INSTALLATION AND MAINTENANCE INSTRUCTIONS

ED-DPR
Intelligent Photoelectric Duct Smoke Detector

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1-800-SENSOR2, FAX: 630-377-6495
www.systemsensor.com

Specifications

Normal Operating Voltage:	14 to 30 VDC	Duct Air Velocity:	500-4000 ft./min.
Standby Current:	360μA max. @ 24 VDC		(2.54-20.32 m/sec.)
Alarm Current:	7 mA max. @ 24 VDC (LEDs on)	Length:	14.5 inches (36.7 cm.)
Humidity Range:	10% to 93% Relative	Width:	5 inches (12.7 cm.)
	Humidity, non-condensing	Depth:	4 inches (10.2 cm.)
Temperature Range:	32° to 120°F (0° to 49°C)	Weight:	4 lbs. (1.8 kg)

Relay Contact Ratings:

CURRENT RATINGS	MAXIMUM VOLTAGE	LOAD DESCRIPTION	APPLICATION
3A	30VDC	Resistive	Non Coded
2A	30VDC	Resistive	Coded
.9A	110VDC	Resistive	Non Coded
.9A	125VAC	Resistive	Non Coded
.5A	30VDC	Inductive (L/R = 5ms)	Coded
1A	30VDC	Inductive (L/R = 2ms)	Coded
.3A	125VAC	Inductive (PF = .35)	Non Coded
.7A	75VAC	Inductive (PF = .35)	Non Coded
1.5A	25 VAC	Inductive (PF = .35)	Non Coded

NOTE: Coded implies a service life of 6,000 operations. Non-coded implies a service life of 250,000 operations.

Before Installing

Please thoroughly read the System Sensor Manual A05-1004-XX *Duct Smoke Detector Applications Guide*, which provides detailed information on detector spacing, placement, zoning, wiring, and special applications. Copies of this manual are available at no charge from System Sensor. NFPA Standards 72 and 90A should also be referenced for detailed information.

NOTICE: This manual should be left with the owner/user of this equipment.

IMPORTANT: This detector must be tested and maintained regularly following NFPA 72 requirements. The detector should be cleaned at least once a year.

NOTE: This detector is not intended as a substitute for open area protection.

General Description

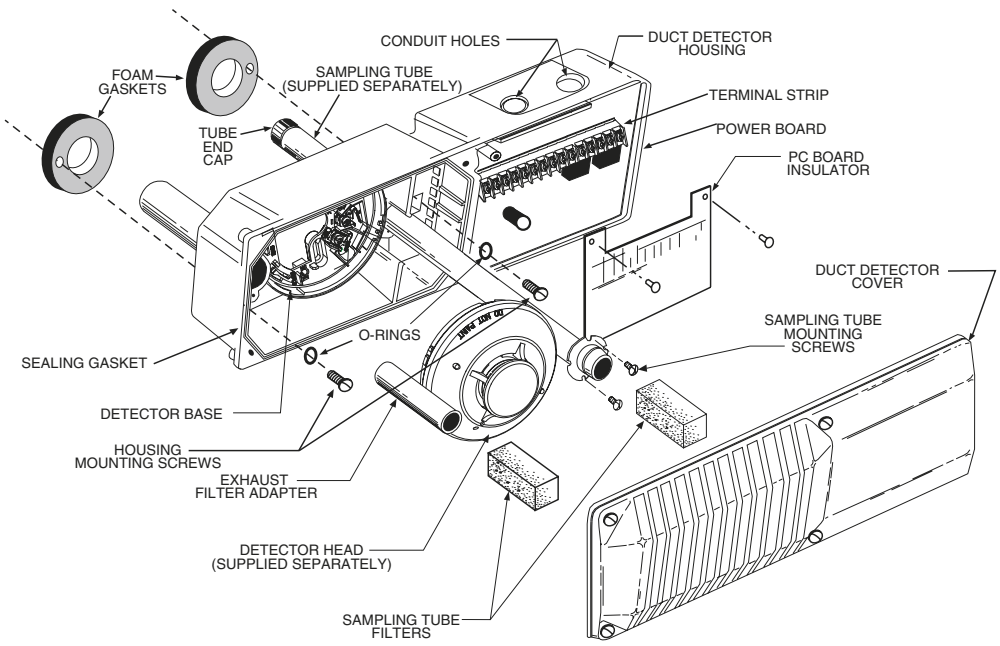
An HVAC system supplies conditioned air to virtually every area of a building. Smoke introduced into this air duct system could be distributed to the entire building. Smoke detectors designed for use in air duct systems are used to sense the presence of smoke in the duct, and prevent its spread.

