

Proximity Sensors FL7M Series (3-wire DC Type) User's Manual

Thank you for purchasing our proximity sensor. This manual contains information for ensuring correct and safe use of this product. Please read and understand the manual thoroughly before using this product, and keep the manual nearby after installation for handy reference.

Please read the "Terms and Conditions" from the following URL before ordering or use:

<http://www.azbil.com/products/bi/order.html>

© 2004-2013 Azbil Corporation All Rights Reserved.

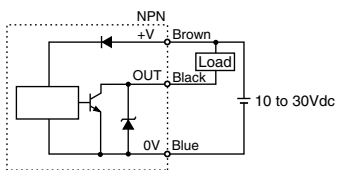
Specifications

Shielded type proximity sensor (suitable for flush mounting onto metal)

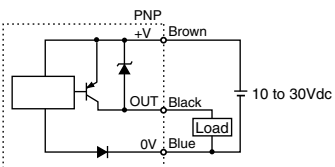
Model number	FL7M-			
	1P5_6	2_6	5_6	10_6
Size	M8	M12	M18	M30
Sensing distance	1.5mm	2mm	5mm	10mm
Setting distance	0 to 1.05mm	0 to 1.4mm	0 to 3.5mm	0 to 7mm
Standard target (steel)	8 x 8 x 1mm	12 x 12 x 1mm	18 x 18 x 1mm	30 x 30 x 1mm
Hysteresis	10% max. of sensing distance			
Supply voltage	10 to 30Vdc			
Current consumption	13mA max.			
Output	Load current: 100mA max. Voltage drop: 2V max. Withstand voltage: 30V max.			
Operating temperature	-25 to +70°C		-10 to +60°C	
Insulation resistance	50MΩ min. (500Vdc)			
Dielectric strength	1000Vac 1min			
Sealing	IP67 (IEC Standard)			
Circuit protection	Surge voltage protection, reverse polarity protection, short circuit protection			

Circuit and Wiring

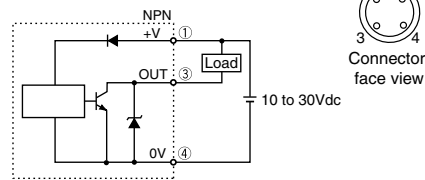
Pre-wired type (NPN) FL7M- A/B_



Pre-wired type (PNP) FL7M- D/E_



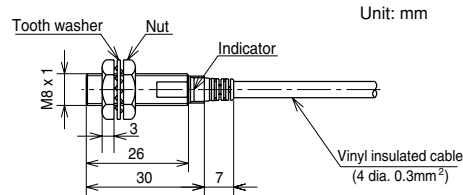
Pre-wired connector type (NPN) FL7M-1P5A6-CN03



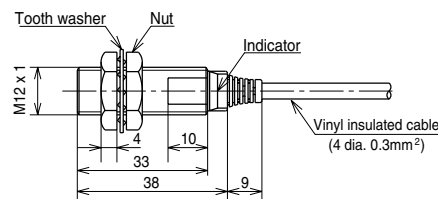
- A load must be used when power is applied to the sensor.
- A combination of short circuit and wrong wiring will cause permanent damage, regardless of short-circuit protection.
- When connecting a connector fasten tightly by hand.

Dimensions

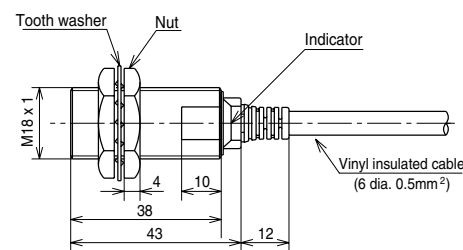
FL7M-1P5_6



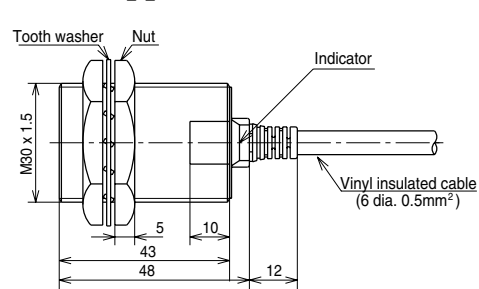
FL7M-2_6



FL7M-5_6



FL7M-10_6



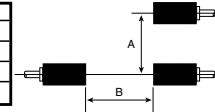
Operating Chart for Output and Indicator

Model	Indicator	Output	Sensing distance
FL7M- A/D6_ (N.O.)	OFF	OFF	RED
	OFF	ON	RED
FL7M- B/E6_ (N.C.)	RED	ON	OFF
	RED	OFF	OFF

Mutual Interference

Erroneous operation due to mutual interference is caused when sensors are installed in parallel or facing each other. Separate the sensors by at least the distance specified in the table below.

