

MCT-423

Supervised Wireless PowerCode Smoke Detector



Installation Instructions

1. INSTALLATION SUMMARY

1.1 Disassembly

A. Separate the unit from its mounting bracket as shown in Figure 1.

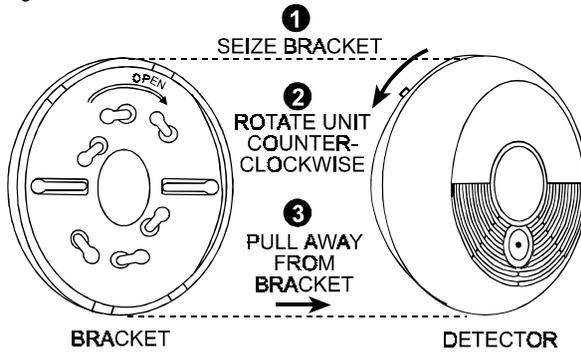


Figure 1. Separating the MCT-423 from its Bracket

B. Open the MCT-423 by pulling the cover away from the base at the point indicated by "OPEN HERE" in Figure 2.

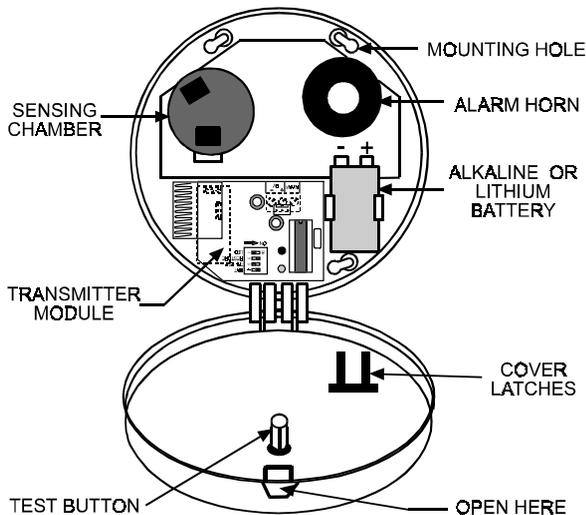


Figure 2. MCT-423 with Cover Swung Open

1.2 Setting the Function Switch

The MCT-423 has a 4-position DIP switch function selector (see Figure 3). The switch levers are numbered 1 to 4, and each switch allows you to select one of two options.

Open the cover and set the function switches as desired. The ON position is indicated by the arrow near the switch body.

Table 1. Function selector settings

Sw-	Marking	Pos.	Selected Option	Default
SW-1	LED	ON	LED will light upon transmission	ON
		OFF	LED is disabled	
SW-2	RESTORE	ON	"Restore" events reported	ON
		OFF	"Restore" events not reported	
SW-3	TR-REP	ON	Alarm reported every 3 min.	OFF
		OFF	Alarm reported only once	
SW-4	BAT	ON	Lithium battery is being used	OFF
		OFF	Alkaline battery is being used	

Note: Transmissions initiated by "tamper" events will be repeated once every 3 minutes, regardless of SW-3 setting.

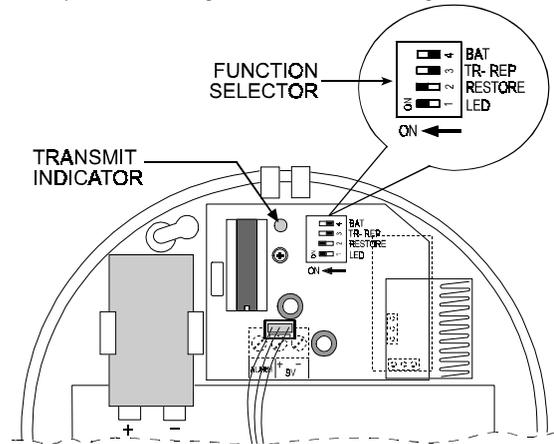


Figure 3. Transmit Indicator and Function Switch

1.3 Battery Connection and Initial Test

CAUTION: The MCT-423 comes with cover latches that will prevent the cover from closing if there is no battery inside.

The smoke detector is supplied with a 9V alkaline battery seated within its holder but insulated from the battery terminals.

