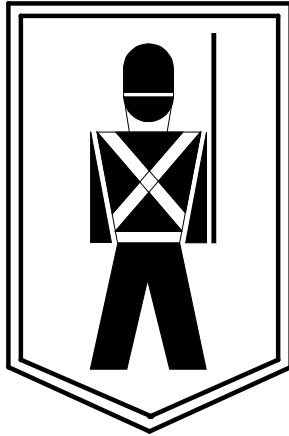


# Heritage MedCall



## **Sentry E-Call Model HM-560B Photoelectric Smoke Detector**

# Heritage MedCall Sentry Emergency Call System Model 560B Smoke Detector Installation and Service Instructions

## PRINCIPLE OF OPERATION

The Model HM-560 Smoke Detector is a conventional 4-wire 12 VDC photoelectric smoke detector. This technology is superior in reliability and performance to less expensive ionization type smoke detectors. A high intensity infrared light emitting diode (LED) light source is pulsed in a sensing chamber that is designed for optimum smoke entry. The light source LED and a photo-diode sensor are positioned in the chamber at angles to each other so that when no smoke is in the chamber, the sensor sees virtually no light.

Light scattered by smoke particles in the chamber is sensed by the photo-diode. When the light reaching the photo-diode reaches a predetermined level, the detector will sound an alarm. Once the smoke has been cleared from the unit, it is reset by pushing the Check-In button on the apartment Host Panel. Because smoke may have to travel some distance from the fire source to the detector, it is important that the photoelectric detector responds best to both open flame and smoldering fires.

The HM-560B Smoke Detector includes automatic sensitivity testing. Once daily and upon power-up the detector performs a full diagnostic test that includes a dynamic test of the sensing chamber and internal electronics. This meets NFPA 72 field sensitivity testing requirements without the need for external meters.

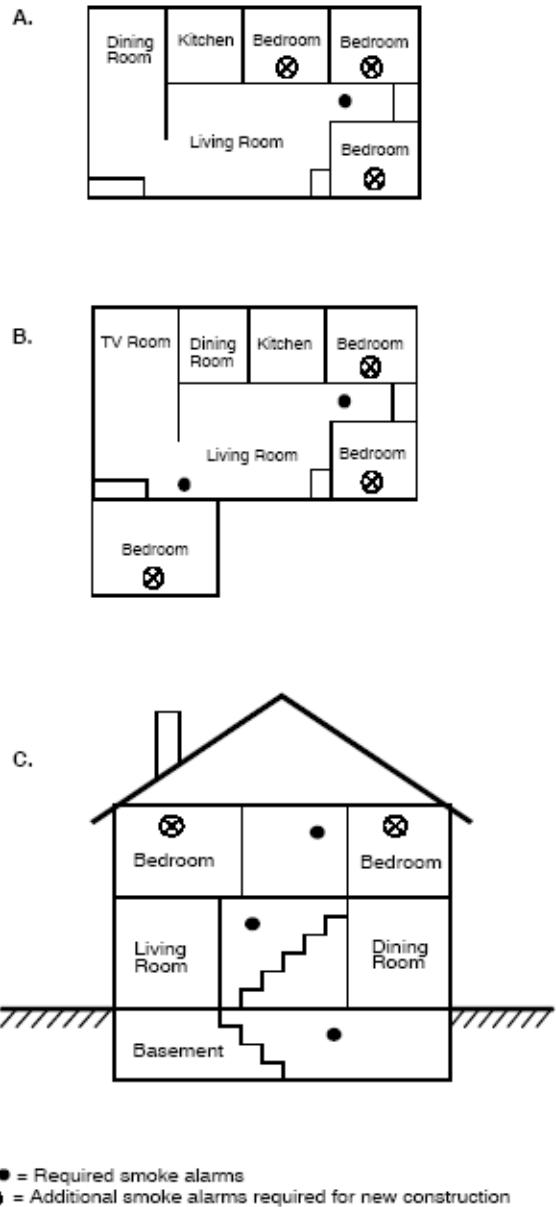
The detector also contains an integral piezoelectric horn which produces an interrupted 85 dBa Temporal 3 tone.

