# Small Rooftop Units
# 3 to 15 Tons
# Field-Installed Smoke Detectors

# Installation Instructions

Part No. CRSMKKIT003A00, CRSMKSEN003A00

## CONTENTS



## SAFETY CONSIDERATIONS

Installation and servicing of air-conditioning equipment can be hazardous due to system pressure and electrical components. Only trained and qualified service personnel should install, repair, or service air-conditioning equipment.

Untrained personnel can perform basic maintenance functions of cleaning coils and filters and replacing filters. All other operations should be performed by trained service personnel. When working on air-conditioning equipment, observe precautions in the literature, tags and labels attached to the unit, and other safety precautions that may apply.

Follow all safety codes, including ANSI (American National Standards Institute) Z223.1. Wear safety glasses and work gloves. Use quenching cloth for unbrazing operations. Have fire extinguisher available for all brazing operations.

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.

**⚠WARNING**

ELECTRICAL SHOCK HAZARD

Failure to follow this warning could result in personal injury and/or death.

Before beginning any modification, be certain that the main-line electrical disconnect switch is in the OFF position. Close the main gas supply shutoff valve. Tag disconnect switch and gas valve with suitable warning labels.

## GENERAL

These instructions cover the installation of a return and/or supply smoke detectors in rooftop equipment from 3 to 15 tons. These apply to Gas-Electric, Electric-Electric and Heat Pump units. Table 1 outlines the accessory quantities required, depending on which option is needed.

**Table 1 — Return and/or Supply Smoke Detector Requirements**

| | CRSMKKIT003A00 | CRSMKSEN003A00 |
|---|---|---|
| **Return Smoke** | 1 | 1 |
| **Supply Smoke** | 1 | 1 |
| **Return and Supply Smoke** | 1 | 2 |

The primary intent of these smoke detectors is to shut down the unit's air delivery services upon an alarm trip. They are not designed as a substitute for an open area smoke detector, a substitute for early warning detection, or a replacement for a building's regular fire detection system. Smoke detectors are not designed to detect toxic gases which can build up to hazardous levels in some fires. These devices will not operate without electrical power. As fires frequently cause power interruptions, it is recommended to install further safeguards with the local fire protection specialist and code enforcement agency.

See Tables 2 and 3 for package contents. See Table 4 for model usage and pickup tube information.

NOTE: Not all unit sizes may be available at this time.

**Table 2 — Sensor Package Contents CRSMKSEN003A00**

| ITEM | PART NUMBER | QTY |
|---|---|---|
| **Sensor Kit** | HK50ZT001 | 1 |

**Table 3 — Package Contents CRSMKKIT003A00**

| ITEM | PART NUMBER | QTY |
|---|---|---|
| **Standard harness assembly** | 48TMHSRLST-A00 | 1 |
| **SystemVu™ harness** | 48LCHSRASTXA00 | 1 |
| **Pickup tube 24 in.** | RN20ZT024 | 2 |
| **Pickup tube 2-7/8 in.** | 48HG503589 | 2 |
| **Pickup tube 11 in.** | 48TC002092 | 1 |
| **Pickup tube coupling** | HW40FA001 | 1 |
| **Flex tube** | 50HE501410 | 1 |
| **Smoke controller** | HK28ZT001 | 1 |
| **Sensor cable (15 ft)** | RM91ZT015 | 2 |
| **Elbow assemblies** | 50HJ441866 | 2 |
| **Wire ties** | HY76TB125 | 10 |
| **Nylon cable clamp** | AS89ZP001 | 10 |
| **#10 Screws 5/8 in.** | AL48AM217 | 16 |
| **#8 Screws 3/4 in.** | AL56AU168 | 10 |
| **10-16 self drilling screws** | AL83AS216 | 10 |
| **Supply sensor bracket** | 48TC001810 | 1 |
| **Supply pickup tube bracket** | 48TC001809 | 1 |
| **Hanger bracket** | 48TM403921 | 2 |
| **Return pickup tube bracket** | 48TM003398 | 1 |
| **Return pickup tube bracket** | 50HJ542419 | 2 |
| **Return sensor bracket** | 50HJ542418 | 1 |
| **Smoke controller bracket** | 50HJ542417 | 1 |
| **Supply sensor bracket** | 48TM002384 | 1 |
| **Supply sensor bracket** | 50HJ542422 | 1 |

**Table 4 — Model Usage and Size Guide**

| ACCESSORY PART NUMBER USAGE | MODEL | SIZE | TONNAGE | SUPPLY AIR BRACKET | SUPPLY AIR PICKUP TUBE | RETURN AIR BRACKET | RETURN AIR PICKUP TUBE |
|---|---|---|---|---|---|---|---|
| **CARRIER** | | | | | | | |
| **CRSMKKIT003A00, CRSMKSEN003A00** | 48FC, 50FC, 50FCQ | 04-16 | 3 to 15 | 48TC001809 (tube) 48TC001810 (sensor) | 48TC002092 (11 in.) | 50HJ542418 (sensor) | Qty 1: RN20ZT024 |
| | 48GC, 50GC, 50GCQ | 04-14 | 3 to 12.5 | 48TC001809 (tube) 48TC001810 (sensor) | 48TC002092 (11 in.) | 50HJ542418 (sensor) | Qty 1: RN20ZT024 |
| | 48JC, 50JC | 04-06 | 3 to 5 | 48TC001809 (tube) 48TC001810 (sensor) | 48TC002092 (11 in.) | 50HJ542418 (sensor) | Qty 1: RN20ZT024 |
| | 48HC, 50HC, 50HCQ | 04-06 | 3 to 5 | 50HJ542422 (sensor) | 48HG503589 (2-7/8 in.) | 50HJ542418 (sensor) | Qty 1: RN20ZT024 |
| | | 07-14 | 6 to 12.5 | 48TM002384 (sensor) | 48HG503589 (2-7/8 in.) | 50HJ542418 (sensor) | Qty 2: RN20ZT024 Qty 1: HW40FA001 |
| | 48KC, 50KC, 50KCQ | 04-06 | 3 to 5 | 50HJ542422 (sensor) | 48HG503589 (2-7/8 in.) | 50HJ542418 (sensor) | Qty 1: RN20ZT024 |
| | 48LC, 50LC | 04-06 | 3 to 5 | 50HJ542422 (sensor) | 48HG503589 (2-7/8 in.) | 50HJ542418 (sensor) | Qty 1: RN20ZT024 |
| | | 07-12 | 6 to 10 | 48TM002384 (sensor) | 48HG503589 (2 7/8 in.) | 50HJ542418 (sensor) | Qty 2: RN20ZT024 Qty 1: HW40FA001 |
| | 48TC, 50TC, 50TCQ | 07 | 6 | 50HJ542422 (sensor) | 48HG503589 (2-7/8 in.) | 50HJ542418 (sensor) | Qty 1: RN20ZT024 |
| | | 08-16 | 7.5 to 15 | 48TM002384 (sensor) | 48HG503589 (2-7/8 in.) | 50HJ542418 (sensor) | Qty 2: RN20ZT024 Qty 1: HW40FA001 |

NOTE: Not all unit sizes may be available at this time.

**Table 4 — Model Usage and Size Guide (cont)**

| ACCESSORY PART NUMBER USAGE | MODEL | SIZE | TONNAGE | SUPPLY AIR BRACKET | SUPPLY AIR PICKUP TUBE | RETURN AIR BRACKET | RETURN AIR PICKUP TUBE |
|---|---|---|---|---|---|---|---|
| **BRYANT** | | | | | | | |
| **CRSMKKIT003A00, CRSMKSEN003A00** | 580J, 558J, 548J | 07 | 6 | 50HJ542422 (sensor) | 48HG503589 (2-7/8 in.) | 50HJ542418 (sensor) | Qty 1: RN20ZT024 |
| | | 08-16 | 7.5 to 15 | 48TM002384 (sensor) | 48HG503589 (2-7/8 in.) | 50HJ542418 (sensor) | Qty 2: RN20ZT024 Qty 1: HW40FA001 |
| | 581J, 551J, 549J | 04-06 | 3 to 5 | 50HJ542422 (sensor) | 48HG503589 (2-7/8 in.) | 50HJ542418 (sensor) | Qty 1: RN20ZT024 |
| | | 07-14 | 6 to 12.5 | 48TM002384 (sensor) | 48HG503589 (2-7/8 in.) | 50HJ542418 (sensor) | Qty 2: RN20ZT024 Qty 1: HW40FA001 |
| | 581K, 551K, 549K | 04-14 | 3 to 12.5 | 48TC001809 (tube) 48TC001810 (sensor) | 48TC002092 (11 in.) | 50HJ542418 (sensor) | Qty 1: RN20ZT024 |
| | 582J, 559J, 547J | 04-06 | 3 to 5 | 50HJ542422 (sensor) | 48HG503589 (2-7/8 in.) | 50HJ542418 (sensor) | Qty 1: RN20ZT024 |
| | 582K, 559K, 547K | 04-16 | 3 to 15 | 48TC001809 (tube) 48TC001810 (sensor) | 48TC002092 (11 in.) | 50HJ542418 (sensor) | Qty 1: RN20ZT024 |
| **ICP** | | | | | | | |
| **CRSMKKIT003A00, CRSMKSEN003A00** | RGH, RAH, RHH | 036-060 | 3 to 5 | 50HJ542422 (sensor) | 48HG503589 (2-7/8 in.) | 50HJ542418 (sensor) | Qty 1: RN20ZT024 |
| | | 072-150 | 6 to 12.5 | 48TM002384 (sensor) | 48HG503589 (2-7/8 in.) | 50HJ542418 (sensor) | Qty 2: RN20ZT024 Qty 1: HW40FA001 |
| | RGS, RAS, RHS | 072 | 6 | 50HJ542422 (sensor) | 48HG503589 (2-7/8 in.) | 50HJ542418 (sensor) | Qty 1: RN20ZT024 |
| | | 089-183 | 7.5 to 15 | 48TM002384 (sensor) | 48HG503589 (2-7/8 in.) | 50HJ542418 (sensor) | Qty 2: RN20ZT024 Qty 1: HW40FA001 |
| | RGV, RAV, RHV | 036-180 | 3 to 15 | 48TC001809 (tube) 48TC001810 (sensor) | 48TC002092 (11 in.) | 50HJ542418 (sensor) | Qty 1: RN20ZT024 |
| | RGW, RAW, RHW | 036-150 | 3 to 12.5 | 48TC001809 (tube) 48TC001810 (sensor) | 48TC002092 (11 in.) | 50HJ542418 (sensor) | Qty 1: RN20ZT024 |
| | RGX, RAX, RHX | 036-060 | 3 to 5 | 50HJ542422 (sensor) | 48HG503589 (2-7/8 in.) | 50HJ542418 (sensor) | Qty 1: RN20ZT024 |

NOTE: Not all unit sizes may be available at this time.