- Pull the battery out and peel off the insulating material to expose the terminals.
- Match the battery terminals with the flexible contacts on the detector PCB. Be sure to get the polarity right. **If you reverse the [+] and [-], the battery will discharge completely within a very short time through the built in protection diode!**
- When the terminals are properly matched, push the battery firmly in until it is seated tightly within the holder.

Note: When the battery first makes contact with the detector, the alarm horn may sound for one second. This indicates that the battery is positioned properly.

- Close the cover, then press the test button for about 5 seconds until the horn sounds two sequences of a loud 3-beep alarm. This means that the smoke detection section is working properly.

1.4 Resetting the Transmitter Module and Enrolling its PowerCode ID

A tamper protection switch is mounted on the transmitter board. The tamper actuator, extending through a hole in the base (see Figure 4), is pressed against the bracket when the unit is attached to the bracket.

Removal of the unit from the bracket will cause the switch contacts to open, creating a tamper event, which will be reported by the transmitter to the control panel.

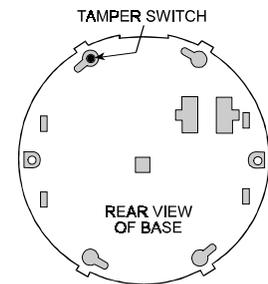


Figure 4. Tamper Switch

Besides its tamper protection role, the tamper switch is used to reset the transmitter at power up - this is important for proper function of the unit.

To reset the transmitter and enroll its ID in the control panel's memory, proceed as follows:

- A. Close the cover and turn the unit over, so that you can see the back of the base.
- B. Press the tamper switch once and release it. This will perform the reset necessary for smooth transmitter power-up.
- C. Refer to the control panel's installation instructions and follow the procedure given there for enrolling transmitter IDs. When required to initiate a transmission for enrollment, press the smoke detector's test button until the built-in horn sounds.

Note: It is much easier to carry out this operation while holding the MCT-423 in your hand, close to the control panel.

1.5 Mounting the Bracket in Place

Read Section 4 in this manual first, then decide where to install a detector. Refer to Figures 5 and 6 and proceed as follows:

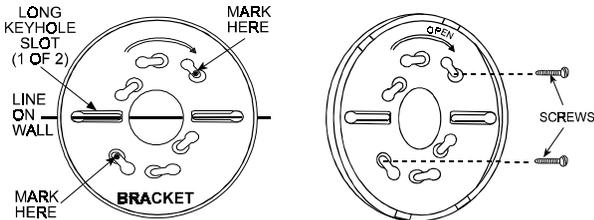


Figure 5. Aligning the Bracket **Figure 6.** Mounting the Bracket

- A. At the chosen location, draw a 15 cm (6") long horizontal line.
- B. Press the bracket against the mounting surface, aligning the two longest keyhole slots with the line drawn in Step A. Mark the drilling spots through two opposite keyhole slots.
- C. Drill two 5 mm (3/16") holes at the marked spots.
- D. Attach the bracket to the wall, using the two screws and plastic wall anchors (supplied).

1.6 Final Assembly and Test

- A. Before attaching the detector unit to the bracket, it is a good practice to secure the cover to the base with two screws (supplied with the unit) through the holes shown in Figure 7. This will prevent unauthorized opening of the cover.

Note: Unauthorized removal of the unit from the bracket will initiate a tamper alert!

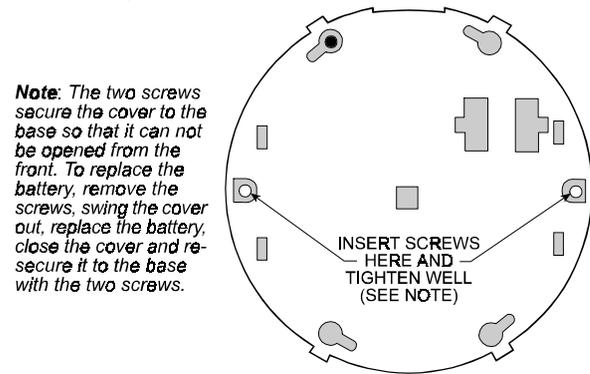


Figure 7. Securing the Cover to the Base

- B. Press the test button until the built-in horn sounds. Verify that the transmitted signal has been received at the control panel, and that the control panel responds accordingly by activating the fire alarm siren or any other warning device.
- C. Attach the detector to the bracket as shown in Figure 8. Pull outward to make sure that the detector is securely attached to the bracket.

