

INSTALLATION AND MAINTENANCE INSTRUCTIONS

L-Series Low Frequency Sounders and L-Series with LED Low Frequency Sounder Strobes

**SYSTEM
SENSOR®**
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156-7038-000

For use with the following models: HWL2-LF, HRL2-LF, HGWL2-LF, HGRL2-LF, HCWL2-LF, HCRL2-LF, HWL2A-LF, HRL2A-LF, HCWL2A-LF, HCRL2A-LF, P2RLED-LF, P2WLED-LF, PC2RLED-LF, PC2WLED-LF, P2WLED-B-LF, P2RLED-B-LF, PC2RLED-B-LF, PC2WLED-B-LF.

PRODUCT SPECIFICATIONS

Operating Temperature:	32°F to 120°F (0°C to 49°C)
Humidity Range:	10 to 93% Non-condensing
Strobe Flash Rate:	1 flash per second
Nominal Voltage (Low Frequency Sounder):	Regulated 24VDC
Nominal Voltage (Low Frequency Sounder/Strobe):	Regulated 24VDC
Operating Voltage Range (includes fire alarm panels with built in sync):	16 to 33V (24V nominal)
Input terminal wire gauge:	12 to 18 AWG

DIMENSIONS FOR PRODUCTS AND ACCESSORIES

WALL PRODUCTS	Length	Width	Depth
Standard Sounder	5.67" (144mm)	4.7" (119.4mm)	1.63" (41.3 mm)
Sounder Strobe	5.67" (144mm)	4.7" (119.4mm)	2.20" (55.8mm)
Compact Sounder	5.26" (133.5 mm)	3.46" (87.8 mm)	1.63" (41.3 mm)
Standard Sounder with SBBRL/WL Surface Mount Back Box	5.77" (146.7 mm)	4.82" (122.3mm)	3.48" (88.3mm)
Sounder Strobe with SBBRL/WL Surface Mount Back Box	5.77" (146.7mm)	4.82" (122.3mm)	4.05" (102.8mm)
Compact Sounder with SBBGRL/WL Surface Mount Back Box	5.38" (136.7 mm)	3.57" (90.8mm)	3.48" (88.4mm)
NOTE: SBBRL/WL Surface Mount Back Box intended only for standard sounder and sounder strobe. SBBGRL/WL Surface Mount Back Box intended for compact sounder.			

CEILING PRODUCTS	Diameter	Depth
Sounder	6.80" (172.7mm)	1.63" (41.3mm)
Sounder Strobe	6.80" (172.7mm)	2.20" (55.8mm)
Sounder with SBBCRL/WL Surface Mount Back Box	6.92" (175.8mm)	4.13" (104.8mm)
Sounder Strobe with SBBCRL/WL Surface Mount Back Box	6.92" (175.8mm)	4.70" (119.3mm)

JUNCTION BOX OPTIONS

Standard Indoor Products: 4" x 4" x 1½", Single Gang, Double Gang, 4" Octagon, SBBRL/WL (wall), SBBCRL/WL (ceiling)

Compact Indoor Products: Single Gang, SBBGRL/WL (wall)

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

GENERAL DESCRIPTION

The second generation L-Series low frequency series of notification appliances offers a range of low frequency sounder and low frequency sounder/strobe products for wall and ceiling applications. Studies have shown that low frequency audible devices that operate around 520Hz are more effective in waking individuals in sleeping areas. These products are electrically backward compatible with the previous generation of System Sensor notification appliances. The 2-wire products fit systems where a single NAC controls both sounder and strobe. The System Sensor MDL3 module may be used to provide synchronization for strobes and sounder strobes configured for Temp 3 tone.

Sounder-only models are approved for wall and ceiling installations.

FIRE ALARM SYSTEM CONSIDERATIONS

The National Fire Alarm Code, NFPA 72, requires that all sounders, 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. The National Fire Alarm Code, NFPA 72, requires that audible appliances installed in sleeping areas produce a low frequency alarm signal that shall be a square wave or provide equivalent awakening ability (effective Jan. 1, 2014). System Sensor recommends spacing notification appliances in compliance with NFPA 72, NFPA 70, CSA C22.1, and CAN/ULC-S524 guidelines should be observed.

LOOP DESIGN AND WIRING

The system designer must make sure that the total current drawn 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 this manual. For convenience and accuracy, use the voltage drop calculator on the Tools menu of the System Sensor website.

When calculating the voltage available to the last device, it is necessary to consider the voltage drop 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.

NOTE: Loop resistance on a single NAC should not exceed 120 ohms for 24 volt.