The ED-DPR Duct Detector Housing is used with System Sensor's Model ED-DP/I photoelectronic detector head (purchased separately). This smoke detection method samples air passing through a duct and allows detection of a developing hazardous condition. When sufficient smoke is sensed, an alarm signal is initiated at the detector and appropriate action is taken to shut off fans and blowers, change over air handling systems, etc. This can prevent the distribution of toxic smoke and fire gases throughout the areas served by the duct system.

Model ED-DP/I is an intelligent photoelectric, type smoke detector that utilizes a sensing chamber that is designed to respond rapidly to a broad range of fires. The sensing chamber employs features that minimize the effects of settled dust on performance.

The ED-DP/I is designed with tri-color LEDs to indicate detector status. The detector can be programmed to make the LEDs blink or be steady green, amber or red. The detector remote output is configured to follow the head LED. A remote LED annunciator is available as an accessory (RA400Z, RTS451, RTS451KEY). The ED–DPR has remote test capability with the RTS451KEY remote test station.

Figure 1.



The ED-DPR is built to operate on communication lines from a compatible fire alarm panel. Two sets of Form C (SPDT) relay contacts are available for control purposes. The red LED on the detector power board flashes when the relay is set. The power board LED is independent of the detector LED. Remote alarm indication is made possible by using the auxiliary alarm output (see Figure 5). The duct detector can be tested by using the correct respective code commands from the panel or by using the RTS451KEY test station. However, in either case, the duct detector must be reset at the panel by using correct code commands. See panel instructions for details.

This duct detector can be programmed through the panel's configuration software to operate in either of two modes: In automatic mode (default mode), relays on the device will be set whenever the detector goes into alarm. In manual mode, the relays operate independently from the state of the detector and are controlled by incoming messages.

This duct detector requires compatible addressable communications to function properly. Connect this detector to listed-compatible control panels only.

Contents Of The Duct Detector Housing Kit

The ED-DPR Duct Detector Housing consists of the following items: (See Figure 1.)

1. Complete housing base and cover assembly.
2. Two #10 sheet metal mounting screws.
3. Two sampling tube filters.
4. Drilling template.
5. Two 5/16-inch O-rings.
6. Two foam gaskets.
7. Four #6 self-tapping mounting screws for the sampling tube.
8. One filter adapter.
9. One sampling tube end cap.
10. Two #10 speed nuts.

Installation Sequence

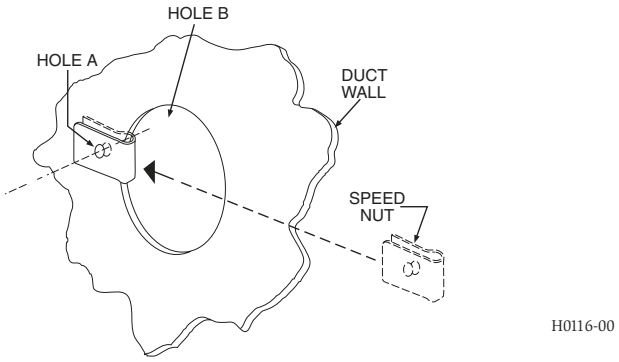
Step 1. Verify Duct Air Velocity

The ED-DPR is designed to be used in air handling systems having air velocities between 500 and 4000 feet per minute. Be sure to check engineering specifications to ensure that the air velocity in the duct falls within these parameters. If necessary, use a meter to check the air velocity in the duct.

Step 2. Drill The Mounting Holes

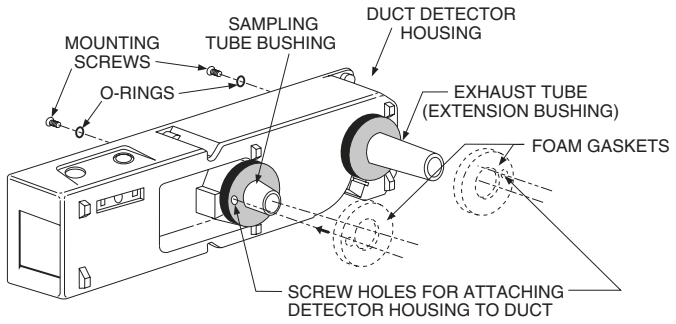
Remove the paper backing from the drilling template. Affix the template to the air duct at the desired mounting location. Make sure the template lies flat and smooth on the air duct. Center punch hole targets and remove the template. Drill the holes as indicated on the template. Slide the two speed nuts over the two small holes (Hole A) next to the sampling tube bushing holes (Hole B) previously drilled in the duct. (See Figure 2.)

