SYSTEM SENSOR SPSWLED-BT Series LED Indoor Selectable Output Speaker Strobes Instruction Manual

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Manual is for use with the following models:
Language designation: "-B" are bilingual (English/French). "-BT" is bilingual packaged with a trim ring. "-P" **are plain versions (no wording);** "TP" is plain packaged with a trim ring. "-SP" are marked "FUGUE".

Contents

Introduction

Product Specifications

Standard Operating Temperature:	32°F to 120°F (0°C to 49°C)
Humidity Range:	10 to 93% Non-condensing
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 (24VDC nominal)
Input terminal wire gauge:	12 to 18 AWG

Dimensions and Mounting Options

Wall Mounted Product	Length	Width	Depth	Mounting Options
Speaker Strobe (including lens)	6.5″(165.1 mm)	5.00″(127 mm)	2.3″(58.4 mm)	2-Wire Indoor Products: Speaker Strobes: SBBSPRL/WL (wall) 4″ x 4″ x $2^1/8$″ or deeper(When using 12 AWG, 14 AWG, oradding extra wires in the box, a deeper box or extension ring is recommended.)
Speaker Strobe (including lens) with SBBSPRL/WL Surface Mount Back Box	6.62″(168.1 mm)	5.12″(130 mm)	4.55″(115.5 mm)	
NOTE: SBBSPRL/WL Surface Mount Back Box intended only for speaker strobes.				

Ceiling Mounted Product	Diameter	Depth	Mounting Options
Speaker Strobe (including lens)	6.8″(172.7 mm)	2.33″(59.2 mm)	2-Wire Indoor Products: Speaker Strobes: SBBCRL/WL (ceiling) 4″ x 4″ x $2^1/8$″ or deeper(When using 12 AWG, 14 AWG,or adding extra wires in the box, a deeper box or extension ring is recommended.)
Speaker Strobe (including lens) with SBBCRL/WL Surface Mount Back Box	6.92″ (175.8 mm)	4.83″ (122.7 mm)	

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

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 and CAN/ULC-524 guidelines should be observed. System Sensor also recommends installing fire alarm speakers in compliance with NFPA 72, NFPA 70, NEC 760, CAN/ULC-524 and Canadian Electrical Code.
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.

General Description

System Sensor series of notification appliances offer a wide range of audible and visible devices for life safet notification. Our indoor speaker strobes come with 7 field delectable Mandela 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. Our speaker strobes are suitable for dry environments. The devices are intended for indoor 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. With its low total harmonic distortion, the System Sensor L-Series Speakers offer 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).
System Sensor amber lens ALERT Speakers Strobes are private mode notification appliances intended to alert trained personnel to investigate a life safety event. The speaker is listed to ANSI/UL 1480 (public mode) and the strobe is listed to ANSI/UL 1638 (private mode).

Fire Alarm System Considerations

System Sensor recommends spacing notification appliances in compliance with NFPA 70 and NFPA 72 (UL applications) or CAN/ULCS524 (ULC applications).
System Sensor also recommends installing fire alarm speakers in compliance with NFPA 70, NFPA 72, and NEC 760.
(CAN/ULC-S524 in ULC applications).

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. Total number of strobes on a single NAC must not draw more current than supported by the Fire Alarm Control Panel (FACP).

Configurations for Notification Appliances

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 17 for window location on device.) All products meet the light output profiles specified in the appropriate UL Standards. **(See Figures 2, 3, and 4.)**
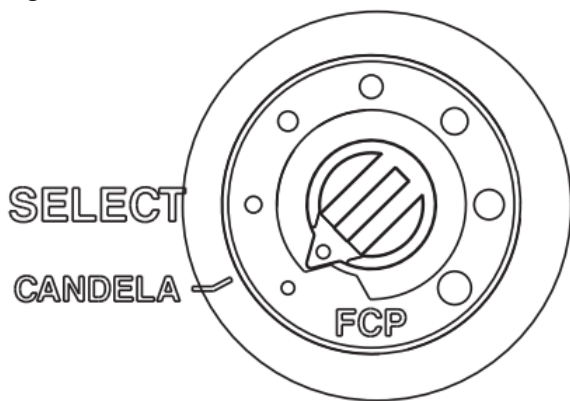
Figure 1 Candela Selector

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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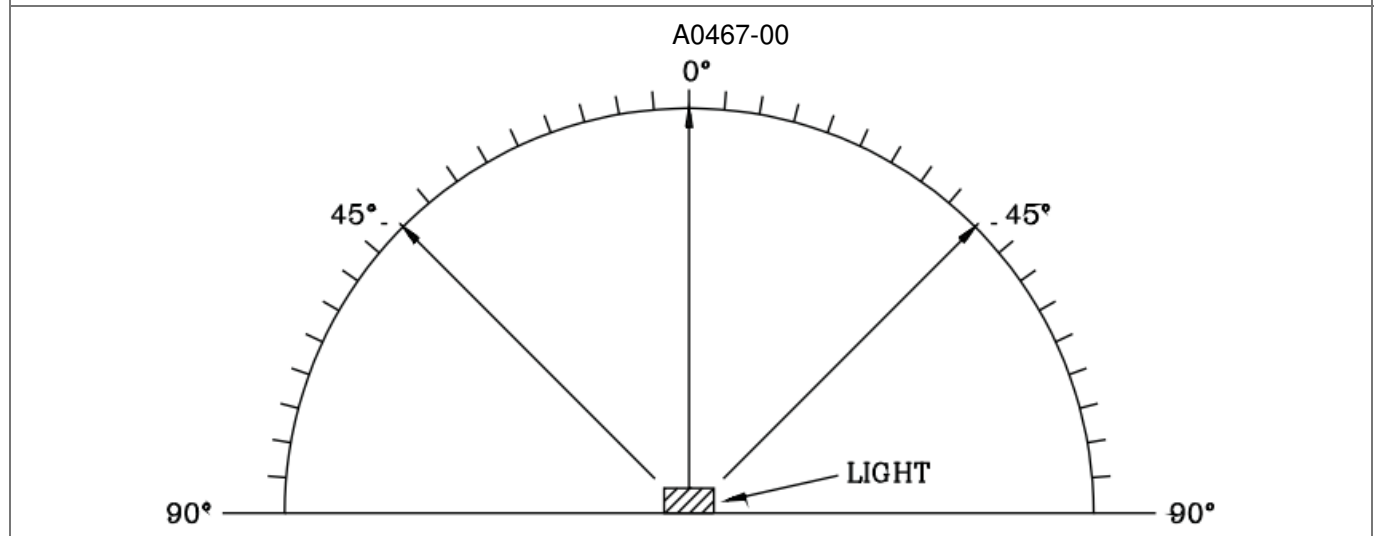
Figure 3 Vertical Dispersion– Wall to Floor

