Duct smoke housings, 4-wire

D341/D341P and D342/D342P

BOSCH

en Installation manual

1 Notices

These instructions cover the installation of the D341/D342 Duct smoke housings and D341P/D342P Duct smoke kits. Install these products in a fire system supervised by a fire alarm control panel or combination Burglary/Fire control panel.
Before installing the module, become familiar with the *Installation and Operation Guide* for the control panel you are using.

Warning!
Follow these instructions to avoid personal injury and damage to equipment.

Install, test and maintain the module according to these instructions, NFPA codes, local codes, and the authority having jurisdiction (AHJ). Failure to follow these instructions can result in failure of a detector to initiate an alarm event. Bosch Security Systems, Inc. is not responsible for improperly installed, tested or maintained devices.
NFPA 72 requires that you perform a complete system wide functional test following any modifications, repair, upgrades or adjustments made to the system's components, hardware, wiring, programming and software/firmware.

Trademarks
All hardware and software product names used in this document are likely to be registered trademarks and must be treated accordingly.

2 Description

2.1 Overview

The D341/D342 Duct smoke housings are designed to mount to heating, ventilation, and air conditioning (HVAC) system ducts. The housings work with D285DH Duct smoke head (provided separately) for general property protection. The housings with the associated detector head monitor the presence of smoke in the conditioned air.
The D341/D342's efficient housing design samples air passing through a duct allowing detection of potentially hazardous conditions. When smoke is detected, the detector sends an alarm signal to the control panel. The panel then acts to shut off fans and blowers or to change over to other air handling systems.
The D341 operates on 24 VDC, 24 VAC, or 120 VAC. The D342 operates on 24 VDC, 24 VAC, 220 VAC, or 240 VAC. Alarm and trouble relay contacts are provided for the control panel interface. In addition, two auxiliary Form C alarm relay contacts are available for other functions such as fan shutdown.
Test the system by:
– placing an external magnet on the detector housing or
– switching a signal from a remote test/indicator plate
Reset the system by:
– shutting down power and placing a magnet on the detector housing or
– sending a signal from the remote test/indicator plate
The D341/D342 include:
– One housing, power card, and cover assembly
– Two #10-24 x 1 in. machine screws for mounting
– Two #10-24 jack nuts
– One exhaust tube
– Two tube clamps with four screws
– Two foam gaskets
– Two air filters
– One drilling template
– One cover gasket
The D341P and D342P also include a D285DH smoke head and a 1.5 ft. (0.46 m) sample tube.

2.2 Compatibilities

The D341 and D341P work with all 24 VDC, 24 VAC, and 120 VAC UL Listed control panels.
The D342 and D342P work with all 24 VDC, 24 VAC, 220 VAC, and 240 VAC UL Listed control panels.
They are also compatible with the following Bosch Security Systems, Inc. (Bosch) accessory products:

Active products:
D285DH Duct smoke head, 2-/4-wire 12/24V
D344-1.5 Sample tube, duct 1.5ft/45.7cm
D344-3 Sample tube, duct 3ft/91.4cm
D344-5 Sample tube, duct 5ft/152cm
D344-RL Remote indicator plate
D344-RT Remote test/indicator plate, 24V

D344-TF Duct tube filters, 20pcs
DRA-5 Remote indicator plate, 5V
PAM-4 Relay module, form C, 10A 12/24V
Legacy products:*
D306 Remote Indicator Plate
D307 Remote Test and Indicator Plate
SMK-TM Smoke Test Magnet
* Legacy products are not available for purchase.

2.3 Setting the jumpers

For the locations of the tamper jumper and reset jumper on the power card, see the following figure.

