

Proximity Switches (2-wire DC)

Model FL7M-2_6_ / FL7M-3_6_ / FL7M-7_6_ / FL7M-10_6_ User's Manual

Thank you for purchasing this product.
This manual contains information for ensuring the safe and correct use of the product. Those designing or maintaining equipment that uses this product should first read and understand this manual.
Be sure to keep it nearby for handy reference.
Please read the "Terms and Conditions" from the following URL before ordering or use:
<https://www.azbil.com/products/factory/order.html>

NOTICE

Please make sure that this manual is available to the user of the product.
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Considerable effort has been made to ensure that this manual is complete and accurate, but if you should find an omission or error, please contact us.
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Specifications

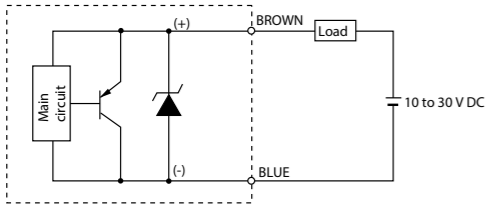
Shield type proximity switch (suitable for flush mounting into metal)

Model No.	FL7M-			
	2_6_	3_6_	7_6_	10_6_
Size	M8	M12	M18	M30
Rated operating distance	2 mm	3 mm	7 mm	10 mm
Setting range	0 to 1.4 mm	0 to 2.1 mm	0 to 4.9 mm	0 to 7 mm
Standard target	SPCC 8 × 8 × 1	SPCC 12 × 12 × 1	SPCC 18 × 18 × 1	SPCC 30 × 30 × 1
Hysteresis	15% max. of the sensing distance			
Supply voltage	10 to 30 V DC			
Leakage current	0.55 mA max.			
Output	Switching current: 3 to 100 mA Residual voltage 3 V max.			
Ambient temperature range	-25 to +70 °C			
Insulation resistance	50 MΩ min. (at 500 V DC)			
Dielectric strength	1000 V AC for 1 minute		2500 V AC for 1 minute	
Degree of protection	IP67 (IEC standards), IP67G (JEM standards), IP67 (IEC 60529) and IP67G (JIS C0920 Annex 1)			
Circuit protection	Reversed polarity, surge voltage, load short-circuit			

Circuit and Wiring

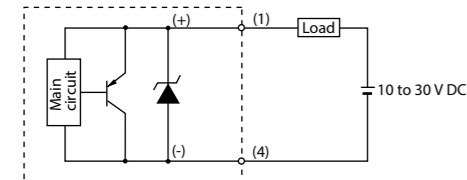
Pre-wired type

- FL7M-__6_

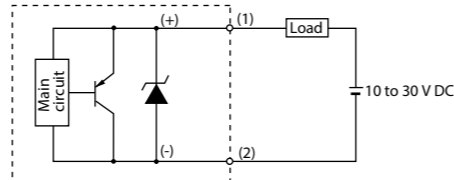


Pre-wired connector type

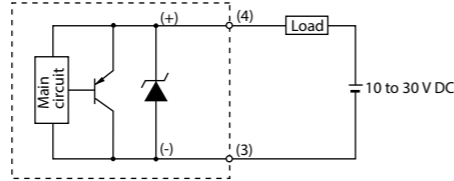
- FL7M-__J6_-CN/-SN



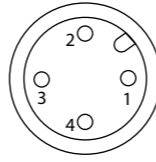
- FL7M-__K6_-CN/-SN



- FL7M-__J6_-CN_A/-SN_A



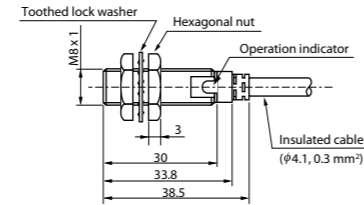
- A load can be connected at both poles.
- A load must be used when power is applied to switches. Combination of short circuit and wrong wiring will cause permanent damage, regardless of short circuit protection.
- Even if the load is shorted, the indicator operates normally. If there is no output when the indicator is lit, check the wiring.
- When using an SN_ connector model with a PA7_ Quick Lock connector, refer to the PA7_ specifications sheet to make a secure connection.
- When using a CN_ or SN_ connector model with a threaded connection, tighten the connector firmly by hand.