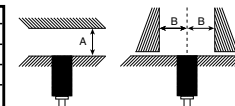
	A(mm)	B(mm)
FL7M-1P5_6	15	20
FL7M-2_6	20	30
FL7M-5_6	35	50
FL7M-10_6	70	100



Influence from Adjacent Metal

Metals opposite the sensor's sensing face must be removed to avoid false actuation. Keep metals away from the sensors as specified below. Shaded areas indicate surrounding metal other than the target object.

	A(mm)	B(mm)
FL7M-1P5_6	4.5	6
FL7M-2_6	8	9
FL7M-5_6	20	13.5
FL7M-10_6	40	22.5



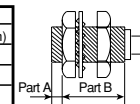
- A : Distance between front of iron plate and sensing face of proximity sensor.
- B : Distance between side of iron plate and center of proximity sensor sensing face.

Tightening Torque

When a nut is used

The permissible torque is different depending upon the distance from the top of the sensor head. Tighten the body at less than the maximum permissible torque shown below, and always with the enclosed nuts and washers. The tightening torque varies depending on the mounting plate or housing, the nut and washer material, and the condition of the mounting surface. Check that the torque is suitable for the actual combination of items before use.

	Part A		Part B
	Distance (mm)	Permissible torque (N·m)	
FL7M-1P5_6	9	9	12
FL7M-2_6	0	-	20
FL7M-5_6	0	-	70
FL7M-10_6	0	-	180



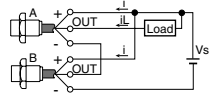
Handling Precautions

- Do not tighten the body by applying torque to the indicator unit (plastic unit).
- Do not mount the body using a setscrew. Doing so might damage the sensor.

AND Connection (Serial Connection)

When connecting two sensors in series, please pay attention to the following:

- Maximum output current (100mA) ≥ load current + current consumption (13mA)
- Supply voltage ≥ operation voltage of a load + 2 x voltage drop (2V)
- If target moves too quickly, sensor may operate incorrectly.
- In series, sensor A may operate incorrectly on startup, because sensor A is supplied power from sensor B's output.

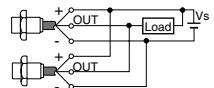


Handling Precautions

- With serial connections the sensor may be briefly unusable due to power fluctuation. Check the system before use.

OR Connection (Parallel Connection)

Up to three of these sensors may be connected in parallel.



Points to be Aware of When Handling

- Do not swing the sensor by the cable.
- Do not pull the cable with excessive force.
- Do not use the sensor outdoors, or where it is surrounded by chemicals (solvents, acids, alkalis, etc.).
- If bending the cable, keep R (the radius of the bend) ≥ (the cable diameter) x 3 at least.
- When disposing of an FL7M Series switch, dispose of it appropriately as industrial waste in accordance with applicable bylaws and regulations.

Wiring cautions

- Route the wires of the sensor separately from power lines or through an exclusive conduit. Otherwise, electrical noise or a surge may cause faulty operation or damage.
- If an extension of the cable is necessary, use at least a 0.3mm² wire of 100m maximum length.
- When using a commercial switching regulator, ground the FG (Frame Ground) and G (Ground) terminals. Otherwise, switching noise may cause faulty operation.
- When using a load to generate a transient current, connect a current limit resistor between the load and the output terminal. (Otherwise, the short-circuit protection may be activated.)

azbil

Specifications are subject to change without notice. (09)

Azbil Corporation
Advanced Automation Company

1-12-2 Kawana, Fujisawa
Kanagawa 251-8522 Japan

URL: <http://www.azbil.com>

1st edition: Sep. 2004 (M)
3rd edition: Aug. 2013 (F)