NOTE: A shorting spring is provided between terminals 2 and 3 of the mounting plate to enable wiring checks after the system has been wired, but prior to installation of the final product. This spring will automatically disengage when the product is installed, to enable supervision of the final system.

Removal of a notification device will result in an open circuit indication on the NAC.

MOUNTING AND REMOVING APPLIANCE

1. Attach mounting plate to junction box. (See Figures 3A, 3C, and 3E.)
2. Connect field wiring to terminals. (See Figures 1 and 2.)
3. If the product is not to be installed at this point, use the paint cover to prevent contamination of the mounting plate.
4. To attach product to mounting plate:
 - a. Remove the protective dust cover.
 - b. Hook the tabs on the top of the product housing into the grooves on mounting plate.
 - c. 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.
 - d. Hold product in place with one hand, and secure product by tightening the single mounting screw in the front of the product housing.
5. To remove products from the mounting plate, press the locking button after loosening the captive mounting screw. (Ceiling models only)

INSTALLING A SURFACE MOUNT BACK BOX

1. The surface mount back box may be secured directly to the wall or ceiling. Use of grounding bracket with ground screw is optional. (See Figures 3B, 3D, 3F, and 4.)
2. The wall mount box must be mounted with the up arrow pointing up. (See Figure 6.)
3. Threaded knockout holes are provided for the sides of the box for $\frac{3}{4}$ inch and $\frac{1}{2}$ inch conduit adapter. Knockout plugs in the back of the box can be used for $\frac{3}{4}$ inch and $\frac{1}{2}$ inch rear entry.
4. To remove the $\frac{1}{2}$ inch or $\frac{3}{4}$ 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 7.)

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

5. V500 and V700 wiremold raceways are also provided. Use V500 for low profile applications and V700 for high profile applications.
6. To remove the knockout, turn pliers up. (See Figure 7.)
7. Attach the mounting plate to the surface mount back box using the four unpainted screws. (See Figures 3B, 3D, 3F, and 4.)
8. To wire and attach the product, follow steps 4 and 5 of "Mounting and Removing Appliance" (above).

FIGURE 1. WIRING DIAGRAM

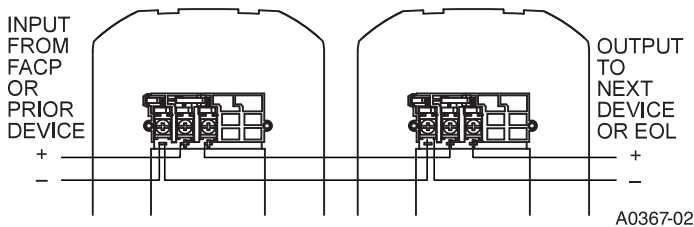


FIGURE 2. WIRING TERMINALS, SHORTING SPRING, AND STRIP GUIDE

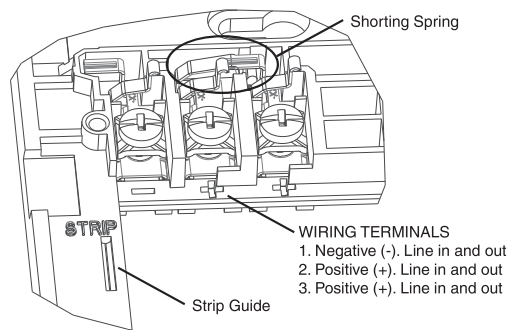
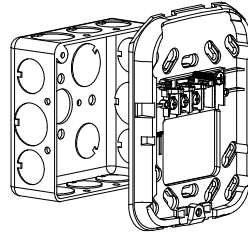


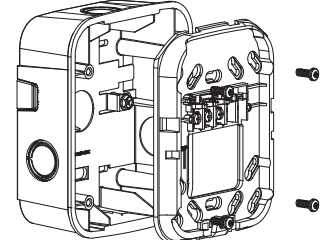
FIGURE 3. ATTACH MOUNTING PLATE TO BACK BOX

3A. WALL MOUNT JUNCTION BOX



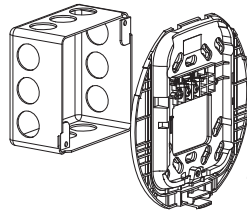
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3B. WALL MOUNT SURFACE-MOUNT BACK BOX



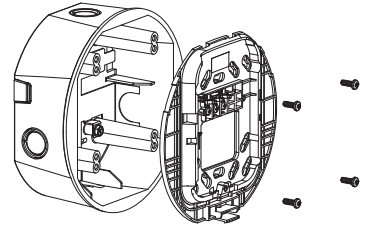
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3C. CEILING MOUNT JUNCTION BOX



