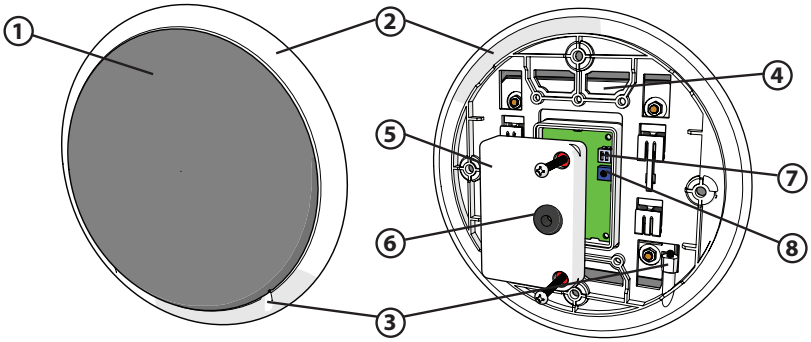
PATENT PENDING

MAGIC SWITCH: MS21H

Hardwired, Stainless Steel, Touchless, Activation Sensor

DESCRIPTION



1. faceplate
2. mounting holes
3. set screws
4. backplate
5. NEMA 4 enclosure
6. wire harness
7. DIP-switches
8. potentiometer

PRODUCT FAMILY

6" ROUND STYLES

10MS21HR

text only

10MS21HRLL

logo only

10MS21HR1

text & logo

4.75" SQUARE STYLES

10MS21HS

text only

10MS21HSLL

logo only

10MS21HS1

text & logo

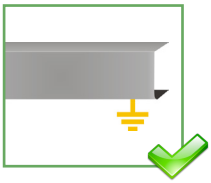
TECHNICAL SPECIFICATIONS

Technology	capacltive sensing	
Detection Mode	proximity	
Supply Voltage	12 – 24 VAC/VDC	
Current Consumption	37 mA (typical)	
Temperature Range	-20 – 120 °F	
Enclosure Rating	NEMA 4	
Sensing Zone	0 – 4"	*Sensing Zone is dependent upon size (area) of object, orientation of object, speed of object, and environmental conditions.*
Relay	1-Form A Solid State Relay 0.4A 60 VAC/VDC (max)	
Dimensions (0verall)	6" Round: 7" (diameter) × 0.5" (D) 4.75" Square: 5.75" (H) × 5.75" (W) × 0.5" (D)	
Wire Harness Length	6 inches (5-conductor)	*A 5-conductor wire is needed between the sensor and the door control.*
Material	stainless steel (faceplate) clear polycarbonate (mounting ring, backplate, enclosure)	

Specifications are subject to change without prior notice.
All values measured in specific conditions.

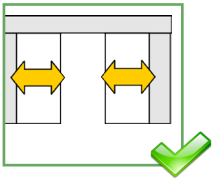
*** Use of the device outside the intended application cannot be guaranteed by the manufacturer.**

PRECAUTIONS

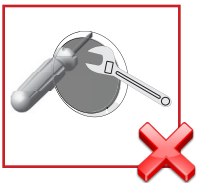


The door control unit and the header cover profile must be correctly grounded.

Only trained and qualified personnel are recommended to install and set up the sensor.



Always test the proper operation of the installation before leaving the premises.



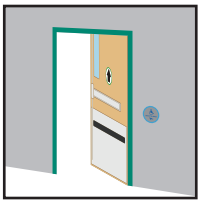
The warranty is invalid if unauthorized repairs are made or attempted by unauthorized personnel.

1 INSTALLATION

TIPS

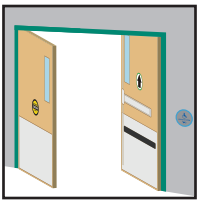
- **Single gang or double gang electrical boxes (ideally, non-metallic) may be used.**
- **Single gang electrical boxes are recommended for 4.75" square version.**
- **Set screws are 4/40 × 1/2" Allen head screws, adjusted with 3/32 Allen wrench (supplied).**
- **Mounting screws are #6-32 × 1/2" Phillips head screws.**

APPLICATIONS

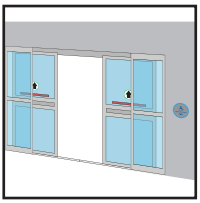


Single Swing Doors

Sim Pair Swing Doors



Dual Egress Swing Doors



Sliding Doors

NOTE: *Do not install the sensor within the swing path of the door.*

1. Install the electrical box.
2. Remove the two (2) set screws.
3. Disassemble (i.e. slide up and pull out) the faceplate assembly from the mounting ring.
4. Temporarily mount the mounting ring to the electrical box. Pay attention to "THIS END UP".
5. Mark four (4) hole locations for installing the mounting ring.
6. Remove the mounting ring from the electrical box.
7. Install four (4) wall anchors.
8. Mount (i.e. hand-tighten) the mounting ring to both the electrical box and the wall.
9. Remove the back of the NEMA 4 enclosure.
10. Sections 2 (WIRING) and 3 (SETTINGS & ADJUSTMENTS) must be completed prior to continuing installation (Section 4).

