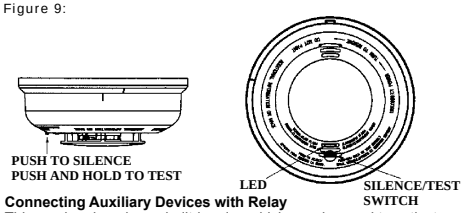
Figure 9:



Connecting Auxiliary Devices with Relay
This smoke-alarm has a built-in relay which may be used to activate auxiliary devices such as bells, horns, and door closers. The relay contacts automatically close approximately eight (8) seconds after the unit goes into alarm, and automatically resets approximately five (5) seconds after the alarm stops. For wiring refer to Figure 8. Auxiliary voltage and current requirements must be within relay contact ratings and appropriate wiring must be used.

How to Interconnect Smoke Alarms
NOTE: Interconnect smoke alarms within one household only. If smoke alarms are interconnected between households, nuisance alarms will occur when a smoke alarm in another residence is tested. The model 2012JA has two interconnection modes shown in table 1.

TABLE 1: INTERCONNECTION MODES

Interconnection Mode	Interconnected Terminals	Electronic Horn	Relay
SIGSND	SIGSND and GND	Sound	Only the smoke alarms in local alarm are activated
SIGRLY	SIGRLY and GND	Sound	All the interconnected smoke alarms are activated

- Up to twelve 2012JA smoke-alarms may be interconnected. The 2012JA smoke-alarms may also be interconnected with 2012H (A) when they all work at 12VDC supply voltage by using SIGRLY interconnecting terminal. If one smoke alarm senses smoke, all of the interconnected units will sound in SIGSND mode, the relays of the interconnected units will be activated approximately eight seconds after horns sound in SIGRLY mode. After interconnecting the smoke alarms, push and hold the test button for more than 3 seconds on one unit. The alarm horns on all of the other smoke alarms should sound if they are connected correctly.
- If any interconnected smoke alarm is activated by another unit, it senses smoke, the unit will go into local alarm state with the LED flashing quickly.
- Connect the smoke alarms together by interconnecting all the SIGSND terminals to each other and all GND terminals to each other in SIGSND mode, interconnecting all the SIGRLY and GND terminals to each other in SIGRLY mode. (See Figure 7.) Use 22 guage (#22AWG) or larger two-conductor standard wire.
- If smoke alarms will not be connected, DO NOT use the SIGSND, SIGRLY and GND terminals.
- The LEDs on all smoke alarms should flash once about 40 seconds when power is turned on to the units.Test smoke alarms after interconnection wiring are complete.

Cautionary Note: Test interconnection wiring after installation is completed. Test each unit in a system and make sure all other units alarm. FAILURE TO OBSERVE ANY OF THESE CONDITIONS CAN CAUSE SYSTEM MALFUNCTION AND/OR DAMAGE TO THE ALARMS.

Testing Information
- You should test your smoke alarm at least once a week to assure yourself of its operation, as recommended by ULC. Test the smoke alarm by firmly depressing the test switch located on the smoke alarm cover (marked “Push and Hold to Test”) FOR MORE THAN 3 SECONDS (See Figure 9). The alarm horn should sound, and the LED should flash rapidly. When the test switch is pushed and held for more than 8 seconds, the relay will be activated.
- In an interconnected system, all of the smoke alarms should sound their alarm horns when any one of the test buttons is pushed and held for more than 3 seconds. The alarm horn sounds if the smoke alarm is working properly. **This is the only way to be sure the smoke alarm is working. Test the smoke alarm weekly. If the smoke alarm fails to test properly, have it repaired or replaced immediately.**
- **DANGER: If the alarm horn sounds an alarm and you are not testing the smoke alarm, the unit has sensed smoke or combustion particles in the air. THE ALARM HORN IS A WARNING OF A POSSIBLY SERIOUS SITUATION. IT REQUIRES YOUR IMMEDIATE ATTENTION.**
- The alarm could be caused by a nuisance situation. Cooking smoke or a dusty furnace can cause the smoke-alarm to sound. If this happens, open a window or fan the air to remove the smoke or dust. The smoke alarm will turn itself off as soon as the air is completely clear. **DO NOT TURN OFF POWER TO THE SMOKE ALARM. THIS WILL REMOVE YOUR PROTECTION.**