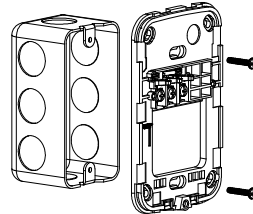
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3D. CEILING MOUNT SURFACE-MOUNT BACK BOX



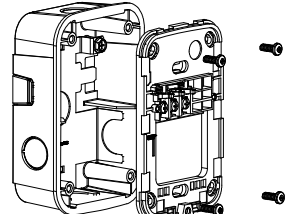
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3E. COMPACT WALL MOUNT JUNCTION BOX



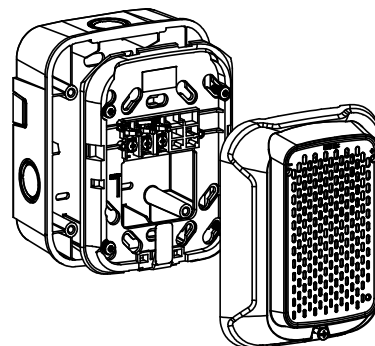
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3F. COMPACT WALL MOUNT SURFACE-MOUNT BACK BOX



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FIGURE 4. ATTACH DEVICE ONTO MOUNTING PLATE (SHOWN: WALL-MOUNT SOUNDER WITH SURFACE-MOUNT BACKBOX)



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TABLE 1A. WALL SOUNDER STROBE CURRENT DRAW (mA) AND SOUND OUTPUT (dBA)

			Current draw (mA)								Sound Output (dBA)
Pos	Tone	Volume Setting	16-33 VDC								16-33 V
			15cd	30cd	75cd	95cd	110cd	135cd	185cd	DC	
1	Temp 3	High	90	95	117	125	131	137	145		81
2	Temp 3	Low	89	89	89	89	89	91	99		78
3	Temp 4	High	89	89	89	89	90	97	125		81
4	Temp 4	Low	89	89	89	89	89	89	91		78
5	Continuous	High	137	138	158	163	169	176	185		81
6	Continuous	Low	88	89	89	91	97	104	113		78

TABLE 1B. CEILING SOUNDER STROBE CURRENT DRAW (mA) AND SOUND OUTPUT (dBA)

			Current draw (mA)								Sound Output (dBA)
Pos	Tone	Volume Setting	16-33 VDC								16-33 V
			15cd	30cd	75cd	95cd	115cd	150cd	177cd	DC	
1	Temp 3	High	90	95	117	125	130	139	143		79
2	Temp 3	Low	89	89	89	89	88	94	102		75
3	Temp 4	High	89	89	89	89	88	107	114		79
4	Temp 4	Low	89	89	89	89	89	88	89		75
5	Continuous	High	137	138	158	163	171	182	185		79
6	Continuous	Low	88	89	89	91	96	109	111		75

⚠ 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.

tone and Candela Selection

Tables 1 and 2 list current draw and sound output for available settings. Figures 8 – 10 list the minimum light output requirements per UL1971.

Sounder tone and volume: Turn the rotary switch on the back of the product.

Candela: Adjust the slide switch on the rear of the product to the desired candela setting. Candela setting will display in the small window on the front of the unit. All products meet the light output profiles specified in the appropriate UL Standards.

TABLE 2A. LOW FREQUENCY WALL SOUNDER ONLY CURRENT DRAW (mA)

Pos	Sound Patterns	Volume Setting	Current Draw (mA)	Sound Output (dBA) Reverberant
			16-33 Volts	16-33 V
			DC	DC
1	Temp 3	High	79	80
2	Temp 3	Low	79	76
3	Temp 4	High	79	80
4	Temp 4	Low	78	76
5	Continuous	High	82	80
6	Continuous	Low	78	76
7*	Coded	High	82	80
8*	Coded	Low	79	76

TABLE 2B. LOW FREQUENCY CEILING SOUNDER ONLY CURRENT DRAW (mA)

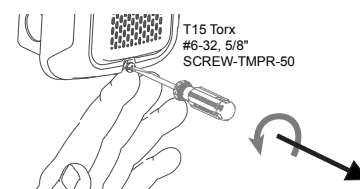
Pos	Sound Patterns	Volume Setting	Current Draw (mA)	Sound Output (dBA) Reverberant
			16-33 Volts	16-33 V
			DC	DC
1	Temp 3	High	79	78
2	Temp 3	Low	79	74
3	Temp 4	High	79	78
4	Temp 4	Low	78	74
5	Continuous	High	82	78
6	Continuous	Low	78	74
7*	Coded	High	82	78
8*	Coded	Low	79	74

*NOTE: for Tables 2A and 2B For coded tones, temporal coding must be provided by the NAC. If the NAC voltage is held constant, the sounder output will remain constantly on. Coded ratings provided are for continuous voltage.

