Revision 1.0
02-27-2024
HFE8055

Installation and maintenance manual
UG8-U-24 and UG8-U-120

Technical data:

Duct smoke detector:	UG8-U-24 and U8-U-120
Reset/Test, push button for two sec:	Resets smoke detector
Test spray type:	Home Guard HO-25S Smoke detector tester
LED Indications:	
Green:	Power on
Yellow flashing:	Smoke detector fault/removed
Yellow fixed:	Service alarm
Red:	LED on smoke detector: Smoke alarm
Duct air velocity:	100-4000 FPM
Pressure differential between tubes:	0.0028 to 1.49 in/H2O
Operating temperature:	32°F (0°C) to 100°F (38°C)
Sensitivity limits:	0.74 – 1.19%/ft. For use with detector head model EVCA-PY-DA UG8. 0,82 - 1,05%/ft. For use with detector head model EVCA-PY-DA. Use Trutest Model number 801 to test the smoke detector.

Specifications:

Operating temperature:	32°F (0°C) to 100°F (38°C),
Storage temperature:	-22°F (-30°C) to 158°F (70°C)
Humidity:	0% to 95% Relative humidity
Air Velocity:	100 ft/min (0.51 m/sec.) - 4000 ft/min (20.32 m/sec).
Footprint dimensions:	L: 8,58 in (218 mm) / W: 4,7 in (119,5 mm) / D: 3,03 in (77 mm)
Weight:	UG8-U-24: 1.025 lb / 0,465kg / UG8-U-120: 1.069 lb / 0,485kg

Electrical	**UG8-U-24**	**UG8-U-24**	**UG8-U-120**
Power supply voltage:	24V DC (-5 / +20%)	24V AC (±10%) 50-60Hz	110-120V AC 50-60Hz
Reset time (by power down):	1 sec. max.	1 sec. max.	1 sec. max.
Power up time:	1 minute	1 minute	1 minute
Sensitivity:	Detector head EVCA-PY-DA UG8: sensitivity 0.74 – 1.19%/ft.		
Sensitivity:	Detector head EVCA-PY-DA: sensitivity 0,82 - 1,05%ft.		

Current requirements	**UG8-U-24**	**UG8-U-24**	**UG8-U-120**
Max. standby current:	70mA	180mA	55mA (at 120Vac)
Max. alarm current:	85mA	235mA	70mA (at 120Vac)

Contact ratings	
Alarm initiation contacts (SPDT and SPST)	8A @ 30V DC (resistive) 8A @ 250V AC (resistive)
Supervisory contacts (SPST)	1A @ 24V DC (resistive) 1A @ 120V AC (resistive)
Service alarm relay (SPST)	1A @ 24V DC (resistive) 1A @ 120V AC (resistive)

Prior to installing yout duct detector

Read this installation manual which provides information on detector placement, wiring, test and maintenance. This manual is also available online at www.calectro.com.

Follow the installation instruction in the installation manual and all applicable local codes including NFPA 72, NFPA 90A, and NEMA Guide for Proper Use of Smoke Detectors in Duct Applications.

Table of contents

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1

⚠ WARNING!

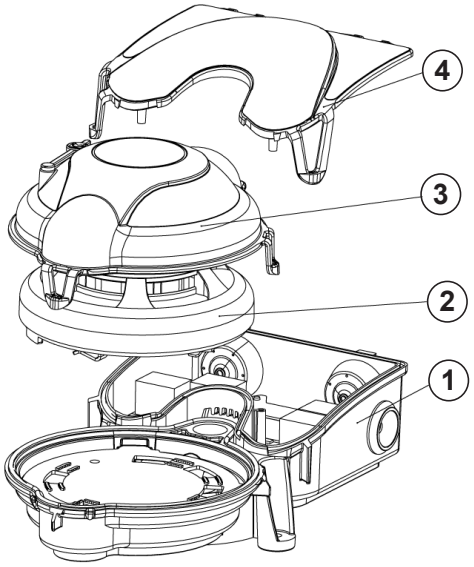
Limitations of duct smoke detectors

The National Fire Protection Association 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. Calectro AB supports this position and strongly recommends that the user read NFPA Standards 90A, 72, and 101. UG8-U is listed per UL 268A. This device will not operate without electrical power supplied to it. Fire situations may cause an interruption of power. The system safeguards should be discussed with your local fire protection specialist. This device will not sense smoke unless the ventilation system is operating and the covers are properly attached. 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.

2

Overview of UG8-U-X components

Item No.	QTY.	PartNo	Description
1	1	000-0061	UG8 Base
2	1	200-0027	Detector Nittan
3	1	000-0124	Detetctor cover
4	1	000-0100	Electronics Cover



3

General description

Smoke entering the duct system will be dispersed throughout the whole building. The UG8-U Duct Detectors utilizes the photoelectric sensing method and is designed to sense the existence of smoke in the duct. This design of the housing along with the detector technology is capable of detecting unsafe conditions by sampling the air through the duct, when the smoke is detected, it will emit a signal that will create the urgency for proper action to be taken to turn off circulating fans, blowers and any other auxiliary devices that are connected to the system. The actions taken will enable the management of hazardous smoke through the entire space that is being protected by the duct detection arrangement.

The UG8-U has two versions that operates with 24V DC/AC or 120V AC. The UG8-U-24 for the 24V DC/AC and the Model UG8-U-120 for the 120V AC versions. Alarm relay contacts are accessible to interface with control panel, HVAC control, and other functions. The two covers over the smoke detector head and electronics have snap locks for toolless access for installation, service and maintenance.

3.1 UG8-U Features:

- High efficient single sampling tube
- Easy to install
- Snap lock covers

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4 Duct smoke detector kit contents

1. Detector/power board assembly and covers
2. Five metal screws for mounting
3. Installation manual (this document)

4.1

Sampling tube	Length of sampling tube
ST280	0,91 ft.
ST580	1,9 ft.
ST-EXTEND	3,47 ft.
PST195	0,64 ft.

NOTE!

A sampling tube must be ordered to complete the installation. The plastic sampling tube PST195 is to be used without any modifications or extensions. See section 5.2 for installation.
The aluminum sampling tube versions ST280 or ST580 should penetrate approx 90% of the width of the duct. See Table 4.1 to determine the sampling tube required for different duct widths. See section 5.3 for installation.

