

FL7T Series

DC 3-wire Type Amplifier Relay Type Proximity Sensors

FEATURES

3dia. × 12, 6.5dia. × 16mm Small Sensor Head and Bend-resistant Shielded Lead Makes This Sensor Ideal for Robots and Automatic Assembly Machines.

- Small sensor head (3dia. × 12, 6.5dia. × 16mm)
- The sensor head is shielded.
- Bend-resistant leads are used as the shielded lead between the sensor and the amplifier.
- Operation indicator lamp is provided on amplifier. Operation can be confirmed even if sensor head is imbedded.
- Two types of shielded lead lead-in models available.
(Select the desired model according to the installation site.)



CLICK

ORDER GUIDE

- Standard (pre-leaded) model (cord length 2m)

Actuation method	Appearance		Sensing distance	Output operation mode		Catalog listing
	Sensor package style	Sensor dimensions				
High-frequency oscillating type (shielded)		3dia. × 12mm	0.5mm	NPN	N.O.	FL7T-P5A6
					N.C.	FL7T-P5B6
				PNP	N.O.	FL7T-P5D6
					N.C.	FL7T-P5E6
				NPN	N.O.	FL7T-1P5A6
					N.C.	FL7T-1P5B6
		6.5dia. × 16mm	1.5mm	NPN	N.O.	FL7T-1P5A6
					N.C.	FL7T-1P5B6
				PNP	N.O.	FL7T-1P5D6
					N.C.	FL7T-1P5E6
				NPN	N.C.	FL7T-P5B6Q
					N.O.	FL7T-P5D6Q
PNP	N.C.	FL7T-P5E6Q				
	N.O.	FL7T-1P5D6Q				
PNP	N.C.	FL7T-1P5E6Q				
	N.O.	FL7T-1P5D6Q				

Note: Vibration-resistant output cord and ultra bend-resistant shielded lead between sensor and amplifier are available. Append Catalog No. with **-R** and **-SR** indicated below.

(Typical values)

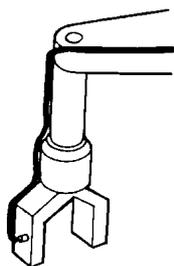
		Shielded wire	
		Bend-resistant (standard)	Super bend-resistant
		«300,000 times»	«600,000 times»
Output cord	Standard (10,000 times)	Do not append.	—
	Vibration resistance (100,000 times)	-R	-SR

Figures in parentheses “()” indicate the number of bends taking reciprocal bending by 180° at a bending radius of 5mm as one operation.

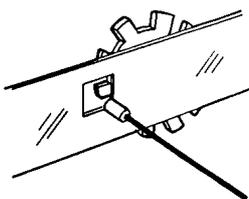
Figures in brackets “« »” indicate the number of bends taking reciprocal bending by 180° at a bending radius of 5mm under a 50g load as one operation.

APPLICATION EXAMPLES

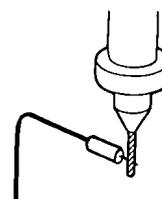
- Industrial robots



- Automatic assembly machines



- Machine tools

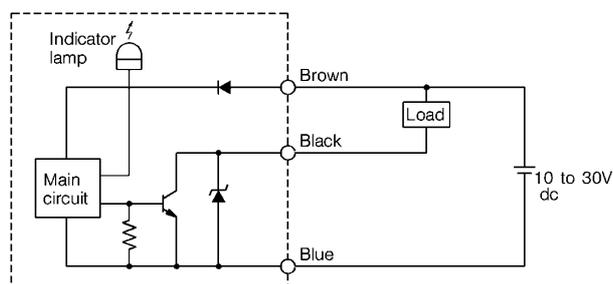


SPECIFICATIONS

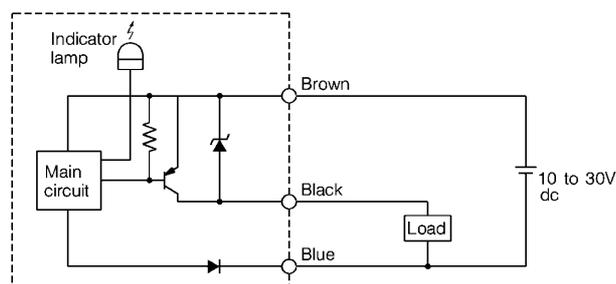
Catalog listing		FL7T-P5□6 FL7T-P5□6Q	FL7T-1P5□6 FL7T-1P5□6Q
Item			
Actuation method	High-frequency oscillating type (shielded)		
Rated supply voltage	12/24V dc		
Rated sensing distance	0.5±0.075mm	1.5±0.225mm	
Usable sensing distance	0 to 0.35mm	0 to 1.1mm	
Standard target object	5×5mm, 1mm thick iron		8×8mm, 1mm thick iron
Differential travel	15% max. of sensing distance		
Operating voltage range	10 to 30V dc		
Current consumption	15mA max. (24V dc)		
Output operation mode	A: NPN N.O., B: NPN N.C., D: PNP N.O., E: PNP N.C.		
Control output	Switching current: 100mA max., voltage drop: 1V max. (load current: 100mA), output dielectric strength: 30V dc		
Operating frequency	1kHz	500Hz	
Temperature characteristics	±20% max. for the range of -25 to +70°C when +25°C is taken as standard temperature in sensing distance		
Supply voltage characteristics	±5% max. with ±15% voltage fluctuation with rated supply voltage as standard voltage in sensing distance		
Indicator lamps	Lights (red) when object approaches		
Operating temperature range	-25 to +70°C		
Storage temperature range	-25 to +70°C		
Operating humidity range	35 to 95%RH max.		
Insulation resistance	50MΩ min. (by 500V ac megger)		
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 ² 3 times in X, Y and Z directions		
Protection	IP66		
Weight (pre-leaded model)	Approx. 60g		
Circuit protection	Surge absorption, load short-circuit protection, reverse connection protection circuit		
Wiring method	Pre-leaded		
Material	Sensor case	Ni-plated brass	
	Sensor sensing face	PBT	
	Amplifier case	PBT	