Figure 2. Speed nut mounting location:



CAUTION: Do not over tighten the screws.

Figure 2A. Installation of foam gaskets over sampling tube bushings:



Location of detectors mounted in or on air ducts should be at least six duct widths downstream from any duct openings, deflection plates, sharp bends, or branch connections.

Exception: Where it is physically impossible to locate the detector, it can be positioned closer than six duct widths, but as far as possible from the opening, bend, or deflection plates.

Step 3. Mount Duct Housing

Remove the duct housing cover. Slide the foam gaskets over the tube bushings as shown in Figure 2A. Make sure the two small holes in the gaskets line up with the two duct housing mounting holes. Put one 5/16-inch O-ring over each of the two #10 sheet metal screws. Use the two sheet metal screws to secure the duct housing to the duct.

Table 1. Sampling Tubes

TUBE	OUTSIDE DUCT WIDTH	
ST-1.5	1 to 2 ft.	(0.3 to 0.6 m)
ST-3	2 to 4 ft.	(0.6 to 1.2 m)
ST-5	4 to 8 ft.	(1.2 to 2.4 m)
ST-10	8 to 12 ft.	(2.4 to 3.7 m)

Step 4. Install The Sampling Tube

The sampling tube (shown in Figure 3) is identified by a series of air inlet holes on the tube. This tube must be purchased separately. Order the correct length, as specified in Table 1, for the width of the duct where it will be installed. The exhaust tube is molded into the base of the duct housing.

Figure 3. Air duct detector sampling tube:

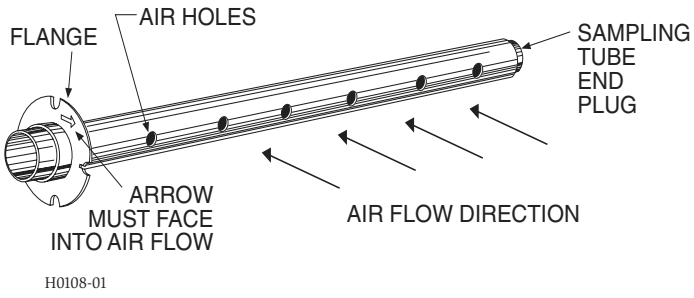
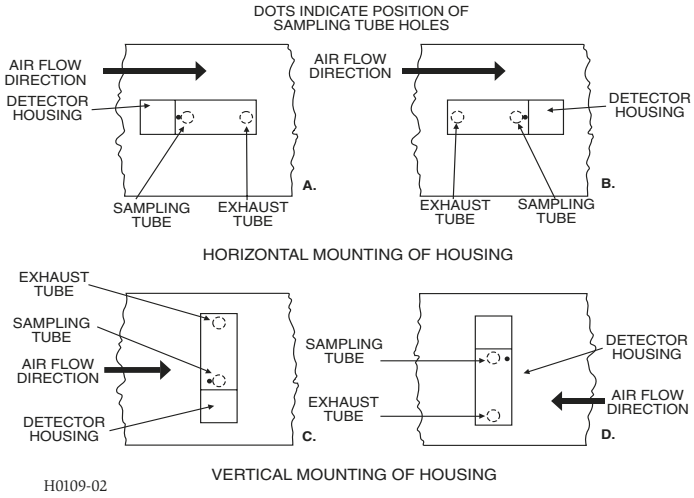


Figure 4. Tube mounting configurations with varying air flow direction and orientation of detector housing. Vertical or horizontal mounting is acceptable.



The sampling tube should be installed in the sampling tube bushing located in the center of the duct detector housing. (See Figure 2A.) The air inlet holes must face into the air flow. To assure proper installation, the tube mounting flange is marked with an arrow. Mount the sampling tube so that the arrow points into the air flow. Figure 4 shows the various combinations of duct detector and tube mounting configurations with respect to air flow.

