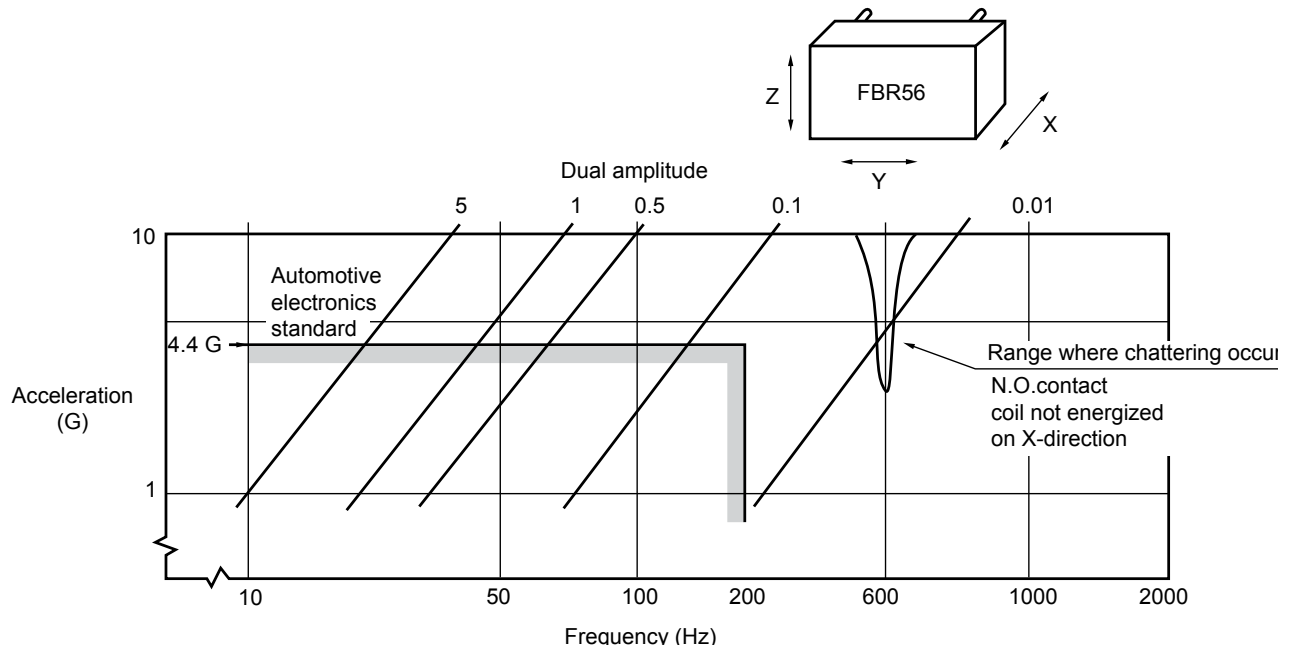


## 5. OPERATING COIL VOLTAGE RANGE (EXAMPLE)

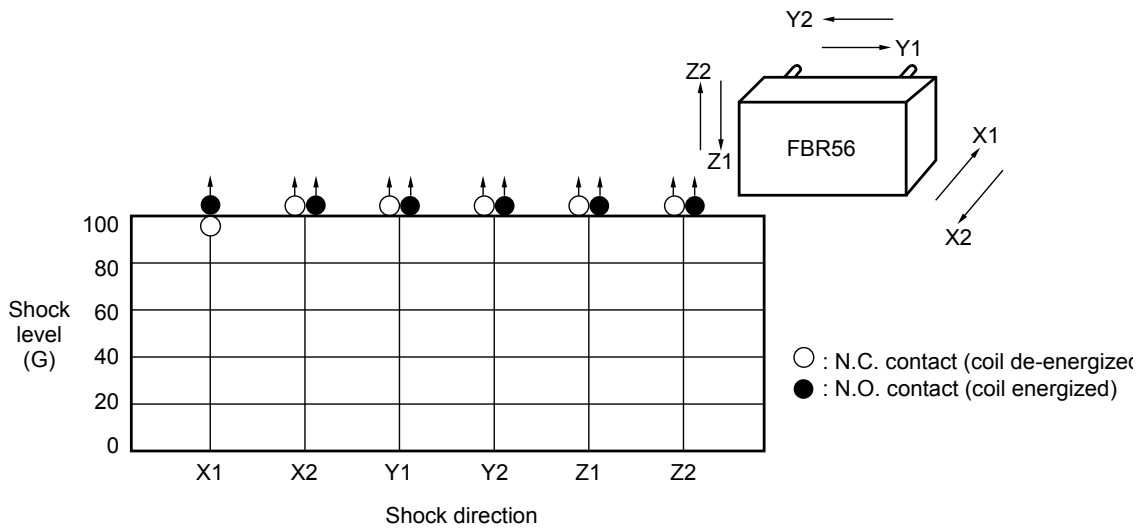


# FBR56 SERIES

## 6. VIBRATION RESISTANCE CHARACTERISTICS

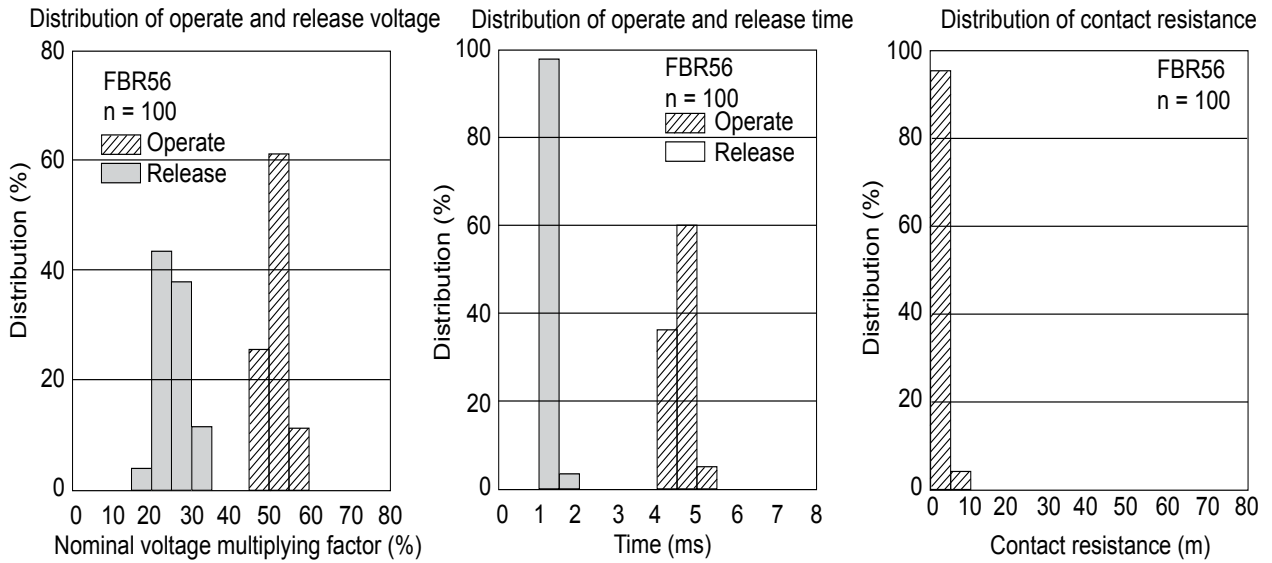


## 7. SHOCK RESISTANCE CHARACTERISTICS



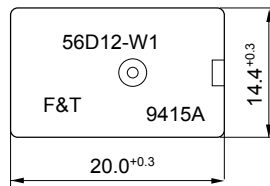
# FBR56 SERIES

## REFERENCE DATA

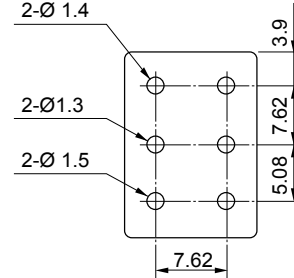