5 Installation

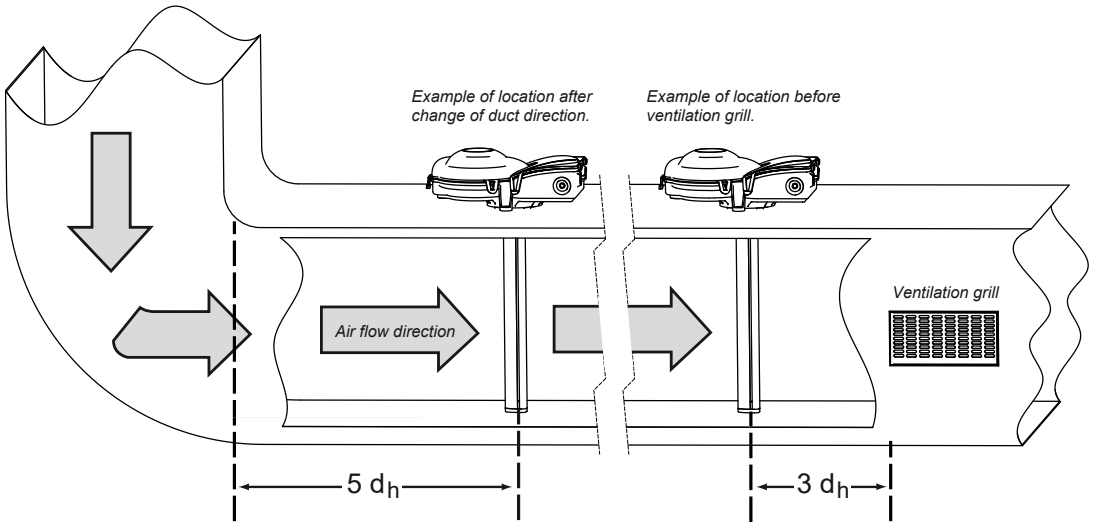
Check the air flow direction and velocity. The UG8-U detector is designed to be used in air handling systems with air velocities of 100 to 4000 feet per minute. Duct widths from 6 inches (7,8 with PST195) to 9 feet can be accommodated. For rectangular ducts, the minimum width is 4 inches. Follow engineering specifications to ensure that the air velocity in the duct falls within these parameters. The air velocity can be verified by the use of a velocity meter to check the air velocity in the duct.

NOTE! Avoid mounting in places where condensation problems could arise, such as cold attics or outdoors.

5.1 determine mounting location on the duct

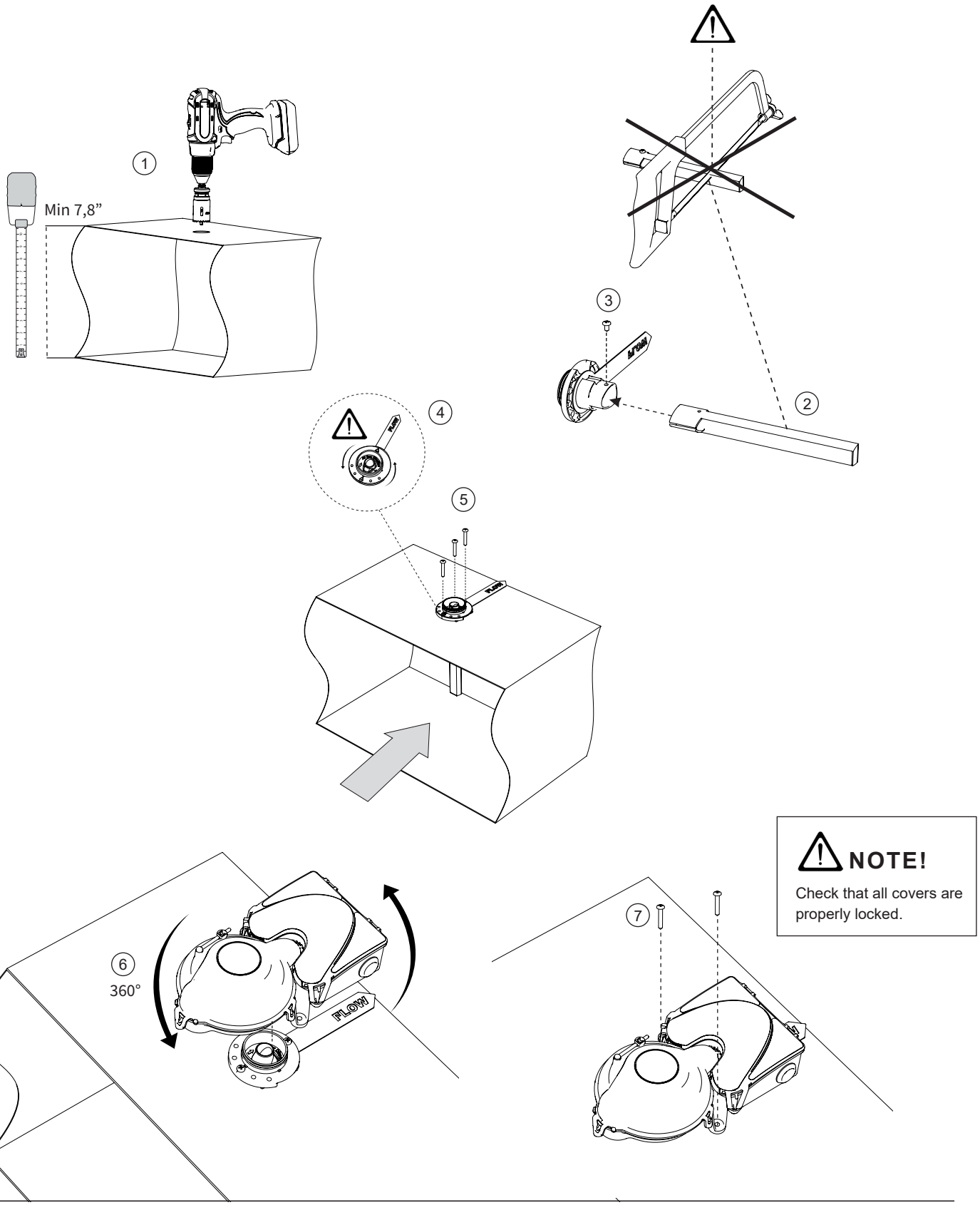
- The sampling tube must be installed in the correct air flow direction according to.
- The UG8-U can be installed on any side of the duct.

We recommend that the UG8-U is mounted on a distance of approximately 3 times the duct diameter **before** an obstruction such as dampers, filters or bends, and approximately 5 times the diameter **after** these obstructions as shown in.



5.2 Mounting of detector with plastic tube (PST195) on the duct

1. Make sure that the diameter of the duct is minimum 7,8 inch (200 mm). Drill a 1 ½ inch (38 mm) hole where the detector is to be mounted.
2. Insert the sampling tube into the bottom of the rotation part. **NOTE! The plastic tube must not be cut.**
3. Secure it with the locking screw.
4. Insert the rotation part with the sampling tube. Turn the rotation part in the correct air flow direction. See the air flow direction arrow.
5. Fix the rotation part on the ventilation duct with enclosed screws.
6. Mount the Uniguard on the rotation part and rotate it in the desired direction.
7. Secure the Uniguard with two screws.