Installation for Ducts

NOTE: To install sampling tubes in ducts more than 8 feet wide, work must be performed inside the air duct. Sampling of air in ducts wider than 8 feet is accomplished by using the ST-10 sampling tube.

⚠WARNING

In no case should more than 2 air inlet holes be cut off the tube. There must be a minimum of 10 holes in the tube exposed to the air stream.

Install the sampling tube as follows:

1. *If the sampling tube is longer than the width of the air duct,* drill a 3/4-inch hole in the duct opposite the hole already cut for the sampling tube. Make sure the hole is 1“ to 2” below the inlet hole on the opposite side of the duct to allow moisture drainage away from the detector.
2. Slide the sampling tube into the bushing located in the center of the duct housing. Position the tube so that the arrow points into the air flow. Secure the tube flange to the housing bushing with the two #6 self-tapping screws.
3. For ducts greater than 8 feet wide only. From inside the duct, couple the other section of the sampling tube to the section already installed using the 1/2-inch conduit fitting supplied. Make sure that the holes on both of the sampling tubes are lined up facing the direction of air flow.
4. If there are more than two holes in the section of the tube extending from the duct, select a different length using Table 1. Otherwise, trim the end of the tube protruding through the duct so that 1 to 2 inches of the tube extends outside the duct. Plug this end with the tube end cap and tape closed any holes in the protruding section of the tube. Be sure to seal the duct where the tube protrudes.
5. Any sampling tube over 3 feet long must be supported on the opposite side of the duct detector housing. If the tube (over 3 feet long) doesn’t protrude through the duct (on the side opposite the housing) it must be supported by other means.

Modification Of Sampling Tubes

There may be situations where duct widths are not as specified for the installation. In such cases, it is permissible to modify a sampling tube that is longer than necessary to span the duct width.

Use a 0.193-inch diameter (#11) drill and add the appropriate number of holes so that the total number of holes exposed to the air flow in the duct is 10 to 12. Space the additional holes as evenly as possible over the length of the tube.

NOTE: This procedure should only be used as a temporary fix. It is not intended as a permanent substitute for ordering the correct length tubes.

Wiring Instructions

All wiring must be installed in compliance with the National Electrical Code, applicable local codes, and any special requirements of the Authority Having Jurisdiction.

Step 5. Field Wiring

For signal wiring, (the wiring between interconnected detectors or from detectors to auxiliary devices), it is recommended that single-conductor wire be no smaller than 18 gauge. The duct detector terminals accommodate wire sizes up to 14 gauge. The last foot or so of conduit should be flexible steel conduit which facilitates installation and puts less strain on the conduit holes in the housing. Solid conduit connections may be used, if desired.

Smoke detectors and alarm system control panels have specifications for allowable loop resistance. Consult the control panel manufacturer’s specifications for the total loop resistance allowed for the control panel being used before wiring the detector loop.

NOTE: For wiring between duct smoke detectors and accessories, it is recommended to use shielded twisted pair where the shield wire is earth grounded at the panel.

1. Wire the detector housing per the wiring diagram, see Figure 5.
2. Install the detector head into the base. Push the detector into the base while turning it clockwise to secure it in place.
3. Set the desired address using the IR configuration tool (EA–CT).
4. Test the duct detector as described in the Testing section of this manual.

NOTE: When using the EA–CT tool, the address/loop on a duct detector in sight can be set or changed. However, if the duct detector is being communicated to as a target (out of sight device) through another device (in sight), only the address of the target can be changed.