## WHERE TO LOCATE

The smoke alarm should be installed in accordance with National Fire Protection Association (NFPA) Standard 72. Excerpts follow:

### **A-8-1.2.1a Where to Locate the Required Smoke Alarms in Existing Construction**

The major threat from fire in a family living unit occurs at night when everyone is asleep. The principal threat to persons in sleeping areas comes from fires in the remainder of the unit. Therefore, a smoke detector(s) is best located between the bedroom areas and the rest of the unit. In units with only one bedroom area on one floor, the smoke detector(s) should be located as shown in Figure 1A.



**FIGURE 1 DETECTOR LOCATION**

In family living units with more than one bedroom area or with bedrooms on more than one floor, more than one smoke detector is required, as shown in Figure 1B.

In addition to smoke alarms outside of the sleeping areas, the installation of a smoke alarm on each additional story of the family living unit, including the basement, is required. These installations are shown in Figure 1C. The living area smoke alarm should be installed in the living room or near the stairway to the

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upper level, or in both locations. The basement smoke alarm should be installed in close proximity to the stairway leading to the floor above. Where installed on an open-joisted ceiling, the alarm should be placed on the bottom of the joists. The alarm should be positioned relative to the stairway to intercept smoke coming from a fire in the basement before the smoke enters the stairway.

## **Where to Locate the Required Smoke Alarms in Existing Construction**

All of the smoke alarms specified for existing construction are required and, in addition, a smoke alarm is required in each bedroom.

## **Are More Smoke Alarms Desirable?**

The required number of smoke alarms might not provide reliable early warning protection for those areas separated by a door from the areas protected by the required smoke alarms. For this reason, it is recommended that the (designer/installer) consider the use of additional smoke alarms for those areas for increased protection. The additional areas include the basement, bedrooms, dining room, furnace room, utility room, and hallways not protected by the required smoke alarms. The installation of smoke alarms in kitchens, attics (finished or unfinished), or garages is not normally recommended, as these locations occasionally experience conditions that can result in improper operation.

**IMPORTANT!**  
**REGULATIONS PERTAINING TO SMOKE  
DETECTOR INSTALLATIONS VARY FROM STATE  
TO STATE. FOR MORE INFORMATION, CONTACT  
YOUR LOCAL FIRE DEPARTMENT OR LOCAL  
AUTHORITY HAVING JURISDICTION.**

In addition to NFPA 72, use the following location guidelines to optimize performance and reduce the chance of false alarms.

Locate ceiling mounted smoke detectors in the center of a room or hallway at least 4 inches from any walls or partitions.

Locate wall mounted smoke detectors so the top of the alarm is 4 to 12 inches below the ceiling.

When more than one detector is required, spacing of 30 feet may be used as a guide on smooth ceilings. Other spacing may be used depending on ceiling

height, high air movement, and other conditions or response requirements.

Locate in a suitable environment:

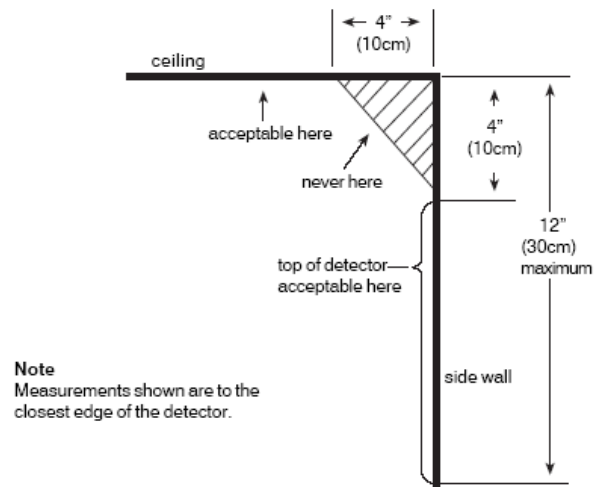
-Temperature between 32°F (0°C) and 100°F (38°C)

-Humidity between 0 and 95% non-condensing

Locate away from air conditioners, heating registers and any other ventilating source that may interfere with smoke entering the detector. Locate away from kitchens, wood stoves, garages, furnaces and bathrooms.