## DESCRIPTIONS

### Controller

The controller includes a controller housing, a printed circuit board, and a clear plastic cover. The controller can be connected to one or two compatible duct smoke sensors. The clear plastic cover is secured to the housing with a single captive screw for easy access to the wiring terminals (see Fig. 1). See Table 5 for controller specifications.

### Sensor

The sensor includes a plastic housing, a printed circuit board, a clear plastic cover, an exhaust tube, and a sampling tube (see Fig. 2). The exhaust tube and sampling tube are attached during installation. The sampling tube varies by size, but the correct one is included with the kit. The clear plastic cover permits visual inspections without having to disassemble the sensor. The cover attaches to the sensor housing using four captive screws and forms an airtight chamber around the sensing electronics.

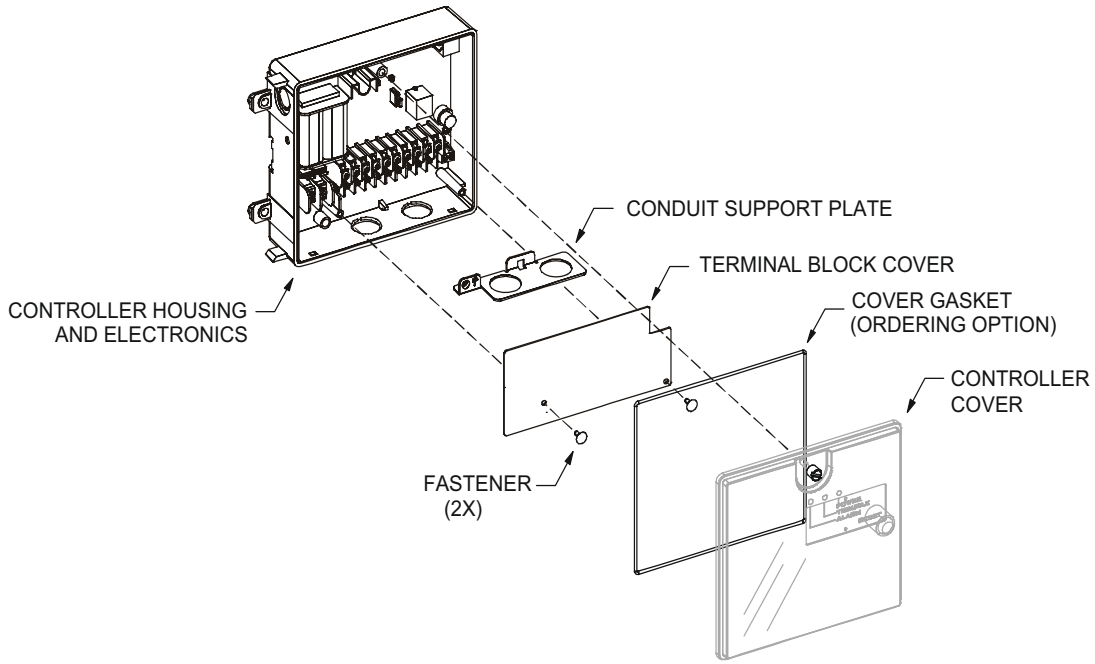


**Fig. 1 — Controller Exploded View**

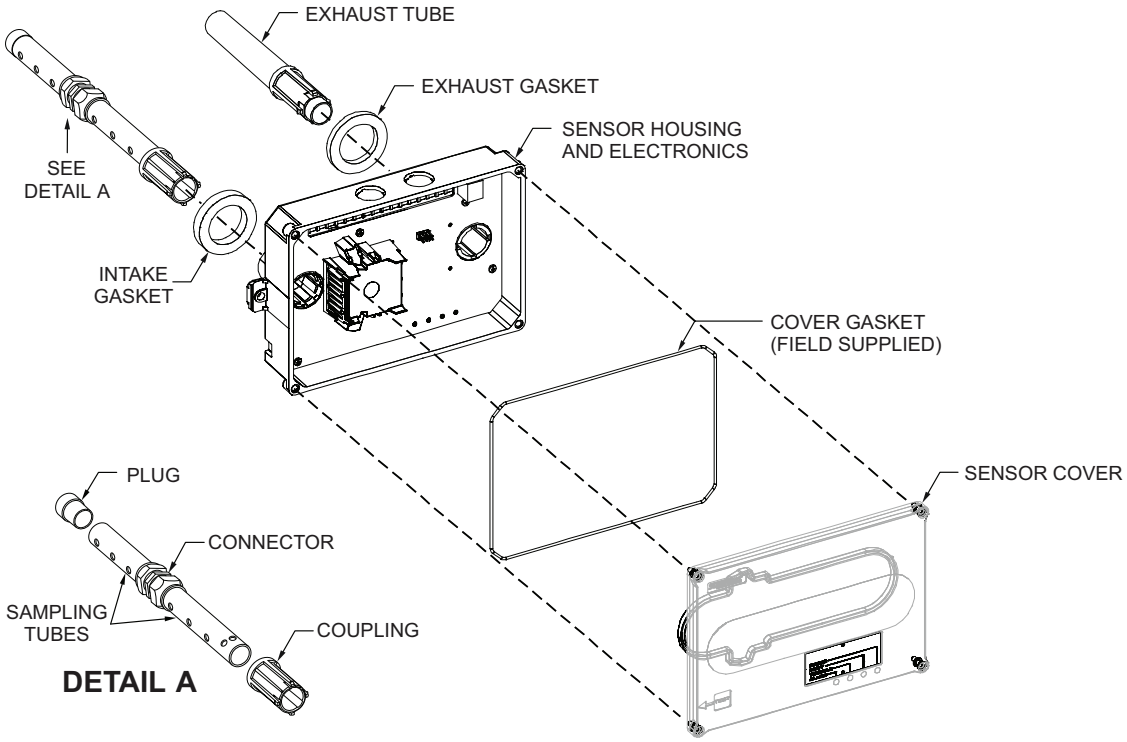


**Fig. 2 — Smoke Sensor Exploded View**

**Table 5 — Controller Specifications**

| FEATURES | DESCRIPTIONS | MEASUREMENTS |
|---|---|---|
| **Dimensions** | Controller only | 6.75 x 5.45 x 1.90 in. |
| | Controller and detector | 14.51 x 5.45 x 1.90 in. |
| **Operating environment** | Temperature | –20°F to 158°F (–29°C to 70°C) |
| | Humidity | 10% to 93% RH, non-condensing |
| **Wire size** | High voltage terminals | 12 to 22 AWG |
| | All others | 14 to 22 AWG |
| **Operating voltages** | 20 to 29 VAC | 175mA |
| | 24 VAC | 500 mA at 50/60 Hz |
| | 120 VAC | 100 mA at 50Hz |
| | | 75 mA at 60 Hz |
| | 220/240 VAC | 53 mA at 50 Hz |
| | | 40 mA at 60 Hz |
| **Operating current** | 20 to 29 VDC | 175 mA |
| | 24 VAC | 500 mA at 50/60 Hz |
| | 120 VAC | 100 mA at 50 Hz |
| | | 75 mA at 60 Hz |
| | 220/240 VAC | 53 mA at 50 Hz |
| | | 40 mA at 60 Hz |
| **LED indicators** | Red (alarm) | — |
| | Yellow (trouble) | — |
| | Green (power) | — |
| **Relays** | Alarm initiation relay | Quantity: 1<br>Style: Normally open<br>Ratings: 2.0A at 30 VDC (resistive) |
| | Auxiliary relay | Quantity: 1<br>Style: Form C<br>Ratings: 10A at 30 VDC, 10A at 250 VAC |
| | Supervision (trouble) relay | Quantity: 1<br>Style: Form C<br>Ratings: 2.0A at 30 VDC (resistive) |

## System

The smoke detector is comprised of a controller and one or two sensors. Its primary function is to shut down the rooftop unit in order to prevent smoke from circulating throughout the building. It is not to be used as a life saving device. When these smoke detectors are factory installed on the units listed above, no additional sampling tubes need to be field installed.

The controller is designed for multiple operating voltages and provides relay contacts for connection to fire alarm systems, HVAC controls, and other auxiliary functions. A remote test/reset station can be connected to the controller to provide these functions.

For installations using two sensors, the duct smoke detector does not differentiate which sensor signals an alarm or trouble condition. The sensor uses a process called differential sensing to prevent gradual environmental changes from triggering false alarms. A rapid change in environmental conditions, such as smoke from a fire, causes the sensor to signal an alarm state but dust and debris accumulated over time does not.

Air is introduced to the duct smoke detector's sensing chamber through a sampling tube that extends into the HVAC duct and is directed back into the ventilation system through an exhaust tube. The difference in air pressure between the two tubes pulls the sampled air through the sensing chamber. When a sufficient amount of smoke is detected in the sensing chamber, the sensor signals an alarm state and the controller automatically takes the appropriate action to shut down fans and blowers, change over air handling systems, notify the fire alarm control panel, etc.