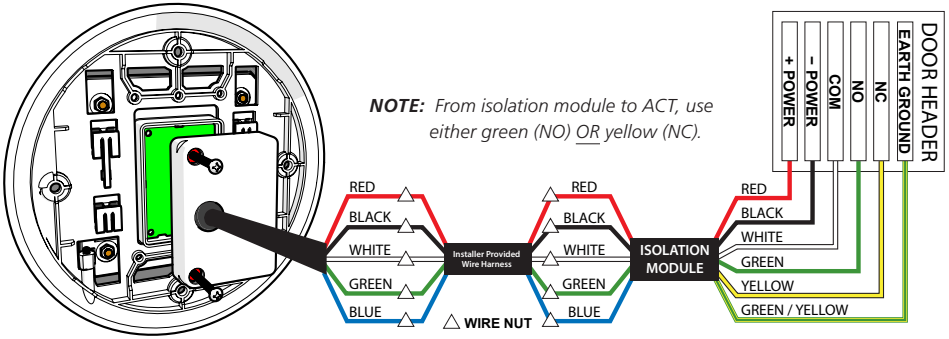
2 WIRING

IMPORTANT WIRING NOTES:

- *Always use a BEA-provided isolation module (polarity-sensitive) for powering each MS21.* ***Red must be connected to power (+) and black connected to power (-).***
- *If using a shielded wire harness, both ends of the shielding foil must be connected to Earth Ground.*
- *If using a wire harness with more than 5 conductors, all extra conductors must be wired at both ends to Earth Ground.*

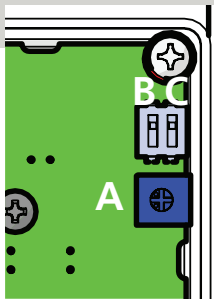
It will take approximately 10 seconds to complete the initialization sequence once powered.

Wire-nut harness wires and isolation module wires together and then connect the isolation module wires to the door control using the chart or visual representation below:



Isolation Module	Signal	Harness Wire	Isolation Module Wire	Door Control Terminal
To Door Control (6-wire side)	AC/DC +	-	Red	AC/DC +
	AC/DC -	-	Black	AC/DC -
	COM	-	White	ACT COM
	NO	-	Green	ACT NO
	NC	-	Yellow	ACT NC
	Earth Ground	-	Green / Yellow	Earth Ground
To MS21 (5-wire side)	COM	White	White	-
	NO	Green	Green	-
	AC/DC	Red	Red	-
	AC/DC	Black	Black	-
	Earth Ground	Blue	Blue	-

3 SETTINGS & ADJUSTMENTS



(A) SENSING ZONE – **potentiometer**
COUNTERCLOCKWISE – decrease (0'' minimum)
CLOCKWISE – increase (4'' maximum)[1]

(B) AUDIBLE ALERT – DIP-switch 1 (left)
ON – audible alert pulsed for 0.5 seconds during detection
OFF – audible alert off

(C) LED – DIP-switch 2 (right)
ON – LED on at rest, pulsed off for 0.5 seconds during detection
OFF – LED off at rest, pulsed on for 0.5 seconds during detection

NOTES:

1. Maximum Sensing Zone will vary depending on size (area), orientation, and speed of object as well as environmental conditions.

4 INSTALLATION (cont.)

11. Reinstall the back of the NEMA 4 enclosure.
12. Reassemble (i.e. align, push in, and slide down) the faceplate assembly to the mounting ring.
13. Reinstall the two (2) set screws.
14. Test the installation functionality and performance.

CAUTION:

When installing near unprotected and/or uninsulated circuits, additional electrical isolation may be needed. The shrink tubing over the printed wiring board (provided by BEA) is rated minimum 150V, VW-1, and 80 °C. This information may be taken into account to define whether additional isolation is required.

FUNCTIONALITY

ACTIVATION	Activation signal held until sensing zone is cleared (or relearned). Audible Alert (if enabled) will pulse for 0.5 seconds at initial detection.
REJECTION	An object must be within sensing zone for at least 130 milliseconds for detection to occur (i.e. parallel traffic rejection).
TRACKING	Reduced unwanted detections by allowing small variations in baseline capacitance (e.g. temperature/humidity changes). If stationary object remains within sensing zone for more than 5 seconds, a new capacitive zone will be learned and normal operation will resume (e.g. chewing gum stuck to faceplate).

TROUBLESHOOTING

Sensor erratically detecting or falsely activating	Not properly grounded	Verify continuity between sensor ground and earth ground. See Application Note for details.
	Unstable power supply	Ensure the BEA isolation module (polarity-sensitive) is being used with each MS21.
	Electrical noise within sensing zone	Reduce sensing zone (potentiometer counterclockwise).
	Non-stationary object within detection zone	Clear a 10" zone around detection field.
Sensor not detecting	Sensing zone is set too low	Increase sensing zone (potentiometer clockwise).
	No power	Verify power supply and connection.

ANSI / AAADM Compliance

Upon completion of the installation or service work, at a minimum, perform a daily safety check in accordance with the minimum inspection guidelines provided by AAADM. Provide each equipment owner with an owner's manual that includes a daily safety checklist and contains, at a minimum, the information recommended by AAADM. Offer an information session with the equipment owner explaining how to perform daily inspections and point out the location of power/operation switches to disable the equipment if a compliance issue is noted. The equipment should be inspected annually in accordance with the minimum inspection guidelines. A safety check that includes, at a minimum, the items listed on the safety information label must be performed during each service call. If you are not an AAADM certified inspector, BEA strongly recommends you have an AAADM certified inspector perform an AAADM inspection and place a valid inspection sticker below the safety information label prior to putting the equipment into operation.

Tech Support: 1-800-407-4545 | Customer Service: 1-800-523-2462 | General Tech Questions: Tech_Services@beainc.com | Tech Docs: www.BEAinc.com