NOTE!
Check that all covers are properly locked.

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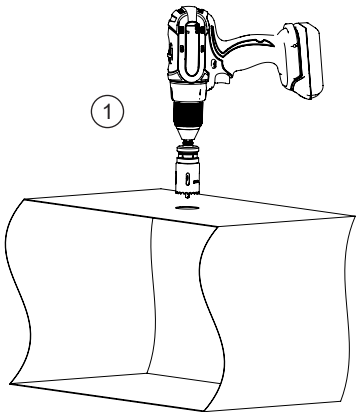
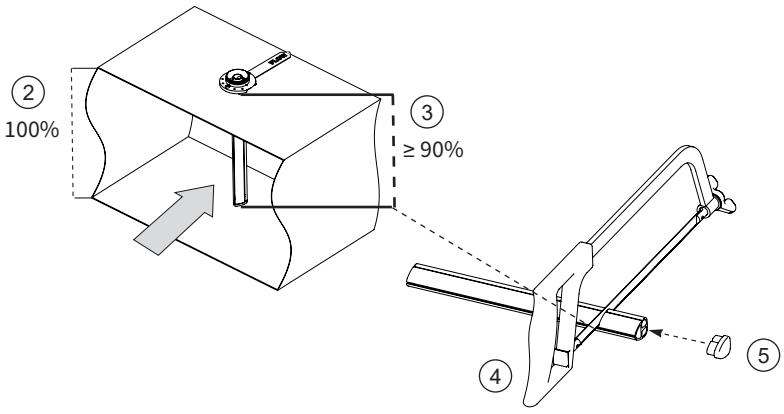
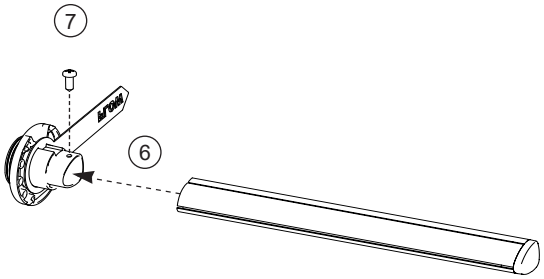
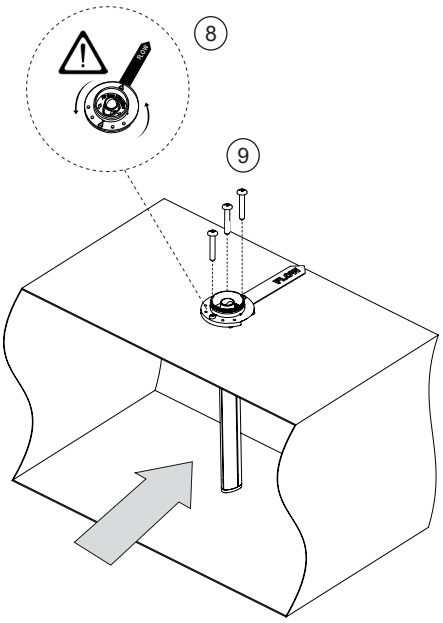
5.3 Mounting of detector with aluminium tube (ST280 / ST580) on the duct

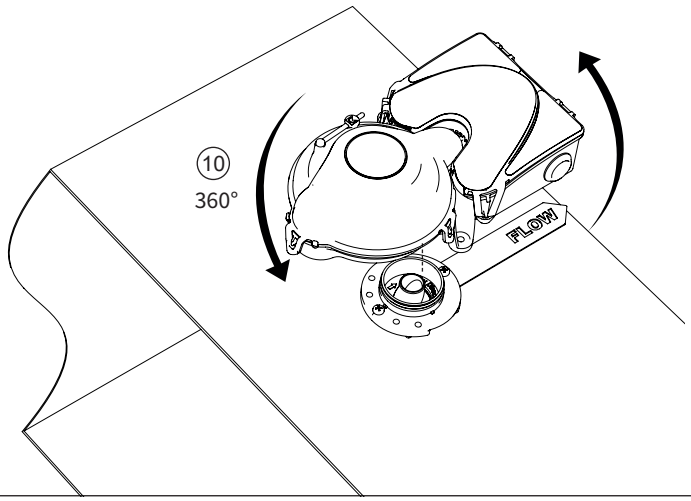
1. Drill a 1 ½ inch (38 mm) hole where the detector is to be mounted.
2. Measure the diameter of the duct.
3. The tube should penetrate at least 90% of the width of the duct.
4. Shorten the sampling tube, if necessary.
5. Insert the end plug.
6. Insert the sampling tube into the bottom of the rotation part.
7. Secure it with the locking screw.
8. Insert the rotation part with the sampling tube. Turn the rotation part in the correct air flow direction. See the air flow direction arrows.
9. Fix the rotation part on the ventilation duct with enclosed screws.
10. Mount the Uniguard on the rotation part and rotate it in the desired direction.
11. Secure the Uniguard with two screws.