**⚠ CAUTION**

EQUIPMENT DAMAGE HAZARD

Failure to follow this caution may result in damage to equipment.

Excess temperature differentials between the ambient air and the sampled air can produce unwanted condensation inside the sensor, which may cause the sensor to function improperly. Precautions should be taken to limit the temperature range and the amount of condensation to which the sensor is exposed.

## FEATURES

The smoke sensor incorporates the following features:

- Environmental compensation with differential sensing for reliable, stable, and drift-free sensitivity.
- Magnet-activated test/reset switch on sensors.
- PCB mounted photoelectric sensor with on-board intelligence.
- Cover tamper switch for added security.
- Alarm, Trouble, Dirty, and Power status LEDs (see Fig. 3).
- Extended temperature and air velocity ranges.
- Capable of adding an additional sensors (for a total of two) using the same controller.
- Multiple operating voltages.
- No tools required to access field connection terminals.
- Recessed momentary switch for test/reset of the detector.
- One set of normally open alarm initiation contacts for connection to an initiating device circuit on a fire alarm control panel.

- Two Form-C auxiliary alarm relays for interface with rooftop unit or other equipment.
- One Form-C supervision (trouble) relay to control the operation of the Trouble LED on a remote test/reset station.
- Can be wired to up to 14 other duct smoke detectors for multiple fan shutdown applications.

See Table 6 for smoke detector specifications.

**Table 6 — Detector Specifications**

| FEATURE | CHARACTERISTICS |
|---|---|
| **Sensor** | 8.70 x 5.45 x 1.90 in. |
| **Smoke detection method** | Photoelectric |
| **Operating environment** | Same as controller |
| **Air velocity (min-max)** | 100 to 4,000 ft/min |
| **Pressure differential (min-max)** | 0.005 to 1.00 in. |
| **Sensitivity** | 0.67 to 2.48% obscuration/ft |
| | Wire size: 14 to 22 AWG |
| **Reset time** | 2 second maximum |
| **Power up time** | 8 second maximum |
| **Alarm test response time** | 5 to 7 seconds |
| **LED indicators** | Red (alarm) |
| | Yellow (trouble) |
| | Yellow (dirty) |
| | Green (power) |

## INDICATORS

### Normal State

The smoke detector operates in the normal state in the absence of any trouble conditions and when its sensing chamber is free of smoke. In the normal state, the Power LED on both the sensor and the controller are on and all other LEDs are off.

### Alarm State

The smoke detector enters the alarm state when the amount of smoke particulate in the sensor's sensing chamber exceeds the alarm threshold value (see Table 7).

Upon entering the alarm state:

- The sensor's Alarm LED and the controller's Alarm LED turn on.
- The contacts on the controller's two auxiliary relays switch positions.
- The contacts on the controller's alarm initiation relay close.
- The controller's remote alarm LED output is activated (turned on).
- The controller's high impedance multiple fan shutdown control line is pulled to ground Trouble state.

The duct smoke detector enters the trouble state under the following conditions:

- A sensor's cover is removed and 20 minutes pass before it is properly secured.
- A sensor's environmental compensation limit is reached (100% dirty).
- A wiring fault between a sensor and the controller is detected.

An internal sensor fault is detected upon entering the trouble state:

- The contacts on the controller's supervisory relay switch positions (see Fig. 3).
- If there is a sensor fault, the sensor's Trouble LED and the controller's Trouble LED will turn on.
- If 100% dirty, the sensor's Dirty LED turns on and the controller's Trouble LED flashes continuously.
- If there is a wiring fault between a sensor and the controller, the controller's Trouble LED turns on but not the sensor's Trouble LED.

NOTE: All trouble LEDs are closed by the duct smoke detector. The trouble condition must be cleared and then the duct smoke detector must be reset in order to restore it to the normal state.

### Multiple Detector Operation

The interconnect feature of the smoke detector allows up to 15 smoke detectors to be connected to each other, typically for multiple fan shutdown applications. When one of the smoke detectors goes into alarm, it operates as described above. On the remaining smoke detectors not in alarm, only the following occurs:

- The auxiliary relay contacts switch positions.
- The remote LED output is activated (turned on).

## INSTALLATION

### Installing Controller (Supply, Return, or Both)

1. Locate smoke controller in kit (see Fig. 3).
2. Remove plastic cover from controller (see Fig. 1).
3. With harness from kit, plug the harness to controller as shown in wiring label (see Fig. 4-7).
4. For return smoke sensor, locate 15 ft sensor cable (RM91ZT015) and plug into phone jack (RJ45) on the smoke controller by routing cable through one of the knock outs in plastic case. For supply smoke sensor, use the additional 15 ft cable (RM91ZT015). For both supply and return sensors, utilize both cables.
5. Reinstall the plastic cover.
6. Locate smoke controller bracket (50HJ542417). Using self-tapping screws in kit, attach the bracket in the indoor cabinet's return area. The location of the bracket needs to allow space for the return air sensor's bracket to attach to the controller bracket and for air filter clearance (see Fig. 8).
7. Using two #8 screws, mount the controller to the bracket in the orientation shown in Fig. 8.
8. Install hanger bracket (48TM403921) for controller harness pathway, if desired.
9. Complete the wiring of the harness by routing the harness across the hanger bracket, through the top left gap next to the evaporator coil, across the top of blower scroll (avoiding any moving parts), and through the hole leading into the control box. Secure the harness with zip ties from kit along the pathway. Complete the wiring of the harness to the unit controller in the control box as shown in Fig. 4-7.
10. Cut or remove smoke shutdown jumper on unit controller as shown in Fig. 9-11.

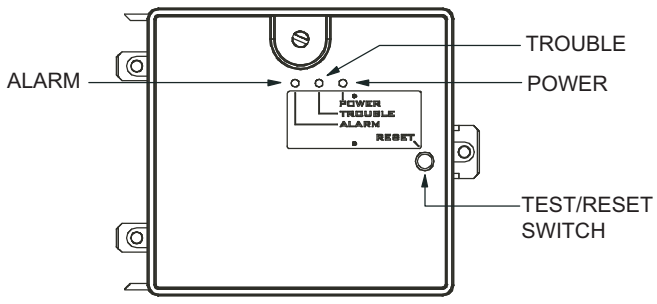


**Fig. 3 — Controller Assembly**

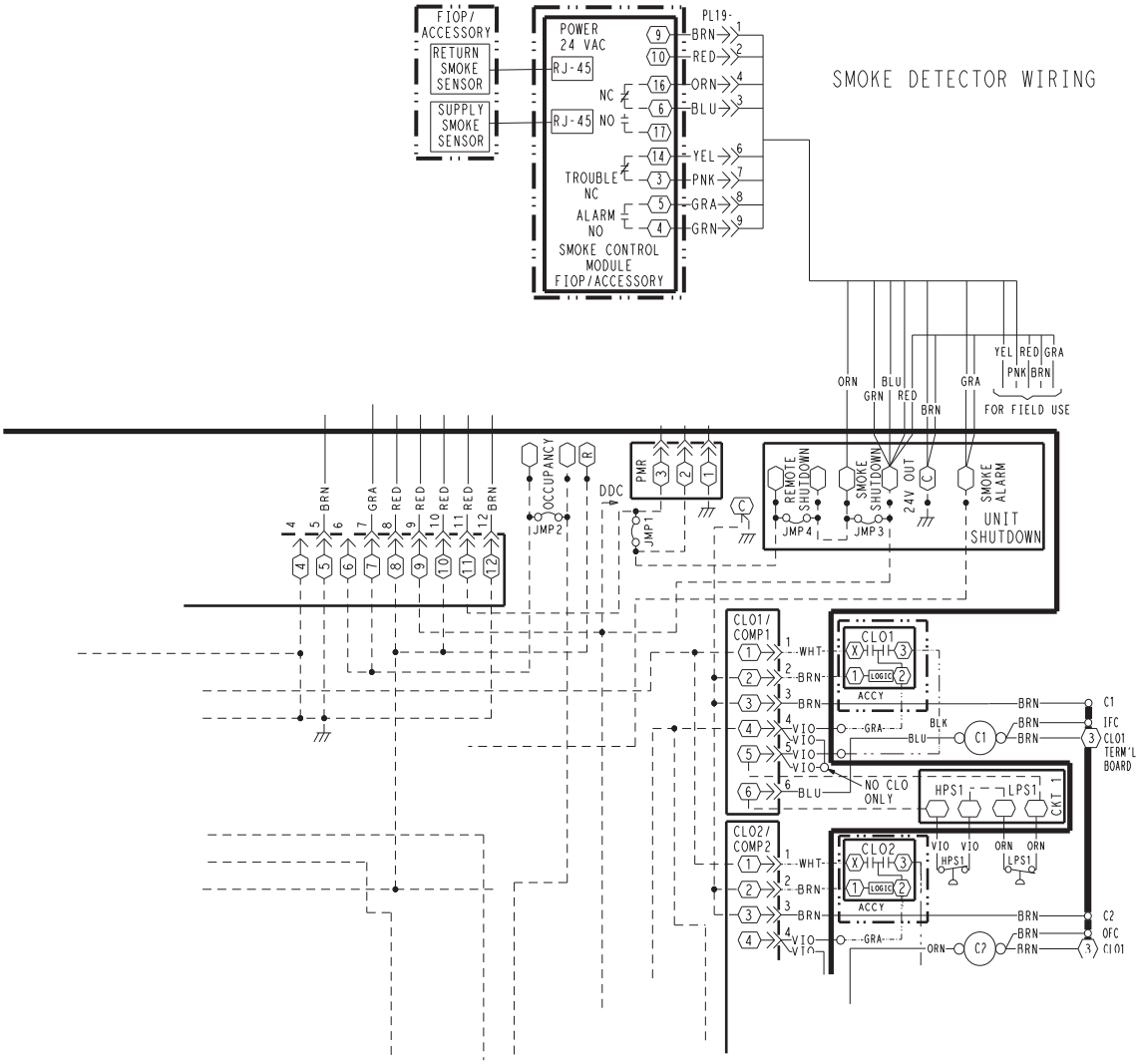


**Fig. 4 — Smoke Detector Wiring**
**(Models: 48/50HC, 50HCQ, 48/50JC, 48/50KC, 50KCQ, 48/50TC, 50TCQ, 581J/551J/549J, 581J/559J/547J, 580J/558J/548J, RGH/RAH/RHH, RGX/RAX/RHX, RGS/RAS/RHS)**

