



# Installation Instructions

Part No. CRSMKDET005A00

## CONTENTS

	Page
<b>SAFETY CONSIDERATIONS</b> .....	1
<b>GENERAL</b> .....	2
<b>INSTALLATION</b> .....	2
<b>Check Package Contents</b> .....	2
<b>Return Air Smoke Detector Installation</b> .....	3
<b>Configuring the SmartVu Controller</b> .....	4
<b>OPERATION</b> .....	5
<b>MAINTENANCE</b> .....	5
<b>Cleaning Procedure</b> .....	5
• AIR FILTERS	
• PHOTO DETECTOR BOARD	
<b>Filter Replacement</b> .....	5
<b>Board Replacement</b> .....	5
• SMOKE DETECTOR BOARD REPLACEMENT	
• POWER BOARD REPLACEMENT	
<b>TROUBLESHOOTING</b> .....	6
<b>Smoke Entry Tests</b> .....	6
• AIRFLOW TEST	
• SMOKE RESPONSE TEST	
<b>Standby, Alarm, and Sensitivity Tests</b> .....	6
• STANDBY AND TROUBLE TEST	
• ALARM TEST	
• SENSITIVITY TEST	

## SAFETY CONSIDERATIONS

Installation of this accessory can be hazardous due to system pressures, electrical components, and equipment location (such as a roof or elevated structure). Only trained, qualified installers and service technicians should install, start-up, and service this equipment.

When installing this accessory, observe precautions in the literature, labels attached to the equipment, and any other safety precautions that apply:

- Follow all safety codes
- Wear safety glasses and work gloves
- Use care in handling and installing this accessory

It is important to recognize safety information. This is the safety-alert symbol: ⚠. When you see this symbol on the unit and in instructions or manuals, be alert to the potential for personal injury.

Understand the signal words DANGER, WARNING, CAUTION, and NOTE. These words are used with the safety-alert symbol. DANGER identifies the most serious hazards which **will** result in severe personal injury or death. WARNING signifies hazards which **could** result in personal injury or death. CAUTION is used to identify unsafe practices, which **may** result in minor

personal injury or product and property damage. NOTE is used to highlight suggestions which **will** result in enhanced installation, reliability, or operation.

### ⚠ CAUTION

The National Fire Protection Association (NFPA) has established that DUCT DETECTORS MUST NOT BE USED AS A SUBSTITUTE FOR OPEN AREA DETECTOR PROTECTION as a means of providing life safety. Nor are they a substitute for early warning in a building's regular fire detection system. Carrier supports this position and strongly recommends that the user read NFPA Standards 90A, 72, and 101. This smoke detector is listed per UL 268A.

### NOTICE

#### OPERATIONAL TEST ALERT

Failure to follow this ALERT can result in an unnecessary evacuation of the facility.

If the smoke detector is connected to a fire alarm system, first notify the proper authorities that the detector is undergoing maintenance, then disable the relevant circuit to avoid generating a false alarm.

### NOTICE

#### OPERATIONAL TEST ALERT

Failure to follow this ALERT can result in an unnecessary evacuation of the facility.

This test places the duct detector into the alarm state. Unless part of the test, disconnect all auxiliary equipment from the controller before performing the test. If the duct detector is connected to a fire alarm system, notify the proper authorities before performing the test.

### ⚠ WARNING

This device will not operate without electrical power. Fire situations may cause an interruption of power. The system safeguards should be discussed with your local fire protection specialist.

### ⚠ WARNING

This device will not sense smoke unless the ventilation system is operating and the cover is installed.

## ⚠ WARNING

For this detector to function properly, it **MUST** be installed according to the instructions in this manual. Furthermore, the detector **MUST** be operated within ALL electrical and environmental specifications listed in this manual. Failure to comply with these requirements may prevent the detector from activating when smoke is present in the air duct.

## GENERAL

An HVAC (heating, ventilation and air-conditioning) system supplies conditioned air to virtually every area of a building. Smoke introduced into this air duct system will be distributed throughout the entire building. Smoke detectors designed for use inside the unit are used to sense the presence of smoke passing through the unit.