Monitoring Your Smoke Alarm
Once the smoke alarm is powered, a green LED flashes once about 40 seconds. This signals that the smoke alarm is receiving power and is in the detection mode. If the smoke alarm is not operating properly, the green LED will be OFF. (If so, have the smoke alarm repaired or replaced immediately.) When the smoke alarm senses smoke, the green LED will flash rapidly. If the initiating smoke alarm senses smoke and signals other interconnected smoke alarms to sound their alarm horns, their LEDs will stop flashing. See TABLE 2 for specific LED functions.

TABLE 2: SMOKE ALARM STATUS

Smoke alarm Status	Electronic Horn	LED	Relay
Normal Standby	Silent	Flash every 40 seconds	Open
Silence State	Beep every 40 seconds	Flash every 40 seconds	Open
Local Alarm	Temporal Tone	Flash rapidly	Closed after 8 seconds
SIGSND Signal Received	Temporal Tone	Off	Open
SIGRLY Signal Received	Temporal Tone	Off	Closed after 8 seconds
Failed cham-ber test	Beep every 40 seconds	Flash every 10 seconds	Open

The smoke alarm will automatically return from Alarm to Normal state when the reason for alarm, as the presence of smoke, is completely removed.
As the fire is very dangerous for your family, usually you must draw a family escape plan including a map which shows all your home windows and doors, less than two escape routs, a safe meeting place and other required things in your area.
Furthermore your family members should practice the escape plan at least twice a year.

Cleaning and Maintenance
DANGER: Electrical Shock Hazard. Turn off power to the smoke alarm at the main service panel before cleaning the smoke alarm.
This smoke alarm has been designed to be as maintenance-free as possible. However, regular testing (see “Testing” above) and periodic maintenance are necessary.
To clean the smoke alarm, turn off power and vacuum the outside of the smoke alarm with the soft brush attachment of a vacuum cleaner. Do this at least once every year, preferably every six months. **DO NOT ATTEMPT TO CLEAN THE SMOKE ALARM IN ANY OTHER WAY.**
If the smoke alarm requires service, do not attempt to service it yourself ; this will void your warranty. Return the smoke alarm to your local System Sensor distributor or agent. Enclose a note describing what is wrong with the smoke alarm.

Special Note Regarding Smoke Alarm Guards
Smoke alarms are not to be used with alarm guards unless the combination has been evaluated and found suitable for that purpose.

Please refer to insert for the Limitations of Fire Alarm Systems

INSTALLATION AND MAINTENANCE INSTRUCTIONS

2012JA Photoelectric Smoke Alarm with **Integral Temporal** Tone Sounder

SYSTEM SENSOR®
6581 Kitimat Rd., Unit #6, Mississauga, Ontario, L5N 3T5
1-800-SENSOR2, FAX: 905-812-0771
www.systemsensor.ca

Specifications:

Supply Voltage Range:	10VDC~30VDC
Max. Standby Current:	60µA
Max. Alarm Current:	65mA
P-Horn Sound Output Level:	85dBA at 3m
Max. Interconnected Units:	12
Silence Timeout Period:	8 minutes
Silence Mode Indication:	Sounder Beeps and LED Flashes Green once every 40 secs.
Height:	55mm
Diameter:	135mm
Weight:	180g
Operating Temperature Range	0° to 50°
Humidity:	5% to 93% R.H.

