

Proximity Sensor Training Manual

Training Kit

1. Proximity sensor training set
 - **FL7M-2B6**
 - **FL2-20A6H**
 - **FL7M-10J6D**
2. 24Vdc power supply
3. 24Vdc relay
4. **PS5** indicator
5. Graph paper
6. Terminal box
7. Target set
8. Terminal block
9. Terminal box

For use of this product, be sure to refer to the user's manual. In the user's manual, **safety precautions** are marked by





and **handling precautions** are marked by



To use this product safely and properly, be sure to follow the precautions.

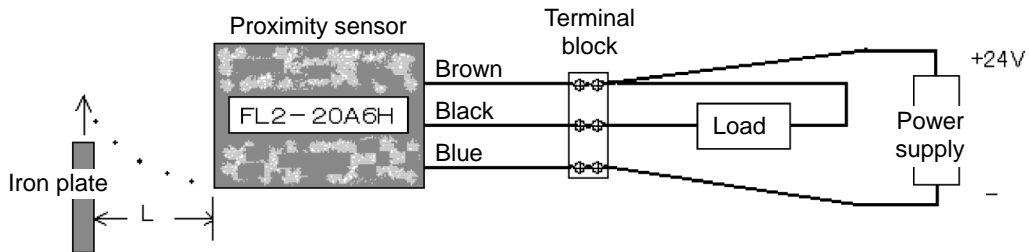


WARNING

	During the training, do not touch terminals or bare wire leads. Doing so might cause electric shock.
	Do not wire or dismount the product with the power ON. Failure to remove the plug from the outlet might cause electric shock.

1. Sensing Area Diagram

On a piece of graph paper, draw a sensing area diagram for the **FL2-20A6H** using the procedure described below.



- ① Wire the **FL2-20A6H** as in the figure above. Use the relay as the load, connecting terminals 13 and 14.
- ② Put the **FL2-20A6H** on the graph paper aligned with the grid. Trace the sensor body with a pencil to mark its position on the graph paper.
- ③ Use an iron plate (50×50mm, 1mm thick) as the target. At the distance between the target and sensing face of $L = 0\text{mm}$, slide the target parallel to the sensing face, and plot the operating point. Do the same for several distances L in a range from 0 to 20mm. Do so also for the OFF points.

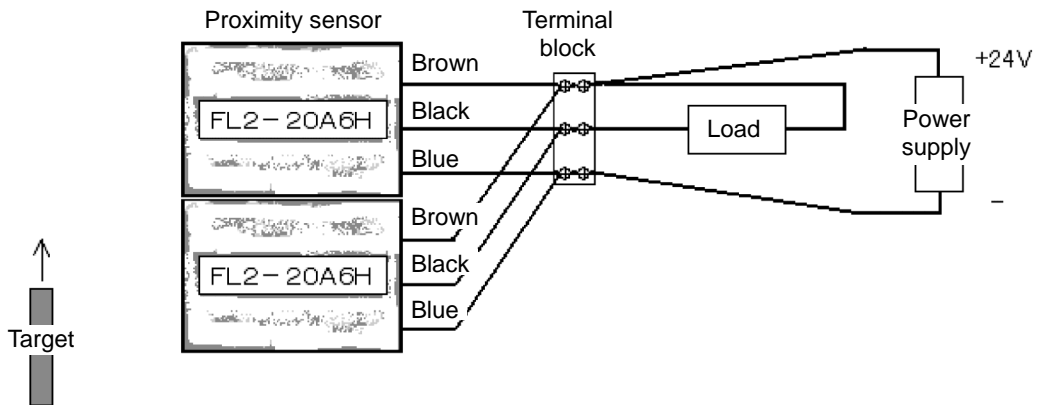
2. Relation of sensing distance to target size and material

Measure sensing distances for the **FL2-20A6H** by moving the target vertically toward the sensing face. Do so for the target materials shown in the following table.

Target	Sensing distance (mm)	Target	Sensing distance (mm)
Iron (50×50mm)		Iron (25×25mm)	
Copper (50×50mm)			
Aluminum (50×50mm)		Aluminum foil (50×50mm)	

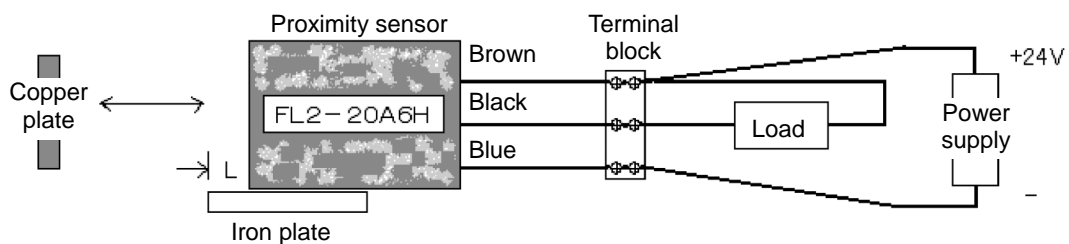
3. Mutual interference

Mutual interference occurs when multiple units of the same model of proximity sensor are mounted adjacently, as shown below. For various targets, slide the target horizontally toward the sensing faces, and check the operating points. If 3 or more operating points are observed, there is mutual interference.