WIRING DIAGRAMS

- NPN output type



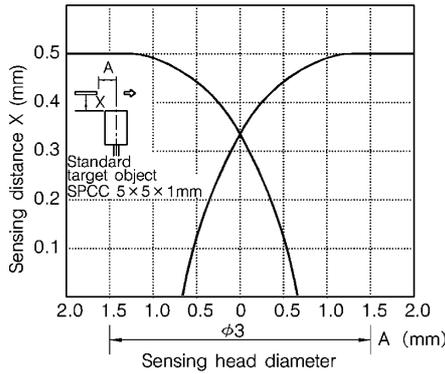
- PNP output type



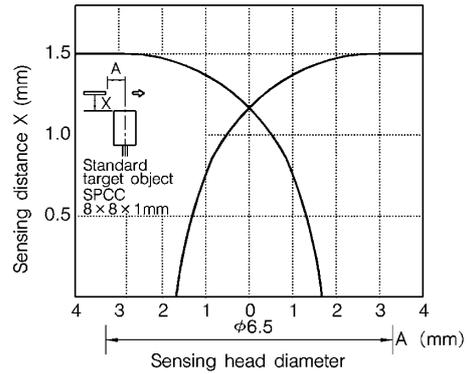
CHARACTERISTICS DIAGRAMS (typical example)

● Sensing area diagrams

FL7T-P5□6(Q)

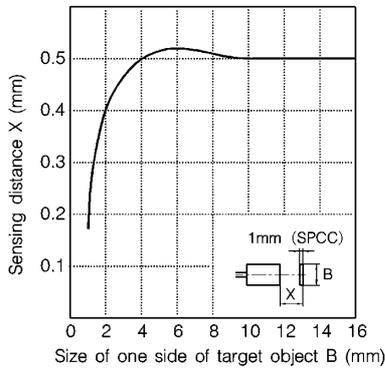


FL7T-1P5□6(Q)

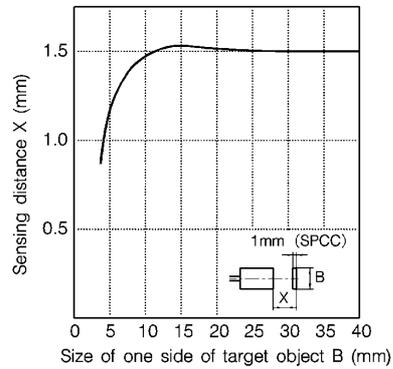


● Sensing distance according to material & size of object

FL7T-P5□6(Q)

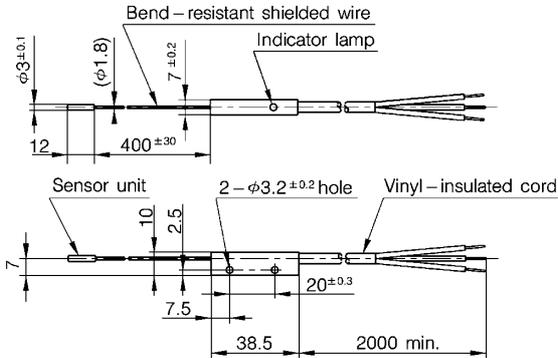


FL7T-1P5□6(Q)



EXTERNAL DIMENSIONS

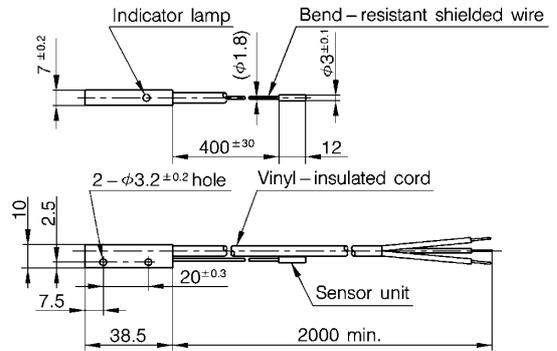
FL7T-P5□6



Vinyl-insulated cord (oil-resistant: 0.3mm², 27/0.12, 3-core) 4.2mm dia.
Note that length of **-SR** bend-resistant shielded lead is 300±30mm.
Cap color: blue