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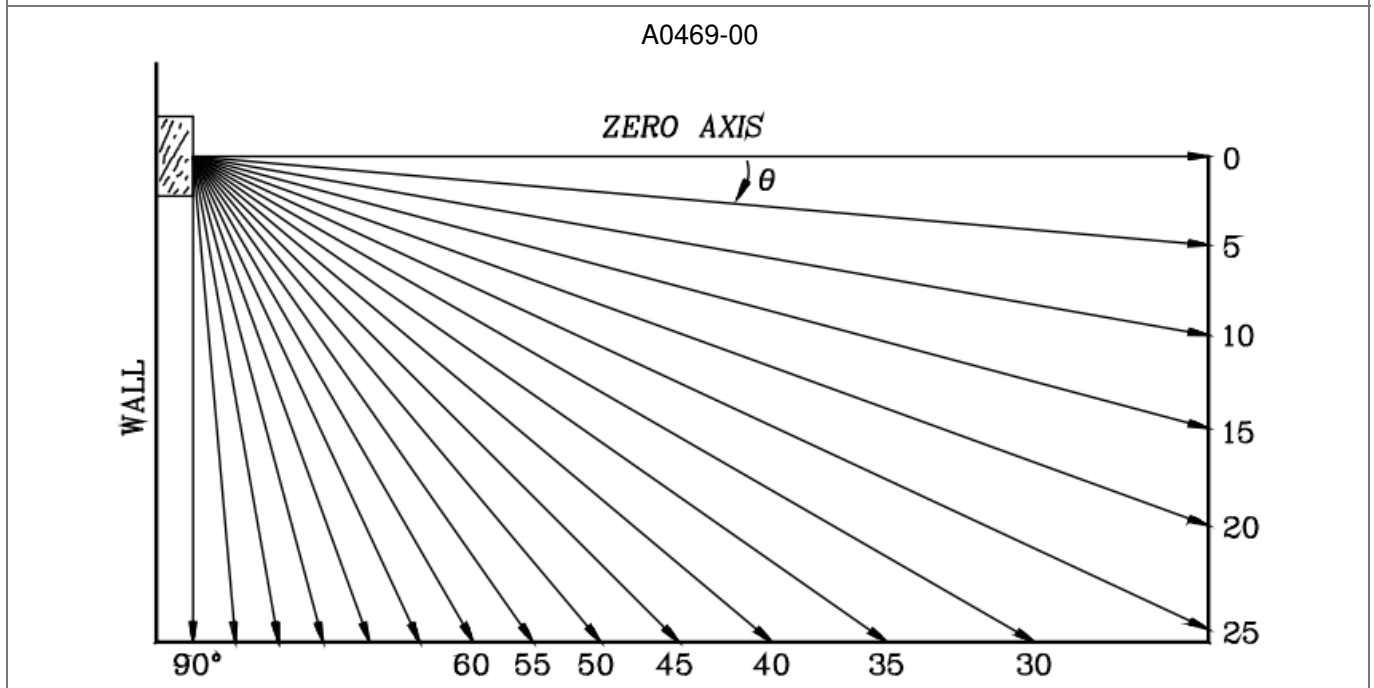
Figure 4 Light output – vertical dispersion, ceiling to walls to floor

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.	