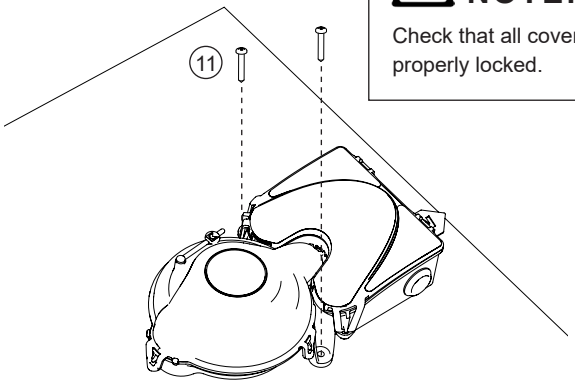








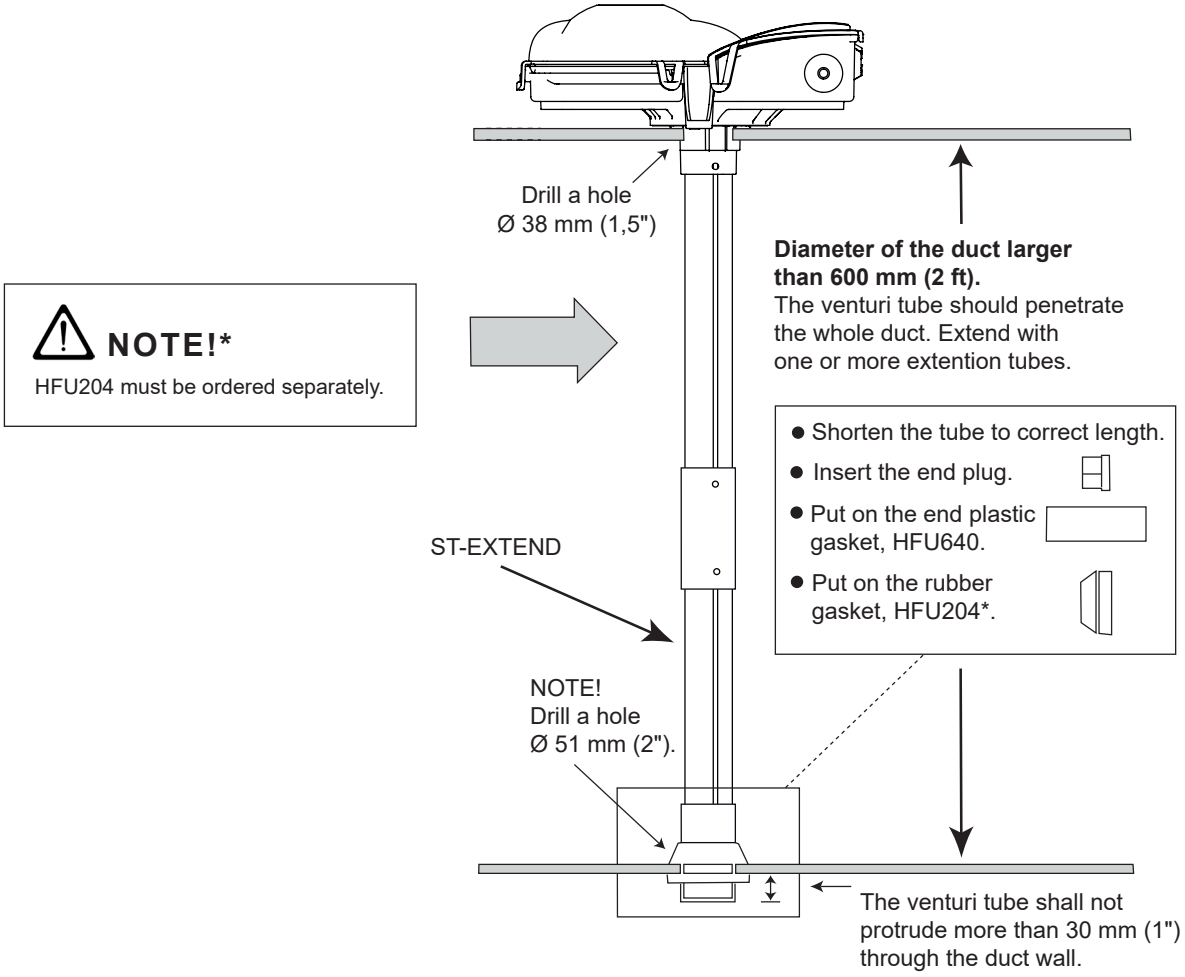




NOTE!
Check that all covers are properly locked.

5.4 Installation of sampling tube longer than 2 ft.

Strong vibrations can arise inside a duct due to the air currents. When the diameter of the duct is larger than 2 ft. the sampling tube should penetrate the whole duct. Drill a 2 inches hole in the opposite side of the duct. Mount the rubber gasket HFU204* in the hole. Put on the long plastic end plug HFU640 on the sampling tube. The sampling tube should not protrude more than 1 inch through the duct wall in order to avoid air leakage.



6 Field wiring installation guidelines

All wiring must be installed in compliance with the National Electrical Code and the local codes having jurisdiction. Appropriate wire gauges should be used. Color-Code the conductors used to connect smoke detectors to control panels and accessory devices to avoid wiring problems. Improper connections can prevent a system from operating and responding properly in the event of a fire condition. A minimum of 18 AWG wire must be used for signal wiring (when interconnecting detectors or between detectors and auxiliary devices).

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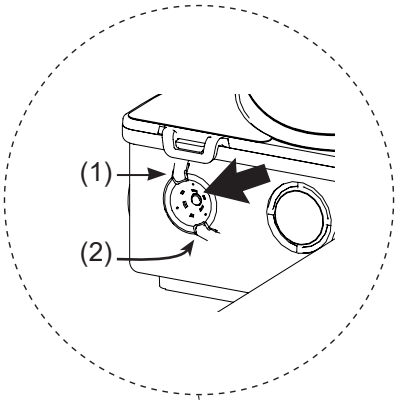
6.1 Cable glands

The UG8 has two pre-mounted IP67 approved glands for cable diameter 4-11mm, type Klikseal. When using another type of cable gland dismount the ones already installed by first pressing one side through the hole and then the other one (1-2).

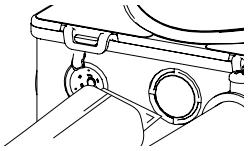


⚠ NOTE!

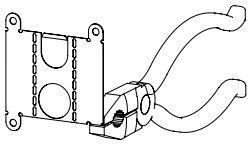
The cable must only be pulled through the Klikseal in one direction: into the Uniguard. To exchange a mounted cable: cut the cable outside of Uniguard and pull out the rest from the inside.

