

# FL2B Series

## DC 2-wire Type Small Terminal Board Proximity Sensors

### FEATURES

Ideal for No-contact Connection of Microswitches and Limit Switches  
High Seal Capabilities (IP 67)

- Easy-to-maintain terminal plate connection
- Mounting compatible with Yamatake microswitch BZ series
- Reduced wiring costs
- Different-frequency types that are only slightly influenced by mutual interference available
- High seal capabilities (IP 67)


[CLICK](#)

### ORDER GUIDE

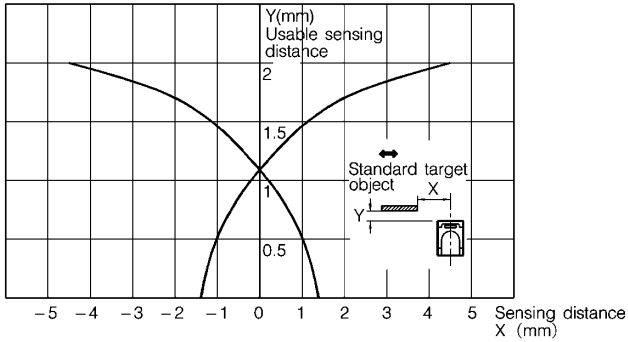
Actuation method	Appearance		Sensing distance	Operation mode	Different-frequency type	Catalog listing
	Sensor package style	Dimensions (mm)				
High-frequency oscillating type		18 × 23 × 77	2.0mm	N.O.	—	<b>FL2B-2J6</b>
				N.C.	○	<b>FL2B-2J6-F</b>
			4.4mm	N.O.	—	<b>FL2B-2K6</b>
				N.C.	—	<b>FL2B-4J6</b>
					○	<b>FL2B-4J6-F</b>
—	<b>FL2B-4K6</b>					

### SPECIFICATIONS

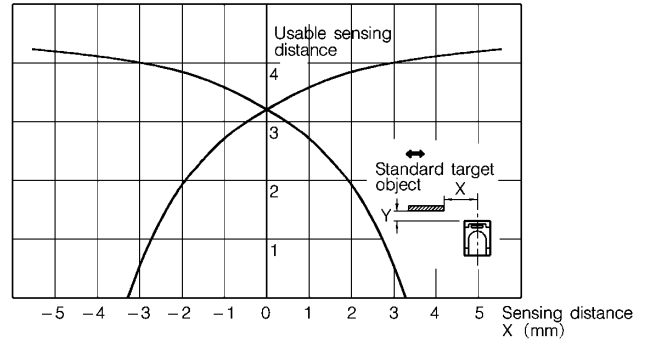
Catalog listing	FL2B-2J6(-F)	FL2B-2K6	FL2B-4J6(-F)	FL2B-4K6
Actuation method	High-frequency oscillating type			
Rated sensing distance	2 ± 0.4mm		4.4 ± 0.4mm	
Usable setting distance	0 to 1.4mm		0 to 3.1mm	
Standard target object	20 × 20mm, 1mm thick iron			
Differential travel	15% max. of sensing distance			
Hysteresis	0.05mm max.			
Rated supply voltage	12/24V dc both			
Operating voltage range	10 to 30V dc			
Leakage current	1.0mA max.			
Control output	Switching current: 4 to 100mA Voltage drop: 3.3V max. (100mA) Output dielectric strength: 30V			
Operating frequency	800Hz			
Temperature characteristics	± 10% max. for the range of -25 to +70°C when +25°C is taken as standard temperature in sensing distance			
Supply voltage characteristics	± 1% max. with +15% voltage fluctuation with rated supply voltage as standard voltage in sensing distance			
Operating temperature range	-25 to +70°C			
Storage temperature range	-25 to +70°C			
Operating humidity range	35 to 95%RH (condensation not allowed)			
Insulation resistance	50MΩ min. (at 500V dc)			
Dielectric strength	500V ac, 50/60Hz for 1 minute			
Vibration resistance	10 to 55Hz, 1.5mm peak-to-peak amplitude, 2 hrs in X, Y and Z directions			
Shock resistance	490m/s <sup>2</sup> 10 times in X, Y and Z directions			
Protection	IP 67 (IEC standard)			
Circuit protection	Surge absorption, load short-circuit protection, reverse connection protection			
Wiring method	Terminal screw			
Material	Body case	PBT		
	Terminal cover	PBT		