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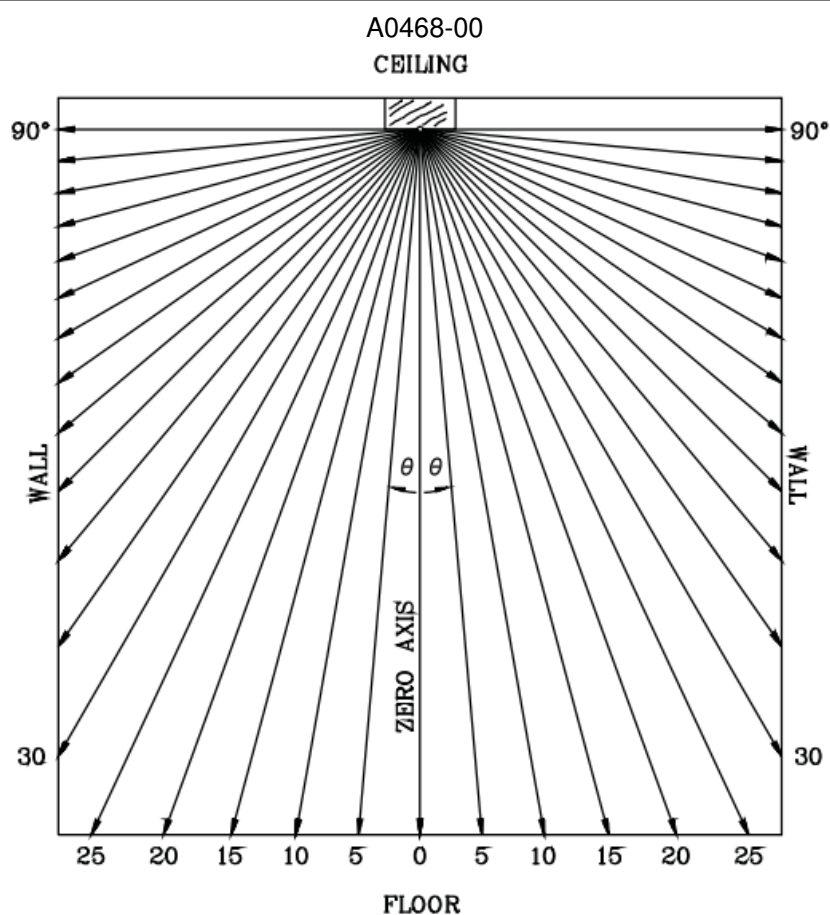
Table 1 UL/ULC Maximum Strobe Current Draw (mA)

Candela	16-33 Volts 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	

Current Draw and Audibility ratings

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

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: Minimum Speaker Strobe Sound Output for Each Transformer Power Setting

Setting	Speaker Strobe (Wall or Ceiling) UL Reverberate (dBA @ 10 ft)
¼ W	76
½ W	79
1 W	82
2 W	83

⚠ **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)
+/- 75	-3	+/- 80	-3
ND	-6	ND	-6
+/- 90	-4.8	+/- 90	-4.3
Vertical Axis		**Vertical Axis**	
Angle	**Decibel loss (dBA)**	**Angle**	**Decibel loss (dBA)**
0° (ref)	0 (ref)	0° (ref)	0 (ref)
+/- 85	-3	+/- 80	-3
ND	-6	ND	-6
+/- 90	-4.3	+/- 90	-4.6

Installation

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.

Wire sizes up to 12 AWG (2.5 mm²) may be used with the mounting plate. The mounting plate ships with the terminals set for 12 AWG field wiring.

Make wire connections by stripping about 3/8″ of insulation from the end of the field wire. Then slide the bare end of the wire under the appropriate clamping plate and tighten the clamping plate screw. NOTE: Do not loop electrical wiring under terminal screws. Wires connecting the device to the control panel must be broken at the device terminal connection in order to maintain electrical supervision.
See Figure 6 for detailed wiring connections; see Figure 5 for location of terminals, shorting spring, and wire strip guide.

Wiring Diagrams

Shorting Spring Feature. These devices enable system continuity checks of field wiring before appliances are installed. The mounting plate has a shorting spring between terminals 2 and 3 that will automatically disengage when the product is installed, to enable supervision of the final system. (**See Figure 5**.)
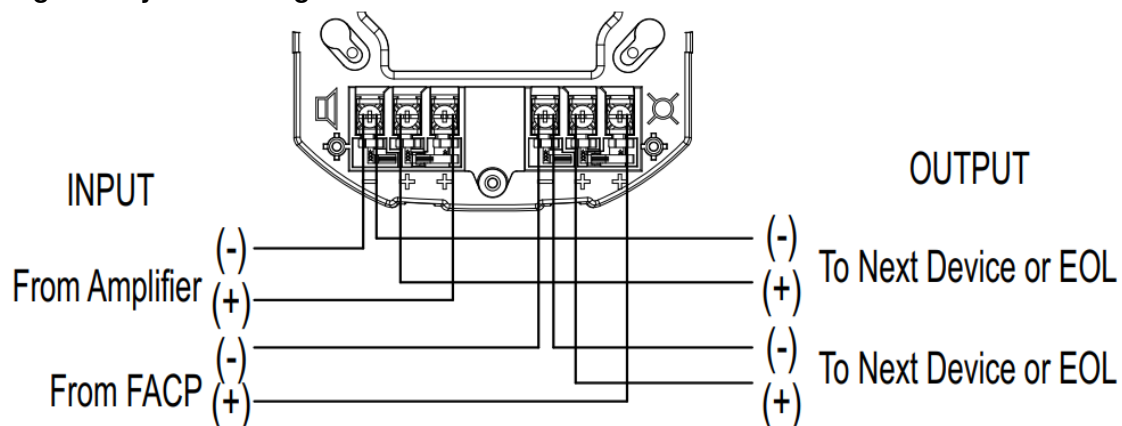
Figure 5 Wiring Terminals, Shorting Spring, and Strip Guide
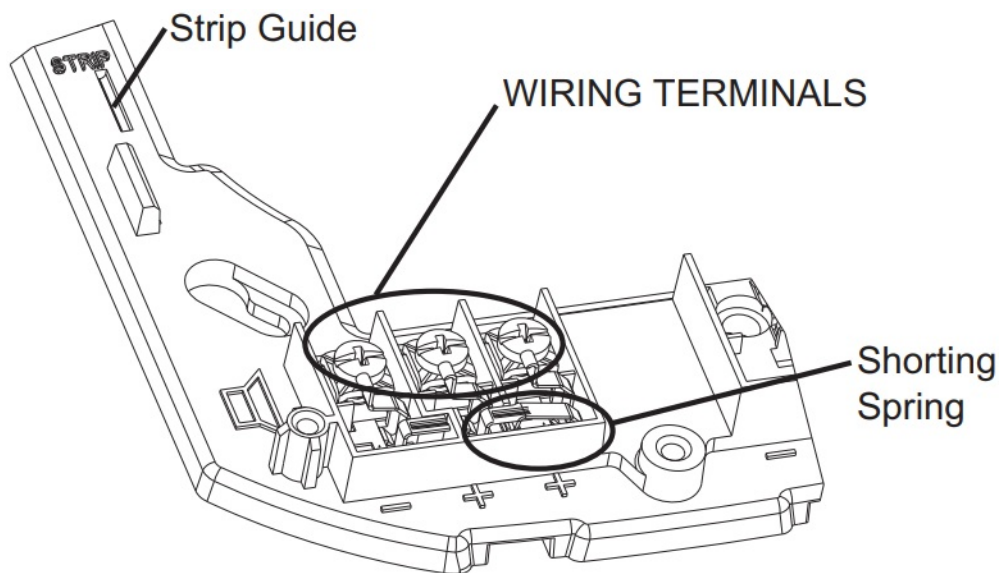
WIRING TERMINALS