Mount smoke detectors on a firm permanent surface, typically a stud or metal runner.

Additional information on Household Fire Warning is available at nominal cost from: The National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169-7471 or [www.nfpa.org](http://www.nfpa.org). Request the latest Standard No. NFPA 72.



**FIGURE 2 DETECTOR PLACEMENT**

## **PENDANT RECEIVER OPTION**

The Model HM-547 Pendant Receiver is sometimes used in apartment installations to receive a call signal from a handheld wireless pendant. The location of a smoke detector towards the center of the living area within an apartment makes a good location to install

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the receiver. The receiver's 3/4" thick enclosure is designed to fit in the smoke detector electrical box.

Often a facility will purchase a few sets of pendants & receivers to use on a special basis for residents that might be recuperating from surgery. With the possibility of future use, always install 2 or 4 extra conductors to the smoke detector wiring.

## SUPERVISION

Power wiring in four-wire systems is required by NFPA 72 to be supervised. Smoke detectors are supervised by the apartment host panel and the console. Supervision is achieved by using both the End-Of-Line (EOL) resistor (P/N HM-585) and a Smoke Load resistor (P/N HM-568) or by using the End-of-Line Device (HM-569). This type of supervision requires that multiple smoke detectors are wired in a daisy chain, from the host panel to the last detector which includes the EOL and Smoke Load or EOL Device. When the host panel is located in the apartment center, the wire must go to one detector then back towards the host panel and on to the last detector.

**NOTE: Wiring must be installed so when a detector is disconnected for any reason, the end-of-line resistor or device must become disconnected.**

A break in the detector power circuit or contact circuit will cause a trouble annunciation at the Sentry console.

## WIRE REQUIREMENTS

The Sentry smoke detector can be installed in many different arrangements to meet most system requirements. The wiring diagrams illustrate the typical installation methods and shows the recommended minimum number of conductors to use. Sentry recommends to always have an additional 2 or 4 conductors as spare for future options.

Heritage MedCall recommends the following wire or equivalent for installation of the Sentry smoke detectors:

- 6 conductor: West Penn Wire (WPW) # 252
- 8 conductor: WPW # 253

## DUST PROTECTION

System installers should be directed to place the plastic dust cover that comes in the smoke detector carton over the installed detector. This simple step will protect the sensing chamber and screens from the usual dust buildup during construction and painting.

