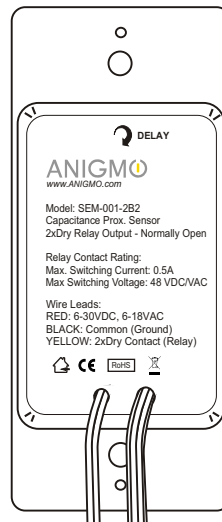


DIRECTIONAL TOUCHLESS SENSORS SEM SERIES



Description

SEM-001-2X directional capacitive sensors are designed to detect hand movement direction. They can detect up/down or left/right movement, depending on the sensor mounting orientation. They use our patented multi sensor technology for reliable detection of the movement while maintaining large sensing range.

The sensor works through most materials and can be used as an input device for wide variety of electronic devices.

Features

- Hand movement direction sensing.
- Reliable static and dynamic object detection (user's hand, foot etc.) through most materials.
- Can be hidden behind walls, floors, surfaces, objects etc.
- Comes with variety of output options for use as an input device with any device needing directional control.
- Range or time delay adjusted with potentiometer.
- Low power consumption.
- Excellent noise immunity.

Applications

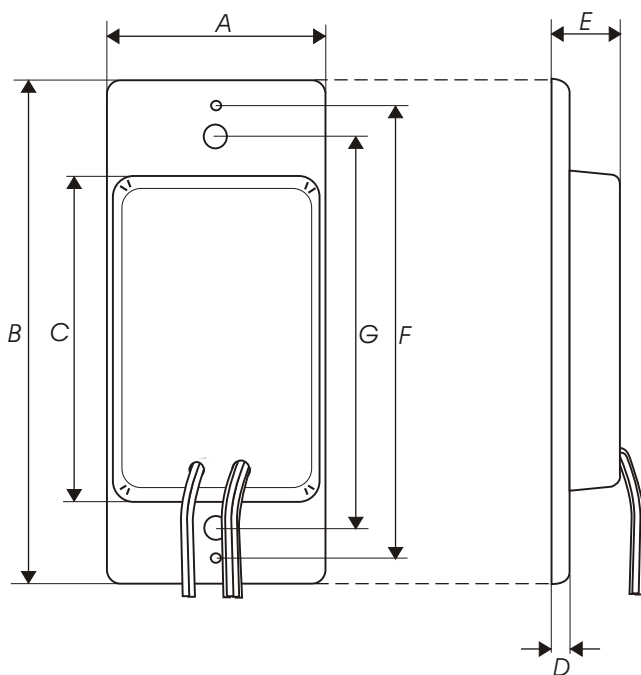
- Controlling devices requiring directional input (blinds, curtains, lights, projection screens...).
- Home automation systems (single sensor capable of supplying multiple commands).
- Hidden or invisible controls.
- Controlling DMS or DDM series of low voltage dimmers.

Specifications

TECHNICAL DATA	SEM-001-2x
Supply input voltage range nom:	12 - 24 V DC
Supply input voltage (min - max):	12 - 30 V DC
Supply current:	6 mA (20mA when signal relay is activated)
Output:	Output version (x = A) - NPN Open collector (x = B) - Dry (isolated) relay contact (x = D) - 0-10V output (0V - off; 1-10V - output level)
Detection frequency (mode 1):	5 Hz
Object speed (max):	1m/s
Range (single sensor): ⁽¹⁾	6 cm (max., adjustable)
Range (double sensor):	4 cm (max., Adjustable)
Temperature range:	0 °C to +50 °C
Input and output connections:	0.5mm ² wires (1.5mm overall diameter)
Connection wire length:	150 mm (6")
Housing dimensions (W x H x D):	47mm x 107mm x 15mm (1.8" x 4.25" x 0.6")

(1) Sensor output option 3 (two independent single sub-sensors) or when one single sub-sensor is activated in output option 1 or 2

Dimensions



A (width)	47 mm (1.8")
B (height)	107 mm (4.25")
C (back housing height)	69 mm (2.7")
D (front sensor thickness)	3.5 mm (0.14")
E (depth)	15 mm (0.2")
F (mounting hole 3 pitch)	96 mm (3.75")
G (mounting hole 5 pitch)	82.5 mm (3.25")

Installation

Connect the unit according to the output signal used (see details). Take connection diagram of the controlled unit (blind motor controller etc.) into account

Unit can be mounted using two screws, double-sided tape or cable ties.