1. Negative (-). Line in and out
2. Positive (+). Line in and out
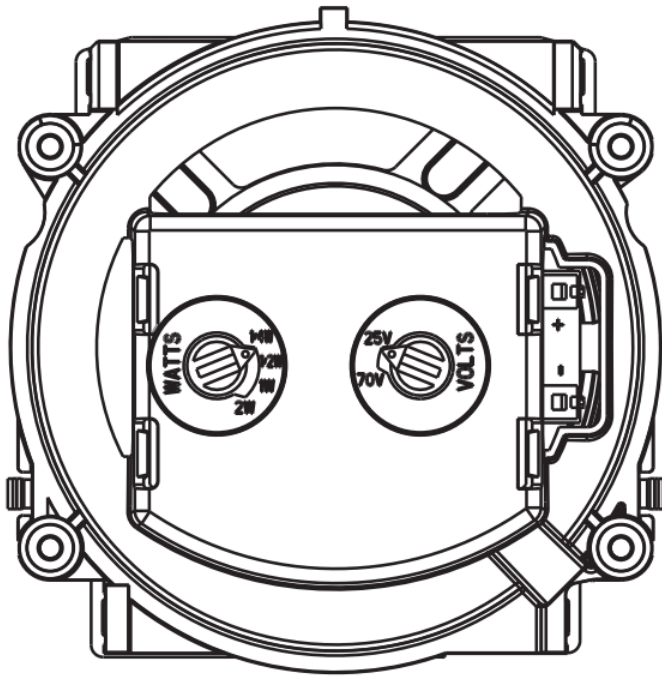3. Positive (+). Line in and out

Figure 6 System Wiring

Wiring Terminals:

1. Negative (-). Line in and out
2. Positive (+). Line in and out
3. Positive (+). Line in and out

Figure 7 Speaker Wattage and Voltage Settings

Install Back Box

1. Attach back box to wall or ceiling.
   - Junction boxes are mounted following industry standard. (See Figures 8 and 10.)
   - Surface mount back boxes may be secured directly to the wall or ceiling. Use of grounding bracket with ground screw is optional. **(See Figures 9 and 11.)**
   - **Note for positioning**: Wall mount back boxes: Mount with the up arrow pointing up. (See Figure 14.)
   - **Note for positioning:** Ceiling mount back boxes: Ceiling surface mount back box SBBCR/WL is a common back box for ceiling horn strobes, chime 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, chime strobe and strobe installation needs. **(See Figure 13.)**
2. 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 15a.)
   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 15b.)**

Install Mounting Plate and Appliance

1. Attach mounting plate using the provided Philips head screws. Junction box uses 2 screws. Surface mount back box uses 4 screws. **(See Figures 8 – 11.)**
2. Connect field wiring according to terminal designations. (See Figure 6.)
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 mounting plate:**

   - Remove the protective dust cover.
   - Hook the tabs on the top of the product housing into the grooves on mounting plate.
   - Pivot the product into position to engage the terminals on the mounting plate. Make sure that the tabs on the back of the product housing fully engage with the mounting plate.
   - Hold product in place with one hand, and secure product by tightening the single mounting screw in the front of the product housing.

⚠ **CAUTION:**
The "hold in place" snaps are not intended to secure the product to the back box. The product must be secured to the back box using the screws provided

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

⚠ **CAUTION:**
Do not over tighten mounting plate screws; this may cause mounting plate to flex.

Remove a Ceiling Model Appliance

Ceiling models only: To remove the product from the mounting plate, loosen the captive mounting screw and press the locking button. **(See Figure 12.)**

