INSTALLATION AND MAINTENANCE INSTRUCTIONS

ENGLISH

L-Series with LED Outdoor Selectable-Output Speaker Strobes and Dual Voltage Evacuation Speakers

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I56-0039-000

Manual is for use with the following models:

Wall Mount Speakers: SPRKL, SPWKL
Wall Mount Speaker Strobes: SPSRKLED, SPSRKLED-P, SPSRKLED-B, SPSWKLED, SPSWKLED-P, SPSWKLED-B, SPSWKLED-CLR-ALERT

Ceiling Mount Speakers: SPCWKL
Ceiling Mount Speaker Strobes: SPSCWKLED, SPSCWKLED-P, SPSCWKLED-B, SPSCWKLED-CLR-ALRT

Language designators: “-B” are bilingual (English/French). “-P” are plain versions (no wording).
NOTE: When replacing outdoor units; device and back box must be replaced.

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Section 1: Introduction

1.1 Product Specifications

Standard Operating Temperature:	-40°F to 151°F (-40°C to 66°C)
Humidity Range:	0 to 95 ±5%
Normal Voltage (Speakers):	25 Volts or 70.7 Volts RMS
Maximum Supervisory Voltage	33 VDC
Speaker Frequency Range:	400-4000 Hz
Power Settings	¼, ½, 1, 2 Watts
Strobe Flash Rate	1 flash per second
Nominal Voltage (Strobe):	Regulated 24 VDC
Operating Voltage Range (Strobe):	16 to 33 VDC (24 VDC nominal)
Input terminal wire gauge:	12 to 18 AWG
Environmental Considerations:	Enclosure meets rating requirements for Type 4X (UL50E), NEMA 4X (FM), and IP56 as a standalone device (without the backbox)

1.2 Dimensions and Mounting Options

Wall Mounted Product	**Length**	**Width**	**Depth**	**Mounting Options**
Speaker	6.69" (170 mm)	5.16" (131 mm)	1.68" (42.6 mm)	2-Wire Outdoor Speaker Products: SBBSPRL/WL (wall)
Speaker Strobe (including lens)	6.69" (170 mm)	5.16" (131 mm)	2.42" (61.6 mm)	
Speaker with SBBSPRL/WL Surface Mount Back Box	6.69" (170 mm)	5.16" (131 mm)	3.93" (9.8 mm)	
Speaker Strobe (including lens) with SBBSPRL/WL Surface Mount Back Box	6.69" (170 mm)	5.16" (131 mm)	4.68" (118.7 mm)	

Ceiling Mounted Product	**Diameter**	**Depth**	**Mounting Options**
Speaker	6.97" (177 mm)	1.2" (30.4 mm)	2-Wire Outdoor Speaker Products: SBBCRL/WL (ceiling)
Speaker Strobe (including lens)	6.95" (176.5 mm)	2.23" (56.6 mm)	
Speaker with SBBCRL/WL Surface Mount Back Box	6.97" (177 mm)	3.7" (93.9 mm)	
Speaker Strobe (including lens) with SBBCRL/WL Surface Mount Back Box	6.95" (176.5 mm)	4.73" (120.1 mm)	

NOTICE: This manual shall be left with the owner/user of this equipment.

1.3 Before Installing

Please read the System Sensor Voice Evacuation Application Guide, which provides detailed information on speaker notification devices, wiring and special applications. Copies of this manual are available from System Sensor. NFPA 72, NEMA guidelines and CAN/ULC 524 guidelines should be observed. System Sensor also recommends installing fire alarm speakers in compliance with NFPA 70, NFPA 72, NEC 760, CAN/ULC 524 and CEC.

Important: The notification appliance used must be tested and maintained following requirements of NFPA 72 in UL applications or CAN/ULC S536 in ULC applications.