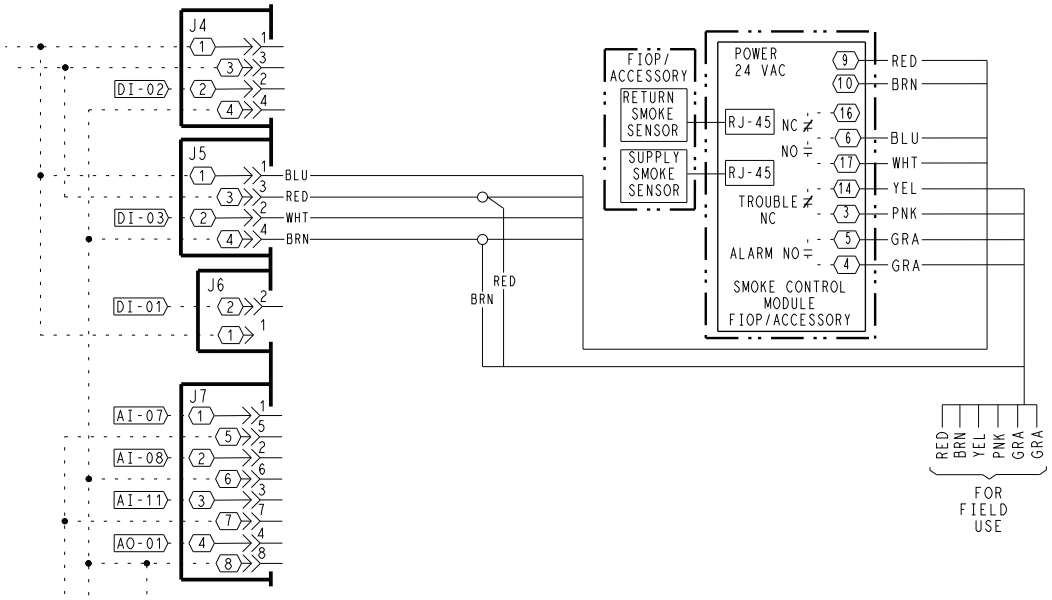


**Fig. 5 — SystemVu™ Smoke Detector Wiring**

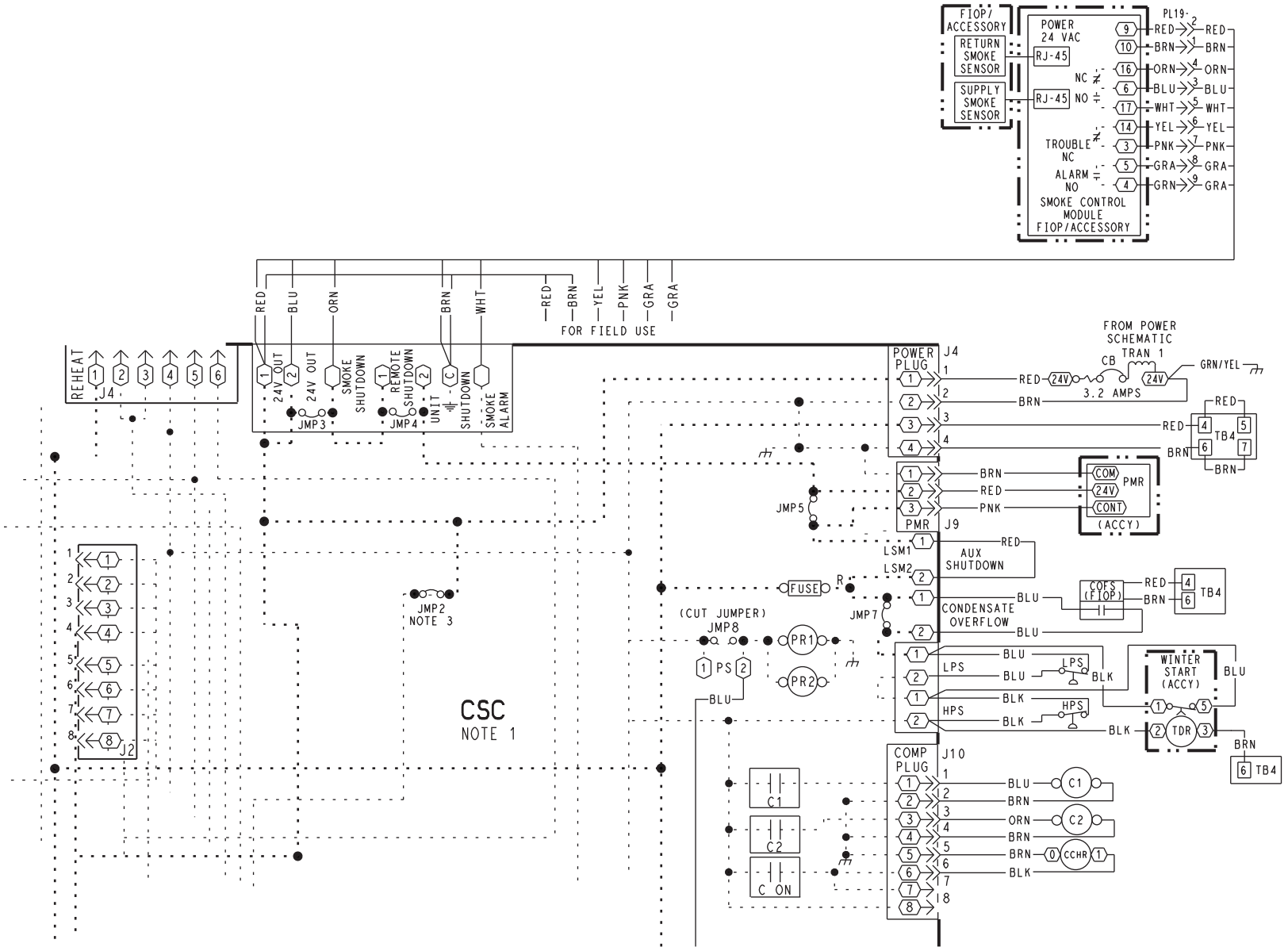


**Fig. 6 — 48/50LC Smoke Detector Wiring**

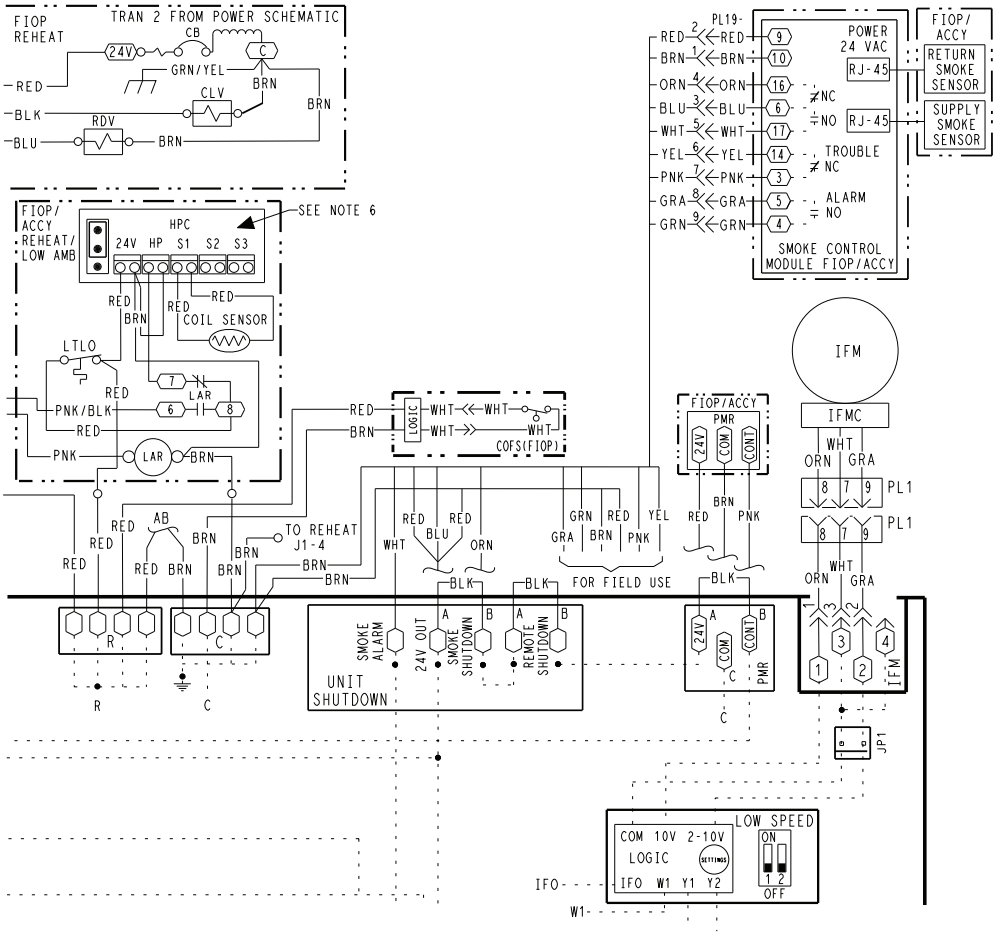


**Fig. 7 — Smoke Detector Wiring (Models: 48/50FC, 50FCQ, 48/50G, 50GCQ, 592K/559K/547K, 581K/551K/549K, RGV/RAV/RHV, RGW/RAW/RHW)**