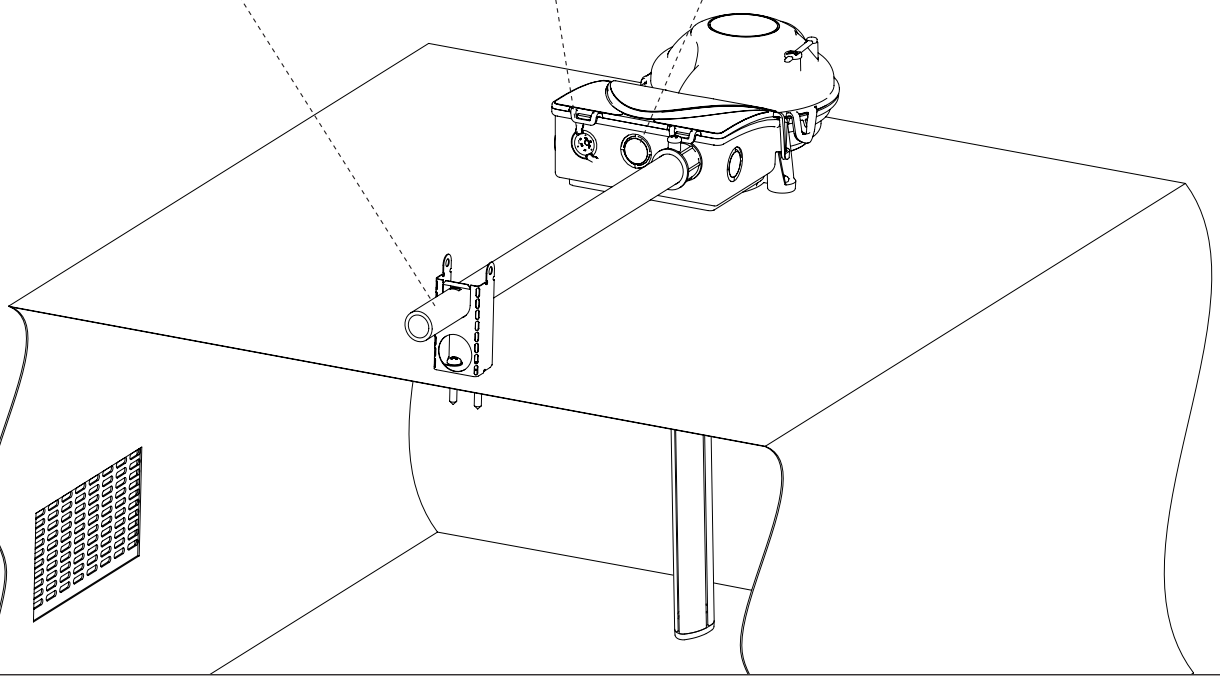
6.2 Steel conduit tube

Steel conduit tubes must be mounted with the enclosed mounting bracket. Place the bracket not closer than 12 inches from the UG8-U.



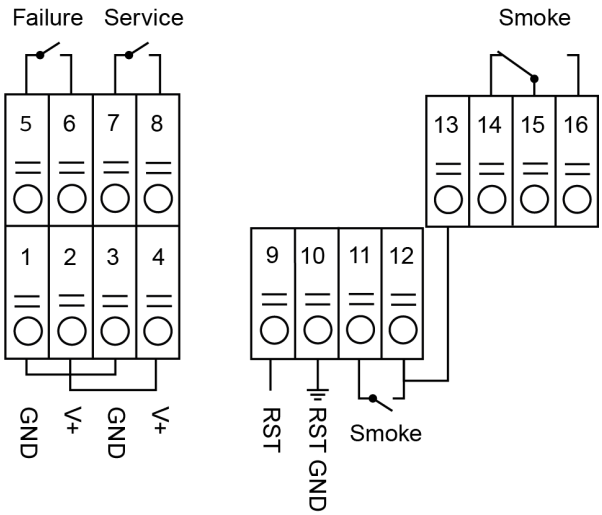
If the ”knock-out” part is to be used. Cut out the plastic with a **knife** and remove it completely, using your finger or a blunt object.



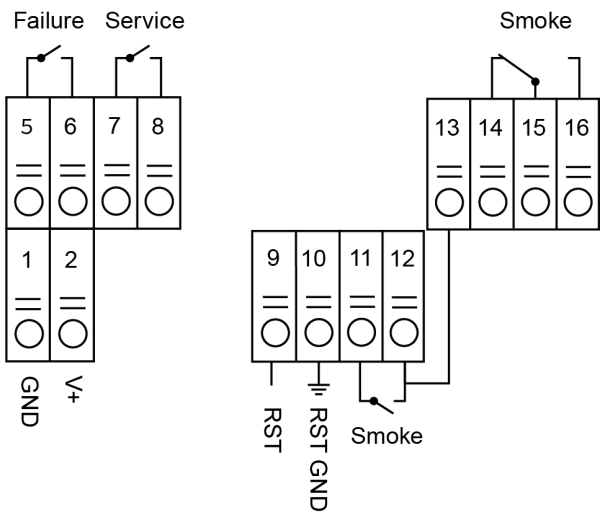


6.3 Connection terminals in UG8-U

24V AC/DC Version



120V AC Version



NOTE!

All relay contacts are shown in Power off / alarm condition. See specifications for contact rating.

Terminal	Function	Information
1	Power supply (non-polarized)	24V version: interconnected with terminal 3.
2	Power supply (non-polarized)	24V version: interconnected with terminal 4.
3	Power supply (not 120V version)	120V version: terminals not fitted.
4	Power supply (not 120V version)	120V version: terminals not fitted.
5	Supervisory relay (NC)	Indicates removed detector or power failure.
6	Supervisory relay (Common)	Indicates removed detector or power failure.
7	Service alarm relay (NC)	Indicates contaminated detector.
8	Service alarm relay (Common)	Indicates contaminated detector.
9	External Reset/Test input	Short circuit to terminal 10 to activate Reset/ Test alarm.
10	External Reset/Test input	Short circuit to terminal 9 to activate Reset/Test alarm.
11	Smoke alarm relay 1 (Common)	Indicates smoke alarm.
12	Smoke alarm relay 1(NC)	Indicates smoke alarm. Interconnected with terminal 13.
13	Smoke alarm relay 1(NC)	Indicates smoke alarm. Interconnected with terminal 12.
14	Smoke alarm relay 2 (NO)	Indicates smoke alarm.
15	Smoke alarm relay 2 (Common)	Indicates smoke alarm.
16	Smoke alarm relay 2 (NC)	Indicates smoke alarm.