Mounting Drawings

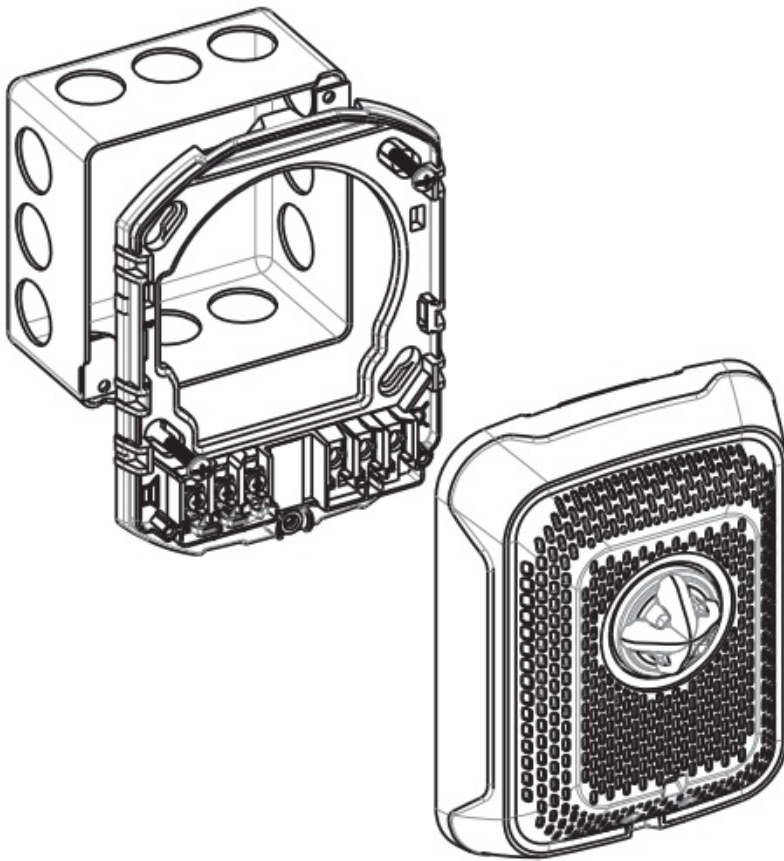**Figure 8 Mounting a Wall Device (Double-gang box)**

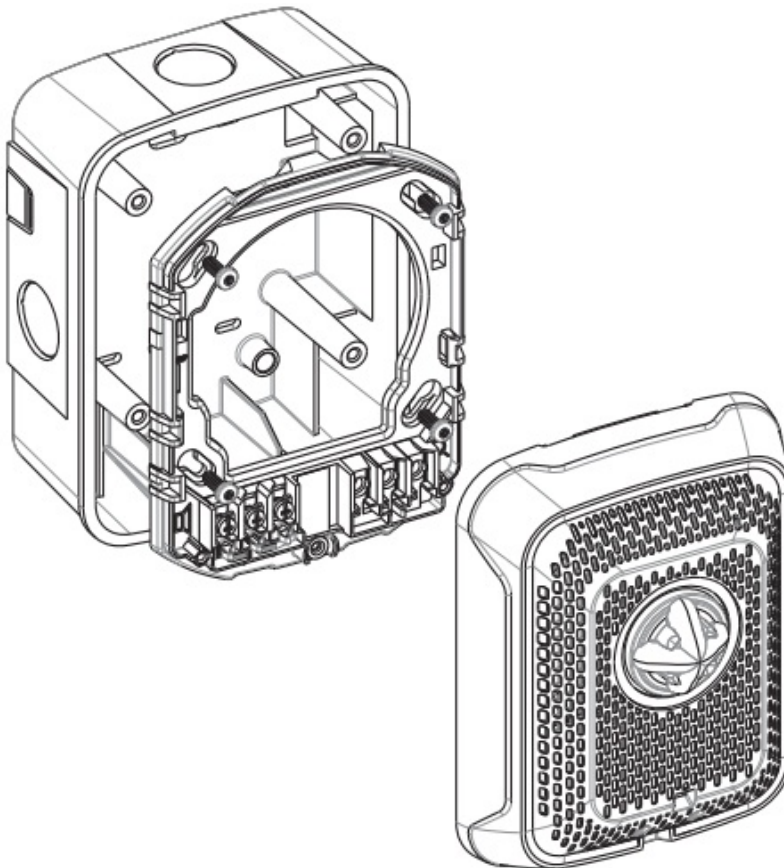**Figure 9 Surface Mounting a Wall Device (SBBRL/SBBWL)**

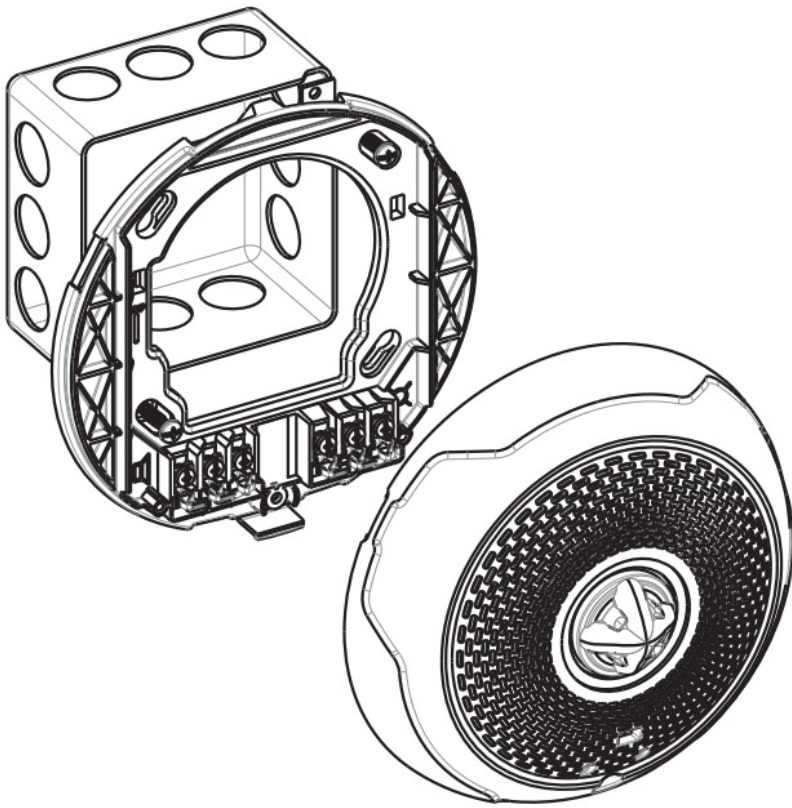**Figure 10 Mounting a Ceiling Device (Double-Gang Box)**