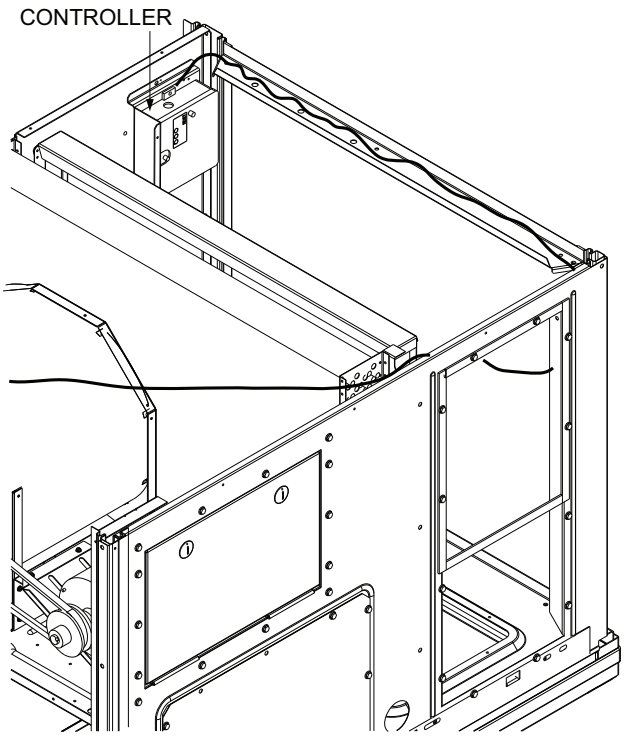


**Fig. 8 — Controller Mounting Location**

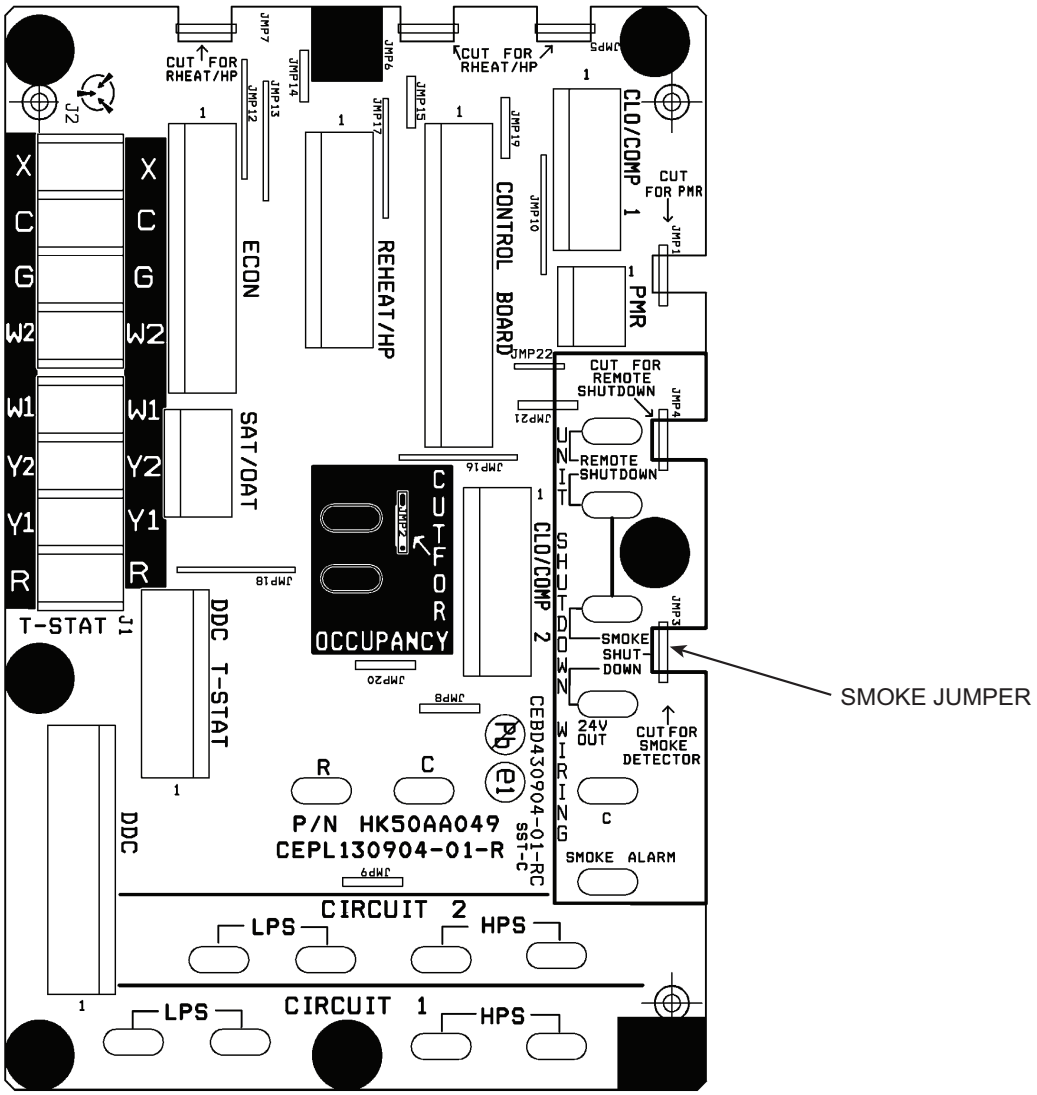


**Fig. 9 — Central Terminal Board**
**(Models: 48/50HC, 50HCQ, 48/50JC, 48/50KC, 50KCQ, 48/50TC, 50TCQ, 581J/551J/549J, 581J/559J/547J, 580J/558J/548J, RGH/RAH/RHH, RGX/RAX/RHX, RGS/RAS/RHS)**

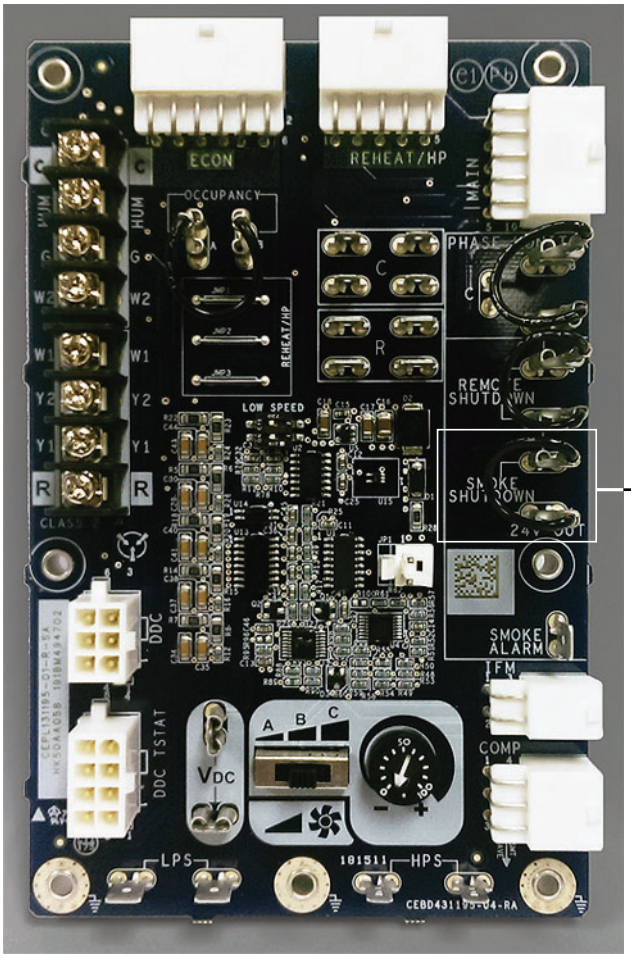


**Fig. 10 — Unit Control Board (Models: 48/50FC, 50FCQ, 48/50G, 50GCQ, 592K/559K/547K, 581K/551K/549K, RGV/RAV/RHV, RGW/RAW/RHW)**