Smoke Alarm Description

Smoke alarms are designed to provide early warning of developing fires at a reasonable cost. They monitor the air and can sense smoke, providing precious minutes for you and your family to escape before a fire spreads.
Early warning fire detection is best achieved by the installation of fire detection equipment in all rooms and areas of the household.
Model 2012JA is a photoelectric smoke alarm designed for open area protection in a residential building. It has a built-in relay which may be used to activate auxiliary devices such as bells, horns, and door closers. The relay contacts automatically close 8 seconds after the unit goes into alarm, and automatically resets approximately 5 seconds after the alarm stops. A piezoelectric horn in each smoke alarm produces an audible 85dBA temporal tone evacuation signal when the unit alarms or an interconnected one alarms. This temporal tone evacuation signal complies with CAN/ULC-S531-02.
The signal consists of 3 beeps each 0.5 seconds long. spaced 0.5 seconds apart, followed by 1.5 seconds of silence. These smoke alarms can be interconnected with the SIGSND and GND terminals for a system of up to 12 units per premises so when one smoke alarm sounds its evacuation signal it causes the other connected smoke alarms to sound as well. They also can be interconnected with the SIGRLY and GND terminals, when any one alarms, all the interconnected units' relays will be activated approximately 8 seconds after their horns sound. The smoke alarm has a built-in silence/test push button to silence or test. If the silence/test button is pushed for less than 3 seconds, this is a silence instruction, the smoke alarm will reduce its sensitivity and give an audible trouble signal for about 8 minutes. If the silence/test button is pushed and held for more than 3 seconds, this is a test instruction (See “Testing” below for more detailed instructions.).
NOTE: If the smoke alarm is not in alarm but beeps and flashes every 40 seconds, it is in the silence state. To exit this silence state when the unit is not in alarm, press and hold the silence/test button for more than 3 seconds to do a test.

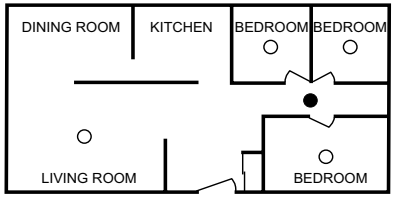
Smoke Alarm Power Requirements

Power input rating to the smoke alarm is 12/24VDC@0.065 amp. Power supply and smoke-alarm installation must conform to the electrical codes in your area and CAN/ULC S553. It is recommended that wiring be performed by a licensed electrician.

Smoke alarm Limitations
- This smoke alarm is designed for residential use only. This smoke alarm is self-restoring and does not lock into an alarm condition.
- Smoke alarms will not sense a fire if the smoke does not reach the sensor. In order for a smoke alarm to sense smoke, it must be installed in the immediate vicinity of the fire. In addition, smoke from fires in chimneys, in walls, on roofs, in remote parts of the building, or on another level from where the smoke alarm is located, may not reach the smoke alarm quickly enough for occupants to escape unharmed. For this reason, the installer shall install smoke alarms on every level, in every sleeping area, and in every bedroom of the household.
- Smoke alarms may not be heard. The alarm horn in this smoke alarm meets or exceeds current Underwriter's Laboratories standards. However, if the smoke alarm is not located in the same room as the occupant, or if it is blocked by a closed door or normal noise, the alarm horn may not be heard. In addition, sound sleepers, or persons who are under the influence of drugs or alcohol may not hear the alarm or be able to react to it. Therefore, locate this smoke alarm, which has a sounder rated at 85dBA at 3 meters, on every level, in every sleeping area, and in every bedroom of the household.
- In general, smoke alarms may not always warn you about fires caused by carelessness and safety hazards like smoking in bed, violent explosions, escaping gas, improper storage of flammable materials, overloaded electrical circuits, children playing with matches, or arson.
- Smoke alarms are not fool-proof. Like all electronic devices, smoke-alarms have limitations. No type of smoke-alarm can sense every kind of fire every time. In addition, smoke from slow, smoldering fires rises slowly and may not reach the smoke alarm until actual flame breaks out. This type of smoke may not reach the smoke alarm in time for occupants to escape unharmed. Smoke alarms are not a substitute for life or property insurance. Though smoke alarms have been responsible for saving many lives, they are not warranted or implied to protect lives or property in the event of a fire.
- To keep your equipment in excellent working order, ongoing maintenance is required per the manufacturer's recommendations and ULC, a preventative maintenance agreement should be arranged through the local manufacturer's representative.Though smoke alarms are designed for long life, they may fail at any time. Therefore, smoke alarms shall be replaced after being in service for 10 years. Any smoke alarm, fire alarm equipment, or any component of that system which fails shall be repaired or replaced as soon as possible.