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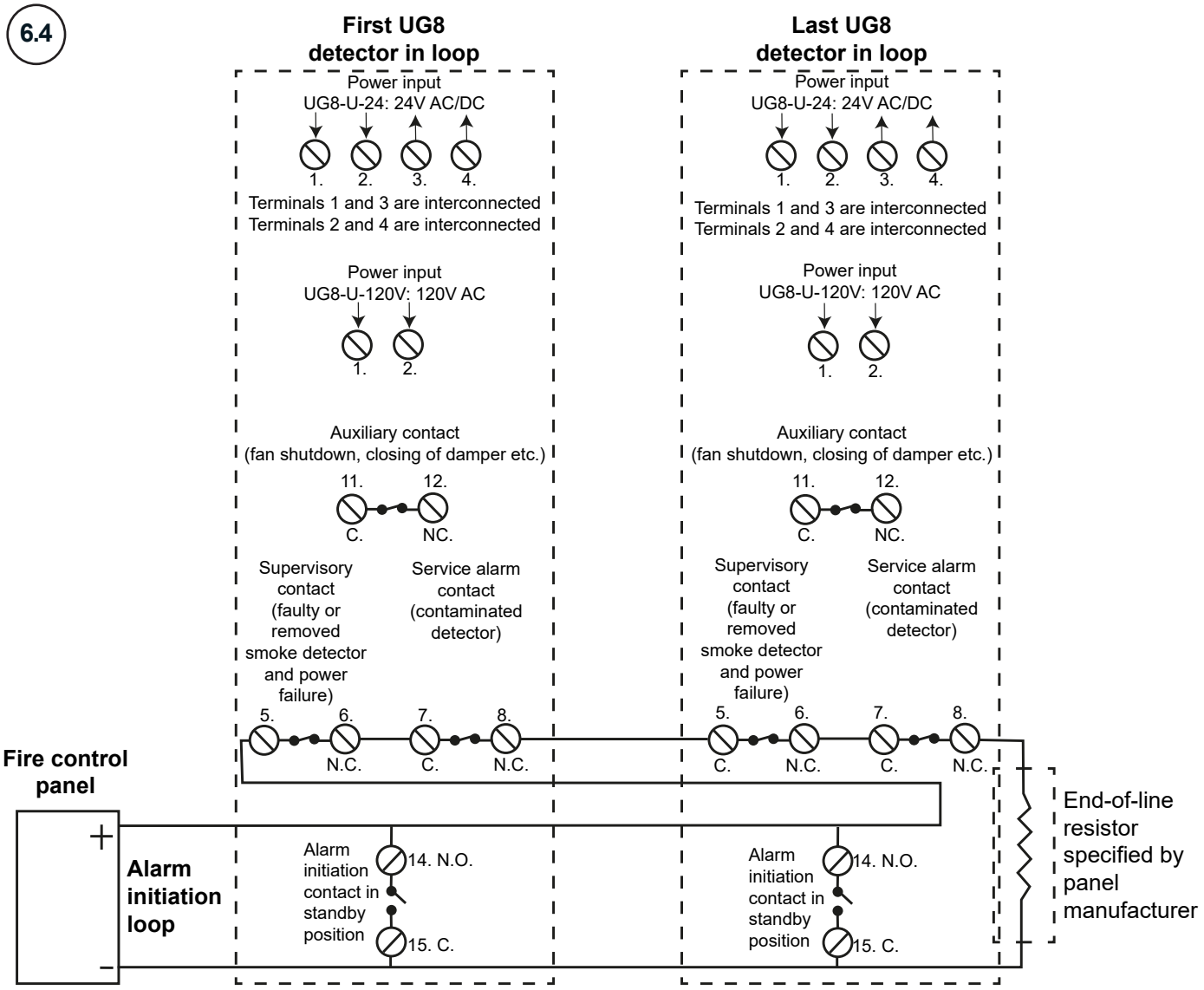
6.4



NOTE!

All relay contacts are shown in power on / no alarm condition. See specifications for contact rating.

7 Measurement tests

7.1 METHOD 1: aerosol spray for air flow speed: 100-275 FPM

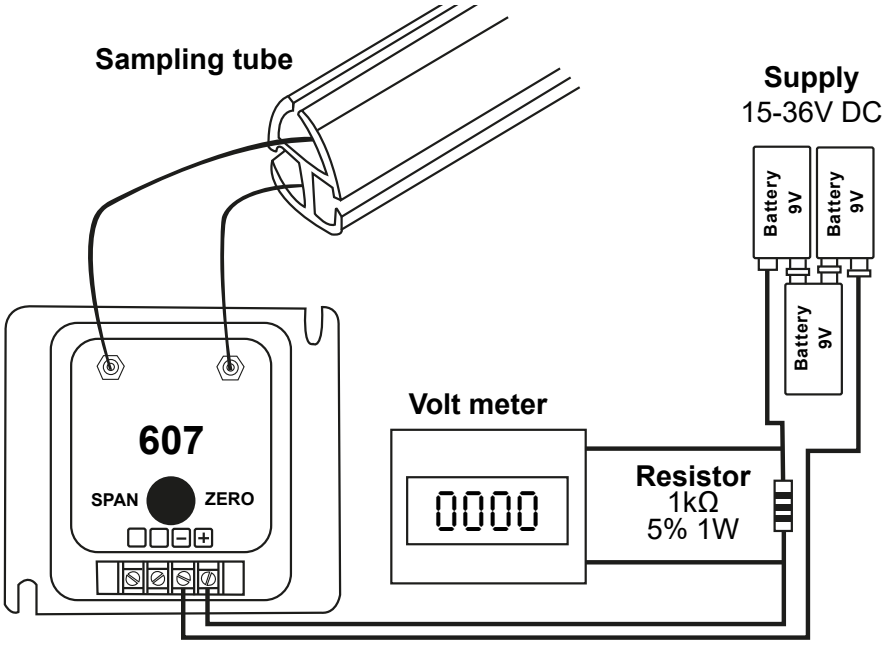
This test is aimed toward a system that operates between 100-275 FPM. Additional modifications will be required for a system that operates at higher air velocities that exceeds 275 FPM. This will require drilling an approximately ¼ inch (6.35mm) hole about 3 feet (0.914m) upstream from the duct detector. Measure the air movement through the hole with a velocity meter while the air handler is on, the air velocity should be a minimum of 100 FPM Introduce aerosol smoke into the duct through the ¼ inch (6.35mm) hole by following the instruction on the smoke detector tester and wait approximately 2-3 minutes for the detector to alarm. The detector alarm indicates that air is moving into the detector.

With the air handling unit on, push the Reset/Test Button (repeatedly if necessary) until the UG8-U remains in Standby condition. This also indicates that the aerosol smoke is ventilated from the detector chamber. Once this operation is completed, the ¼ inch (6.35mm) hole must be sealed.

> **⚠ NOTE!**
>
> Aerosol smoke can be purchased from Home Safeguard Industries at homesafeguard.com, model HO-25S Smoke Detector Tester. Proper use of the canned smoke agent will place the smoke detector in alarm mode. Refer to the manufacture's details and instructions for the proper use of the canned smoke agent.

7.2 METHOD 2: Low velocity 100-500 FPM: *This test is intended for low-flow systems (100-500 FPM)*

With the air handling unit on, measure the air velocity with an anemometer. The air speed must be100 FPM or greater. Then use the Dwyer Transmitter (series 607) by following the details provided in figure 16B. The pressure differential across the inlet port and outlet ports of the sampling tube shall be verified to be more than 0.01 inches of water. Measure the pressure difference between the inlet port and outlet ports on the sampling tube with a Dwyer Series 607 Differential Pressure Transmitter. To verify sufficient sampling of ducted air, turn the air handling unit on. Connect the leads of the meter to either side of the 1KΩ resistor. Allow unit to warm up for 15 seconds. With both HIGH and LOW pressure ports open to ambient air, measure and record the voltage drop across the 1KΩ resistor (measurement A), typical reading is approximately 4V. Use flexible tubing to connect the HIGH side of the transmitter to the inlet port of the sampling tube and the LOW side of the transmitter to the outlet ports of the sampling tube. Measure and record the voltage drop across the 1KΩ resistor (measurement B). Subtract the voltage recorded in measurement A from the voltage recorded in measurement B. The results should be greater than 0.15 volts, and then this indicates that there is enough air flow through the duct smoke detector for proper operation.