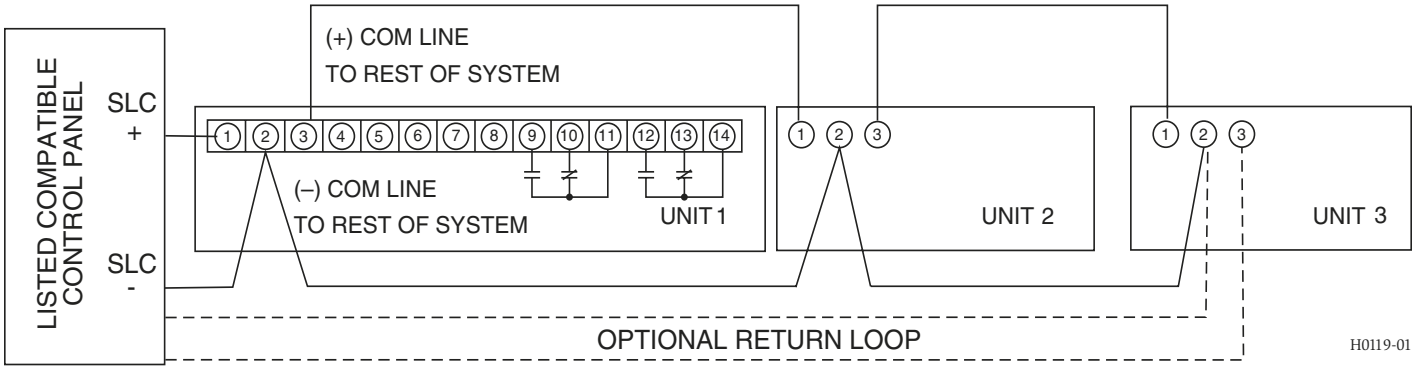
Device in sight must be within 30ft. of the EA–CT in order for it to communicate.

⚠CAUTION

Dust covers provide limited protection against airborne dust particles during shipping. Dust covers must be removed before the detectors can sense smoke. Remove detectors prior to heavy remodeling or construction.

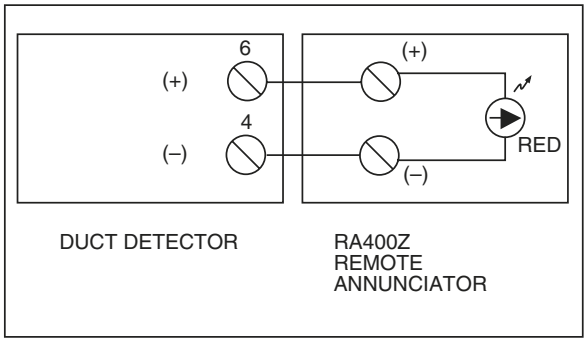
Figure 5. Wiring diagram:
CAUTION: Do not loop wire under terminal 1, 2 or 3. Break wire run to provide supervision of connections.

Wiring Diagram for ED-DPR Duct Smoke Detector using a UL Listed Control Panel



NOTE: For terminals 9 through 14, normally closed and normally open relay positions are defined with product in reset condition, not in alarm.

Wiring Diagram for ED-DPR Duct Smoke Detector with Optional RA400Z



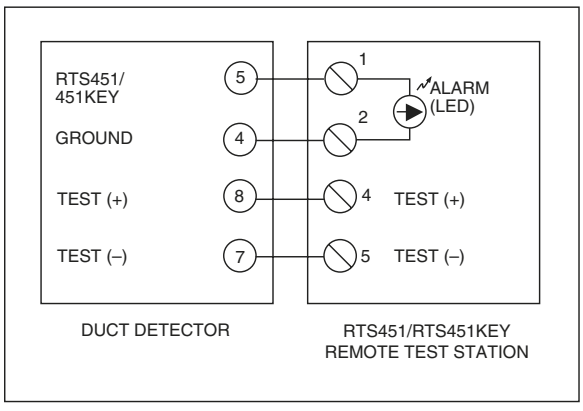
Break Tab on RA400Z for use with ED-DPR.

Power Supply Electrical Ratings

ACCESSORY CURRENT LOADS AT 24VDC		
DEVICE	STANDBY	ALARM
RA400Z	0mA	10mA MAX
RTS451/ 451KEY	0mA	4.6mA MAX

H0122-01

System Wiring Diagram for ED-DPR Duct Smoke Detector with RTS451/RTS451KEY



NOTE: For wiring between duct smoke detectors and accessories, it is recommended to use shielded twisted pair where the shield wire is earth grounded at the panel.

* All accessory currents are additional to the ED-DPR. There are no additional currents for accessories in standby.

Step 6. Install the Filters

Most duct installations are subject to dust accumulation. System filters remove a large percentage of this contamination, but cannot remove all of it. Dust inside the duct detector causes problems. First, very fine particles of dust can enter the detector sensing chamber and cause the unit to alarm. Second, the accumulation of dust and dirt necessitates a more frequent periodic cleaning schedule, which can result in substantial cost and/or down time. Disposable sampling tube filters can reduce the nuisance alarms caused by dust, and can also extend the maintenance interval. To install the sampling tube filters, insert the filter adapter into the exhaust tube and push the filter onto the adapter tube on the left, as shown in Figure 6. Then, install the other filter over the end of the sampling tube.