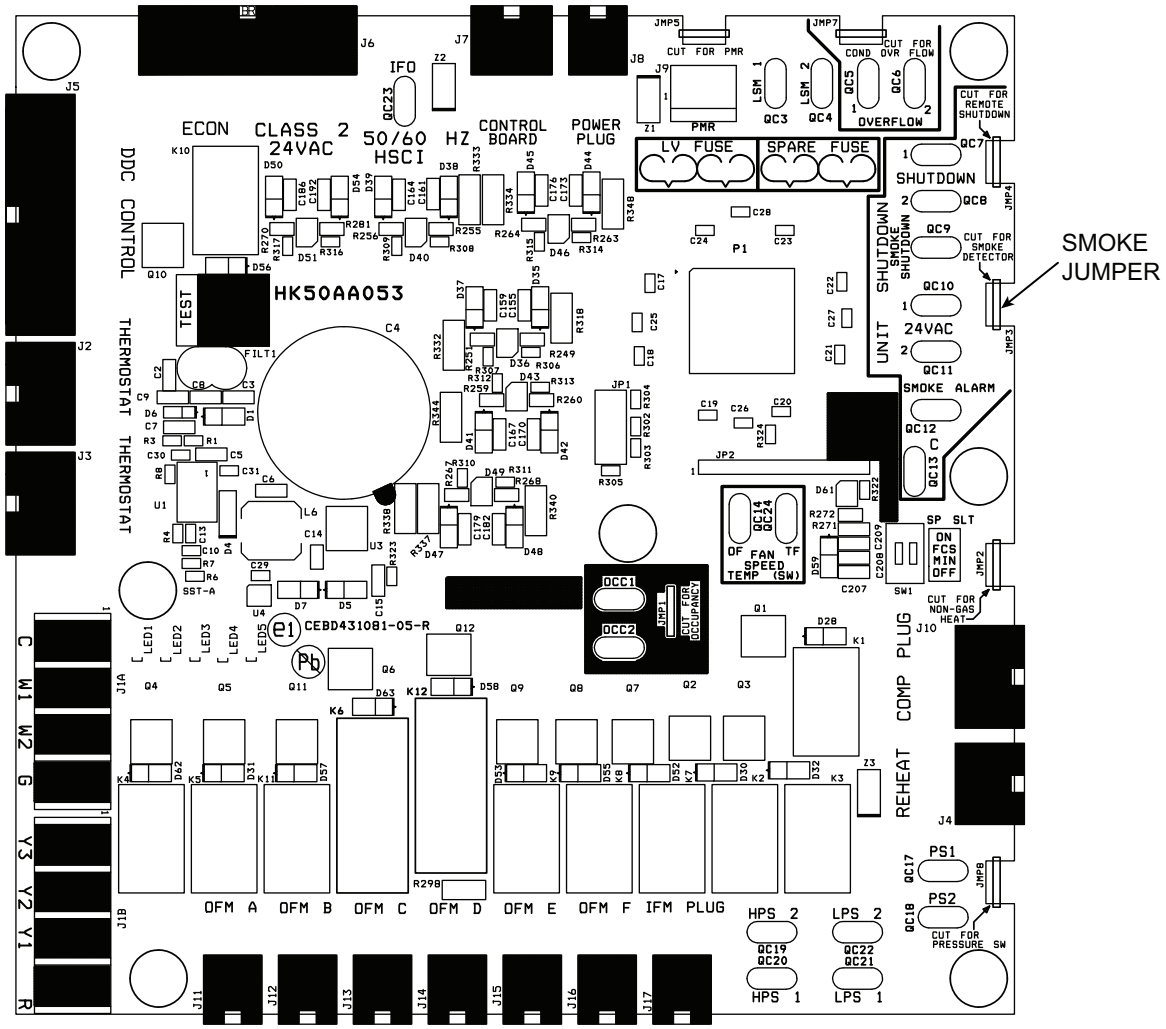


**Fig. 11 — 48/50LC Control Board (for 48/50LC Only)**

## Installing Return Smoke Sensor

1. Locate sensor from the CRSMKSEN003A00 kit (see Fig. 12).
2. Locate return air sensor bracket (50HJ542418) and attach the sensor to the bracket using two #8 screws. The sensor should be oriented such that the intake is at the bottom of the bracket (see Fig. 13).
3. On the intake of the sensor insert the sampling tube that came with the sensor kit CRSMKSEN003A00. This tube may need to be cut so that it will fit with the elbow fitting added in the next step.
4. Attach one of the elbows (50HJ441866) to the sampling tube that was inserted to the sensor's intake.
5. Using two #8 screws attach the return air sensor bracket to the controller's bracket as shown in Fig. 13.
6. Install the pickup tube's brackets (50HJ542419) using self-tapping screws. Locations for these brackets are shown in Fig. 13 for vertical duct configuration and Fig. 14 for horizontal duct configuration.
   a. For horizontal duct configuration, the sensor and bracket assembly are installed on the duct flange.
7. The pickup tube can now be installed. For 3 to 6 ton units (see Table 4), one tube can be used. For units over 6 tons, both pickup tubes will be needed. Join the two tubes using the conduit connector (HW40FA001). The holes on both tubes must be aligned. Measure the distance between the sampling tube's brackets, add in space to account for the elbow fitting in the next step, and cut the end of the tube to cover the length of the duct opening.
   a. For horizontal duct configuration, the end of the pickup tube rests on the bottom of the base pan. The length of the pickup tubes needs to reach the elbow coming off the sensor bracket assembly. See Fig. 14.
8. Slide the pickup tube through the brackets (note the pickup tubes may need to be separated, then reattached). Orient the holes so that they point into the direction of flow. Attach the remaining elbow (50HJ441866) in the location shown in Fig. 13 and 14. Then plug the other end of the pickup tube with the plug in the kit.
   a. Note the horizontal configuration only requires one elbow. Make sure to plug the end of the pickup tube.
9. Attach the flex tube (50HE501410) from the return air sensor's elbow to the pickup tube's elbow.
   a. Note the horizontal configuration does not require the flex hose.
10. Remove plastic cover on the return air sensor. Utilizing 15 ft. cable previously installed plug sensor end into RJ45 connector by entering sensor through knockout. Ensure that knockout is sealed utilizing grommet which is mounted on cable.
11. Reinstall plastic cover on the return air sensor.
12. If return sensor only is desired, restore power and refer to sensor and controller tests section.