1.4 General Description

System Sensor series of notification appliances offer a wide range of audible and visible devices for life safety notification. Our outdoor speaker strobes come with 7 field selectable candela settings. The strobe portion is designed to be used in 24VDC systems. The speaker is designed to be used at either 25 or 70.7 volts, and operate at any one of four input power levels. The new L-Series with LED outdoor notification appliances are designed to be used over a wider range of temperatures and are suitable for use in wet locations. **The devices are intended for outdoor applications and approved for wall-mount and ceiling-mount installations.**

These products are electrically backwards compatible with the previous generation of System Sensor speaker strobes; new back plates can be connected to existing field wiring. With its low total harmonic distortion, the System Sensor SPxKL series offers high fidelity sound output.

Speakers Strobes are public mode notification appliances intended to alert occupants of a life safety event. The speaker is listed to ANSI/UL 1480/ULC 541 (public mode) and the strobe is listed to ANSI/UL 1638/ULC 526 (public mode).

1.5 Fire Alarm System Considerations

The National Fire Alarm and Signaling Code, NFPA 72, and The National Building Code of Canada require that all notification appliances used for building evacuation produce temporal coded signals. Signals other than those used for evacuation purposes do not have to produce the temporal coded signal. System Sensor recommends spacing notification appliances in compliance with NFPA 70, NFPA 72 (UL applications) or CAN/ULC 524 (ULC applications).

System Sensor also recommends installing fire alarm speakers in compliance with NFPA 70, NFPA 72, and NEC 760.
(CAN/ULC 524 in ULC applications).

1.6 System Design

The system designer must make sure that the total current draw by the devices on the loop does not exceed the current capability of the panel supply, and that the last device on the circuit is operated within its rated voltage. The current draw information for making these calculations can be found in the tables within the manual. For convenience and accuracy, use the voltage drop calculator on the System Sensor website (www.systemsensor.com).

When calculating the voltage available to the last device, it is necessary to consider the voltage due to the resistance of the wire. The thicker the wire, the smaller the voltage drop. Wire resistance tables can be obtained from electrical handbooks. Note that if Class A wiring is installed, the wire length may be up to twice as long as it would be for circuits that are not fault tolerant. t

Wiring terminals or leads corresponding to the rating of the device shall be provided for connection of conductors of at least the size required by:
a) In Canada only: CSA22.1, Section, Section 32, Fire alarm systems, smoke alarms, carbon monoxide alarms, and fire pumps.
b) In the United States only: NFPA 70.

Section 2: Configurations for Notification Appliances

2.1 Available Candela Settings

System Sensor offers a wide range of candela settings for your life safety needs. To select your candela output, turn the rotary switch on the back of the product to the desired candela setting. (See Figure 1.) Table 1 shows available candela options.

The candela setting can be verified from the front of the unit by looking through a small window on the front of the product. (See Figure 12.) All products meet the light output profiles specified in the appropriate UL Standards. (See Figures 2, 3, and 4.)

Figure 1 Candela Selector

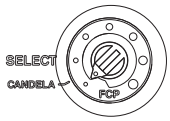

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Figure 2 Light Output –Horizontal Dispersion

Degrees*	Percent of Rating
0	100
5-25	90
30-45	75
50	55
55	45
60	40
65	35
70	35
75	30
80	30
85	25
90	25
Compound 45 to the left	24
Compound 45 to the right	24
*Tolerance of ±1 degree is permitted.	

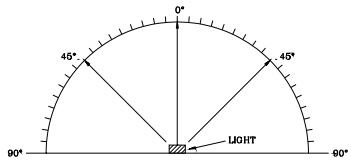

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Figure 3 Vertical Dispersion– Wall to Floor

Degrees*	Percent of Rating
0	100
5-30	90
35	65
40	46
45	34
50	27
55	22
60	18
65	16
70	15
75	13
80	12
85	12
90	12
*Tolerance of ±1 degree is permitted.	

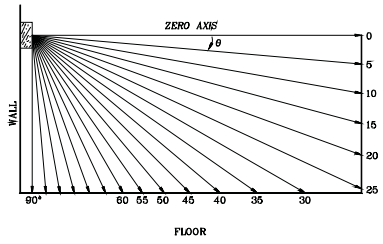

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Figure 4 Light output - vertical dispersion, ceiling to walls to floor

Degrees*	Percent of Rating
0	100
5-25	90
30-45	75
50	55
60	45
65	35
70	35
75	30
80	30
85	25
90	25
*Tolerance of ±1 degree is permitted.	