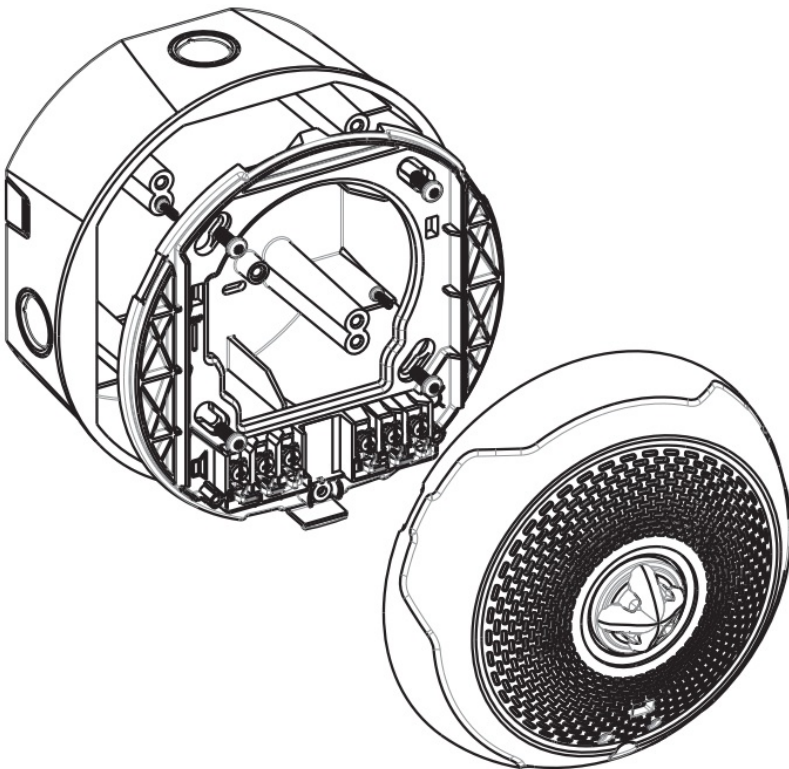**Figure 11 Surface Mounting a Ceiling Device (SBBCRL/SBBCWL)**

Figure 12 Ceiling Device – Location of Locking Button
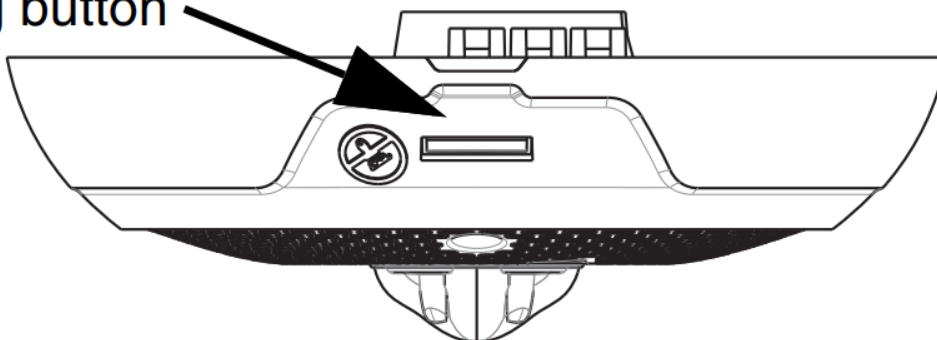

Locking button

Figure 13 Selecting screw location in a ceiling installation of a surface-mount back box
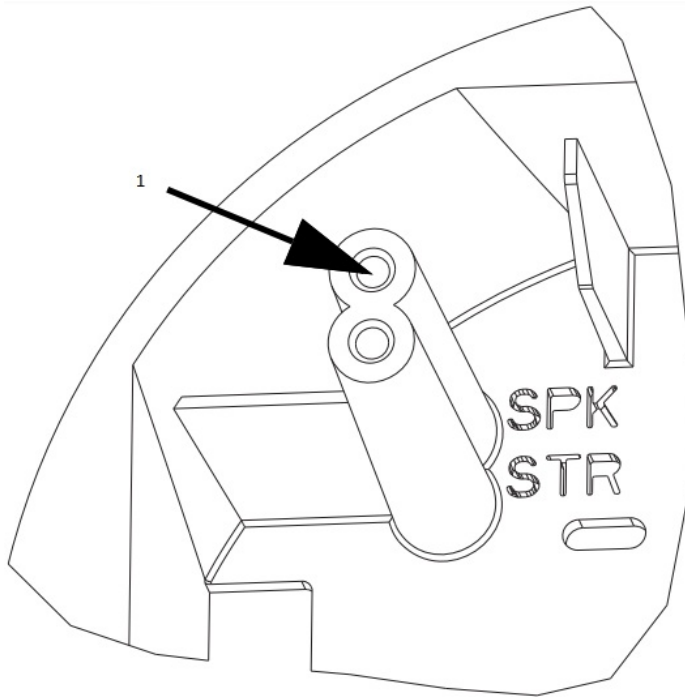
1. Speaker devices mount in location labeled "SPK