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8 Detector condition indication

Detector condition is indicated by the detector LED, and LEDs on the power board. The power board has separate LEDs to indicate the status of the UG8.

8.1 LED indications

= LED off = LED on = LED flashing

Status	Description	Detector LED: red	Power board LED		Status of relays	
			Yellow	Green	Terminals open	Terminals closed
Standby	Detector in normal operation				14-15	5-6 7-8 11-12 15-16
Detector removed	**Flashing LED 1:**				5-6 7-8 11-12 15-16	14-15
Contaminated smoke detector	Service relay open				7-8 14-15	5-6 11-12 15-16
Smoke Alarm	Detector detects smoke				11-12 15-16	5-6 7-8 14-15
Trouble	Power failure				5-6 7-8 11-12 15-16	14-15

9 Confirmation of operation

9.1 Powering the unit

Apply power to terminals 1 and 2:

24V AC/DC for UG8-U-24 version.

120V AC for UG8-U-120 version.

9.2 Perform detector check

Verify that the UG8-U is installed according to this manual and that it is in Standby Status according to **Table 8.1**.

9.3 Sensitivity verification

The UG8-U indicates if the smoke detector is contaminated and should be replaced. The indications are: opening of the relay contact terminals 7 and 8.

9.4 Detector cleaning procedures

Notify the local and responsible authorities that maintenance is being conducted on the smoke detector system, and that the system will be out of service until maintenance is completed. Disable the zone or system that is under maintenance to avoid unwanted alarms and the possibility of an fire department unnecessary dispatch.

9.4.1 Relay test

Reset/Test Button - Press and hold the test button located on the side of the power board cover. This will deactivate all relays. External Reset/Test input shorted (Terminals 9 and 10). This will deactivate all relays. Verify the execution of all intended auxiliary functions (i.e. fan shutdown, damper control, etc.).

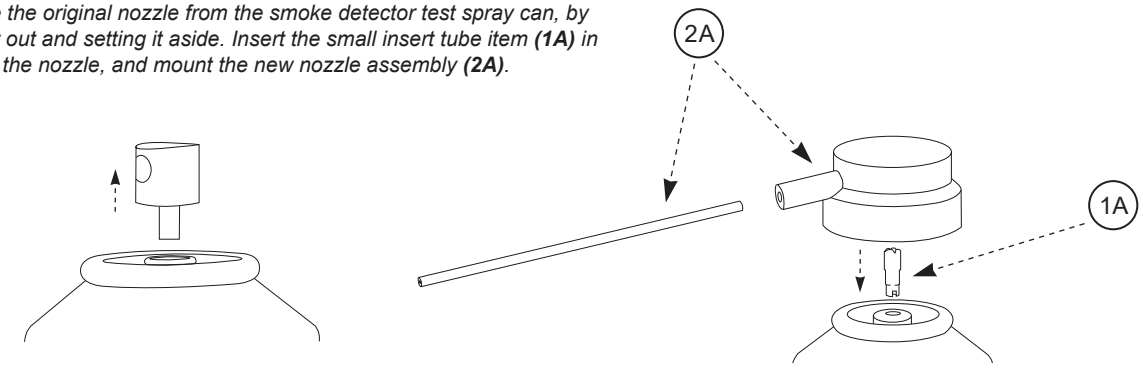
9.4.2 Smoke response and alarm relay test

To test the Smoke Alarm Relay and LEDs, open the test hole by lifting the test hole plug. **Figure 19**. Spray aerosol smoke* through the test hole as follow:

Air Velocity of 100f/m to 1000f/m: Apply the spray for 3 seconds, wait approximately 20 seconds for the detector to alarm.
Air Velocity of 2000 f/m: Apply the spray for 3 seconds, wait approximately 20 seconds, if no alarm, then apply the spray again for 3 seconds and wait for the detector to alarm.
Air Velocity of 3000f/m to 4000f/m: Apply the spray for 3 seconds, wait approximately 20 seconds, if no alarm, then apply the spray again for 3 seconds, wait approximately 20 seconds if no alarm, then apply the spray for 3 seconds and wait for the detector to alarm.

> **NOTE!**
> Make Sure that the Test Hole Plug is plugged back in place after completing the test. This section should follow the description/photos of the spray can assembly.

*Remove the original nozzle from the smoke detector test spray can, by pulling it out and setting it aside. Insert the small insert tube item **(1A)** in place of the nozzle, and mount the new nozzle assembly **(2A)**.*



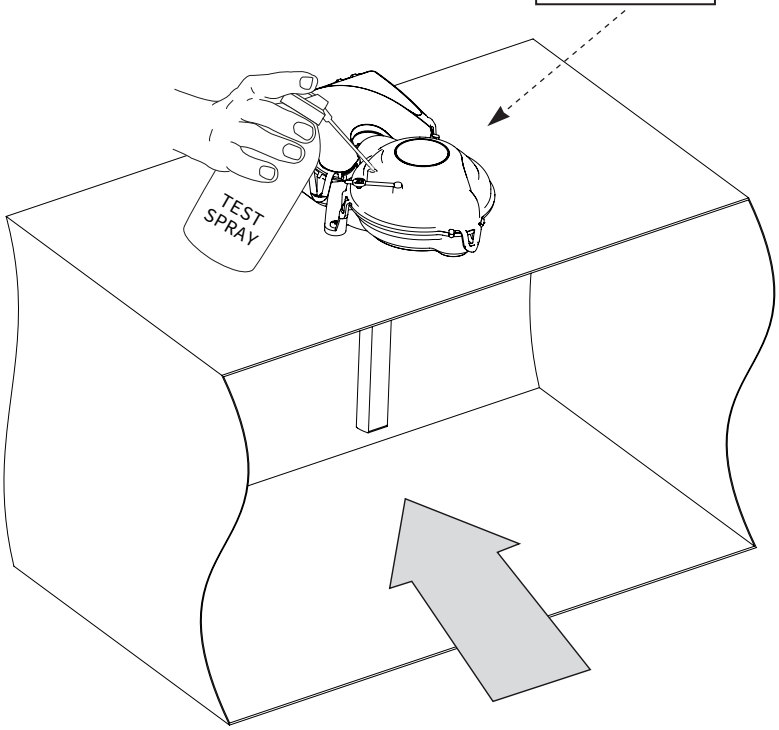


Figure 19

*Aerosol smoke can be purchased from Home Safeguard Industries at www.hsifiresafety.com, model **HO-25S Smoke Detector Tester**.
The rebuild kit for the spray can can be ordered from Calectro, model **PIPE TEST KIT**.

> **WARNING!**
> Use aerosol smoke detector tester with care and by following the duct smoke detector manufacturer's recommendations, use only the aerosol smoke detector tester as recommended by the duct smoke detector manufacturer. If the spray is misapplied or excessively applied, it may affect the operation of the duct smoke detector.