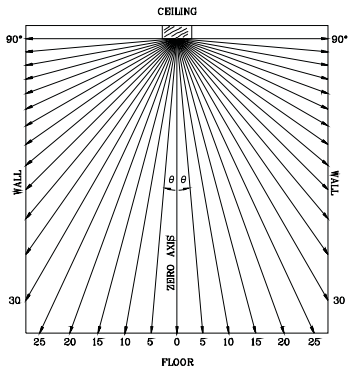


Table 1 UL/ULC Maximum Strobe Current Draw (mA)

	16-33 Volts
Candela	DC
15	18
30	22
75	70
95	75
110	85
115	90
135	105
150	110
177	115
185	120
FCP*	(future)
*FCP Fire Control panel, future use	

2.2 Current Draw and Audibility ratings

For the strobe, the current draw for each setting is listed in Table 1. Reference binational harmonized standard UL 1480/ULC 541 for minimum sound level requirements.

2.3 Available Power Settings for Speakers

System Sensor offers a wide range of power settings for your life safety needs, including ¼, ½, 1, and 2W. Sound levels data per UL 1480 can be found in Table 2.

Table 2 Sound Levels: Speaker and Speaker Strobe Sound Output for Each Transformer Power Setting

Setting	Speaker (Wall or Ceiling) UL Reverberant (dBA @ 10 ft)	Speaker Strobe (Wall or Ceiling) UL Reverberant (dBA @ 10 ft)
¼ W	77	77
½ W	81	81
1 W	83	83
2 W	85	85

CAUTION:

Signal levels exceeding 130% rated signal voltage can damage the speaker. Consequently, an incorrect tap connection may cause speaker damage. This means that if a 25V tap is selected when a 70.7V amplifier is being used, speaker damage may result. Therefore, be sure to select the proper taps for the amplifier voltage/input power level combination being used.

To calculate sound dispersal per UL 1480 and ULC 541, refer to Table 3.

Table 3 Directional Characteristics (Calculated Worst Case Limits)

Wall		**Ceiling**	
Horizontal Axis		**Horizontal Axis**	
Angle	**Decibel loss (dBA)**	**Angle**	**Decibel loss (dBA)**
0° (ref)	0 (ref)	0° (ref)	0 (ref)
+/- 40	-3	+/- 40	-3
+/- 65	-6	+/- 60	-6
+/- 90	-7.8	+/- 90	-9.5
Vertical Axis		**Vertical Axis**	
Angle	**Decibel loss (dBA)**	**Angle**	**Decibel loss (dBA)**
0° (ref)	0 (ref)	0° (ref)	0 (ref)
+/- 40	-3	+/- 35	-3
+/- 80	-6	+/- 70	-6
+/- 90	-7.9	+/- 90	-9.0

Section 3: Installation

3.1 Wiring and Mounting

All wiring must be installed in compliance with the National Electric Code (UL applications), Canadian Electric Code (ULC applications), and local codes as well as the authority having jurisdiction. Wiring must not be of such length or wire size which would cause the notification appliance to operate outside of its published specifications. Improper connections can prevent the system from alerting occupants in the event of an emergency.

The gasketed back plate ships with wire leads stripped and installed at the factory; weatherproof wire nuts are required and provided. Wire sizes up to 12 AWG (2.5 mm²) may be used for field wiring.

Make wire connections by stripping about $^{3}/_{8}$" of insulation from the end of the field wire. Then twist the bare end of the field wire with respective back plate wire lead and secure the wiring by twisting a weatherproof wire nut into place.

1. Connect the speaker weatherproof back plate wire leads. (See Figure 5.)
2. There are two rotary switches on the back of the product. The first switch is used to select either 25 or 70.7 volts input and the second switch is used to select the input power of ¼, ½, 1 or 2 watts. (See Figure 6.)