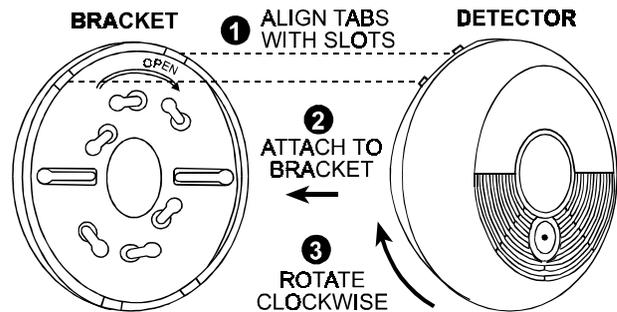


Figure 8. Final Assembly

2. DESCRIPTION AND APPLICATIONS

The MCT-423 is photoelectric smoke detector designed to sense smoke, but not gas, heat or flame and fitted with a PowerCode-type UHF transmitter. It provides early warning of developing fire by sounding an alarm with its built-in alarm horn, and by transmitting a coded alarm signal to a PowerCode receiver or to a compatible wireless alarm control panel.

It must be borne in mind, though, that effective pre-warning of fire accidents is only possible if the detector is located, installed and maintained properly as described in this manual.

WARNING: This smoke detector is designed for use in a single residential unit only, which means that it should be used inside a single family home or apartment. It is not meant to be used in lobbies, hallways, basements or another apartment in multi-family buildings, unless there are already working detectors in each family unit. Smoke detectors, placed in common areas outside the individual living unit, such as on porches or in hallways, may not provide early warning to residents. In multi-family buildings, each family living unit should set up its own detector.

WARNING: This detector is not meant to be used in non-residential buildings. Warehouses, industrial or commercial buildings and special purpose non-residential buildings require special fire detection and alarm systems. This detector alone is not a suitable substitute for complete fire detection systems for places where many people live or work, such as hotels or motels. The same is true of dormitories, hospitals, nursing homes or group homes of any kind, even if they were once single family homes. Please refer to NFPA 101, the Life Safety Code, NFPA71, 72A, 72B, 72C, 72D and 72E for smoke detector requirements for fire protection in buildings not defined as "households".

WARNING: This detector, if used as a stand-alone unit, will not alert people who are hard of hearing.

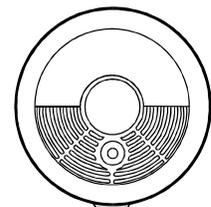


Figure 9. General View

3. SPECIFICATIONS

SMOKE DETECTOR

Detection Sensitivity: 2.3 ± 1.2 %/ft.

Alarm Sound Level: 85 dB at 3 m (10 feet)

Activity Indicator: LED in test button flashes once per 45 sec.

Audible Low Battery Warning: Built in horn beeps once a minute for up to 30 days when the battery voltage drops.

TRANSMITTER AND CODING

Operating Frequency (MHz): 315, 418, 433.92, 868 or other frequencies according to local requirements.

Transmitter's ID Code: 24-bit digital word, over 16 million combinations, pulse width modulation.

Overall Message Length: 36 bits

Message Repetition: Repetitive transmission (once every 3 minutes) or one-shot, as selected with on-board DIP switch.

Supervision: Automatic signaling at 60-minute intervals.

Tamper Alerts: Tamper event (removal of the unit from its bracket) is reported every 3 minutes, until the tamper switch is restored.

Transmission Indicator: Red LED lights upon transmission (visible only when the cover is open and Switch SW-4 set to ON).

ELECTRICAL DATA

Power Source: 9 Volt alkaline or lithium.

Current Drain: 28 μ A standby, 20 mA in operation

Battery Life: At least one year

Battery Supervision: Automatic transmission of battery status data as part of any transmitted message.

PHYSICAL DATA

Operating Temperature: 4.4°C to 37.8°C (40°F to 100°F).