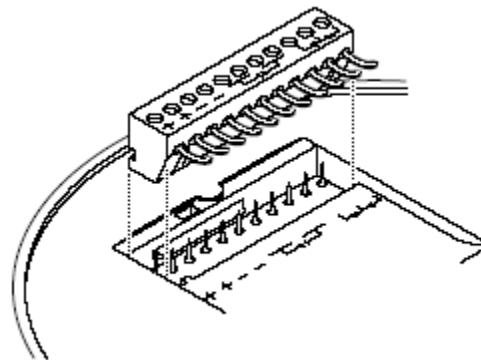


FIGURE 3 PLUG-IN TERMINAL BLOCK

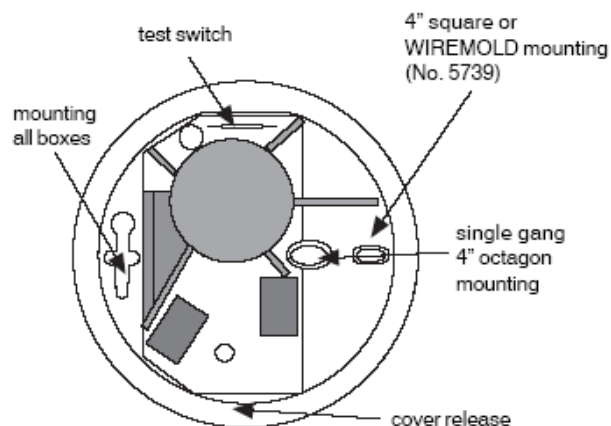


FIGURE 4 DETECTOR MOUNTING

## INSTALLATION

The detectors mount to standard single-gang electrical boxes, four-inch octagonal or four-inch square electrical boxes, or on WIREMOLD No. 5739 fixture boxes. The detectors may also be mounted directly to walls or ceilings where local codes/jurisdictions permit.

1. Pull wire through the electrical box and connect to

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the plug-in terminal block supplied, one wire per terminal. See Figures 3 and 4.

2. Dress wiring neatly and snap the terminal block into the back of the detector.

### NOTE

The detector cover must be closed completely, to support the circuit board, while installing the terminal block.

3. Open the cover and mount the detector, using the mounting holes provided. See Figure 4.

### NOTE

Positive air pressure from wire openings, conduit, mounting boxes, irregular mounting surfaces, or plenums causing air movement through and away from the detector may prevent proper operation. Seal all openings causing unwanted air flow using UL Listed expanding foam or Duxseal.

4. Remove the red plastic dust cover from the detector. The detectors are shipped with a dust cover for protection on construction sites with dusty environments.

## ENERGIZING THE SMOKE ALARM

During system installation the smoke detectors can be preliminarily tested by applying DC power to the apartment's host panel without console operation. Normal operation is indicated by a visible LED on the face of the unit that will flash approximately once every 9 seconds.

## INSTALLATION TEST

After all connections are complete and the wiring is checked for errors, apply power to the system. There should be no alarm. If an alarm is reported, determine if a detector is latched in alarm or if there is a problem with the wiring.

## SMOKE TEST

The units should be tested in place annually using one of the following methods:

- A. Use Smoke! In a can® and follow the directions on the can.
- B. Hold a smoldering punk or cotton wick close to the unit and gently direct the smoke into the smoke entry openings for 20 seconds or until an alarm is indicated.

**Be sure to properly extinguish the smoke source after testing!** This is a go/no go test and is not a reliable indication of detector sensitivity. If it is successful, the LED will remain lit.

To reset the detector, operate the Check-In button on the unit host panel. The control unit alarm and all auxiliary functions should be verified for a complete test of each detector.

## HEAT TEST

The HM-560B Smoke Detectors sample for heat every 3 seconds. Test heat sensors by using a hot air gun. Aim the gun at the heat sensor from 6-10 inches (15-25cm) away. The detector should go into alarm in less than 30 seconds.

## SENSITIVITY TEST

1. Hold the magnet on the hinge side of the unit for more than one second (see Figure 7). The LED will flash 1 to 9 times.
2. Count the number of LED flashes, then use the following table to determine if any action is necessary.

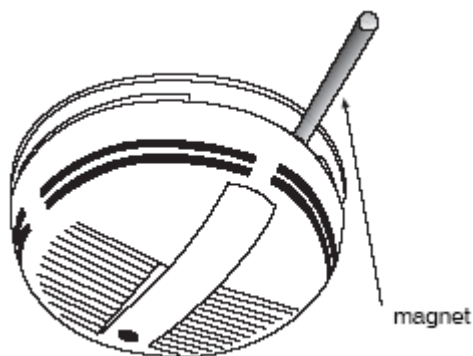
### Flashes

- |     |   |
|-----|---|
| 0-1 | Indication: Unserviceable hardware fault.<br>Action: Reset and rerun sensitivity test. If the error persists, replace unit.                                 |
| 2-3 | Indication: Unit is becoming insensitive.<br>Action: Clean and reset the unit. Rerun sensitivity test. If the error persists, replace the unit.             |
| 4-7 | Indication: Unit is within normal sensitivity range.<br>Action: N/A   |
| 8-9 | Indication: Unit is becoming too sensitive.<br>Action: Verify the optical chamber is snapped down securely. Clean the unit and replace the optical chamber. |

After the sequence of flashes, if the sensitivity is within limits and all other tests pass, the unit goes into alarm until reset by the host panel. If the sensitivity is not within limits, or an unserviceable hardware fault is detected, the alarm LED will continue to flash once per second until the unit is reset by the host panel.