3.2 Wiring Diagrams

Figure 5 Wiring Terminals and System Wiring

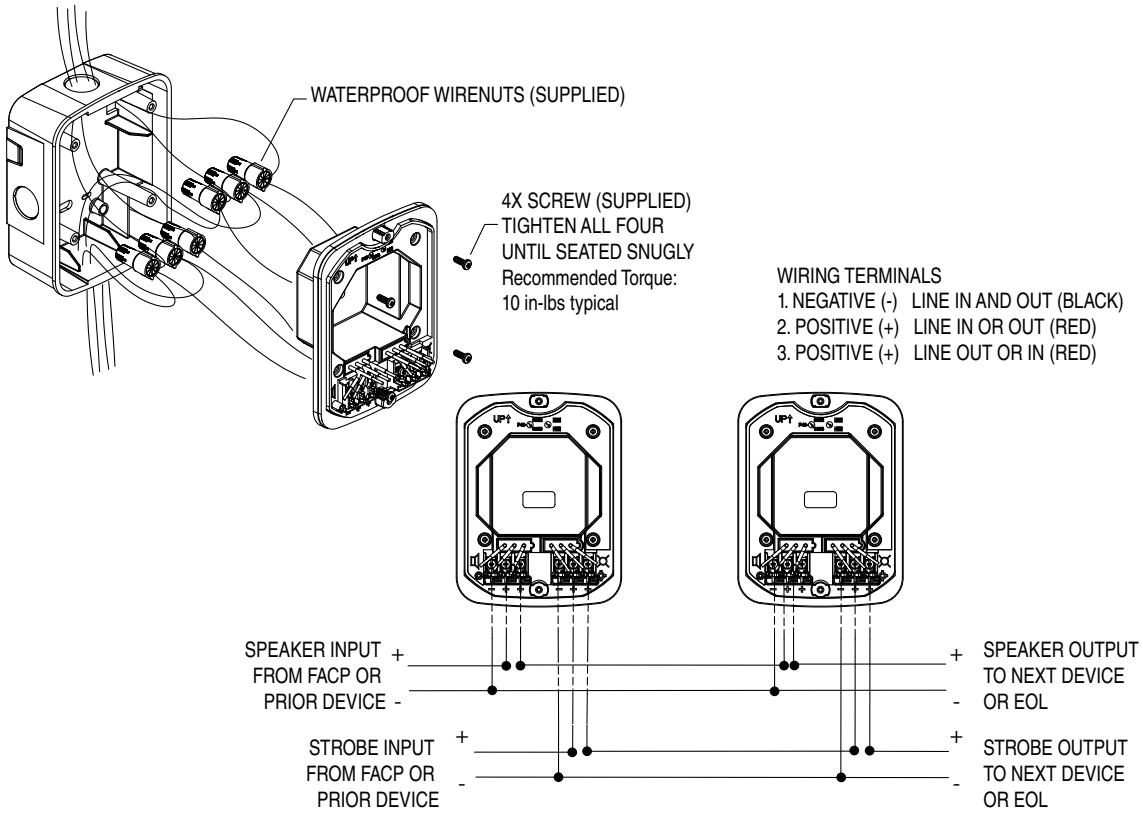
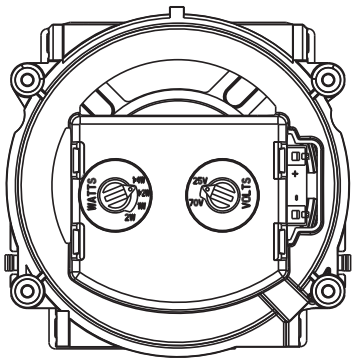