Relative Humidity: 10% to 85%

Dimensions: 140 mm (5.5") x 45 mm (1.75")

Weight (including battery): 256 g (9 oz)

4. SMOKE DETECTOR INSTALLATION OVERVIEW

4.1 Where to Install Smoke Detectors

Smoke detectors should be installed in accordance with the NFPA Standard 74 (National Fire Protection Association, Batterymarch Park, Quincy, MA 02169). For complete coverage in residential units, smoke detectors should be installed in all rooms, halls, storage areas, basements and attics in each family living unit. Minimum coverage is one detector on each floor and one in each sleeping area. Here are a few useful tips for you:

- Install a smoke detector in the hallway outside every separate bedroom area, as in Figure 10. Two detectors are required in homes with two bedroom areas, as in Figure 11.
- Install a smoke detector on every floor of a multi-floor home or apartment, as shown in Figure 12.
- Install a minimum of two detectors in any household.
- Install a smoke detector inside every bedroom.
- Install smoke detectors at both ends of a bedroom hallway if the hallway is more than 12 meters (40 feet) long.

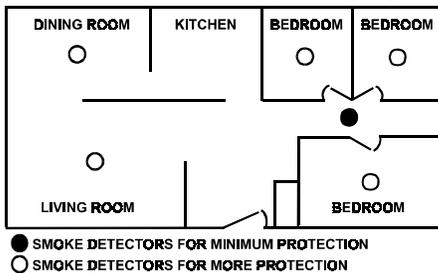


Figure 10. Locations for placing smoke detectors in a single residence with only one sleeping area

- Install a smoke detector inside every room where one sleeps with the door partly or completely closed, since smoke could be blocked by the closed door and a hallway alarm may not wake up the sleeper if the door is closed.

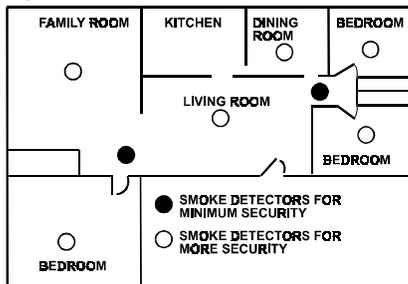


Figure 11. Locations for Placing Smoke Detectors in Single-Floor Residence with More than One Sleeping Area.

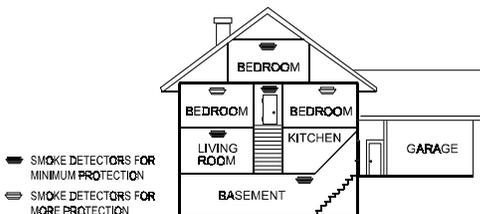


Figure 12. Placing Smoke Detectors in a Multi-Floor Residence

- Install basement detectors at the bottom of the basement stairwell.
- Install second-floor detectors at the top of the first-to-second floor stairwell.
- Be sure no door or other obstruction blocks the path of smoke to the detector.
- Install additional detectors in your living room, dining room, family room, attic, utility and storage rooms.
- Install smoke detectors as close to the center of the ceiling as possible. If this is not practical, put the detector on the ceiling, at least 10 cm (4 inches) away from any wall or corner, as shown in Figure 13.
- If ceiling mounting is not possible and wall mounting is permitted by your local and state codes, put wall-mounted detectors between 10 - 15 cm (4 - 6 inches) from the ceiling, also see Figure 13.
- If some of your rooms have sloped, peaked, or gabled ceilings, try to mount detectors 0.9 meter (3 feet) measured horizontally from the highest point of the ceiling as shown in Figure 14.

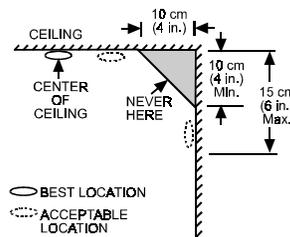


Figure 13. Recommended Best and Acceptable Locations to Mount Smoke Detectors

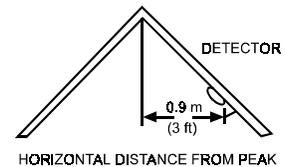


Figure 14. Recommended Location to Mount Smoke Detectors in Rooms with Sloped, Gabled or Peaked Ceiling



CAUTION (As required by the California State Fire Marshall)

"Early warning fire detection is best achieved by the installation of fire detection equipment in all rooms and areas of the household as follows:

- (1) A smoke detector installed in each separate sleeping area (in the vicinity, but outside the bedrooms), and
- (2) Heat or smoke detectors in the living rooms, dining rooms, bedrooms, kitchens, hallways, attics, furnace rooms, closets, utility and storage rooms, basements and attached garages."