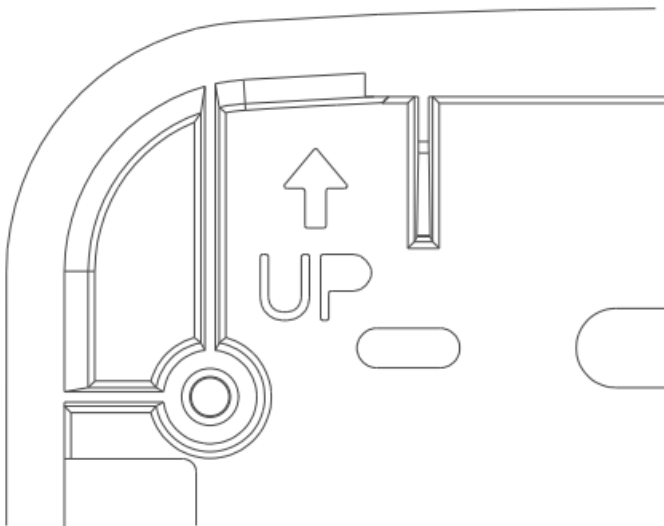**Figure 14 Surface Mount Back Box "Up" Arrow**

Figure 15 Knockout and V500/V700 Removal for Surface Mount Back Box
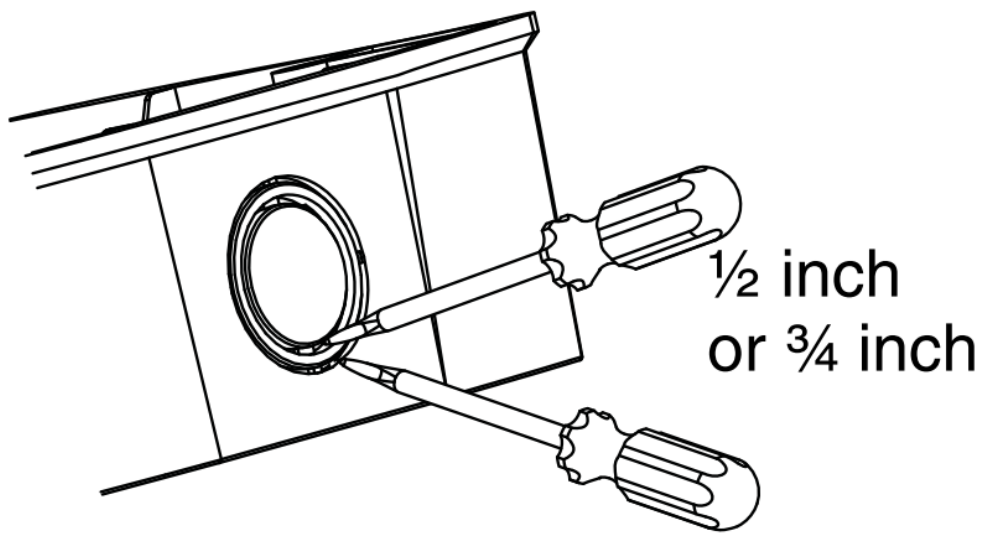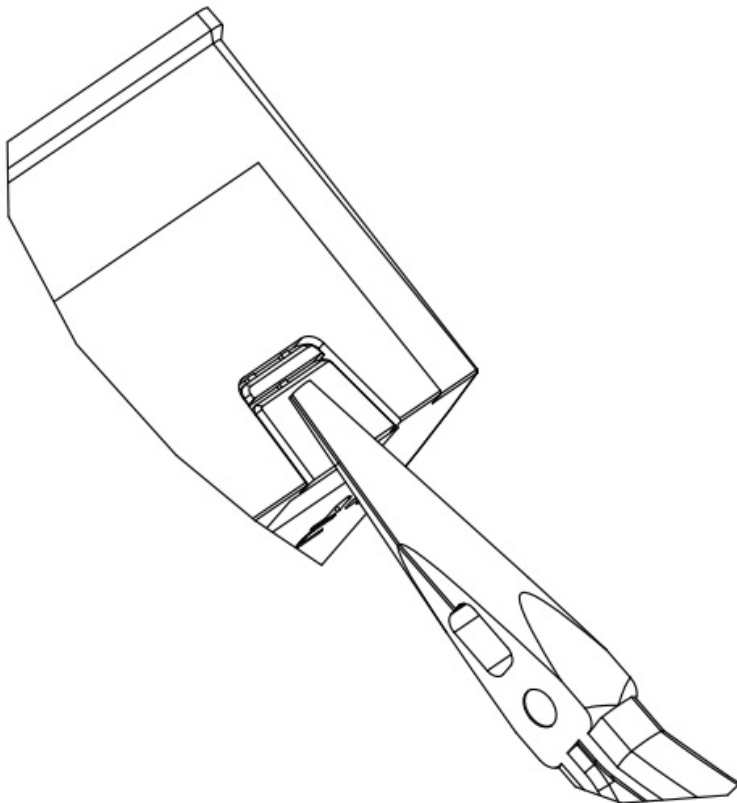
Figure 15A Knockout size

Figure 15B Wire Mold Removal

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

Tamper Screw

For tamper resistance, the standard captive screw may be replaced with a Torx screw, ordered separately.
To remove the captive screw, back out the screw and apply pressure to the back of the screw until it disengages from the housing. Replace with Torx screw. (**See Figure 16.**)
Figure 16 Tamper Screw