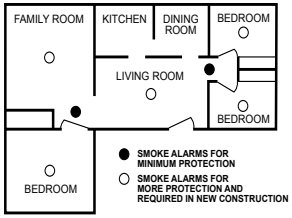
Where to Install Smoke Alarms
Warning: As a minimum requirement, smoke alarms must be installed in accordance with CAN/ULC-S553. In addition, observe all local and national building and electrical codes.

Proper Smoke Alarm Location:
Figure 1: Recommended smoke alarm protection for single-floor residence with only one sleeping area



● SMOKE ALARMS FOR MINIMUM PROTECTION
○ SMOKE ALARMS FOR MORE PROTECTION AND REQUIRED IN NEW CONSTRUCTION

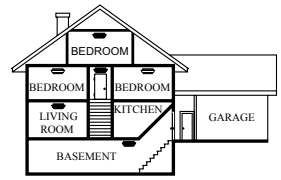
Figure 2: Recommended smoke alarm protection for single-floor residence with more than one sleeping area:



NFPA 72, Chapter 2, Section 2-2.1.1.1 states as follows: “Smoke alarms shall be installed outside of each separate sleeping area in the immediate vicinity of the bedrooms and on each additional story of the family living unit, including basements and excluding crawl spaces and unfinished attics. In new construction, a smoke-alarm also shall be installed in each sleeping room.”
The above NFPA standard is a minimum requirement for smoke alarm installation. For better protection, we also require the installation of a smoke alarm inside every bedroom in existing construction.

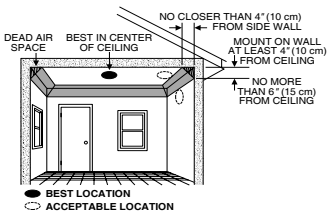
- Install a minimum of two smoke alarms in any household, no matter how small it is.
- Put a smoke alarm in the hallway outside of every separate bedroom area. (See Figure 1.) A minimum of two smoke alarms are required in homes with two bedroom areas. (See Figure 2.)
- Put a smoke alarm on every level of a multi-level residence. (See Figure 3.)
- Install basement smoke alarms on the ceiling at the bottom of the basement stairwell. (See Figure 3.)

Figure 3: Recommended smoke alarm protection for a multi-level residence:



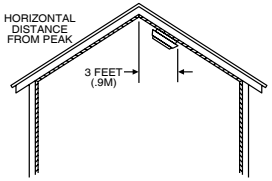
- Install smoke alarms on the ceiling as close to the center of the room as possible. If this is not practical, install it on the ceiling no closer than 4 inches (10 cm) from any wall or corner. (See Figure 4.)
- If wall-mounting is permitted by local and state codes, and ceiling mounting is not practical, install smoke alarms on an inside wall between 4 and 6 inches (10 and 15 cm) from the ceiling. (See Figure 4.)

Figure 4: Recommended smoke alarm mounting locations:



- Put smoke alarms at both ends of a bedroom hallway if the hallway is more than 30 feet (9 meters) long. In addition, large rooms will require more than a single unit if the room is over 900 square feet.
- Rooms or areas that do not have smooth ceilings, or which have short, transom-type walls coming down from the ceiling require additional smoke alarms.
- Install second-floor smoke alarms on the ceiling at the top of the first-to-second floor stairwell. Be sure no door or other obstruction blocks the path of smoke to the unit.
- In rooms with sloped, peaked, or gabled ceilings, install smoke alarms 3 feet (0.9 meter) measured down on the slant from the highest point of the ceiling. See Figure 5.