For your information, NFPA Standard 74, Section 2-4 reads as follows:

"2-4.1.1 Smoke detectors shall be installed outside 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.

The provisions of 2-4.1.1 represent the minimum number of detectors required by this standard. It is recommended that the householder consider the use of additional smoke detectors for increased protection for those areas separated by a door from the areas protected by the required smoke detectors under 2-4.1.1 above. The recommended additional areas are living room, dining room, bedroom(s), kitchen, attic (finished or unfinished), furnace rooms, utility room, basement, integral or attached garage, and hallways not included in 2-4.1.1 above. However, the use of additional detectors remains the option of the householder." We

recommend complete coverage and use of additional smoke detectors.

4.2 Where to Install Smoke Detectors in Mobile Homes and RVs

Mobile homes and RVs built after about 1978 were designed and insulated to be energy-efficient. In mobile homes and RVs built after 1978, smoke detectors should be installed as described above. Older mobile homes and RVs may have little or no insulation compared to current standards. Outside walls and roofs are often made of non-insulated metal, which can transfer thermal energy flow from outdoors. This makes the air right next to them hotter or colder than the rest of the inside air. These layers of hotter or colder air can keep smoke from reaching a smoke detector. Therefore, install smoke detectors in such units only on inside walls. Place them 10 ~ 15 cm (4 to 6 inches) from the ceiling. If you are not sure how much insulation is in your mobile home or RV, then install the detector on an inside wall. If the walls or ceiling are unusually hot or cold, then install the detector on an inside wall. Install one detector as close to the sleeping area as possible for minimum security, or install one detector in each room for more security. Before you install any detector, please read the following section on "Where Not to Install Smoke Detectors."

4.3 Where Not to Install Smoke Detectors

False alarms occur when smoke detectors are installed where they will not work properly. To avoid false alarms, do not install smoke detectors in the following situations:

- Combustion particles are by-products of something burning. Do not install smoke detectors in or near areas where combustion particles are present, such as kitchens with few windows or poor ventilation, garages where there may be vehicle exhaust, near furnaces, hot water heaters and space heaters.
- Do not install smoke detectors less than 6 meters (20 feet) away from places where combustion particles are normally present, like kitchens. If a 20-foot distance is not possible, e.g. in a mobile home, try to install the detector as far away from the combustion particles as possible, preferably on the wall. To prevent false alarms, provide good ventilation in such places.

IMPORTANT: Never try to avoid false alarms by disabling the detector.

- Do not mount smoke detectors in the path of fresh air intake. The flow of fresh air in and out can drive smoke away from the smoke detector; thus reducing its efficiency. Figure 15 indicates the correct and incorrect locations concerning this problem.
- In damp or very humid areas or near bathrooms with showers. Moisture in humid air can enter the sensing chamber, then

turns into droplets upon cooling, which can cause nuisance alarms. Install smoke detectors at least 3 meters (10 feet) away from bathrooms.

- In very cold or very hot areas, including unheated buildings or outdoor rooms. If the temperature goes above or below the operating range of smoke detector, it will not work properly. The temperature range for your smoke detector is 4°C to 38°C (40°F to 100°F).
- In very dusty or dirty areas, dirt and dust can build up on the detector's sensing chamber, to make it overly sensitive. Additionally, dust or dirt can block openings to the sensing chamber and keep the detector from sensing smoke.
- Near fresh air vents or very drafty areas like air conditioners, heaters or fans. Fresh air vents and drafts can drive smoke away from smoke detectors.
- Dead air spaces are often at the top of a peaked roof, or in the corners between ceilings and walls. Dead air may prevent smoke from reaching a detector. See Figures 13 and 14 for recommended mounting locations.
- In insect-infested areas. If insects enter a detector's sensing chamber, they may cause a nuisance alarm. Where bugs are a problem, get rid of them before putting up a detector.
- Near fluorescent lights, electrical "noise" from fluorescent lights may cause nuisance alarms. Install smoke detectors at least 1.5 meters (5 feet) from such lights.