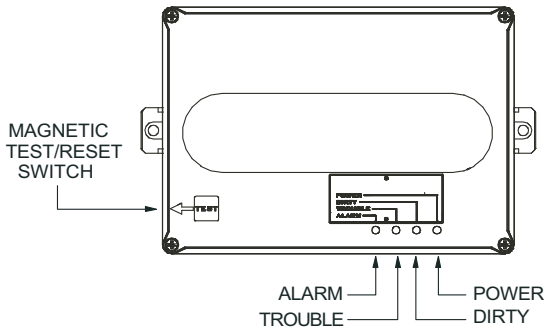


**Fig. 12 — Sensor Assembly**

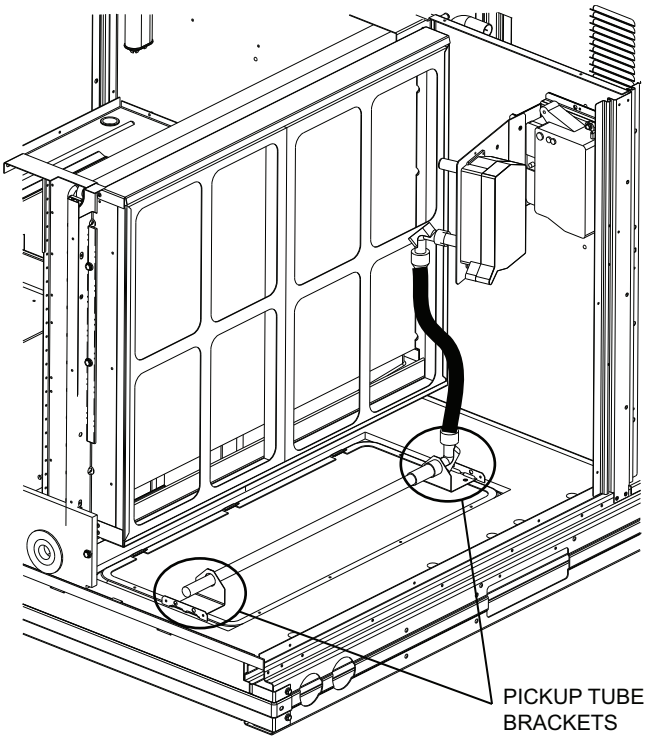


**Fig. 13 — Pickup Tube Bracket for Vertical Duct Configuration**

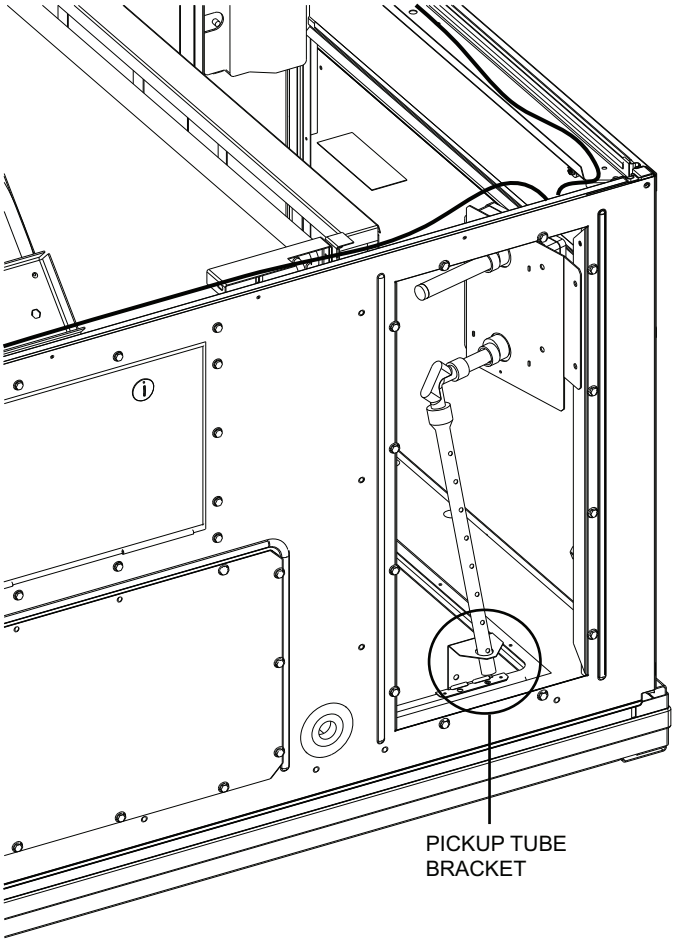


**Fig. 14 — Pickup Tube Bracket for Horizontal Duct Configuration**

## Installing Supply Smoke Sensor

1. Remove blower access panel.
2. Use Table 4 to determine which bracket is appropriate for the unit.
3. Locate respective bracket from kit CRSMKKIT003A00 and locate the sensor from the CRSMKSEN003A00 (see Fig. 12).
4. Installing the bracket and sampling tube for the supply air sensor. Refer to Table 4 for model and size specific parts.
   a. For 48/50TC, 580J, 558J, 548J, RGS, RAS, RHS units (6 tons) and 48/50HC, 581J, 551J, 549J, RGH, RAH, RHH, 48/50LC, 48/50KC, 50KCQ, 50TCQ, 50HCQ, 582J, 559K, 547J, RGX, RAX, RHX units (3 to 5 tons), refer to Fig. 15. Remove 7/8 in. knockout on the left side of the blower. Using two #8 screws, attach the sensor to bracket (50HJ542422), orienting the intake on the sensor such that it will align with the knockout on the blower. Insert the 2-7/8 in. pickup tube (48HG503589) into the intake on the sensor so that the hole in the tube will be in the air stream. Attach the sensor's bracket to the blower.
   b. For 48/50TC, 580J, 558J, 548J, RGS, RAS, RHS units (7.5 to 15 tons) and 48/50HC, 50TCQ, 50HCQ, 581J, 551J, 549J, RGH, RAH, RHH, 48/50LC units (6 to 10 tons), refer to Fig. 15. Remove 7/8 in. knockout on the right side of the blower. Using two #8 screws, attach the sensor to bracket (48TM002384), orienting the intake on the sensor such that it will align with the knockout on the blower. Insert the 2-7/8 in. pickup tube (48HG503589) into the intake on the sensor so that the hole in the tube will be in the air stream. Attach the sensor's bracket to the blower.
   c. For 48/50FC, 50FCQ, 582K, 559K, 547K, RGV, RAV, RHV (3 to 15 tons), 48/50GC, 50GCQ, 581K, 551K, 549K, RGW, RAW, RHW (3 to 12.5 ton) units, use Fig. 16. Remove 7/8 in. knockout on the fan deck. Attach the supply smoke sensor to bracket (48TC001810) using two #8 screws and ensure that the intake on the sensor will be aligned over the hole in the fan deck. Then attach the bracket to the corner post with self-tapping screws as shown in Fig. 16. Attach the tube bracket (48TC001809), aligning it over the knockout in the fan deck. Insert the 11 in. pickup tube (48TC002092) to the intake on the sensor by inserting the sampling end with the hole below the fan deck and then inserting the other end into the intake on the sensor. Orient the hole so that it points into the direction of flow.
5. Route 15 ft cable attached to the controller in the return air area through the opening in the top corner next to the evaporator coil. Route with the controller's harness securing with zip ties. Branch off from the harness's path to the sensor's location.
6. Remove plastic cover on the supply air sensor.
7. Route into the sensor through the knockout hole and plug end into RJ45 connector. Ensure that knockout hole is sealed with grommet mounted to cable.
8. Reinstall plastic cover on the supply air sensor.
9. Installation is complete. Refer to sensor and controller tests section.

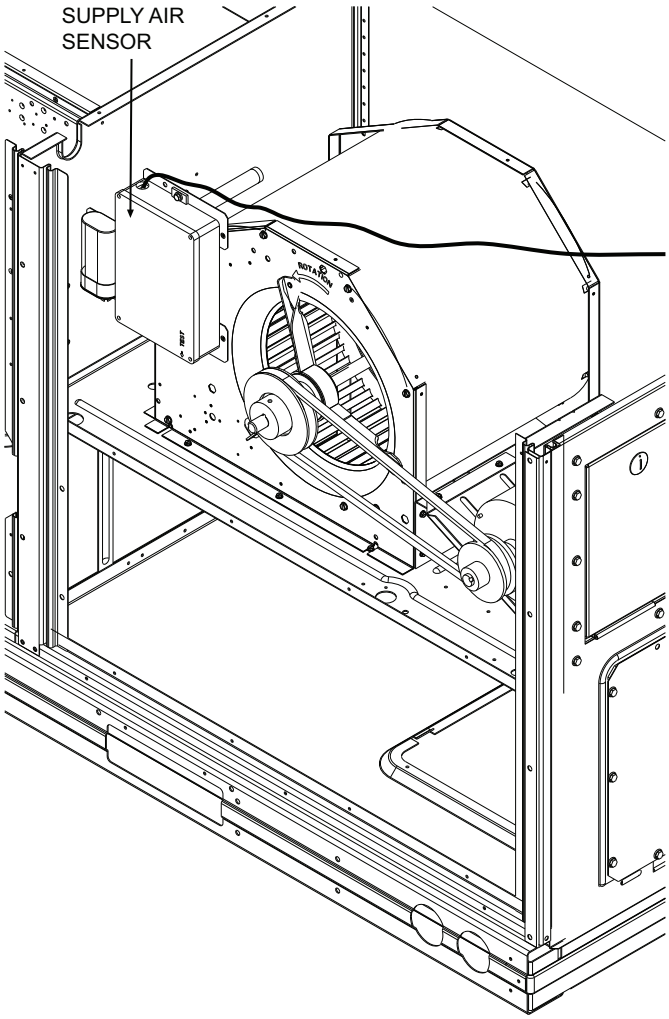


**Fig. 15 — Supply Air Sensor Mounting Location**

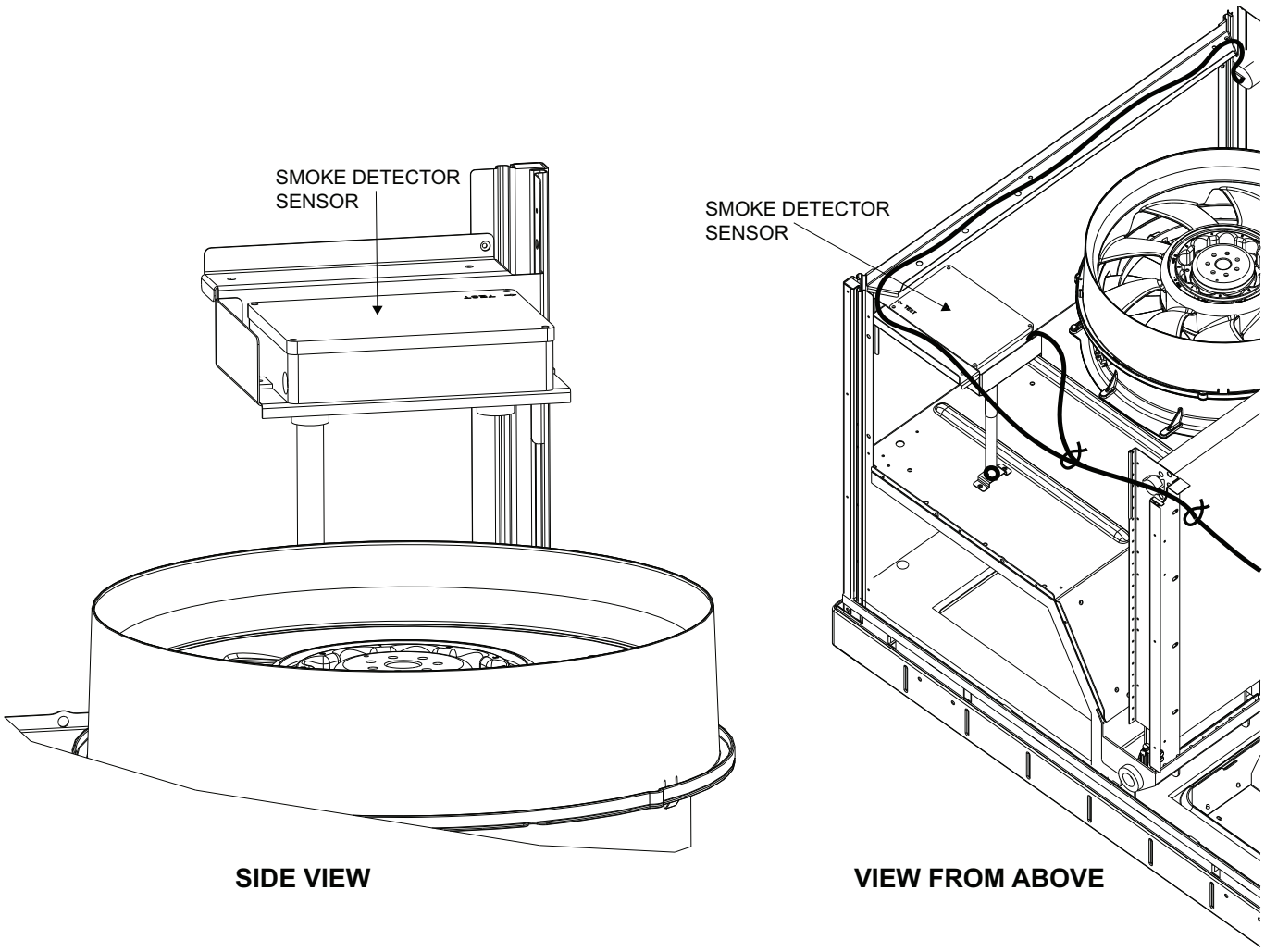


**Fig. 16 — Supply Air Smoke Sensor**

## SENSOR AND CONTROLLER TESTS

### Sensor Alarm Test

The sensor alarm test checks a sensor's ability to signal an alarm state. This test requires the use of a field provided SD-MAG test magnet.

IMPORTANT: Failure to follow this notice may result in personnel and authority concern.

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.

SENSOR ALARM TEST PROCEDURE

1. Hold the test magnet where indicated on the side of the sensor housing for seven seconds.
2. Verify that the sensor's Alarm LED turns on.
3. Reset the sensor by holding the test magnet against the sensor housing for two seconds.
4. Verify that the sensor's Alarm LED turns off.

### Controller Alarm Test

The controller alarm test checks the controller's ability to initiate and indicate an alarm state.

IMPORTANT: Failure to follow this notice may result in personnel and authority concern.

This test places the duct detector into the alarm state. 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.

CONTROLLER ALARM TEST PROCEDURE

1. Press the controller's test/reset switch for seven seconds.
2. Verify that the controller's Alarm LED turns on.
3. Reset the sensor by pressing the test/reset switch for two seconds.
4. Verify that the controller's Alarm LED turns off.