It is recommended that chassis ground is connected to the sensor negative wire. Ground loops should be avoided.

Make sure that wire connections are secure, any loose contact in any connection could lead to unstable operation.

Directional sensors can work through a variety of different materials, however, it is recommended to test the type and thickness of the intended covering material before final installation. Material should be fixed in front of the sensor to observe any change in range.

IMPORTANT: the sensor and test material in front of the sensor should be fixed. Any slight movement could force the sensor into a calibration mode, blocking it for about 30s.

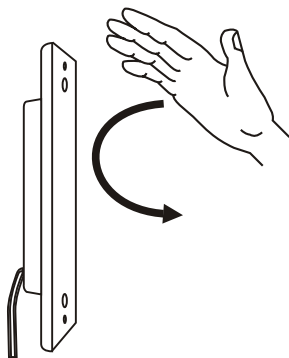
IMPORTANT: sensors with relay output (B suffix) have signal relay output. The output relay should NOT be used to switch loads. Suitable power relay or Anigmo DMS type dimmer should be connected to control the load.

Double sensor operation important notes

In order for sensor to reliably detect object direction, several conditions must be met. The object movement should be as uniform as possible and entire movement of the object must be in the sensor range (please note: double sensors range is about 35% smaller than that of comparable sized single sensor). The speed of the object may not exceed max. speed (see Technical data table).

IMPORTANT: trimmer on the side of the sensor has different function for different output option. Output options 1, 3 and 4 use trimmer to set the sensor range. Option 2 uses trimmer for setting the output pulse duration, while range is always set to the max.

Example 1

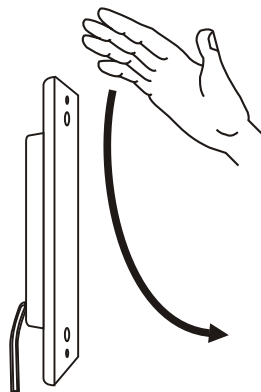


Wrong ❌

Hand movement is not entirely in front of the sensor surface.

Hand should move across the entire length of the sensor.

Example 2

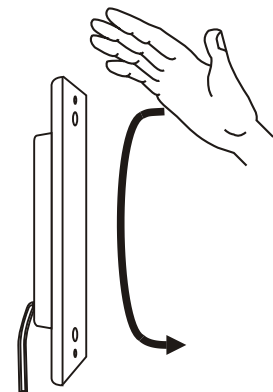


Wrong ❌

Hand movement is not in the sensor range across the entire move.

Keep the hand in the sensor range while moving it across the sensor.

Example 3



Correct ✅

The hand moves across the entire sensor surface while staying in the sensor range.

TIP: directional sensor works best if the object moving across the sensor is narrow. Thus moving hand across the sensor sideways or moving just fingertips across the sensor will improve sensor detection.

Output options

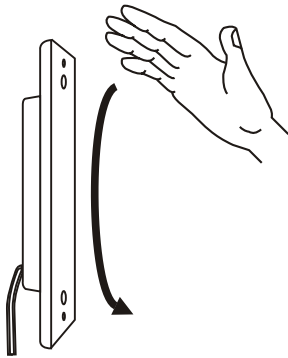
OPTION 1 - pulse directional output

Models SEM-001-2A1, SEM-001-2B1

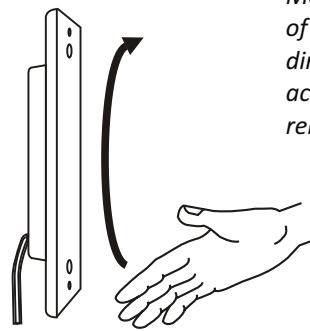
Sensor has two digital outputs, output version 'A' has two NPN OC outputs and version 'B' has two isolated (dry) relay contact outputs.