4. Interference from surrounding metal

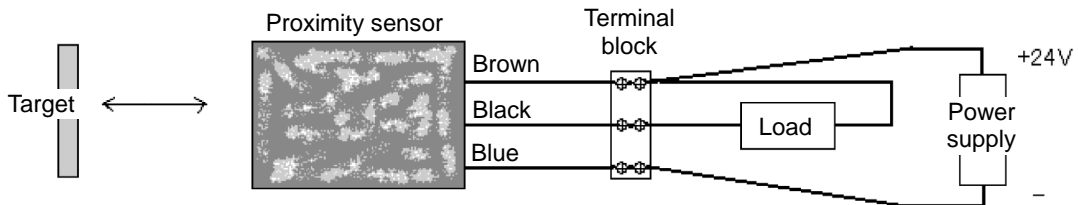
Measure sensing distances for the FL2-20A6H when an iron plate (50×50mm) is placed beside the sensor body, and compare them with the distances without the iron plate. Use a copper plate (50×50mm) as the target.



Distance between the sensing face and the end of the iron plate	Sensing distance (mm)
Without iron plate	
L = 5mm	
L = 10mm	

5. Output types (N.O./N.C.)

For the **FL7M-2B6** and **FL2-20A6H**, check the operation of the indicators and relays, and write "ON" or "OFF" in the table shown below. The relay is ON if its coil is excited.

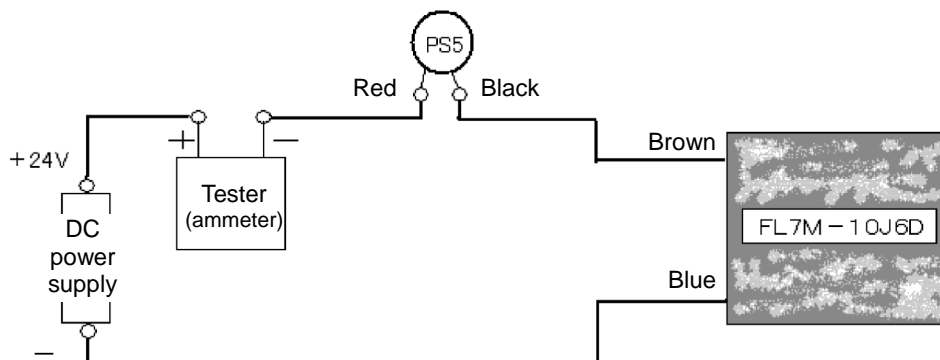


Model	Output	Target	Relay	Indicator
FL7M-2B6	N.C.	Not detected		
		Detected		
FL2-20A6H	N.O.	Not detected		
		Detected		

6. How to use the DC 2-wire sensor

1) Sensing and setting distances

Wire the DC 2-wire proximity sensor (**FL7M-10J6D**) as in the following figure:



① Measure the sensing distance (red indication) and the setting distance (green indication) using an iron plate (50×50mm) as the target.

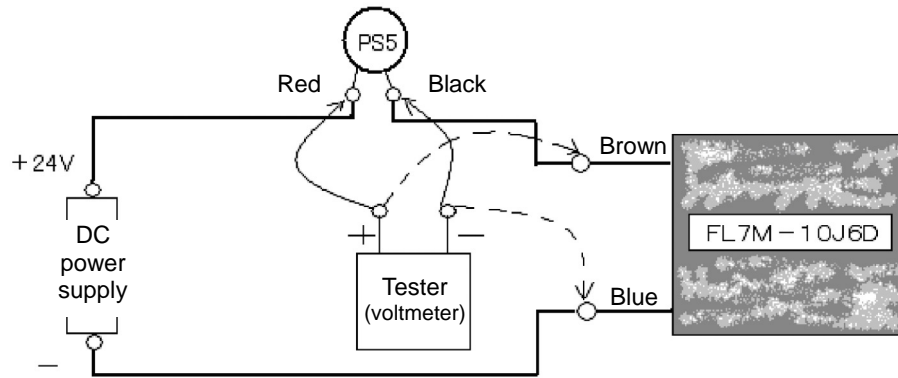
② What percentage of the sensing distance is the setting distance?

Indicator color	Distance (mm)	B/A (%)
Red	(A)	
Green	(B)	

2) Measuring current consumption and voltage drop

Measure the current consumption using the circuit shown in 1) above.

Measure the **PS5** and **FL7M** voltages with the tester. To measure voltages, connect the tester in parallel to the circuit as in the following figure:



Item	With FL7M output ON	With FL7M output OFF
Circuit current	mA	mA
	Rating: mA	mA
PS5 voltage	V	V
FL7M voltage	V	V
	Rating:	V