Connector pin assignment

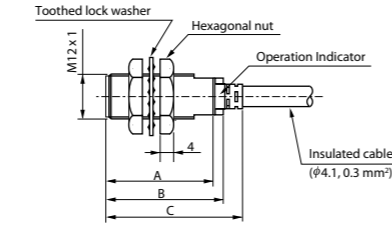
Dimensions

- FL7M-2_6_



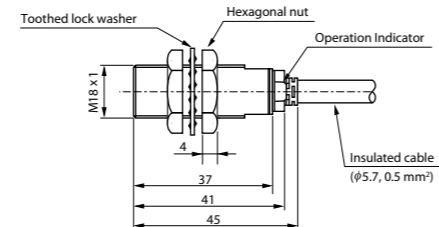
Unit : mm

- FL7M-3_6_

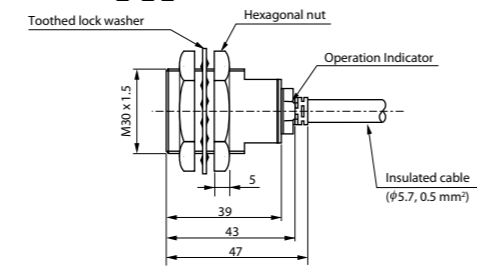


Model No.	A (mm)	B (mm)	C (mm)
FL7M-3_6_	32	35.5	40
FL7M-3_6_G	40	43.5	48

- FL7M-7_6_



- FL7M-10_6_



Installation for Reliable Operation

To ensure reliable detection by the proximity switch, install it as follows.

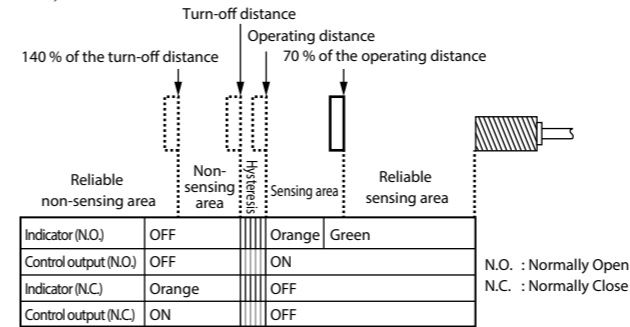
For reliable detection, install the proximity switch at a position that is 70 % or less of the rated operating distance.

If the target object is made of iron and is larger than the standard target object, the appropriate operating distance will be almost the same as the rated operating distance.

If the target object is made of a material other than iron or if its dimensions are smaller than the standard target object, install the proximity switch at a position closer than 70 % of the operating distance that is applicable to the target object.

For models with a setup indicator, the green LED lights up when the switch is at a position that is about 80 % or less of the operating distance.

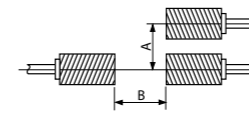
For reliable non-detection, install the switch away from the target object by 150 % or more of the rated operating distance or 140 % or more of the turn-off distance that is applicable to the target object (within the reliable non-sensing area).



Mutual Interference

Faulty operation due to mutual interference may occur when switches are installed in parallel or facing each other. Keep switches away from each other at least the distance specified in the table below.

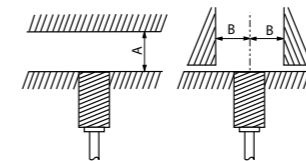
Model No.	A (mm)	B (mm)
FL7M-2_6_	15	20
FL7M-3_6_	20	30
FL7M-7_6_	35	50
FL7M-10_6_	70	100



Influence from Nearby Metal Objects

If a metal object other than the workpiece is located nearby, this switch's sensing distance characteristics will change. Keep the minimum distances between the switch and metal objects shown in the table below.