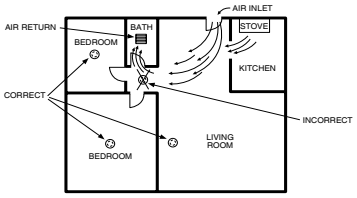
Figure 5: Recommended smoke alarm location in rooms with sloped, gabled or peaked ceilings:



Where Smoke Alarms Should NOT Be Installed

- In or near areas where combustion particles are normally present such as kitchens; in garages where there are particles of combustion in vehicle exhausts; near furnaces, hot water heaters, or gas space heaters. Install smoke alarms at least 20 feet (6 meters) away from kitchens and other areas where combustion particles are normally present.
- On the ceiling in rooms next to kitchens where there is no transom between the kitchen and these rooms. Instead, install the smoke alarm on an inside wall, furthest from the kitchen (See Figure 6). Be sure not to install smoke alarms within 4" of the ceiling or any corner or more than 6" from the ceiling.

Figure 6: Recommended smoke alarm locations to avoid air streams with combustion particles:



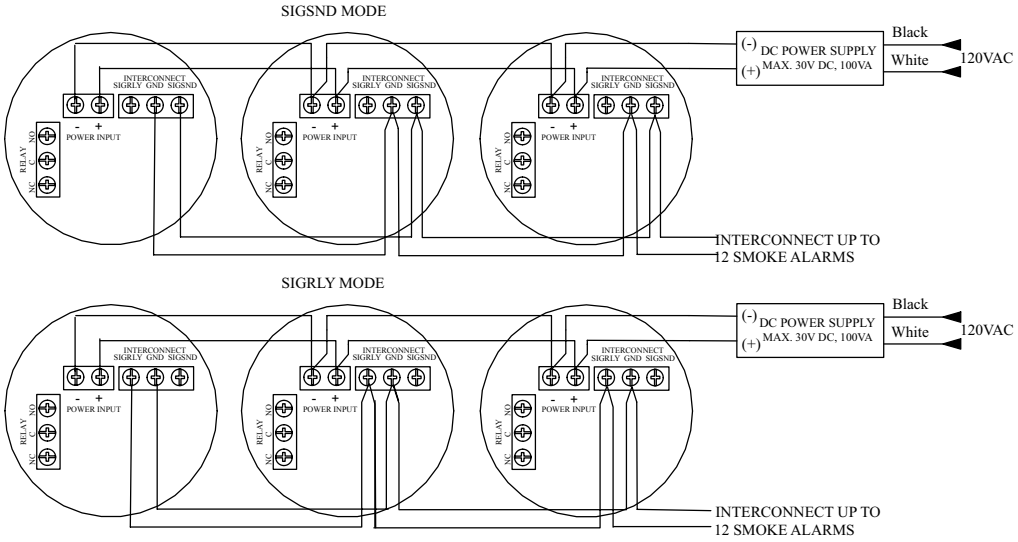
- In damp or very humid areas, or next to bathrooms with showers. The moisture in humid air can enter the sensing chamber as water vapor, then cool and condense into droplets that cause a nuisance alarm. Install smoke alarms at least 5 feet (1.5 meters) away from bathrooms.
- In very cold or very hot rooms or areas. Operating temperature of the smoke alarm is 40°F to 100°F (4°C to 38°C).
- In dusty, dirty, or insect-infested areas. Dust and dirt can build up on the unit’s sensing chamber and make it overly sensitive, or can block openings to the sensing chamber and keep the unit from sensing smoke.
- Near fresh air inlets or returns or excessively drafty areas. Air conditioners, heaters, fans, and fresh air intakes and returns can drive smoke away from smoke alarms, making the units less effective.
- In dead air spaces at the top of a peaked ceiling or wall/ceiling intersect. Dead air may prevent smoke from reaching a unit.
- Near fluorescent light fixtures. Install smoke alarms at least 10 feet (3 meters) away from such light fixtures.

Installation Requirements

Warning: Electrical Shock Hazard. Turn off power at the main fuse box or circuit breaker to the area of unit installation before beginning installation procedures.