Filters rarely have a significant effect on the behavior of smoke. As a result, even a filter that is as much as 90% clogged does not significantly affect the entry of smoke into the duct detector housing. Therefore, visual inspection is usually all that is necessary to determine if filters need replacement.

Step 7. Perform Detector Check

7.1 Air Flow

To verify sufficient sampling of ducted air, use a manometer to measure the differential pressure created from air flow across the sampling tubes. The pressure should measure no less than 0.05 inches of water and no greater than 1.0 inches of water.

Figure 6. Sampling tube filter installation:

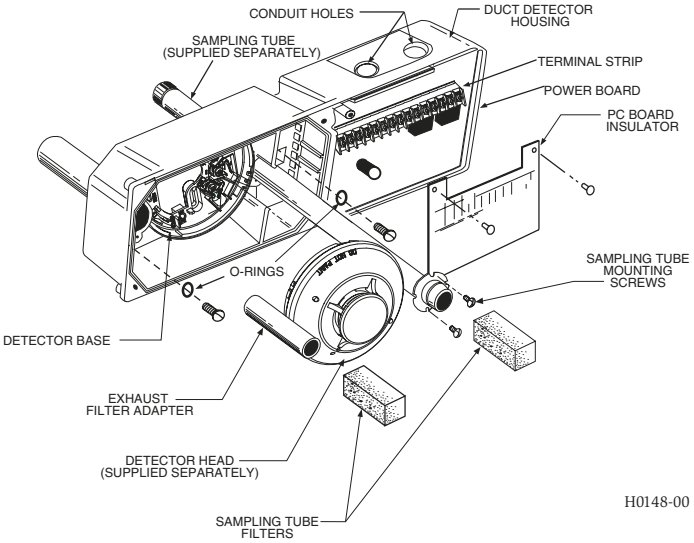


Figure 7. Detector head removal:

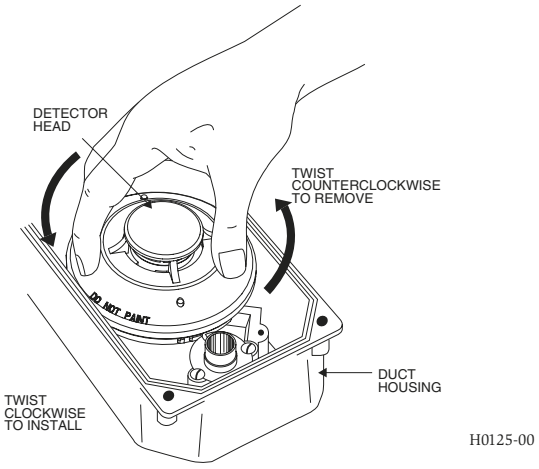
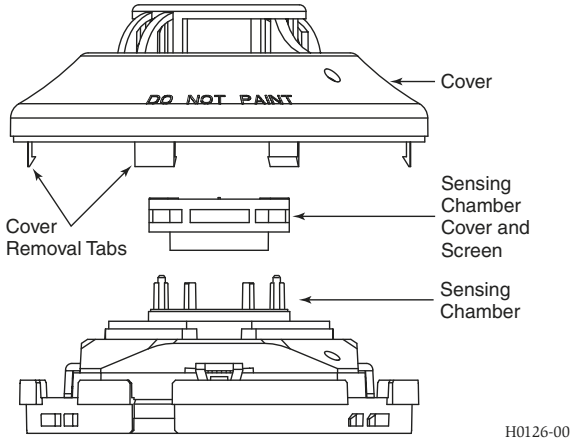


Figure 8. Photo head exploded view:



7.2 Testing

Before replacing the duct housing cover, check the detector interconnections, as follows:

A. Functional:

The duct detector head can be functionally tested by using the IR configuration tool (EA-CT). Following the instructions, initiate the detector test sequence. The detector should initiate a walk test message at the fire alarm control panel. Refer to the control panel technical documentation for further information.

B. RTS451/RTS451KEY Remote Test Station:

The RTS451/RTS451KEY Remote Test Station facilitates testing of the duct detector alarm capability. This duct detector cannot be reset by the RTS451/RTS451KEY. It must be reset at the system control panel.