The smoke detector utilizes photoelectric technology for the detection of smoke. This detection method, when combined with an efficient ducting design, samples air passing through the unit. If sufficient smoke is sensed, an alarm signal is initiated and the SmartVu controls will shut down the unit. With the unit shut down, the unit will not blow toxic smoke and fire gases throughout the areas served by the duct system.

## INSTALLATION

### ⚠ CAUTION

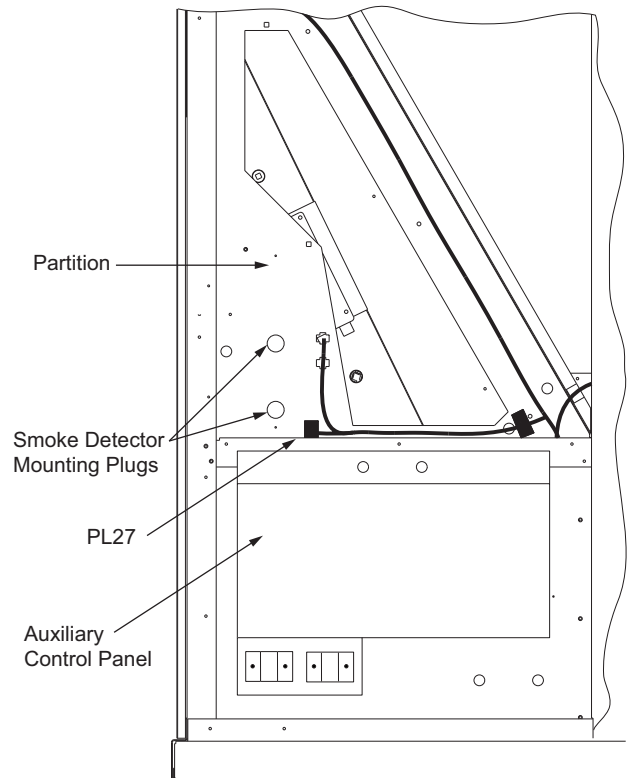
When installing the smoke detector in the unit, follow all local codes. Damage to unit may result.

### Check Package Contents

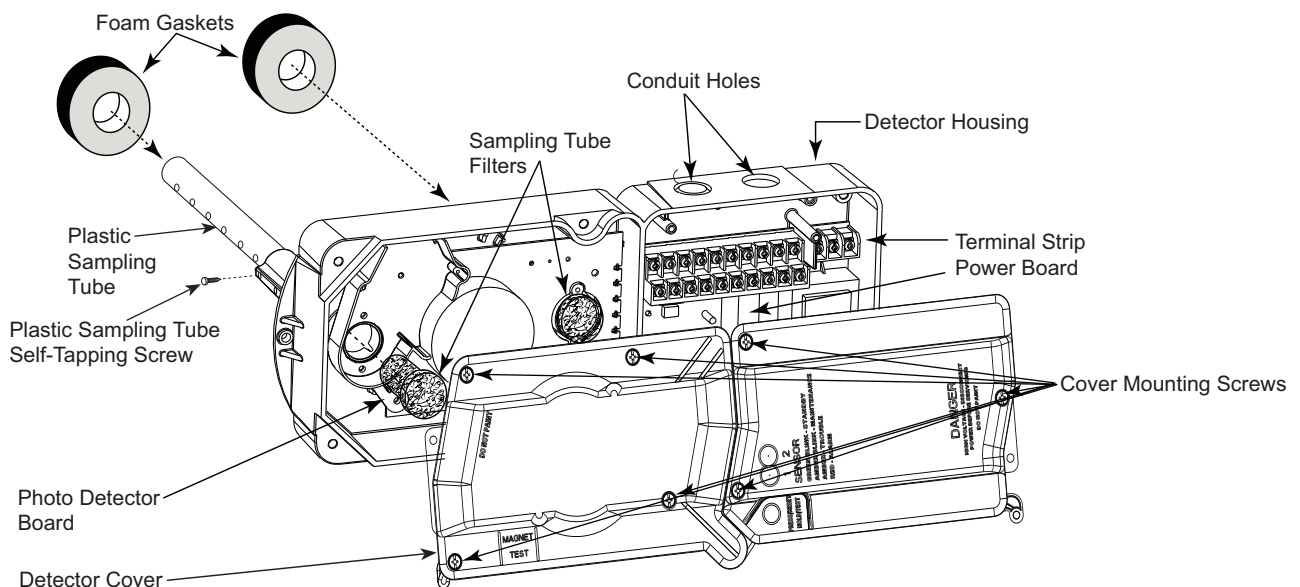
Remove accessory packaging and inspect shipment for damage. If any damage is found, file a claim with the shipping agent