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**FIGURE 5 SENSITIVITY TESTING**

**MAINTENANCE**

The smoke detectors are designed for easy field service and maintenance. If a detector drifts beyond its approved sensitivity range for more than 24 hours, or fails internal diagnostic tests, the unit automatically indicates trouble by flashing its LED every second. This meets field sensitivity testing requirements without the need for external meters.

**NOTE**

Connect to a power supply that will not automatically reset. Since the self-diagnostics only indicate trouble after 27 hours, if the power supply automatically resets the self-diagnostic indication will never be signaled (the smoke detector will still signal alarm correctly).

In accordance with NFPA 72, smoke detector sensitivity should be checked within one year after installation and every alternate year thereafter, in commercial installations, or every three years in residential sites. See *Sensitivity Test*.

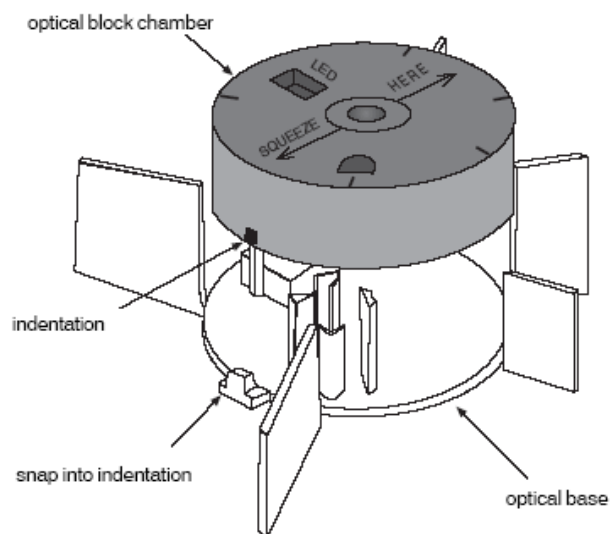
The detector's replaceable optical block chamber unsnaps for easy field cleaning and service. Whenever the status LED indicates cleaning is necessary, follow these steps:

1. Open the detector cover, unsnap and throw away the optical block chamber. See Figure 6.
2. Thoroughly blow off the optical base and snap a new optical block chamber (part #211) back in place.

**NOTE**

Be sure the new optical block chamber is seated all the way down.

3. Close the detector cover and verify sensitivity. See *Sensitivity Test*.



**FIGURE 6 DETECTOR MAINTENANCE**

**OPERATION**

Smoke detectors are powered, monitored, and supervised by the apartment host panel. The host panel is the master call panel for each apartment.

The host panel monitors the detector's contacts and will send an alarm to the console when the detector's relay is energized greater than 20 seconds. This delay is built-in to the host panels' program to provide a "verification" feature often specified on installations.

Host panels are polled by the console every 3.5 seconds, and the host panel must report the smoke alarm on two consecutive poll cycles before the console will announce the smoke condition.

These delays are intentional and will greatly reduce nuisance alarms; however when testing, a delay of up to 49 seconds can be realized before the alarm is announced at the console.

**TANDEM OPERATION - MULTIPLE DETECTORS**

When more than one smoke detector is installed in an apartment, they are connected to all sound when any one detector senses smoke. This connection method is referred to as "tandem" operation.