T15 Torx
#6-32, 5/8"
SCREW-TMPR-50
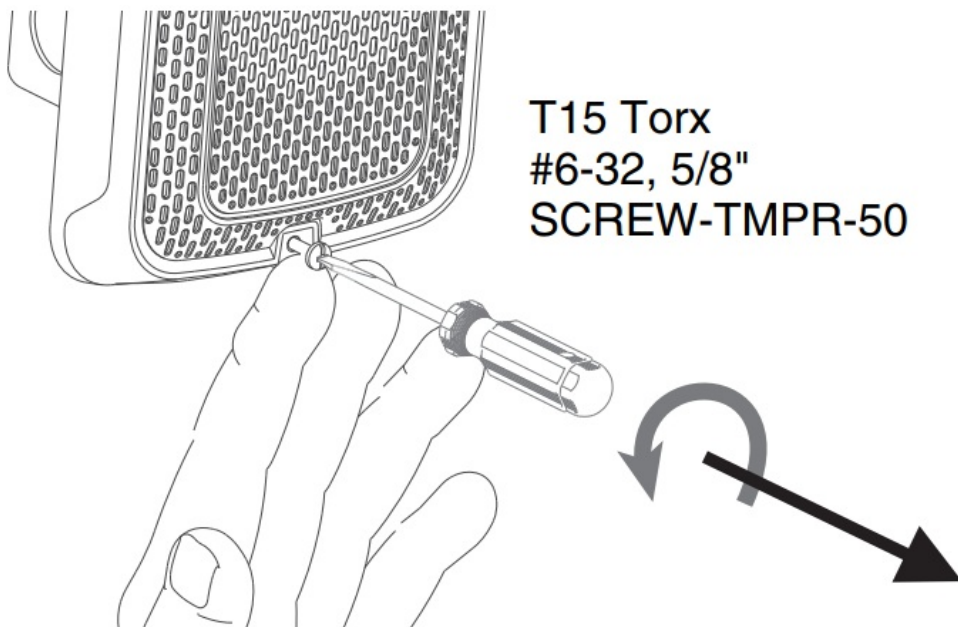
Test Points

System Sensor L-Series with LED notification appliances come with diagnostic test points for ease of access with use of a digital voltage meter to measure device voltage without removing from the wall or ceiling.

1. Insert digital voltage meter positive probe into (+) test point.
2. Insert digital voltage meter negative probe into (-) test point.
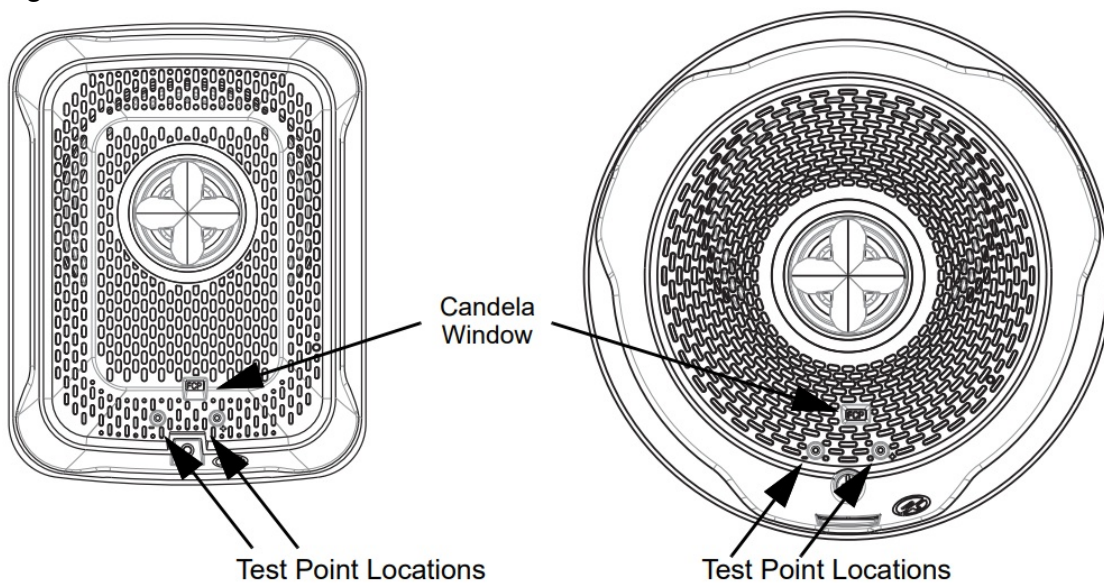
   NOTE: Marking indicates signal polarity when the circuit is active.

⚠️ **CAUTION:**
Short circuiting of these test points may result in improper device operation

Figure 17 Test Point Locations

Candela Window

Test Point Locations

Test Point Locations

⚠️ **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 phototropic 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 minimised.

FCC Statement

This equipment has 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 in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

This Class B digital apparatus complies with Canadian ICES-003.

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

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Documents / Resources

	[SYSTEM SENSOR SPSWLED-BT Series LED Indoor Selectable Output Speaker Strobes](#) [pdf] Instruction Manual SPSRLED, SPSRLED-B, SPSRLED-BT, SPSWLED, SPSWLED-B, SPSWLED-BT, SPSRLED-P, SPSWLED-P, SPSRLED-SP, SPSWLED-CLR-ALERT, SPSCRLED, SPSCRLED-B, SPSCRLED-BT, SPSCWLED, SPSCWLED-B, SPSCWLED-P, SPSCWLED-SP, SPSCWLED-BT, SPSCWLED-T, SPSCWLED-TP, SPSCWLED-CLR-ALERT, SPSWLED-BT Series LED Indoor Selectable Output Speaker Strobes, LED Indoor Selectable Output Speaker Strobes, Selectable Output Speaker Strobes, Output Speaker Strobes, Speaker Strobes, Strobes

References

- **[User Manual](#)**