immediately. If any item is missing or any part does not assemble properly, notify your Carrier distributor.

Table 1 lists the accessory package contents and unit usage. See Fig. 1 for the smoke detector mounting locations. See Fig. 2 for smoke detector parts and components.



**Fig. 1 — Smoke Detector Mounting Location (20-60 Ton Units)**



**Fig. 2 — Smoke Detector**

**Table 1 — Accessory Package Contents and Usage**

ACCESSORY PART NUMBER	USAGE	PACKAGE CONTENTS	PART NUMBER	QUANTITY
CRSMKDET005A00	48/50K 20-60 Ton	Smoke Detector	48EJ509917	1
		Sampling Tube Support Bracket	48EJ502607	1
		Wire Tie	HY76TB045	1
		Harness	48VA002016	1
		Snap Bushing	HY93NH085	2
		Screw Fastener	AL56ZA003	4
		Screw	AL56AU168	3
		60 in. Sampling Tube	50HE503749	1
		18 in. Extension Tube (20-50T)	48VA006114	1
		54 in. Extension Tube (60T)	48VA006115	1
		Conduit Connector	HW24FZ001	1
		Tube End Support Bracket	48VA002349	1

## Return Air Smoke Detector Installation

### **WARNING**

Prior to installation of this accessory, make sure all power is disconnected to the unit and locked out. Failure to disconnect power supply prior to servicing may result in serious injury.

NOTE: For horizontal applications it is easiest to install the smoke detector prior to making duct connections.

The return air smoke detector is to be installed in the pre-drilled holes located in the indoor section above the auxiliary control box.

1. Open the hinged auxiliary control box access door and secure.
2. Find the 2 plugs located in the partition above the control box, remove and discard. Refer to Fig. 1 for plugs and mounting location details.
3. Remove cover from smoke detector. The screws will remain captured in the cover. Refer to Fig. 2 for smoke detector cover and other part locations.
4. Place foam gaskets over each sampling tube on smoke detector. Refer to Fig. 2 for foam gasket locations.
5. Remove one knockout from top of smoke detector.
6. Insert stripped ends of wire harness through knockout and wire to smoke detector as shown in Fig. 3. Use ground screw in smoke detector to secure a wire tie. Use wire tie to provide strain relief for the wire harness.
7. Slide smoke detector into holes in partition. NOTE: Do not secure at this time.
8. Insert tube end plug into sampling tube and slide sampling tube into bottom hole of smoke detector. Refer to Fig. 2 for sampling tube installation location.
9. Remove the unit side panel at the return end of the unit (downshot units only). Save screws for use later.
10. Mount the two sampling tube support brackets to the cross member with two 1/4 AB-14 5/8 in. screws as shown in Fig. 4. Insert snap bushing into hole in bracket.
11. For unit sizes 20-50:
  - a. Remove the end cap from the sampling tube (Part No. 50HE503749) which will be connected to the sensor. See Fig. 5 for sampling tube length example.

- b. Attach the 18 in. extension tube (Part No. 48VA006114) using the connector conduit (Part No. HW24FZ001). Unit size 60: Use the 54 in. conduit (Part No. 48VA006115), connecting it to the sampling tube (60 in.) with the connector conduit. Once connected reuse the same end cap to seal the extended tube length. See Fig. 5 for example of the extension tubes and sampling tube part numbers, placement, and attachment to the conduit.