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## SMOKE DETECTOR TROUBLE

A detector malfunction is displayed on the console screen as "Smoke Trouble". The host panel will send this trouble signal when the circuit to the detector's End-Of-Line resistor or Smoke Load resistor opens.

When the console receives and displays a smoke detector trouble signal, note that the host panel in that apartment is functioning correctly.

When utilizing the Model HM-569 EOL device the module electrically connects a 3300 ohm EOL resistor only when the detector is powered by at least 9 volts. This EOL device will enable the console to sense **Smoke Detector Trouble** if voltage to the last detector is lost or the EOL device is disconnected.

To operate a host panel with a smoke detector and NOT display **Smoke Detector Trouble** on the console screen, the smoke detector must:

1. Have an EOL resistor (HM-568) 3.3K resistor across the alarm contacts.
2. Have a Smoke Load Resistor (HM-585) 1.2K resistor across the power terminals.
3. Use a model HM-569 EOL device in place of 1 and 2 above.

The Model HM-560B Photoelectric smoke detector normally draws 70uA DC. It operates at 9 to 16 volts and is powered by the host panel. When the horn is sounding the current draw is 10mA. Multiple detector installations will have multiples of these currents depending on the number of detectors.

## TROUBLE SHOOTING

When **Smoke Trouble** shows on the screen, the following steps can be taken to quickly diagnose the cause.

**NOTE:** This procedure assumes the host panel is functioning properly and that the apartment number appears only as **Smoke Trouble**.

Go to the apartment. Check for detector operation as described in SMOKE TEST at each detector. Normal Operation will sound the horn after applying smoke for 20 seconds.

**NOTE:** When multiple smoke detectors are present in the apartment, any one detector's alarm will cause the others to sound.

If the smoke detector(s) do not sound, most likely the DC power has become disconnected. Check wiring and check for DC voltage at the detector(s) DC Power screw terminals. The DC voltage must be at least 10 volts.

If the detector has the proper voltage and still does not sound after the smoke test the detector is malfunctioning and must be replaced.

If the detector(s) operate normally, the wiring to the alarm contacts or the EOL device or resistor is most likely the cause. Repair or replace the wiring, the EOL device or resistor.

Remove the positive wire from the + DC Power terminal. Check for DC voltage across the alarm contacts. It should read about 6 volts. Check all detectors in the circuit. When the EOL device or resistor is removed, the DC voltage across the alarm contacts should read 12 volts. If the reading is zero, wiring to the host panel has an open on one of the alarm signal wires. Repair or replace the defective wiring.

## CONSTANT ALARM OR FALSE ALARM

Photoelectric smoke detectors can sometimes false alarm if dirt or dust gets into the sensing chamber. If a detector is in constant alarm, follow the procedures in the MAINTENANCE section. If the alarm does not clear, the detector will need replacement.

## SPECIFICATIONS

Operating temperature ....32°F to 100°F (0°C to 38°C)

Operating humidity range ... 0 to 95% non-condensing

Sounder specifications ..... 85dB at 10 feet

Field wiring size ..... 14-24 AWG

Self-diagnostic indication ..... ttp. 27 hours after reset

Heat detector ..... fixed temp 135°F, 50 foot (15m) spacing rate-of-rise 15°F/min > 105°F (8°C/min > 41°C)