Figure 6 Speaker Wattage and Voltage Settings



3.3 Install Back Box

1. Attach surface mount back box directly to wall or ceiling. Use of grounding bracket with ground screw is optional. (See Figures 7 and 8.)
2. Mounting position:
   – ***Note for positioning:*** *Wall mount back boxes*: Mount with the up arrow pointing up. (See Figure 10.)
   – ***Note for positioning:*** *Ceiling mount back boxes:* Ceiling surface mount back box SBBCR/WL is a common back box for ceiling horn strobes, strobes, speakers, and speaker strobes. Use the top (SPK) mounting holes for ceiling speaker and speaker strobe products. Use the bottom (STR) mounting holes for ceiling horn strobe, and strobe installation needs. (See Figure 9.)
3. Select appropriate knockouts and open as needed.
   – *Threaded knockout holes* are provided for the sides of the box for ¾ inch and ½ inch conduit adapter. Knockout holes in the back of the box can be used for ¾ inch and ½ inch rear entry.
   – *If using the ¾ inch knockout:* To remove the ¾ inch knockout, place the blade of a flat-head screwdriver along the outer edge and work your way around the knockout as you strike the screwdriver. (See Figure 11.)
   NOTE: Use caution not to strike the knockout near the top edge of the surface mount back box.
   – *V500 and V700 raceway knockouts* are also provided. Use V500 for low profile applications and V700 for high profile applications. To remove the knockout, turn pliers up. (See Figure 11.)
   – Remove bottom knockout for Type 4X installation.

3.4 Install Weatherproof Back Plate and Appliance

1. Connect field wiring to wire leads according to terminal designations on weatherproof back plate using the provided weatherproof wire nuts. (See Figure 5.)
2. Attach weatherproof back plate to the surface mount back box using the four Philips head screws provided. (See Figures 7 – 8.)
   – *Ceiling mount back boxes:* Use the top (SPK) mounting holes; screw position will ensure correct alignment. (See Figure 9.)
3. If the product is not to be installed at this point, use the protective dust cover to prevent contamination of the wiring terminals on the mounting plate.
4. To attach product to weatherproof back plate:
   – Remove the protective dust cover.
   – Align the product housing with the guideposts located on the weatherproof back plate.
   – Slide the product into position to engage the terminals on the weatherproof back plate.
   – Hold product in place with one hand and secure product by tightening the mounting screws on the front of the housing. NOTE: *Wall models* have 2 screws (see Figure 7). *Ceiling models* have 3 screws (see Figure 8).
   – Tighten the screws by hand to ensure screws are completely engaged.

CAUTION:
Factory finish should not be altered: Do not paint!

Figure 7 Surface Mounting a Wall Device (SBBSPRL/SBBSPWL)

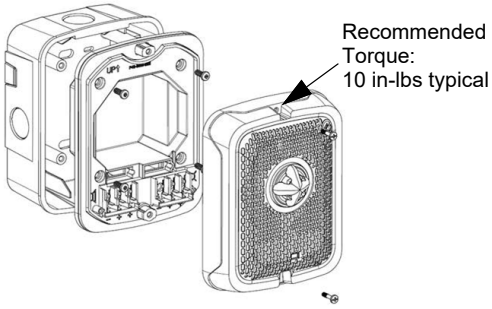


Figure 8 Surface Mounting a Ceiling Device (SBBCRL/SBBCWL)

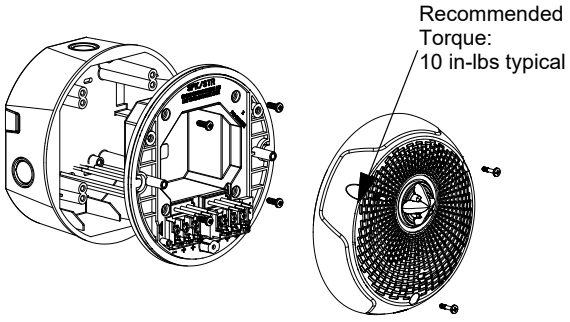


Figure 9 Selecting screw location in a ceiling installation of a surface-mount back box

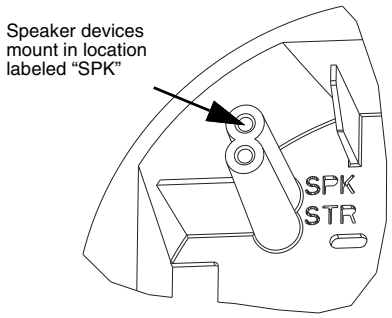


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Figure 10 Surface Mount Back Box “Up” Arrow

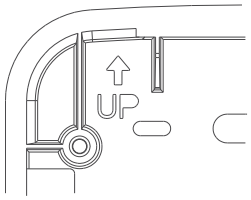

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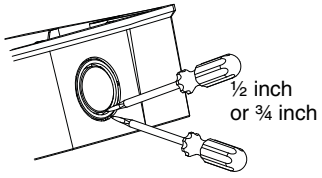
Figure 11 Knockout and V500/V700 Removal for Surface Mount Back Box

Figure 11A Knockout size



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NOTE: Use caution not to strike the knockout near the top edge of the wall version of the surface mount back box.