12. Slide sampling tube into brackets, making sure that the sampling holes point in the opposite direction of the return airflow. Insert the sampling tube all the way into the smoke detector.
13. Return to the auxiliary control box and secure sampling tube to smoke detector with two no. 6 self-tapping screws.
14. Attach smoke detector to partition using two, 8 – 18-3/4 in. pan head screws. See Fig. 4 for example of smoke detector installed.

### **CAUTION**

Do not overtighten the screws. May result in damage to smoke detector.

15. Return to side panel and ensure that tube end plug has been inserted into the sampling tube.
16. Replace the unit side panel.
17. Return to auxiliary control box section and insert sampling tube filters into both sampling tube holders. Refer to Fig. 2 and 4 for sampling tube locations.
18. Connect harness PL27 as shown in Fig. 3.
19. Restore power to the unit.
20. Configure SmartVu controller as specified in the Controls, Start-Up, Operation, Service and Troubleshooting Guide.
21. Perform standby, alarm, and sensitivity tests on page 6. At minimum, the magnet test should be performed to verify smoke detector wiring.
22. Replace smoke detector cover.
23. Check for alarms. Correct any problems.
24. Close and secure auxiliary control box door.

Configuring the SmartVu Controller

For configuration settings refer to the Controls Set Up section in the Unit Installation and Start-up Instructions for 48/50K sizes 020-060 units.

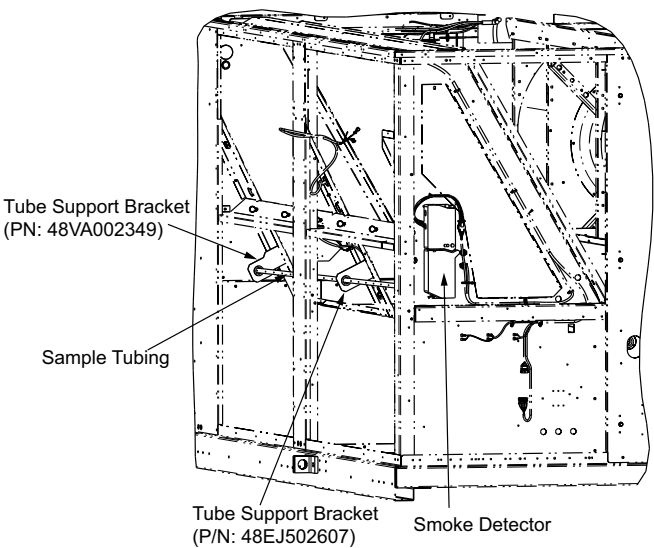
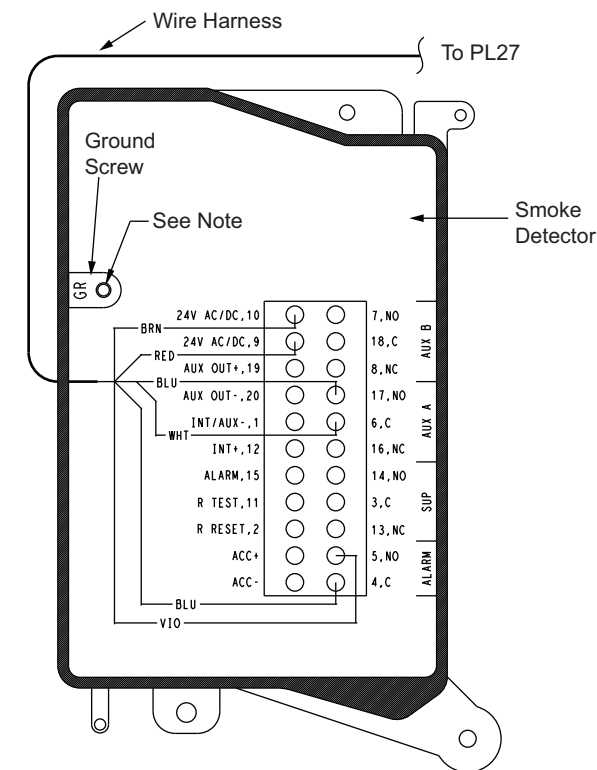


Fig. 4 — Smoke Detector Installed (20-60 Ton Units)

NOTE: Use ground screw in smoke detector to secure wire tie.  
Use wire tie to provide strain relief for harness.