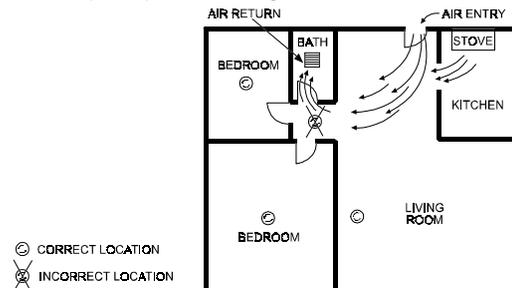


Figure 15. Recommended Smoke Detector Locations to Avoid Air Streams with Combustion Particles

WARNING: Never remove batteries to stop a nuisance alarm. Open a window or fan the air around the detector to get rid of the smoke. The alarm will turn itself off when the smoke is gone. If nuisance alarms persist, attempt to clean the detector as described in this manual.

WARNING: Do not stand close to the detector when the alarm is sounding. The alarm is loud in order to wake you in an emergency. Too much exposure to the horn at close range may be harmful to your hearing.

5. TAKING CARE OF THE MCT-423

5.1 Battery Replacement

The MCT-423 is designed to be as maintenance-free as possible. To keep the smoke detector in good working order, you must test it weekly, as instructed in Para. 6.1 below.

Make sure to test detectors mounted within RVs in storage before each trip, and at least once each week during use.

Make it a rule to replace the detector's battery once a year even if there is no indication that the battery is weak. Also be sure to replace it immediately upon reception of a low battery message via your control panel.

If you disregard this message, an audible reminder in the form of once-per-minute "beep" will sound after a few days. The low-battery "beep" should last at least 30 days before the battery dies out completely.

NOTE: For best performance, use only alkaline or lithium batteries as replacement batteries. Carbon zinc batteries are not acceptable. Alkaline batteries can be purchased at any retail store that sells batteries. The following alkaline 9V batteries are

acceptable for proper operation: Eveready #522, #1222, #216; Duracell #MN1604; or Gold Peak #1604P, #1604S.

Replace the battery as follows:

- Grasp the detector's body with your hands, rotate it slightly counterclockwise and pull it off the wall-mounted bracket.
- Turn the unit over and remove the two screws from behind (see Figure 7).
- Open the cover and remove the old battery. Put the new battery in, paying close attention to correct polarity (see Figures 2 and 3).
- If you are installing a lithium battery, change the position of Switch SW-4 from OFF to ON (see Figure 3 and Table 1).

WARNING! If you reverse the polarity, the unit will not function and the battery will discharge completely through the built-in protection diode!

- Press the tamper switch once and release it (see Figure 4 for switch location). This will perform the reset necessary for smooth transmitter power-up.

- F. Close the cover, re-insert the screws, and test the unit as instructed in Para. 1.6B.
- G. Re-insert the screws, tighten them well and re-mount the unit on the bracket as instructed in Para. 1.6C.

5.2 Cleaning

Open the cover and vacuum the dust off the detector's sensing chamber at least once a year. This can be done when you open the detector to change the battery. Remove the battery before cleaning. Use the soft brush attachment to your vacuum cleaner. Carefully remove any dust on detector components, especially on the openings of the sensing chamber.

Replace the battery after cleaning. Test the detector to make sure that the battery is in correctly. Also make sure there is no foreign matter inside the test button. Insert a toothpick from the back to the front of the test button to remove any dust.

NOTE: *If nuisance alarms keep occurring, check whether the detector's location is adequate (see Para. 4.1 and 4.2). Relocate the unit if it is not located properly. Clean as described above.*

To clean the detector's cover, first open the cover and remove the battery. Hand-wash the cover with cloth dampened with clean water. Dry it with lint-free cloth. Do not get any water on the detector components. Replace the battery, and close the cover. Test detector to make sure that battery works correctly.

6. ADDITIONAL ADVICE

6.1 Routine Testing

The detector should be tested weekly and also whenever you suspect that it does not go into alarm. Push the test button firmly with your finger until the horn sounds (it may take up to 20 seconds). Also verify that the control panel responds to the transmitted fire alarm. If the detector fails, have it repaired or replaced immediately, to ensure that it works properly.