Figure 11B Wire Mold Removal

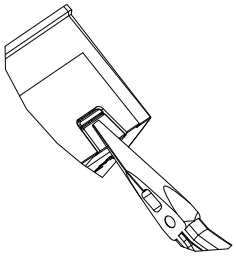

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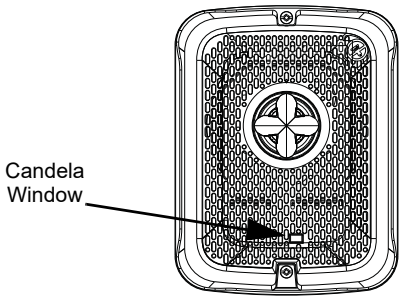
Figure 12 Candela Window Location

Wall Mounted



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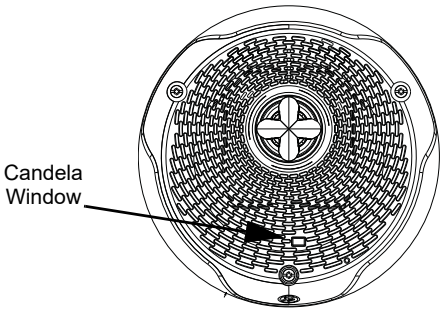
Ceiling Mounted



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⚠WARNING

THE LIMITATIONS OF SPEAKERS

Always make sure that the individual speakers are tested after installation per NFPA regulations. The speakers may not be heard. The loudness of the speaker meets (or exceeds) current Underwriters Laboratories' standards. However, the speaker may not alert a sound sleeper or one who has recently used drugs or has been drinking alcoholic beverages. The speaker may not be heard if it is placed on a different floor from the person in hazard or if placed too far away to be heard over the ambient noise such as traffic, air conditioners, machinery or music appliances that may prevent alert persons from hearing the alarm. The speaker may not be heard by persons who are hearing impaired.

⚠WARNING

THE LIMITATIONS OF STROBES

The strobe will not work without power. The strobe gets its power from the fire/security panel monitoring the alarm system. If power is cut off for any reason, the strobe will not provide the desired audio or visual warning.
The signal strobe may not be seen. The electronic visual warning signal uses LEDs with associated lens system. It flashes at least once every second. The strobe must not be installed in direct sunlight or areas of high light intensity (over 60 foot candles) where the visual flash might be disregarded or not seen. The strobe may not be seen by the visually impaired.
The signal strobe may cause seizures. Individuals who have positive photoic response to visual stimuli with seizures, such as persons with epilepsy, should avoid prolonged exposure to environments in which strobe signals, including this strobe, are activated.
The signal strobe cannot operate from coded power supplies. Coded power supplies produce interrupted power. The strobe must have an uninterrupted source of power in order to operate correctly. System Sensor recommends that the horn and signal strobe always be used in combination so that the risks from any of the above limitations are minimized.

FCC Statement

The System Sensor devices in this document have been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

This symbol (shown left) on the product(s) and / or accompanying documents means that used electrical and electronic products should not be mixed with general household waste. For proper treatment, recovery and recycling, contact your local authorities or dealer and ask for the correct method of disposal.

Electrical and electronic equipment contains materials, parts and substances, which can be dangerous to the environment and harmful to human health if the waste of electrical and electronic equipment (WEEE) is not disposed of correctly.

Supplemental Information

For the latest Warranty information, please go to:
http://www.systemsensor.com/en-us/Documents/E56-4000.pdf

For Limitations of Fire Alarm Systems, please go to:
http://www.systemsensor.com/en-us/Documents/I56-1558.pdf

Speakers only: For the latest Important Assembly Information, please go to:
http://www.systemsensor.com/en-us/Documents/I56-6556.pdf

Warranty Information

Limitations of Fire Alarm Systems

Speakers Only: Assembly Information