When the sensor detects movement of the hand in one direction, OUTPUT1 is active for 500ms. When the sensor detects movement in opposite direction, OUTPUT2 is active.

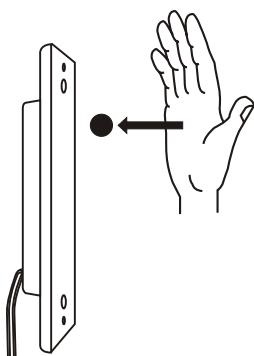
If the hand is held in range on top or bottom part of the sensor for longer than 1s, corresponding output goes active and remains active until the hand is moved out of the area.



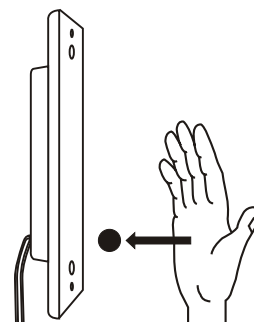
Moving the hand in front of the sensor in the downward direction makes OUTPUT1 active for 500ms. OUTPUT2 remains inactive



Moving the hand in front of the sensor in the upward direction makes OUTPUT2 active for 500ms. OUTPUT1 remains inactive



Moving the hand in front of the top half of the sensor and holding it for more than 1s, OUTPUT1 goes active. It remains active as long as the hand remains in front of the top part of the sensor. OUTPUT2 remains inactive.



Moving the hand in front of the bottom half of the sensor and holding it for more than 1s, OUTPUT2 goes active. It remains active as long as the hand remains in front of the bottom part of the sensor. OUTPUT1 remains inactive.

Note: the trimmer on the side of the sensor can be used to adjust sensing range

This output option is useful for controllers, that accept short button pulses to activate movement in a specified direction or for home automation systems, that can be programmed to act on short button pulses.

This output option is also suited for connection to double switch input of ANIGMO DMS series universal low voltage dimmers. Please check DMS series universal low voltage dimmers for details.

OPTION 2 - timed directional output

Models SEM-001-2A2, SEM-001-2B2

Sensor has two digital outputs, output version 'A' has two NPN OC outputs and version 'B' has two isolated (dry) relay contact outputs.

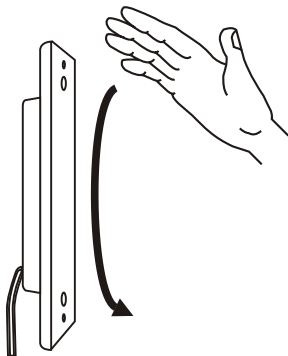
When the sensor detects movement of the hand in one direction, OUTPUT1 goes active. It remains active for predetermined time. When the sensor detects movement in opposite direction, OUTPUT2 goes active and remains active for predetermined time. The length of the output activation is set by the trimmer on the side of the sensor in the range of 0.5s - 30s.

While one of the outputs is active any other move in front of the sensor deactivates the output.

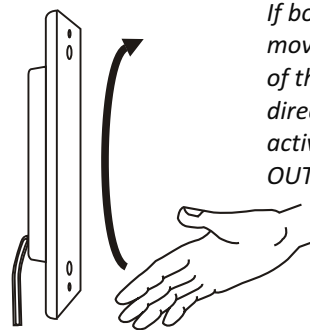
If the hand is held in range on top or bottom part of the sensor for longer than 1s, corresponding output goes active and remains active until the hand is moved out of the area.

EXAMPLE1: Assume the time interval is set by the trimmer to 10s. Both outputs are inactive. Hand moves down. OUTPUT1 goes active and remains active for 10s. After OUTPUT1 deactivates, hand moves up. OUTPUT2 goes active and remains active for 10s.