Fig. 3 — Smoke Detector Wiring Connections

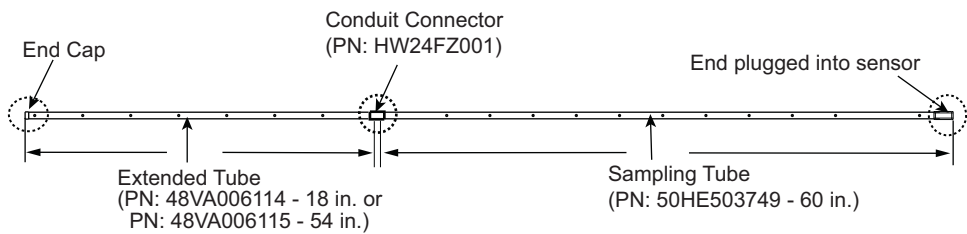


Fig. 5 — Sampling Tube Configuration

## OPERATION

### ⚠ CAUTION

The smoke detector must be tested and maintained regularly following NFPA 72 requirements. The smoke detector should be cleaned at least once a year. Damage to equipment may result.

The smoke detector accessories contain a photoelectric detector approved for an extended air speed range of **100 to 4000 feet per minute** (0.5 to 20.3 m/s) and an operational temperature range of 32°F to 131°F (0°C to 55°C).

NOTE: Do not operate the smoke detector outside of these ranges.

The smoke detector operates on 24/120/240vac. The thermostat power terminals on the unit are used to power the smoke detector. Alarm and supervisory relay contacts are available for control panel interface (alarm initiation), HVAC control, and other auxiliary functions. Auxiliary relays are also provided for fan shut down or signaling of up to 9 other detectors in the loop for multiple fan shut down.

NOTE: The smoke detector is not designed for 2-wire applications.

The smoke detector can be reset by a momentary power interruption, by the reset button on the front cover, by the control panel, or by the remote reset accessory.

**IMPORTANT:** The smoke detector incorporates a cover tamper feature that provides a trouble signal after 20 minutes if the cover is removed or improperly installed. Proper installation of the cover removes the trouble condition.

## MAINTENANCE

### Cleaning Procedure

Notify the proper authorities that the smoke detector system is undergoing maintenance, and that the system will temporarily be out of service. Disable the zone or system undergoing maintenance to prevent unwanted alarms and possible dispatch of the fire department.

#### AIR FILTERS

1. Turn off power to the system.
2. Remove and inspect sampling tube filters.
3. If filters are heavily coated with dirt, replace them with new filters. If they are not heavily coated, use a vacuum cleaner or compressed air nozzle to remove dust, then reinstall the filters.

## PHOTO DETECTOR BOARD

1. Remove the screen by gently grasping on each side and pulling straight off.
2. Lift the photo chamber in the same fashion. Vacuum the screen and cover. Use clean, compressed air to loosen and blow out any remaining debris.
3. Vacuum photo chamber, then use clean compressed air to blow area clean.
4. Replace the chamber by pressing it onto the base. Then press the screen into place. It should fit tightly on the chamber.

### Filter Replacement

The filters do not substantially affect smoke detector performance even when up to 90% of the filter is clogged. Quarterly visual inspection usually suffices to determine whether the filters should be replaced. Only a high percentage of contamination affects performance. If further testing is required, compare differential pressure readings with and without the filters installed. If the difference exceeds 10%, then replace the filters. The pressure differential should never fall below 0.0015 in. wg.