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Table 9.1

Status	Description	Detector LED: red	Power board LED number		Status of relays	
			Yellow	Green	Terminals open	Terminals closed
Smoke Alarm	Detector detects smoke				11-12 15-16	5-6 7-8 14-15

9.4.3 Sensitivity test

Please use the following test set method to ensure that the detector's sensitivity is within the limits specified below:

1. Notify the local and responsible authorities that maintenance is being conducted on the smoke detector system, and that the system will be out of service until maintenance is completed. Disable the zone or system that is under maintenance to avoid unwanted alarms and the possibility of an fire department unnecessary dispatch.

2. Use the Truetester portable smoke detector sensitivity measuring device (model number: Truetest 801). This tester is available at: System Distributors LLC, 1345 Campus Parkway, Monmouth Shores Corp Park, Nep tune, New Jersey, NJ 07753-6815, Tel: 00 1 7327 519266.

3. Disconnect the power.

4. Remove the detector cover as described in section 10.2.

5. *1) Remove the detector head by turning it counter clockwise and lift the detector head.

6. Use a UB-6 smoke detector base. This can be ordered from Calectro AB. Please see contact information in this Installation manual.

7. Install two 9V batteries in the UB-6 base according to **Figure 20**.

8. Mount the detector head in the UB-6 base.

9. Perform the "Fast ramp" sensitivity test with the Trutest device according to the Trutester User Manual.

10.1 Smoke detector head EVCA-PY-DA UG8: sensitivity range is 2.78 %/ft to 3.80 %/ft.

10.2 Smoke detector head EVCA-PY-DA: sensitivity range is 3.36 to 4.42 %/ft.

11. Reassemble the detector head in the UG8-U by rotating it clockwise into place.

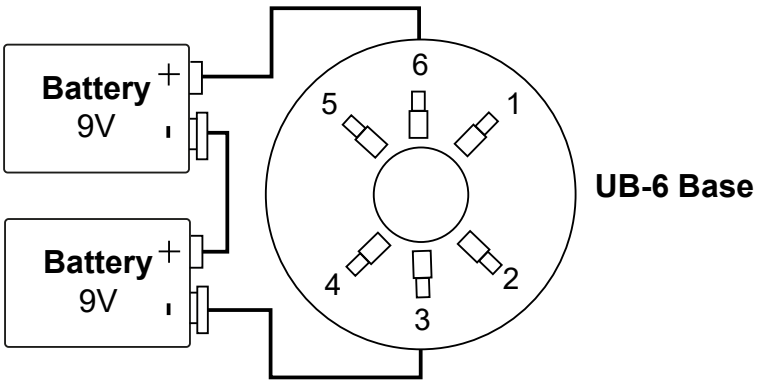
12. Reassemble the Detector Cover.

13. Restore system power.

14. Verify smoke detector functions according to Section 9.4.2.

15. Notify the local and responsible authorities testing has been completed and the smoke detector system is back in operation.

Figure 20



EVCA-PY-DA UG8, Sensitivity range is 2.78 %/ft to 3.80 %/ft.
EVCA-PY-DA, Sensitivity range is 3.36 %/ft to 4.42 %/ft.

10 Detector replacement/cleaning

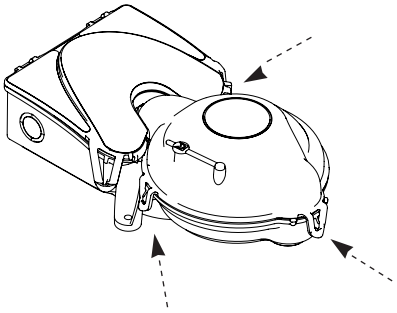
IMPORTANT: Test and maintain this detector frequently (minimum once a year) by following NFPA72 Requirements and guidelines.

10.1 Detector cleaning procedures

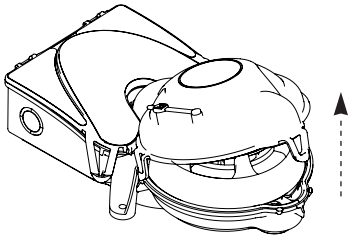
Notify the local and responsible authorities that maintenance is being conducted on the smoke detector system, and that the system will be out of service until maintenance is completed. Disable the zone or system that is under maintenance to avoid unwanted alarms and the possibility of an fire department unnecessary dispatch.

10.2 Detector cleaning

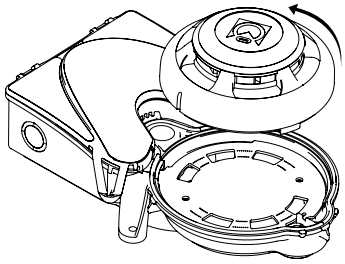
If the detector needs to be cleaned do the following:



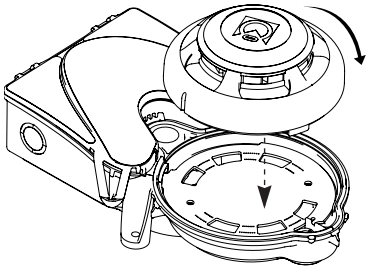
1. Disconnect the power. Remove the smoke detector cover by gently bending the snap locks outwards.



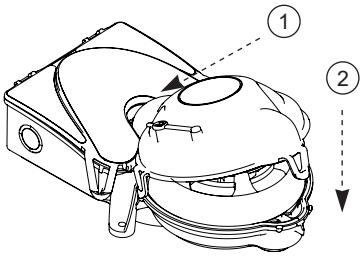
2. Detach the cover.



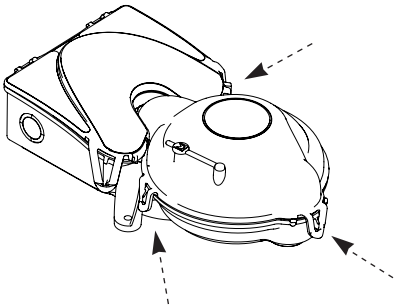
3. Remove the smoke detector by rotating it contraclockwise approximately 1/5 turn, vacuum the detector head. If necessary, use compressed air to remove dust.



4. Insert the detector and rotate it clockwise.



5. Reattach the cover. (1) Start by placing the “lip” of the cover in the cavity next to the air inlet. (2) Then press down the cover.



6. Check that all three snap locks are properly pressed in place. Restore system power.

> **NOTE!**
> Notify the local and responsible authorities that the maintenance has been completed and the smoke detector system is back in operation.

10.3 Detector replacement

If the detector needs to be replaced do the following:

1. Disconnect the power.
2. Follow the steps above, except insert a new detector.

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