- Mount unit to a 4-inch octagonal junction box only. Mount the 12 Volt D.C. power supply to a 4" square junction box 2-1/8" deep only. (If necessary, add an extension ring if the selected box does not have adequate volume.) The power supply may be mounted remotely from the unit.
- All wiring must be performed by a licensed electrician and installed in compliance with the Canadian Electrical Code, applicable local codes, and any special requirements of the local authority having jurisdiction.
- Use only the specified wire gauge. Maximum interconnect bus length is 5,000 feet, #14 – 22 AWG cable.
- The smoke alarm includes a tamper-resist feature that, when activated, requires a tool for smoke alarm removal. The following smoke alarm installation instructions include how to activate this feature instructions include how to activate this feature.

Figure 7:



Maximum power bus length in feet, given number of units (maximum per bus) and wire gauge(AWG)
Supply Voltage = 12VDC

Wire Gauge	1 Unit	2 Units	3 Units	4 Units	5 Units	6 Units	7 Units	8 Units	9 Units	10 Units	11 Units	12 Units
14	13587	6795	4529	3397	2718	2266	1941	1699	1510	1358	1234	1134
16	8505	4254	2835	2126	1701	1419	1216	1064	945	852	772	705
18	5360	2679	1787	1339	1071	894	765	670	595	537	488	443
20	3383	1692	1127	847	677	565	483	422	376	338	308	282
22	2114	1057	705	527	422	352	301	264	236	212	191	175

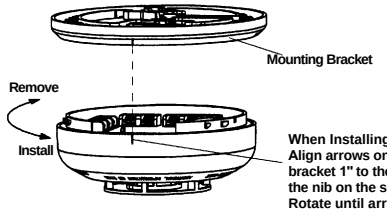
For 24VDC supply voltage, the maximum power bus length is 4 times as long as 12VDC supply voltage.
Maximum interconnect bus length: 5000 FT, No. 14-22AWG cable

All wiring must conform to local electrical codes.

Installation Instructions

1. Turn off power at main service panel.
2. Using wire connectors, attach either **black** wire from power supply to **black AC** power wire. Attach other **black** wire from power supply to **white AC** neutral wire.
3. Using wire connectors, connect **red** and **gray** power supply output wires to the bus line wires supplying power to the remote smoke alarms. (See Figure 7.) Use color-coded bus wires.
4. Mount power supply to junction box and cover junction box with a 4" square box cover, using box mounting screws.
5. Install a junction box where you plan to install the unit. (See type and size for junction box above.)
6. Install bus line wires from power supply output to junction box. Use #14-18 AWG wire only. See Figure 7 to determine maximum power bus length for wire size and number of interconnected smoke alarms.
7. Connect color-coded DC power bus wires to power input screw terminals, located on unit back. If smoke alarms will be interconnected or the relay used, see following sections for specific installation instructions.
8. Remove unit from mounting bracket by turning the unit counter-clockwise and pulling the unit away from the bracket.
9. Remove small tab on mounting bracket to activate tamper-resist feature, if desired. (To release a unit with this feature, push up on locking tab with screwdriver while turning unit counterclockwise.)
10. Install mounting bracket to junction box.
11. Connect power wires to unit(s) as shown in Figure 7. Be sure to tighten each terminal screw to secure wire in place. Tug wire to be sure it is connected properly.
12. Attach smoke alarm to mounting bracket by aligning arrows on side of mounting bracket 1-inch to the right of the nib on the unit. Rotate until the arrow and nib line up. (See Figure 8).

Figure 8:



13. After installing all smoke alarms, turn on power at the main service panel.
14. Check for the green LED to flash about once every 30 to 40 seconds. This means the unit is receiving power. Check all smoke alarms.

Note: If the LED does not flash, power is not getting to the smoke alarm. Check wiring. If LED still does not flash, return the smoke alarm to the manufacturer for repair.

15. Test each unit in the system. (See “Testing” below for more detailed instructions.)