### Dirty Controller Test

The dirty controller test checks the controller's ability to initiate a dirty sensor test and indicate its results.

IMPORTANT: Failure to follow this notice may result in personnel and authority concern.

Pressing the controller's test/reset switch for longer than seven seconds will put the duct detector into the alarm state and activate all automatic alarm responses.

DIRTY CONTROLLER TEST PROCEDURE

1. Press the controller's test/reset switch for two seconds.
2. Verify that the controller's Trouble LED flashes.

## Dirty Sensor Test

The dirty sensor test provides an indication of the sensor's ability to compensate for gradual environmental changes. A sensor that can no longer compensate for environmental changes is considered 100% dirty and requires cleaning or replacing. A field-provided SD-MAG test magnet must be used to initiate a sensor dirty test. The sensor's Dirty LED indicates the results of the dirty test as shown in Table 7.

IMPORTANT: Failure to follow this notice may result in personnel and authority concern.

Holding the test magnet against the sensor housing for more than seven seconds will put the duct detector into the alarm state and activate all automatic alarm responses.

**Table 7 — Dirty Sensor LED Description**

| FLASHES | DESCRIPTION |
|---|---|
| 1 | 0-25% dirty (Typical of a newly installed detector) |
| 2 | 25%-50% dirty |
| 3 | 51%-75% dirty |
| 4 | 76%-99% dirty |

DIRTY SENSOR TEST PROCEDURE

1. Hold the test magnet where indicated on the side of the sensor housing for two seconds.
2. Verify that the sensor's Dirty LED flashes.

## Changing the Dirty Sensor Test

By default, sensor dirty test results are indicated by:

- The sensor's Dirty LED flashing.
- The controller's Trouble LED flashing.
- The controller's supervision relay contacts toggle.

The operation of a sensor's dirty test can be changed so that the controller's supervision relay is not used to indicate test results. When two detectors are connected to a controller, sensor dirty test operation on both sensors must be configured to operate in the same manner.

IMPORTANT: Failure to follow this notice may result in personnel and authority concern.

Changing the dirty sensor test operation will put the detector into the alarm state and activate all automatic alarm responses. Before changing dirty sensor test operation, disconnect all auxiliary equipment from the controller and notify the proper authorities if connected to a fire alarm system.

TO CONFIGURE THE DIRTY SENSOR TEST OPERATION

1. Hold the test magnet where indicated on the side of the sensor housing until the sensor's Alarm LED turns on and its Dirty LED flashes twice (approximately 60 seconds).
2. Reset the sensor by removing the test magnet then holding it against the sensor housing again until the sensor's Alarm LED turns off (approximately 2 seconds).

## Remote Station Test

The remote station alarm test checks a test/reset station's ability to initiate and indicate an alarm state. See Table 8 for remote keyed attenuator and test/reset station specifications.

IMPORTANT: Failure to follow this notice may result in personnel and authority concern.

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.

SD-TRK4 REMOTE ALARM TEST PROCEDURE

1. Turn the key switch to the RESET/TEST position for seven seconds.
2. Verify that the test/reset station's Alarm LED turns on.
3. Reset the sensor by turning the key switch to the RESET/TEST position for two seconds.
4. Verify that the test/reset station's Alarm LED turns off.

REMOTE TEST/RESET STATION DIRTY SENSOR TEST

The test/reset station dirty sensor test checks the test/reset station's ability to initiate a sensor dirty test and indicate the results. It must be wired to the controller (see Fig. 17) and configured to operate the controller's supervision relay. For more information, see "Changing the Dirty Sensor Test."

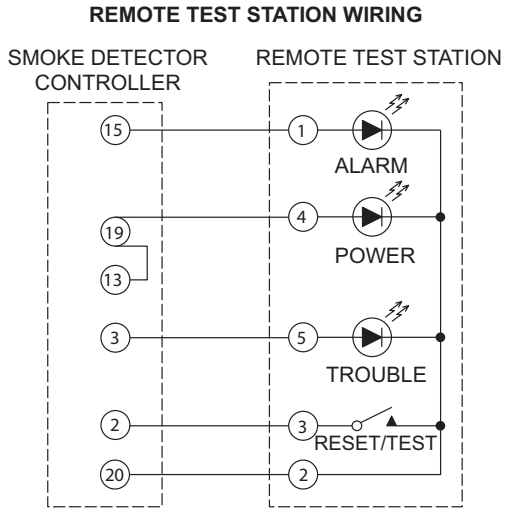


**Fig. 17 — Remote Test Station Wiring**

**Table 8 — Remote Keyed Attenuator and Test/Reset Station Specifications (KA-99ZT-003)**

| FEATURE | CHARACTERISTICS |
|---|---|
| **Compatibility with electrical boxes** | North American 1-gang box |
| | Standard 4 in. square box, 1-1/2 in. deep, with 1-gang cover |
| **LED indicators** | Red (alarm) |
| | Yellow (trouble) |
| | Green (power) |
| **LED type** | Clear lens |
| **Wire size** | 14 to 22 AWG |
| **Resistance per wire** | 10 Ω max |
| **Operating current** | Same as controller specification |
| **Operating voltages** | 24 VDC, 24v at 50/60 Hz |
| | 120v at 50/60 Hz |
| | 220/240v at 50/60 Hz |
| **Compatible detectors** | Four-wire smoke detectors |
| **Operating environment** | Temperature: 32°F to 131°F (0°C to 55°C) |
| | Humidity: 93% RH, non-condensing |
| **Storage temperature** | –20°C to 60°C (–4°F to 140°F) |

IMPORTANT: Failure to follow this notice may result in personnel and authority concern.

If the test/reset station's key switch is left in the RESET/TEST position for longer than seven seconds, the detector will automatically go into the alarm state and activate all automatic alarm responses.

IMPORTANT: Failure to follow this notice may result in personnel and authority concern.

Holding the test magnet to the target area for longer than seven seconds will put the detector into the alarm state and activate all automatic alarm responses.

DIRTY SENSOR TEST USING AN SD-TRK4

1. Turn the key switch to the RESET/TEST position for two seconds.
2. Verify that the test/reset station's Trouble LED flashes.

## DETECTOR CLEANING

### Cleaning the Smoke Detector

Clean the duct smoke sensor when the Dirty LED is flashing continuously or sooner, if conditions warrant.

IMPORTANT: Failure to follow this notice may result in personnel and authority concern.

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.

1. Disconnect power from the duct detector then remove the sensor's cover (see Fig. 18).
2. Using a vacuum cleaner, clean compressed air, or a soft bristle brush, remove loose dirt and debris from inside the sensor housing and cover. Use isopropyl alcohol and a lint-free cloth to remove dirt and other contaminants from the gasket on the sensor's cover.
3. Squeeze the retainer clips on both sides of the optic housing, then lift the housing away from the printed circuit board.
4. Gently remove dirt and debris from around the optic plate and inside the optic housing.
5. Replace the optic housing and sensor cover.
6. Connect power to the duct detector, then perform a sensor alarm test.

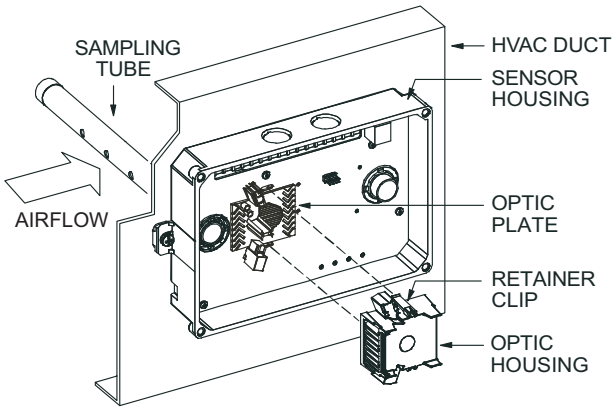


**Fig. 18 — Sensor Cleaning Diagram**

## TROUBLESHOOTING

### Controller's Trouble LED is On

1. Check the Trouble LED on each sensor connected to the controller. If a sensor's Trouble LED is on, determine the cause and make the necessary repairs.
2. Check the wiring between the sensor and the controller. If wiring is loose or missing, repair or replace as required.

### Controller's Trouble LED is Flashing

1. One or both of the sensors is 100% dirty.
2. Determine which Dirty LED is flashing, then clean that sensor assembly as described in the detector cleaning section.

### Sensor's Trouble LED is On

1. Check the sensor's Dirty LED. If it is flashing, the sensor is dirty and must be cleaned.
2. Check the sensor's cover. If it is loose or missing, secure the cover to the sensor housing.
3. Replace sensor assembly.

### Sensor's Power LED is Off

1. Check the controller's Power LED. If it is off, determine why the controller does not have power and make the necessary repairs.
2. Check the wiring between the sensor and the controller. If wiring is loose or missing, repair or replace as required.

### Controller's Power LED is Off

1. Make sure the circuit supplying power to the controller is operational. If not, make sure JP2 and JP3 are set correctly on the controller before applying power.
2. Verify that power is applied to the controller's supply input terminals. If power is not present, replace or repair wiring as required.

### Remote Test/Reset Station's Trouble LED Does Not Flash When Performing a Dirty Test, But the Controller's Trouble LED Does

1. Verify that the remote test/station is wired as shown in Fig. 17. Repair or replace loose or missing wiring.
2. Configure the sensor dirty test to activate the controller's supervision relay. See "Changing sensor dirty test operation."

### Sensor's Trouble LED is On, But the Controller's Trouble LED is OFF

Remove JP1 on the controller.

**Manufacturer reserves the right to discontinue, or change at any time, specifications or designs without notice and without incurring obligations.**

Catalog No. 04-53480287-01 Printed in U.S.A. Form IIK-CRSMK03-02 Pg 20 5-22 Replaces: IIK-CRSMK03-01