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 5.)

FIGURE 5. TAMPER SCREW

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FIGURE 6. SURFACE MOUNT BACK BOX UP ARROW

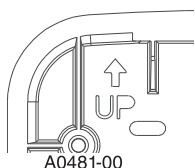
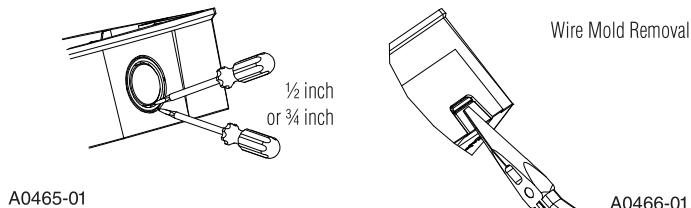


FIGURE 7. KNOCKOUT AND V500/V700 REMOVAL FOR SURFACE MOUNT BACK BOX



DIRECTIONAL CHARACTERISTICS

To calculate the sound dispersal per UL464 or ULC-S525, refer to Table 3

TABLE 3. DIRECTIONAL CHARACTERISTICS

HORIZONTAL AXIS	
Angle (Degrees)	Decibal loss (dBA)
0 (ref)	0 (ref)
+/- 40	-3
+/- 60	-6
+/- 90	-3.3
VERTICAL AXIS	
Angle (Degrees)	Decibal loss (dBA)
0 (ref)	0 (ref)
+/- 25	-3
+/- 40	-6
+/- 90	-2.8

FIGURE 8. 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

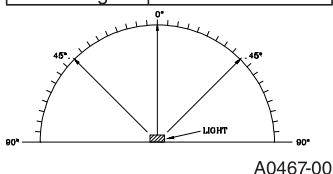
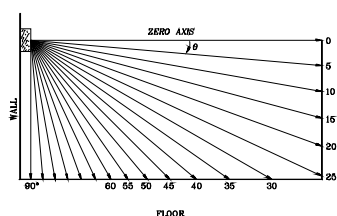


FIGURE 9. VERTICAL DISPERSION, WALL TO FLOOR

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.

TEST POINTS

System Sensor second generation of L-Series Low Frequency sounders and L-Series with LED Sounder Strobes 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.

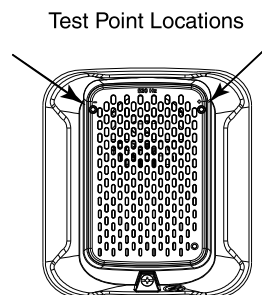
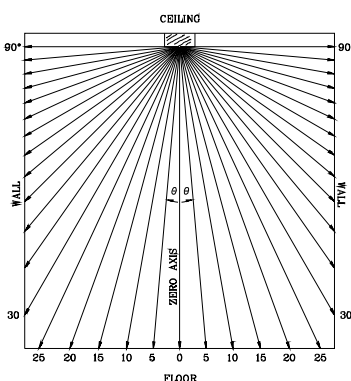


FIGURE 10. LIGHT OUTPUT - VERTICAL DISPERSION, CEILING TO WALLS TO FLOOR

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



DEVICE AND SYSTEM SECURITY

Before installing this product ensure that the tamper seal on the packaging is present and unbroken and the product has not been tampered with since leaving the factory. Do not install this product if there are any indications of tampering. If there are any signs of tampering the product should be returned to the point of purchase.

It is the responsibility of the system owner to ensure that all system components, i.e. devices, panels, wiring etc., are adequately protected to avoid tampering of the system that could result in information disclosure, spoofing, and integrity violation.



THE LIMITATIONS OF LOW FREQUENCY HORN/STROBES

The sounder and/or strobe will not work without power. The sounder/strobe gets its power from the fire/security panel monitoring the alarm system. If power is cut off for any reason, the sounder/strobe will not provide the desired audio or visual warning.

The sounder may not be heard. The loudness of the sounder meets (or exceeds) current Underwriters Laboratories' standards. Studies have shown that the low frequency sounder (520Hz) is more effective at waking individuals in sleeping spaces, especially individuals that may have recently used drugs or drinking alcoholic beverages. The sounder 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 low frequency sounder may not be heard by persons who are hearing impaired.

NOTE: Strobes must be powered continuously for sounder operation.

The signal strobe may not be seen. The electronic visual warning signal uses an extremely reliable xenon flash tube. 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 sounder and signal strobe always be used in combination so that the risks from any of the above limitations are minimized.

FCC STATEMENT

System Sensor Strobes and Horn/Strobes 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.

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



Limitations of
Fire Alarm Systems



Speakers Only:
Assembly Information