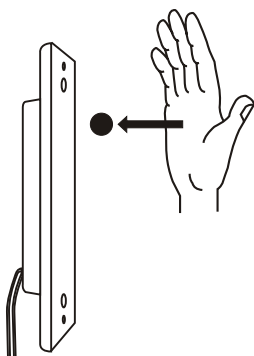
EXAMPLE1: Assume the time interval is set by the trimmer to 10s. Both outputs are inactive. Hand moves down. OUTPUT1 goes active. While OUTPUT1 is still active, hand moves up. OUTPUT1 deactivates but OUTPUT2 does NOT go active. Now both outputs are inactive. Hand goes up again. Now OUTPUT2 goes active and remains active for 10s.



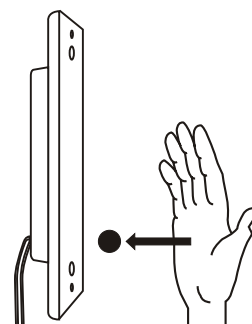
If both outputs are inactive, moving the hand in front of the sensor in the downward direction makes OUTPUT1 active for predetermined time. OUTPUT2 remains inactive.



If both outputs are inactive, moving the hand in front of the sensor in the upward direction makes OUTPUT2 active for predetermined time. OUTPUT1 remains inactive.



Moving the hand in front of the top half of the sensor and holding it for more than 1s, OUTPUT1 goes active. It remains active as long as the hand remains in front of the top part of the sensor. OUTPUT2 remains inactive.



Moving the hand in front of the bottom half of the sensor and holding it for more than 1s, OUTPUT2 goes active. It remains active as long as the hand remains in front of the bottom part of the sensor. OUTPUT1 remains inactive.

Note1: the trimmer on the side of the sensor can be used to set the length of the time interval outputs are active (0.5-30s)

Note2: If any above moves is performed while any output is active, the move will only deactivate that output.

This output option is useful for controlling blinds that require contact closure to operate (they move while the button is pressed and stop when it is released). Set the sensor output activation interval timer to correspond to the blinds max. Needed activation time interval (moving it from one extreme position to another).

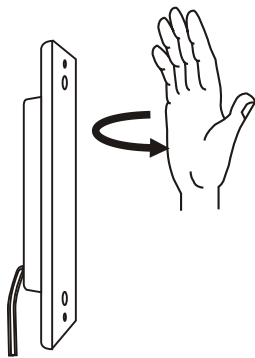
OPTION 3 - double sensor

Models SEM-001-2A3, SEM-001-2B3

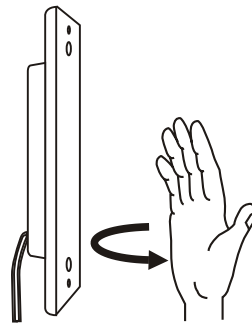
Sensor has two digital outputs, output version 'A' has two NPN OC outputs and version 'B' has two isolated (dry) relay contact outputs.

This output options works as two independent sub-sensors side by side. It doesn't detect movement direction. Each of two sub-sensors activate when the hand is in its range. Sub-sensor use special technology to prevent each sub-sensors range to overlap, preventing both outputs to activate at the same time, only one can be active at a time. This increases sub-sensor separation, making it easier to operate each of them independently from each other. If the hand is placed in the middle of the sensor surface (between both sub-sensors), NO sensor will activate.

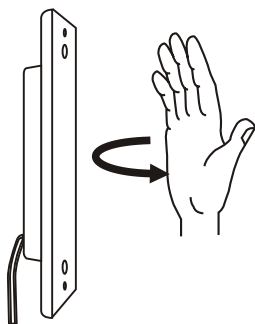
EXAMPLE: If the hand moves from the top to the bottom, top sub-sensor will activate and OUTPUT1 will go active. While hand continues down, when it approaches the middle of the sensor, OUTPUT1 will deactivate. At this point both outputs are inactive. When the hand continues down, bottom sub-sensor activates and OUTPUT2 goes high.