### Board Replacement

#### SMOKE DETECTOR BOARD REPLACEMENT

1. Remove the two detector board mounting screws.
2. Pull gently on the board to remove it.
3. To replace the board, align the board mounting features, holes, and the interconnect terminals. Push the board into place.
4. Secure board with the two mounting screws.

#### POWER BOARD REPLACEMENT

1. Disconnect wiring from the terminal block.
2. Remove the two power board mounting screws.
3. Pull gently on the board to remove it.
4. To replace the board, align the board mounting features, holes, and the interconnect terminals. Push the board into place.
5. Secure board with the two mounting screws.
6. Reconnect wiring to terminal block.

## TROUBLESHOOTING

Test and maintain unit smoke detectors as recommended in NFPA 72. Before conducting tests or maintenance, notify the proper authorities that the smoke detection system will be temporarily out of service. Disable the system under test to prevent unwanted alarms.

### Smoke Entry Tests

#### AIRFLOW TEST

The smoke detector is designed to operate over an extended air speed range of 100 to 4000 fpm. To verify sufficient sampling of unit air, turn on the unit indoor fan using the Service Test function (see Controls, Start-Up, Operation, Service, and Troubleshooting Guide for details on Service Test) and use a manometer to measure the differential pressure between the two sampling tubes.

The differential pressure should measure at least 0.0015 in. wg and no more than 1.2 in. wg. Because most commercially available manometers cannot accurately measure very low pressure differentials, applications with less than 500 fpm of unit air speed may require the use of a current-sensing pressure transmitter or the use of aerosol smoke (see Smoke Response Test section).

#### SMOKE RESPONSE TEST

Drill a 1/4 in. hole 3 ft upstream from the unit smoke detector. Use the Service Test function (see Controls, Start-Up, Operation, Service, and Troubleshooting Guide for details on Service Test) to turn on the unit indoor fan. Measure the air velocity with an anemometer. Air speed must be at least 100 fpm. If the air speed is greater than 500 fpm, use a conventional manometer to measure differential pressure between the sampling tubes.

Spray aerosol smoke into the unit through the 1/4 in. hole for 5 seconds. Wait two minutes for the unit smoke detector to alarm. If the unit smoke detector alarms, then air is flowing through the detector. Remove the unit smoke detector cover and blow out the residual aerosol smoke from the chamber and reset the unit smoke detector. Use duct tape to seal the aerosol smoke entry hole.

To determine if smoke is capable of entering the sensing chamber, visually identify any obstructions. Plug the exhaust and inlet tube holes to prevent unit air from carrying smoke away from the detector head, then blow smoke directly at the head to cause an alarm.

### ⚠ CAUTION

Remove the plugs after this test, or the smoke detector will not function properly and damage may result.

### Standby, Alarm, and Sensitivity Tests

The cover of the smoke detector must be removed to perform these tests.

#### STANDBY AND TROUBLE TEST

- Standby: Look for presence of flashing green LED. The LED should flash approximately every 10 seconds.
- Trouble: If the detector LED does not flash, then the detector lacks power, the detector board is missing (replace), the cover has been missing or not secured properly for more than 20 minutes (secure cover properly), or the unit is defective (return for repair).
- Test: The trouble condition can be caused intentionally to verify correct operation of the system. Remove the detector board to cause an alarm.
- Cover Tamper: If the cover is removed or not properly secured for a period longer than 20 minutes, a trouble signal is generated to indicate the cover is missing.

#### ALARM TEST

##### *Magnet Test*

1. Place the painted surface of the magnet onto the TEST locator on the bottom of the housing.
2. The red alarm LED on the detector should switch on. Verify system control panel alarm status and control panel execution of all intended auxiliary functions (i.e., fan shutdown, damper control, etc.).
3. The detector must be reset by the front cover reset button.

#### SENSITIVITY TEST

After verification of alarm capability, use a field-supplied voltmeter to check detector sensitivity. The housing cover must be removed to perform this test. If readings indicate that the detector head is outside of the acceptable range that is printed on the label of the detector, the detector chamber requires cleaning.



