EXITPOINT

SYSTEM SENSOR®

3825 Ohio Avenue, St. Charles, Illinois 60174
1-800-SENSOR2, FAX: 630-377-6495
www.systemsensor.com

PF24 Directional Sounder

Specifications

Mechanical

Input terminals:	12 – 24 AWG
Sounder size:	4 inches (101mm)
Grille Size:	4 7/8″ (127mm)

Electrical

Voltage Input:	Regulated 24 Volts
Operation Voltage Range:	16 to 33 Volts
Operating Humidity Range:	10% to 93% relative humidity non-condensing
Frequency range:	20 Hz to 20 kHz
Operating Temperature range:	32° to 120°F (0° to 49°C)
Power:	1/4″, 1/2″, 1, 2 and 4 Watts, selectable
Listings:	UL 464 Directional Sounder, supplemental notification appliance

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

General Description

Before installing, please read the Directional Sound Applications Guide, available through System Sensor. The installation must meet the requirements of the authority having jurisdiction. Directional sounders are used as supplemental signals on a fire alarm system to aid in the evacuation of building occupants. Although directional sounders may be connected to notification appliance circuits (NAC) for fire alarm service, they are not a replacement for audible or visible notification appliances as required by the authority having jurisdiction.

The directional sounder can be installed in systems using 24 Volt DC regulated power supplies only. It is not approved for use with FWR unregulated power supplies.

Directional sound is a broadband, multi-frequency sound. The sound source is easily and quickly located by building occupants, making it ideal for rapid building evacuation. The Sounder incorporates four different pulse patterns. The patterns consist of pulses of broadband noise. The four patterns can be used to create an egress pathway out of a building. The sound pattern becomes faster as the building occupant approaches the perimeter exit. Three additional tone pulses can be added to each of the four pulse patterns. The first two tone pulses are used to alert occupants that they are approaching a stairway and need to proceed either up or down. The second tone pulse is a special tone used to identify areas of refuge.

Power Supply Considerations for Directional Sounders

Panels typically supply DC filtered voltage or FWR (full-wave rectified) voltage. This device is only compatible with DC filtered supplies and must not be used with panel supplies that are FWR. Be certain the sum of all the device currents do not exceed the current capability of the panel power supply. Calculations are based on using the device current found in Table 1 and must be the current specified for the installed settings of the device.

Wire Sizes

The last device on the circuit must have sufficient voltage to operate the device within its rated voltage range. 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 less the voltage drop. Generally, for purposes of determining the wire size necessary for the system, it is best to consider all of the devices as “lumped” on the end of the supply circuit (simulates “worst case”).

Typical wire size resistance:

18 AWG solid:	Approximately 8 ohms/1,000 ft.
16 AWG solid:	Approximately 5 ohms/1,000 ft.
14 AWG solid:	Approximately 3 ohms/1,000 ft.
12 AWG solid:	Approximately 2 ohms/1,000 ft.

Example: Assume you have 10 devices on a zone and each requires 50mA average and 2000 ft. of 14 AWG wiring (total length = outgoing + return). The voltage at the end of the loop is 0.050 Amps per device × 10 devices × 3 ohms/1000 ft. × 2000 ft. = 3 volts drop.

The same number of devices using 12 AWG wire will produce only a 2 volt drop. The same number of devices using 18 AWG wire will produce an 8 volt drop. Consult your panel manufacturer's specifications, as well as the sounder's operating voltage to determine the acceptable voltage drop.

NOTE: If class "A" wiring is installed the wire length may be up to 4 times the single wire length in this calculation.

Table 1: Current Draw Measurements and Sound Output Guide

Speed Selection		Power Setting	Maximum DC Operating Current (mA RMS) (16 to 33V)	Audibility (dBA) (16 to 33V) Note 1	Audibility (dBA) (16 to 33V) Note 2
Speed	Switch Selection				
FAST (exit)	10	4 Watt	225	85	78
FAST (exit)	10	2 Watt	114	82	76
FAST (exit)	10	1 Watt	75	79	73
FAST (exit)	10	1/2 Watt	62	76	69
FAST (exit)	10	1/4 Watt	49	73	66
MED1	9	4 Watt	221	85	77
MED1	9	2 Watt	112	82	74
MED1	9	1 Watt	74	79	71
MED1	9	1/2 Watt	61	76	68
MED1	9	1/4 Watt	48	73	65
MED2	8	4 Watt	203	85	78
MED2	8	2 Watt	103	82	75
MED2	8	1 Watt	68	79	73
MED2	8	1/2 Watt	56	76	69
MED2	8	1/4 Watt	44	73	66
SLOW	7	4 Watt	189	85	76
SLOW	7	2 Watt	96	82	73
SLOW	7	1 Watt	63	79	70
SLOW	7	1/2 Watt	52	76	67
SLOW	7	1/4 Watt	41	73	64

NOTE 1: Sound output measured in anechoic room at 10 feet.
NOTE 2: Sound output measured in a reverberant room at 10 feet.

Installation

Consult the Directional Sound Applications Guide for information regarding the appropriate mounting locations of directional sounders.