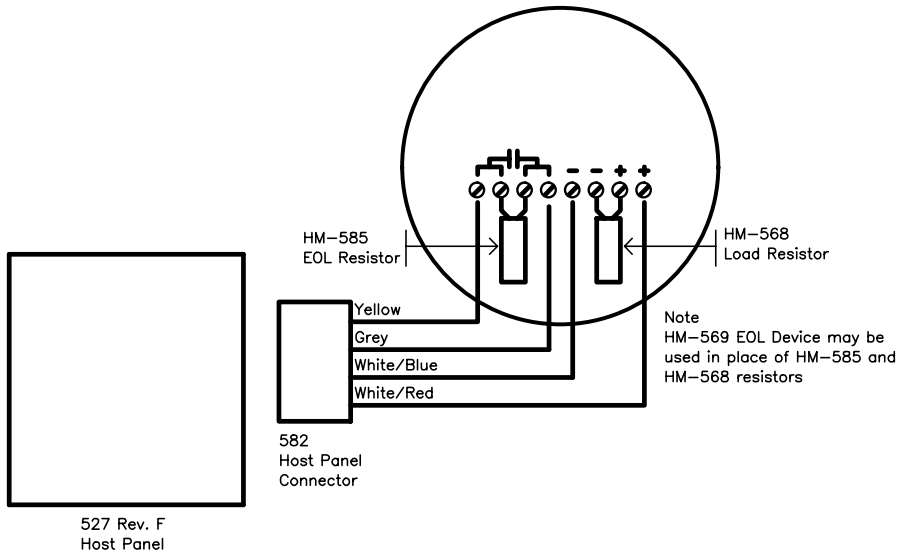
Alarm contacts ..... 500mA @ 36VDC (resistive)

Dimensions .....6.1" (15.5cm) diameter x 1.9" (4.7cm) deep

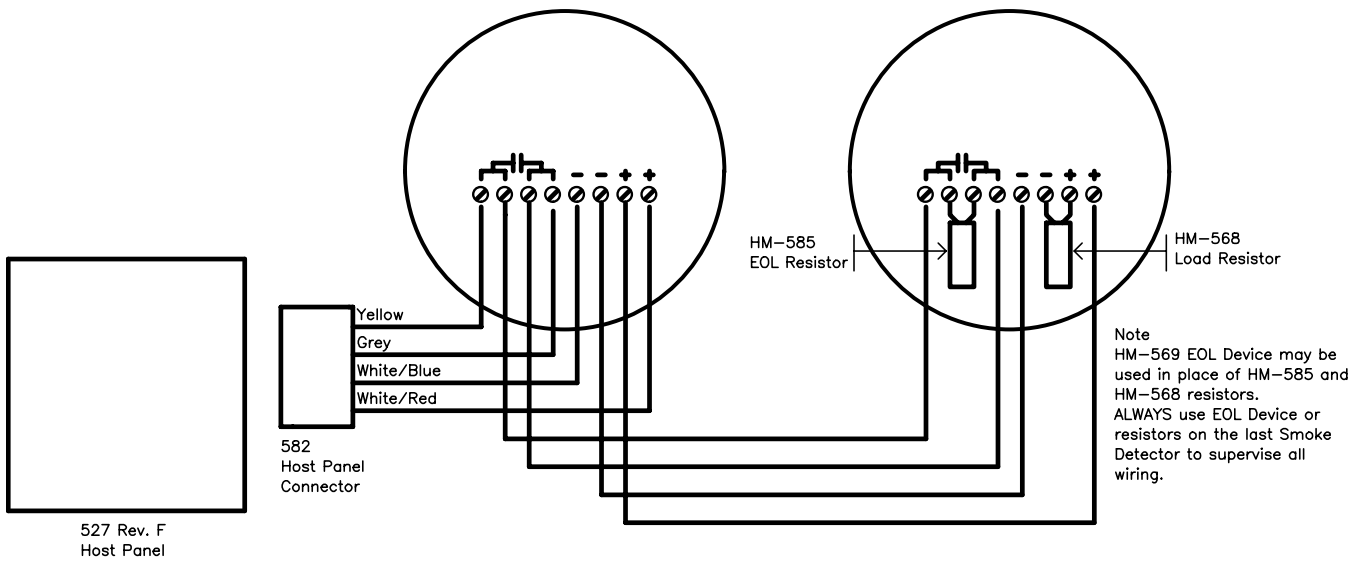
Weight ..... 8.8 oz. (0.25kg)

Color ..... white

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**FIGURE 7 SINGLE SMOKE DETECTOR WIRING**



**FIGURE 8 MULTIPLE SMOKE DETECTOR WIRING**