C. Smoke Entry:

To determine that smoke is capable of entering the sensing chamber, conduct a visual examination to note any obstructions around the sensing chamber. If a smoke test is required, blow smoke from a cigarette, cotton wick, or punk directly at the smoke detector head. It is

important to plug the exhaust and sampling tube hole to prevent ducted air from blowing smoke away from the smoke detector head. Record all test records. A detector that fails any of these tests should be cleaned as described under **Cleaning**, and retested. If the detector fails after cleaning, it must be replaced.

Step 8. Install the Cover

Install the cover using the four screws. Be certain filters are installed as specified in Step 6. Make sure that the cover fits into the base groove and the gasket is in the proper position. Tighten the four cover screws to 10 in-lbs.

⚠CAUTION

The cover must be properly affixed in order for the duct detector to operate.

Cleaning/Maintenance Procedure

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

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 install the filters.
4. Remove the detector head to be cleaned from the duct housing.
5. Remove the detector cover by pressing firmly on each of the four removal tabs that hold the cover in place.
6. Vacuum the screen carefully without removing it. If further cleaning is required continue with Step 7, otherwise skip to Step 10.
7. Remove the chamber cover/screen assembly by pulling it straight out.
8. Use a vacuum cleaner or clean, compressed air to remove dust and debris from the sensing chamber.
9. Reinstall the chamber cover/screen assembly by sliding the edge over the sensing chamber. Turn until it is firmly in place.
10. Replace the cover using the LEDs to align the cover and then gently pushing it until it locks into place.
11. Reinstall the detector head in the duct housing.
12. Test the detector as described in **Testing**.
13. Reconnect disabled circuits.
14. Other checks that should be made during maintenance procedures:
    - — Holes or cracks in duct work near vicinity of detector.
    - — Air leaks where detector housing or sampling tubes are attached to duct.
    - — Dust accumulations in or on sampling tubes.
    - — Wiring terminal screw tightness.
15. Perform detector check as specified in step 7.
16. Install the cover.
17. Notify the proper authorities that the system is back on line.

Periodic Maintenance Requirements

Air duct smoke detectors should be maintained at least once a year – more often if the detector heads become obviously dirty. The detectors must also be cleaned immediately after a fire. Failure to properly maintain air duct smoke detectors may cause unnecessary false alarms.

It is recommended that a permanent Detector Test Log be set up and maintained, with a record for each individual smoke detector in each building. Each detector should be clearly described, with information on the type of detector, the model number, the serial number (if any), the location, and the type of environment. Data entries should include test dates, type of test mode, test results, maintenance, and comments.

Accessories	Part No.
Remote LED	RA400ZA
Replacement Filters	F36-05-00
End Cap For Sampling Tube	P48-61-00
Installation Kit (Parts bag)	A2650-01
Remote Test Station	RTS451/RTS451KEY
Sampling Tube 12″	ST-1
Sampling Tube 18″	ST-1.5
Sampling Tube 3 ft.	ST-3
Sampling Tube 5 ft.	ST-5
Sampling Tube 10 ft.	ST-10
IR Configuration Tool	EA–CT

Please refer to insert for the Limitations of Fire Alarm Systems

FCC Statement

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.
Note: This equipment 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 a residential installation. 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 communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Three-Year Limited Warranty

System Sensor warrants its enclosed smoke detector to be free from defects in materials and workmanship under normal use and service for a period of three years from date of manufacture. System Sensor makes no other express warranty for this smoke detector. No agent, representative, dealer, or employee of the Company has the authority to increase or alter the obligations or limitations of this Warranty. The Company's obligation of this Warranty shall be limited to the repair or replacement of any part of the smoke detector which is found to be defective in materials or workmanship under normal use and service during the three year period commencing with the date of manufacture. After phoning System Sensor's toll free number 800-SENSOR2 (736-7672) for a Return Authorization number, send defective units postage prepaid to: System Sensor, Returns Department, RA #_____, 3825 Ohio Avenue, St. Charles, IL 60174. Please include a note describing the malfunction and suspected cause of failure. The Company shall not be obligated to repair or replace units which are found to be defective because of damage, unreasonable use, modifications, or alterations occurring after the date of manufacture. In no case shall the Company be liable for any consequential or incidental damages for breach of this or any other Warranty, expressed or implied whatsoever, even if the loss or damage is caused by the Company's negligence or fault. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you. This Warranty gives you specific legal rights, and you may also have other rights which vary from state to state.