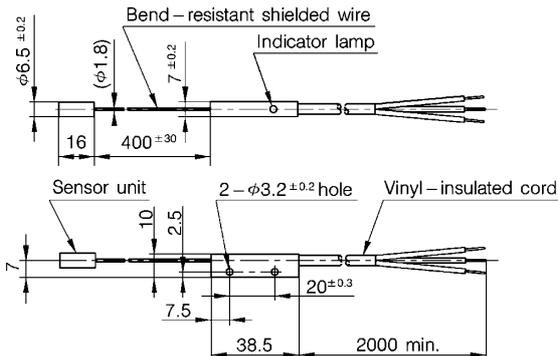
FL7T-P5□6Q

(unit: mm)



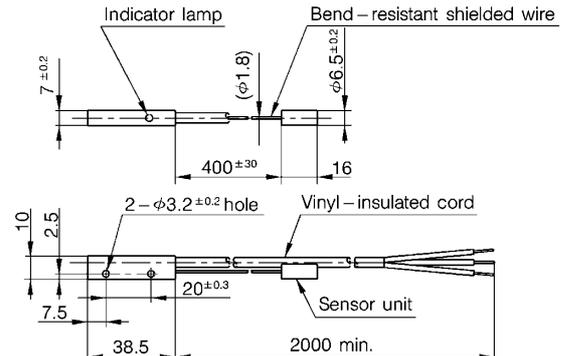
Vinyl-insulated cord (oil-resistant: 0.3mm², 27/0.12, 3-core) 4.2mm dia.
Note that length of **-SR** bend-resistant shielded lead is 300±30mm.
Cap color: blue

FL7M-1P5□6



Vinyl-insulated cord (oil-resistant: 0.3mm², 27/0.12, 3-core) 4.2mm dia.
Note that length of **-SR** bend-resistant shielded lead is 300±30mm.
Cap color: blue

FL7N-1P5□6Q

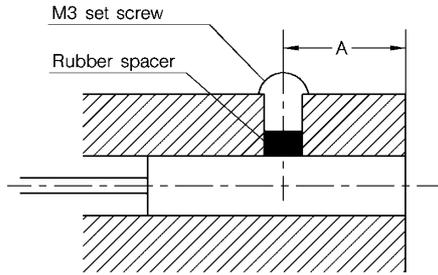


Vinyl-insulated cord (oil-resistant: 0.3mm², 27/0.12, 3-core) 4.2mm dia.
Note that length of **-SR** bend-resistant shielded lead is 300±30mm.
Cap color: blue

PRECAUTIONS

● Mounting sensor head

Use a rubber spacer (provided) to ensure that the distance between the M3 set screw and the end of the sensor is at least the following. Tighten the screw to the designated torque.



Catalog listing	A dimensions (mm)	Allowable tightening torque N•m
FL7T-P5□6□	5	0.4
FL7T-1P5□6□	9	0.6

Dimension A (mm) is as follows in the case of tightening fastening:

Tightened fastening A (mm)

Catalog listing	Tightened fastening A (mm)
FL7T-P5□6□	7mm max.
FL7T-1P5□6□	11mm max.

● Tensile strength of shielded lead between sensor and amplifier

Bend-resistant shielded lead is used between the sensor and the amplifier. The tensile strengths are as follows:

Handle shielded lead taking care not to apply a force exceeding this limit.

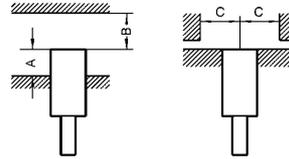
Cord/shielded wire	Tensile strength N
—	29
R	29
SR	5

● Mounting amplifier

Mount the amplifier on a flat surface at a tightening torque of 0.5N•m. Never mount the amplifier in such a way that it may become deformed.

● Influence of surrounding metal

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



Shaded areas indicate surrounding metal other than the target object.

A: Dimension to tip (sensing face) of proximity sensor from mounting surface

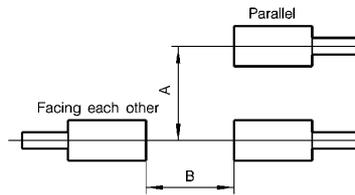
B: Dimension to front iron plate from tip (sensing face) of proximity sensor

C: Dimension to front iron plate of proximity switch when A=0

Catalog listing	A (mm)	B (mm)	C (mm)
FL7T-P5□6□	0	1.5	1.5
FL7T-1P5□6□	0	4.5	3.25

● 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 below.



Catalog listing	A (mm)	B (mm)
FL7T-P5□6□	12	15
FL7T-1P5□6□	15	20

SENSING DISTANCE ACCORDING TO MATERIAL OF OBJECT

The sensing distance of the proximity switch varies according to the material of the target object. When the target object is the same size as a standard target object, the relationship in size of

differing materials is as shown in the table below. Select the model that satisfies the required sensing distance.

Material	Cast iron	Soft iron	Aluminum foil (0.05mm thick)	Stainless steel	Brass	Aluminum	Copper
Relative sensing distance	Approx. 100%	100%	Approx. 90%	Approx. 70%	Approx. 40%	Approx. 35%	Approx. 30%