Model No.	A (mm)	B (mm)
FL7M-2_6_	8	8
FL7M-3_6_	8	9
FL7M-7_6_	20	13.5
FL7M-10_6_	40	22.5



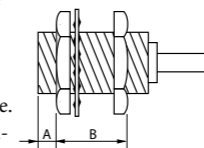
A: Distance from the sensing surface of the proximity switch to a metal object in front of the switch

B: Distance from the axis of the proximity switch to a metal object in front of the switch

Tightening Torque

When nuts are used

The maximum torque varies depending upon the distance from the head. Tighten the body to less than the maximum torque shown below, using the included 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.

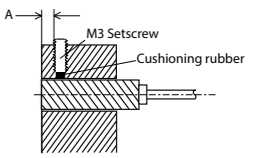


Model No.	Distance A (mm)	Maximum torque (N-m)	Distance B (mm)	Maximum torque (N-m)
FL7M-2_6_	10	9	16	12
FL7M-3_6_	10	20	22	30
FL7M-7_6_	0	—	37	70
FL7M-10_6_	0	—	39	150

When a setscrew is used

When mounting the FL7M-2_6_ with a set screw, use an M3 cup point set screw or an M3 flat point set screw. Do not use an M4 or M5 set screw. Also, use cushioning rubber (model No. SZ-B05, sold separately) for cushioning. The tightening torque of the set screw must not exceed the value shown in the table below. Maintain distance "A" indicated below.

Model No.	A (mm)	Maximum torque (N-m)
FL7M-2_6_	10	0.6*



*The recommended tightening torque is 0.5 N-m.

Serial Connection

If connecting two switches in series, take the following notes into account.

- Supply voltage ≥ Load voltage + 2 × Residual voltage (3 V)
- A delay of about 20 ms may occur.
- False pulses (about 1 ms/3 mA) may be generated.
- Indicators may not be turned on.

Parallel Connection

If connecting two or more switches in parallel, take the following notes into account.

- Number of switches × Leakage current ≤ Recovery load current
- False pulses (about 200 μs) may be generated.

Using a Relay as a Load

This switch has a residual voltage of 3.0 V max.

If using a relay as a load, pay fully attention.

(If the supply voltage is 12 V DC, a 12 V DC type relay doesn't operate.)

Handling Precautions

- Do not swing the proximity switch around by the cable. Also, do not pull on the cable with excessive force.
- Do not use the device outdoors or in a place with direct exposure to chemicals (organic solvents, acids, alkalis, etc.).
- The bend radius of the cable should be at least three times the cable's outer diameter. Do not make a bend 30 mm or less from where the cable comes out. Doing so may break the cable.
- Do not use the device in a place where the cable would receive repeated bending stress. Doing so may break the cable.
- When disposing of this device, please do so appropriately, in compliance with local ordinances for industrial waste.
- Do not use an SN_ connector model in an environment where corrosion is likely to occur. If the connector rusts, it may be impossible to remove.
- Up to 40 ms is required for stabilization after the power is turned on.

Wiring Precautions

- Do not put the wires of the proximity switch together with motor power lines or other power wires in the same conduit. Doing so may cause malfunction or damage due to induced electromagnetic noise.
- If cable extension is necessary, use a cable whose nominal cross-sectional area is at least 0.3 mm². The total cable length should be no more than 100 m.
- When using a commercially available switching regulator, ground the flame ground and ground terminals. Otherwise, switching noise from the regulator may cause a malfunction.
- If a capacitive load is connected to the output of the proximity switch, the output short-circuit protection function may be activated due to inrush current. In this case, insert a current-limiting resistor between the output and the load.

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Specifications are subject to change without notice. (11)

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