Switch Settings

Selections are made via DIP switches on the back of the sounder. Switch positions 7-10 are used to select the pulse pattern of the sounder. Switch 10 is used to mark the perimeter exit locations (fastest pulse). The remaining settings are used for egress routing to the perimeter exit. The egress route would originate with the "slow" (switch 7) tone and follow "medium 2" (switch 8) to "medium 1" (switch 9) and finally the exit point "fast" (switch 10). If more than one switch is selected the sounder will default to the fastest selected setting.

Switch positions 5 and 6 are used to select additional tone pulses that can be inserted in between bursts of the directional sound pulses. The additional tone pulse will be inserted on every 6th directional sound pulse. These switches should be used when the sounder will be placed near a stairway to guide a building occupant up or down the stairs. Switch setting 5 inserts a down sweep indicating the presence of a downward stairway. Switch setting 6 inserts an up sweep indicating the presence of an upward stairway. If switch positions 5 and 6 are both set to "on" this will insert a special tone for use near areas of refuge. The area of refuge tone should be used if the directional sounder is marking an area of refuge. This tone provides a distinct signal indicating that the sounder is not marking an exit. If both switches are set to "off" the sounder will default to no additional tones. In this case only the directional sound pulses will be heard. See Table 2 for tone selection options.

Table 2: Additional Tone Selection Guide

Switch Position 5 Setting	Switch Position 6 Setting	Sound Output
on	on	Refuge
on	off	DOWN Stairs
off	on	UP Stairs
off	off	no tones

Switch setting 4 enables a directional sound device to become disabled when used in conjunction with devices with dry contacts such as heat sensors or control modules. The sounder has a set of input terminals that can be configured for an "active open" or "active closed" state. When the switch is in the "on" position, the sounder is "on" when the disable connection is closed. When the switch is in the "off" position, the sounder is "on" when the disable connection is open. See Table 3 for operation modes.

Table 3: Enable/Disable Function Logic Table

Switch Position 4 Setting	Terminals 3 & 4	Sound Output
on	open	disabled
on	closed	enabled
off	open	enabled
off	closed	disabled

There are five different power settings for the sound output pressure. Switch settings 1, 2, and 3 set the power setting for the sounder. Switch 1 selects the 2 watt setting, switch 2 selects the 1 watt setting, switch 3 selects the 1/2 watt setting. If all three switches are "off" this selects the 4 watt setting and if all three switches are "on" this selects the 1/4 watt setting.

Table 4: Power Setting Guide

Switch Position 1 Setting	Switch Position 2 Setting	Switch Position 3 Setting	Power Setting
off	off	off	4 Watt
on	off	off	2 Watt
off	on	off	1 Watt
off	off	on	1/2 Watt
on	on	on	1/4 Watt

NOTE 1: Any other combinations of switch setting for positions 1, 2, and 3 are invalid and should not be used.

Consult the Directional Sound Applications Guide for information regarding the appropriate power, speed, and additional tone selections.

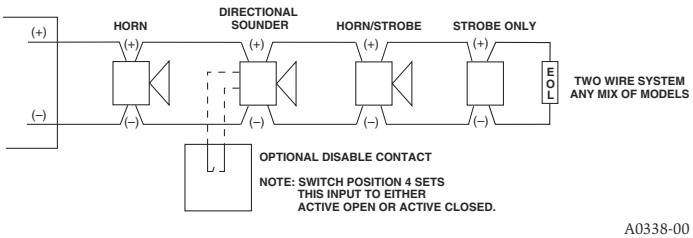
Electrical

Connect the Sounder as shown in Figure 1 for 2-wire applications. Connect the sounder as shown in Figure 2 for 4-wire applications.

4-wire notification appliance circuits are circuits that use a separate power supply and pair of wires for sounder and strobe circuits. Some types of notification circuits may provide coded signals to the sounders by pulsing the power supply on and off in specific patterns such as the temporal 3 evacuation signal. The directional sounders should not be connected to 4-wire sounder circuit power supplies where coded signals are used to pulse the sounders. Directional sounders may be used in conjunction with sync modules such as the System Sensor MDL or syncable power supplies. The sounder is compatible with syncable power supplies using any of the following syncronization protocols; wheelock, gentex, and faraday.

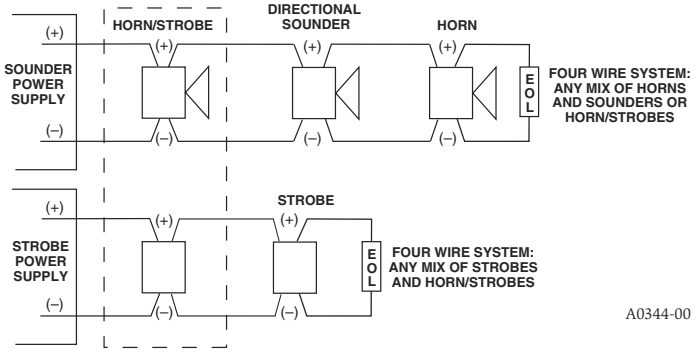
All wiring must be installed in compliance with the National Electrical Code (NEC) and applicable local codes as well as special requirements of the authority having jurisdiction.