WARNING: **Never use an open flame of any kind to test your detector. You may set fire to damage the detector as well as your home. The built-in test switch accurately tests all detector functions, as required by Underwriters' Laboratories. This is the only correct way to test the unit.**

NOTE: *If the alarm horn produces a loud continuous sound when you are not testing the unit, this means the detector has sensed smoke or combustion particles in the air. Verify that the alarm is a result of a possible serious situation, which requires your immediate attention.*

- The alarm could be caused by a nuisance situation. Cooking smoke or a dusty furnace, sometimes called "friendly fires" can cause the alarm to sound. If this happens, open a window or fan the air away to remove the smoke or dust. The alarm will turn off as soon as the air is completely clear.
- **CAUTION:** *Do not disconnect the battery from the detector. This will remove your protection from fires.*
- If the alarm horn begins to beep once a minute, this signal means that the detector's battery is weak. Install a new battery immediately. Keep fresh batteries on hand for this purpose.

6.2 Tips to Enhance Your Protection From Fires

Putting up smoke detectors is only one step in protecting your family from fires. You must also reduce the chances of fires starting in your home. You must also increase your chances of escaping safely if one does start. To have a good fire safety program you must apply the following tips to enhance your family's protection from fires:

- A. Install smoke detectors properly. Carefully follow all the instructions in this manual. Keep your smoke detectors clean and test them every week.
- B. Remember that detectors that do not work will not alert you. Replace your smoke detectors immediately if they are not working properly.
- C. Follow fire **safety** rules, and prevent hazardous situations:
 - Use smoking materials properly. Never smoke in bed.
 - Keep matches and cigarette lighters away from children.
 - Store flammable materials in proper containers. Never use them near open flame or sparks.
 - Keep electrical appliances in good condition. Do not overload electrical circuits.
 - Keep stoves, fireplaces, chimneys, and barbecue grills grease free. Make sure they are properly installed and away from any combustible materials.
 - Keep portable heaters and open flames such as candles away from combustible materials.

- Do not allow rubbish to accumulate.
- Keep a supply of extra batteries on hand for your battery powered smoke detectors.
- D. Develop a family escape plan and practice it with your entire family. Be sure to include small children in your practice.
 - Draw a floor plan of your home, and find two ways to exit from each room. There should be one way to get out of each bedroom without opening the door.
 - Explain to children what the smoke detector alarm signal means. Teach them that they must be prepared to leave the home by themselves if necessary. Show them how to check to see if doors are hot before opening them. Show them how to stay close to the floor and crawl if necessary. Show them how to use the alternate exit if the door is hot and should not be opened.
 - Decide on a meeting place which has a safe distance from your house. Make sure that all your children understand that they should go and wait for you there if there is a fire.
 - Hold fire drills at least every 6 months, making sure that everyone, even small children, knows what to do to escape safely.
 - Know where to go to call the Fire Department outside your home.
 - Provide emergency equipment, such as fire extinguishers, and teach your family to use this equipment properly.

6.3 More Tips on How to Face a Fire at Home

If you have made an escape plan and practiced it with your family, their chances of escaping safely are increased. Go over the following rules with your children when you have fire drills. This will help everyone remember the rules in a real emergency.

- A. Don't panic and stay calm. Your safe escape may depend on thinking clearly and remembering what you have practiced.
- B. Get out of the house as quickly as possible. Follow a planned escape route. Do not stop to collect anything or to get dressed.
- C. Feel the doors to see if they are hot. If they are not, open them carefully. Do not open a door if it is hot. Use an alternate escape route.
- D. Stay close to the floor. Smoke and hot gases rise.
- E. Cover your nose and mouth with a wet or damp cloth. Take short, shallow breaths.
- F. Keep doors and windows closed. Open them only if you have to in order to escape.
- G. Meet at your planned meeting place after leaving the house.
- H. Call the Fire Department as soon as possible from outside your house. Give the address and your name.
- I. Never go back inside a burning building. Contact your local Fire Department. They will give you more ideas about how to make your home safer from fires and how to plan your family's escape.

The 315 MHz version of this device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) This device must accept any interference received, including interference that may cause undesired operation.

WARNING! *Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment*

The digital circuit of this device 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 residential installations. 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 and television reception. However, there is no guarantee that interference will not occur in a particular installation. If this device does cause such interference, which can be verified by turning the device off and on, the user is encouraged to eliminate the interference by one or more of the following measures:

- Re-orient or re-locate the receiving antenna.
- Increase the distance between the device and the receiver.
- Connect the device to an outlet on a circuit different from the one which supplies power to the receiver.
- Consult the dealer or an experienced radio/TV technician.