## SENSING AREA DIAGRAMS

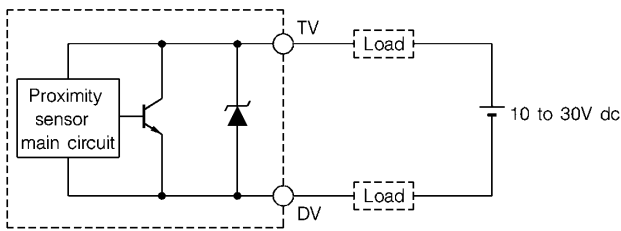
FL2B-2J6



FL2B-4J6

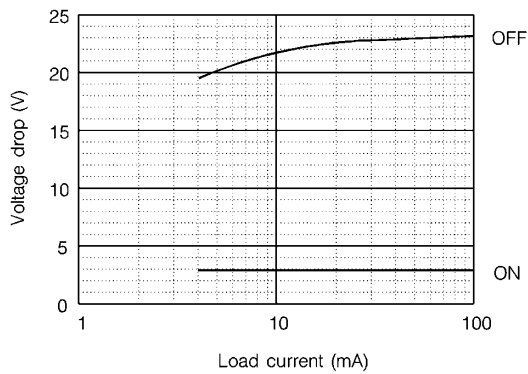


## WIRING DIAGRAM

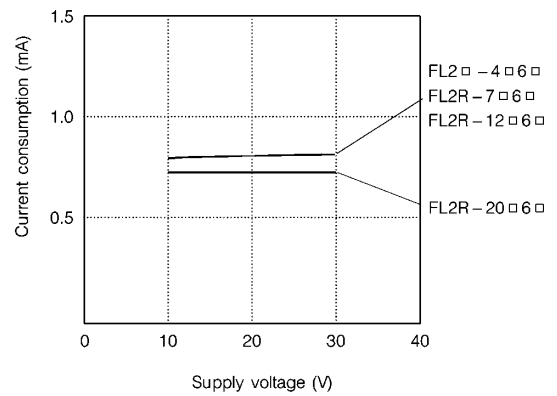


The load can be connected to either of the power supplies.

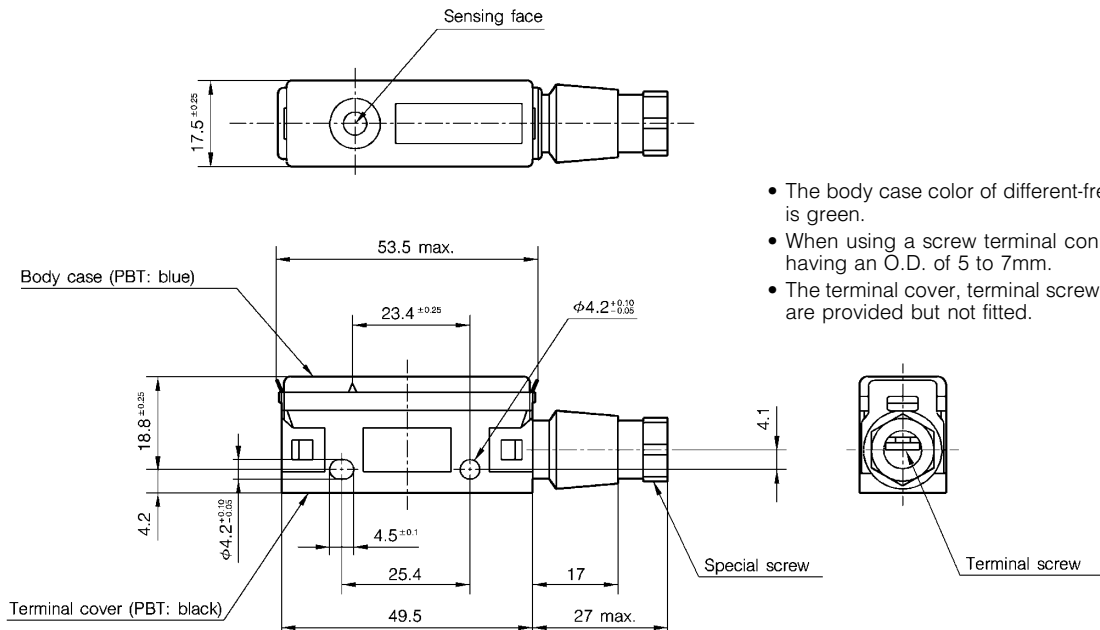
## VOLTAGE DROP CHARACTERISTICS (typical example)



## LEAKAGE CURRENT CHARACTERISTICS (typical example)



## EXTERNAL DIMENSIONS



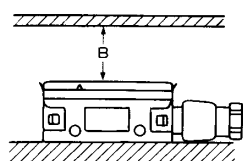
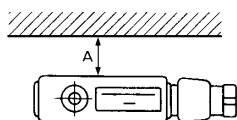
- The body case color of different-frequency types '-F' is green.
- When using a screw terminal connection, use a cord having an O.D. of 5 to 7mm.
- The terminal cover, terminal screw and special screws are provided but not fitted.