Figure 1.



A0338-00

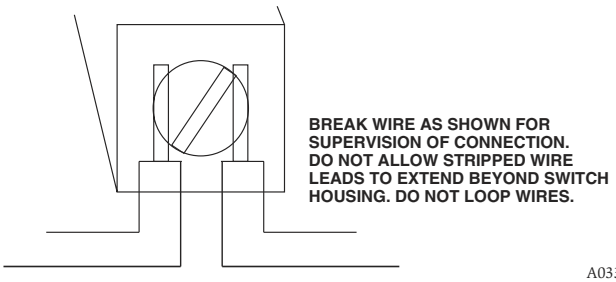
Figure 2.



A0344-00

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 3.

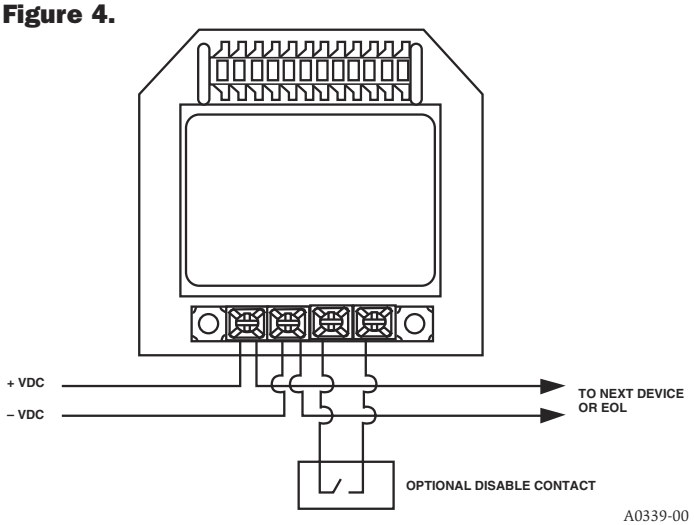
Figure 3.



A0337-00

The sounder has a set of input terminals to provide additional control of the sound output of the directional sounder. These terminals can be connected to the dry relay contacts of control devices such as heat sensors or control modules. When the input is active it will disable the sound output of the Sounder. Connect the disable function as shown in Figure 4. Refer to Table 3 for function switch settings.

Figure 4.



A0339-00

Mechanical

Two screws are included for attaching the sounder to the electrical junction box.

NOTE: If surface mounting is required, an extension ring will be necessary to give proper depth for mounting the sounder. The minimum depth required, in the backbox/extension ring combination, is 2¼″. Any combination of 4″ × 4″ backbox and 4″ × 4″ extension ring that gives an interior depth of at least 2¼″ may be used.

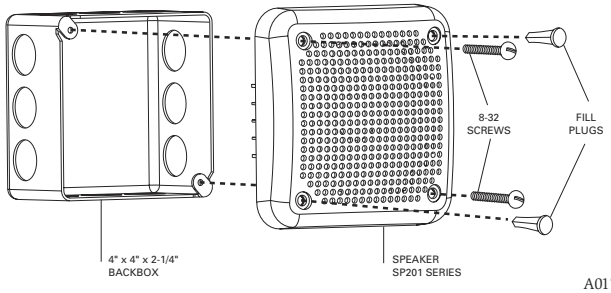
Mounting

See Figure 5. The sounder can be flush mounted on a 4″ × 4″ × 2¼″ back box, as follows:

A. Use the two 8-32 × 1¾″ screws (provided) to attach the Sounder to the back box.

B. Plug the remaining two holes that will not be used for attachment with the plugs provided.

Figure 5.



A0176-04

Please refer to insert for the Limitations of Fire Alarm Systems

⚠WARNING

The Limitations of Directional Sounders

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

The directional sounder may not be heard. The directional 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 sounder. The Sounder may not be heard by persons who are hearing impaired.

Three-Year Limited Warranty

System Sensor warrants its enclosed directional sounder to be free from defects in materials and workmanship under normal use and service for a period of three years from date of manufacture. System Sensor makes no other express warranty for this directional sounder. No agent, representative, dealer, or employee of the Company has the authority to increase or alter the obligations or limitations of this Warranty. The Company's obligation of this Warranty shall be limited to the repair or replacement of any part of the directional sounder which is found to be defective in materials or workmanship under normal use and service during the three year period commencing with the date of manufacture. After phoning System Sensor's toll free number 800-SENSOR2 (736-7672) for a Return Authorization number, send defective units postage prepaid to: System Sensor, Returns Department, RA #_____, 3825 Ohio Avenue, St. Charles, IL 60174. Please include a note describing the malfunction and suspected cause of failure. The Company shall not be obligated to repair or replace units which are found to be defective because of damage, unreasonable use, modifications, or alterations occurring after the date of manufacture. In no case shall the Company be liable for any consequential or incidental damages for breach of this or any other Warranty, expressed or implied whatsoever, even if the loss or damage is caused by the Company's negligence or fault. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you. This Warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

FCC Statement

NOTE: Directional Sounder has been tested and found to comply with the limits for a Class A 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.

©2004 System Sensor