## DIMENSIONS

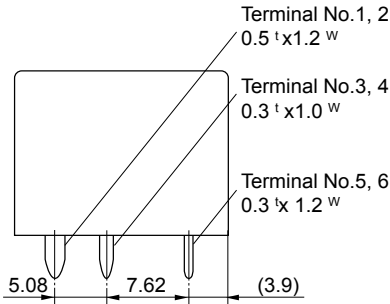
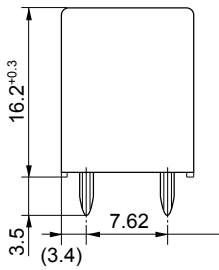
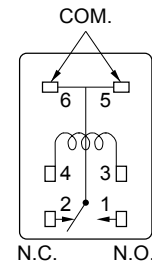
### Dimensions



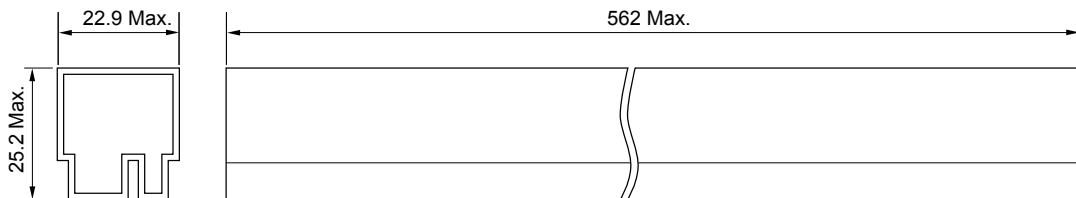
### PC board mounting hole layout (BOTTOM VIEW)



### Schematics (BOTTOM VIEW)



### Tube carrier



35 pcs/tube

Unit : mm

## 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.



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