## PRECAUTIONS

### ● Influence of surrounding metal

Metal other than the object surrounding the sensor may influence operating characteristics. Maintain the following space between the switch and surrounding metal:

Catalog listing	Dimensions	A (mm)	B (mm)
FL2B-2□6 (-F)		10	20
FL2B-4□6 (-F)		10	20



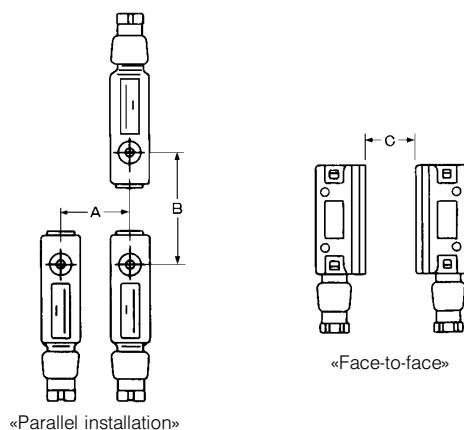
Note: Shaded areas indicate surrounding metal other than the target object.

### ● Mutual interference prevention

When mounting proximity sensors in parallel or facing each other, mutual interference may cause the sensor to malfunction. Maintain at least the spaces indicated in the figures above.

Catalog listing	Dimensions	A (mm)	B (mm)	C (mm)
FL2B-2□6 (-F)		30(17.5)	60(30)	60(30)
FL2B-4□6 (-F)		70(17.5)	60(40)	95(40)

Figures in parentheses “( )” are values when a standard frequency type is combined with a different-frequency type.



### ● Mounting

Be sure to use M4 screw when mounting the proximity sensors, and tighten the sensor to a tightening torque of 4 N-m or less.

### ● Wiring

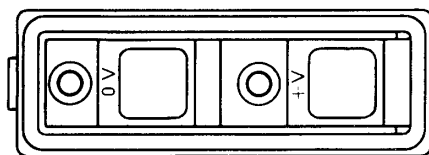
Connect the power supply and load to the proximity switch correctly.

#### • Wiring method

Use a cord having an O.D. of 5 to 7mm.

Firmly connect a M3 round crimped terminal to the end of the cord.

Connection terminal



### ● Cautions during series or parallel connection

#### (1) Series connection

- When connecting two or more proximity sensors in series, erroneous output (1 to 3ms) may occur without the rated current being supplied to each of the sensors. For this reason, series connection of proximity sensors is not recommended. However, if proximity sensors must be connected in series, a resistor of 10kΩ must be provided in parallel to each of the sensors. However, note that the maximum leakage current in a series connection will be 3.5mA.

Operation lag also will occur, resulting in increased voltage drop, and the operation indicator lamp will not light.

$$\text{Operation lag} = 40\text{ms} \times (\text{number of series connections} - 1)$$

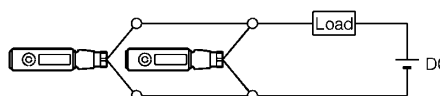
$$\text{Voltage drop} = \text{voltage drop of single sensor} \times \text{number of series connected sensors}$$

#### (2) Parallel connection (OR connection)

- When connecting two or more proximity sensors in parallel, leakage current increases as follows, and may result in faulty load restore.

$$(\text{Leakage current} = \text{Leakage current of single sensor} \times \text{number of series connected sensors})$$

- When two or more sensors turn ON in a parallel connection, one (or some) of the sensors may not indicate operation. This is not an abnormality.



### ● Relay loads

The voltage drop of the FL2B series is 3.3V. Pay attention to this voltage drop when using a relay load. (With 12V dc relays, switching is not possible.)

### ● Operation at power ON

After the power is turned ON, it takes 40ms or less until the proximity sensor is ready for sensing.

When the load and the proximity sensor use different power supplies, be sure to turn the proximity sensor ON before turning the load ON.

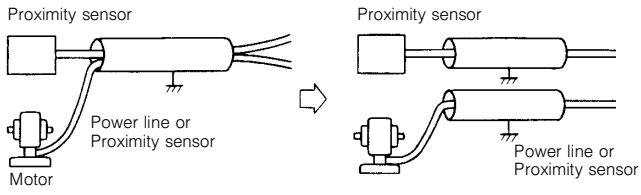
### ● Influence of leakage current

Minimal current flows as leakage current for operating the circuits even when the proximity sensor is OFF.

Take sufficient care when restoring connected loads.

● **Wiring**

- Do not bundle signal leads from the proximity sensor together with power lines. If they are included in the same wiring path, surge or noise may influence the sensor. Wire the proximity sensor cords independently or in a separate wiring duct.



- Keep cord extensions to within 100mm when using 0.3mm<sup>2</sup> or more electrical wire.