Whenever the objects enters the range of top sub-sensor, OUTPUT1 goes active immediately. It stays active as long as the object stays in the range



Whenever the objects enters the range of bottom sub-sensor, OUTPUT2 goes active immediately. It stays active as long as the object stays in the range



If the object approaches the middle of the sensor, NO output will activate

Note: the trimmer on the side of the sensor can be used to adjust sensing range of both sub-sensors

This output option is useful for controllers needing two independent outputs and no need for directional control, for example to activate two different lights. It can be connected to the home automation systems or any controller requiring push button control.

If two sensors need to be active at the same time we recommend using two single sensors side by side. Check ANIGMO SEZ/SEM single sensors datasheet for details.

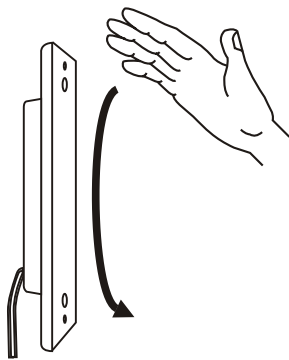
OPTION 4 - 0-10V directional sensor

Model SEM-001-2D

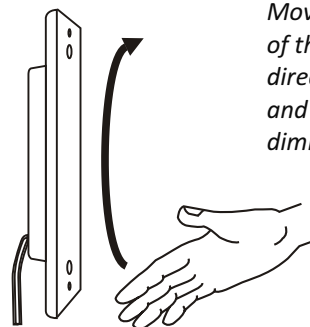
Sensor has an analog output and a PNP OC digital output. Analog voltage <1V corresponds with off state and output voltages 1-10V correspond to set dimming level. Digital OC output is active when analog voltage is above 1V and inactive otherwise. This output can be used to switch off the power to the load via a power relay or a power pack whenever the load is turned off by the analog control voltage, reducing any load standby current and improving the efficiency of the system.

When the sensor detects the object moving up, sensor turns* the light on. The light brightness sets to the last set dimming level. If the hand is moved down, output turns the lights off. If the hand is put and held over the top part of the sensor, the light intensity slowly increases, until it reaches maximum brightness. If the hand is put and held over the bottom part of the sensor, the light intensity slowly decreases, until it reaches minimum brightness (it doesn't turn off).

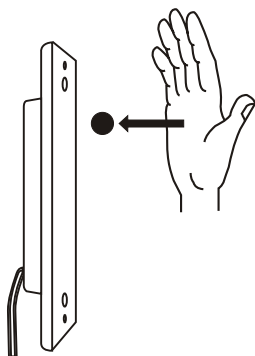
*For better understanding the sensor operation description is formed as if the sensor is controlling classical 0-10V light dimmer. Actual sensor output is analog 0-10V voltage. "Light off" corresponds to 0V, "maximum brightness" corresponds to 10V and minimum brightness corresponds to 1V on the sensor output.



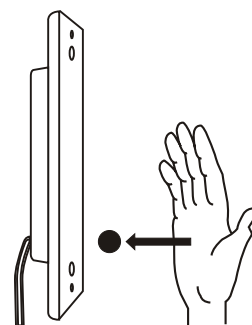
Moving the hand in front of the sensor in the downward direction turns the light off. If the light is already off, nothing happens.



Moving the hand in front of the sensor in the upward direction turns the light on and sets it to the last set dimming level.



Moving the hand in front of the top half of the sensor and holding it for more than 1s, light output slowly increases until it reaches maximum brightness. If the light is off, it first jumps to its minimum brightness.



Moving the hand in front of the bottom half of the sensor and holding it for more than 1s, light output slowly decreases until it reaches minimum brightness.

Note: the trimmer on the side of the sensor can be used to adjust sensing range

This output option is useful for controlling light drivers, ballasts and dimmers that are controlled by 0-10V voltage. Additional OC output can be used to externally disconnect (by means of a power relay or a power pack) the load when it is turned off by control voltage.