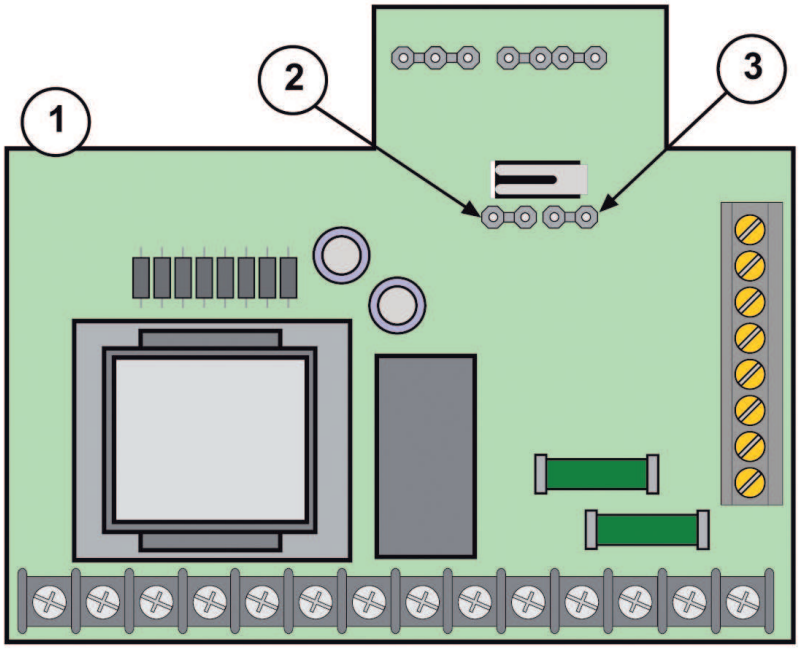

Figure 2.1: Jumper locations

1	Power card	2	Tamper jumper
3	Reset jumper		

The tamper jumper enables or disables the housing cover tamper switch. When this jumper is enabled, a trouble is indicated if the cover is removed. The reset Jumper enables or disables the remote reset (D344-RT keyswitch). The power off reset from the control panel zone functions normally regardless of the jumper setting.

Notice!
Disable the reset jumper whenever you are not using the D344-RT (D307).

For enabled and disabled jumper positions, see the following figure.

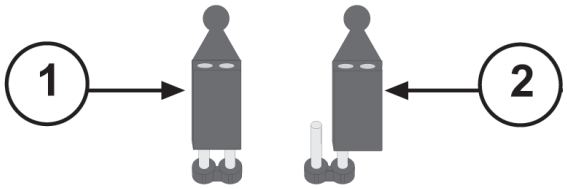

Figure 2.2: Jumper settings

1	Disabled	2	Enabled

3 Mounting

3.1 Preparing the duct

Before installing the duct detector, you must verify the duct air flow and velocity. The detector is designed for use in air handling systems with air velocities between 300 ft/min and 4000 ft/min (1.5 m/s to 20.3 m/s). Check the HVAC engineering specifications to ensure the air velocity in the duct falls within these parameters. If necessary, use a velocity meter to check the air velocity in the duct.

3.2 Determining mounting location

To obtain a representative air sample, avoid stratification and dead air space. These conditions can be caused by return duct openings, sharp turns, connections, or long, uninterrupted runs. Place the duct housing six to ten times the width of the duct from any uninterrupted run. See the following figure.

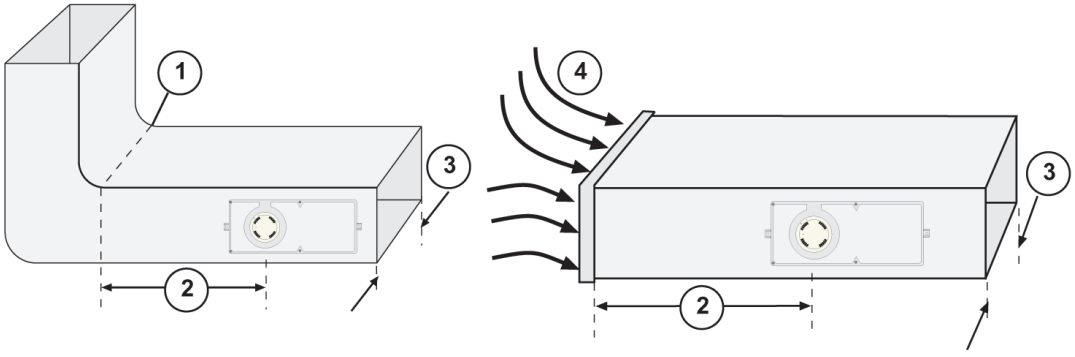

Figure 3.1: Typical duct detector placement

1	Bend or other obstruction	2	6 to 10 times the width oft he duct
3	Width of duct	4	Return air inlet

The housing can be mounted in any direction of 90° increments without regard to the air flow direction. See the following figure.

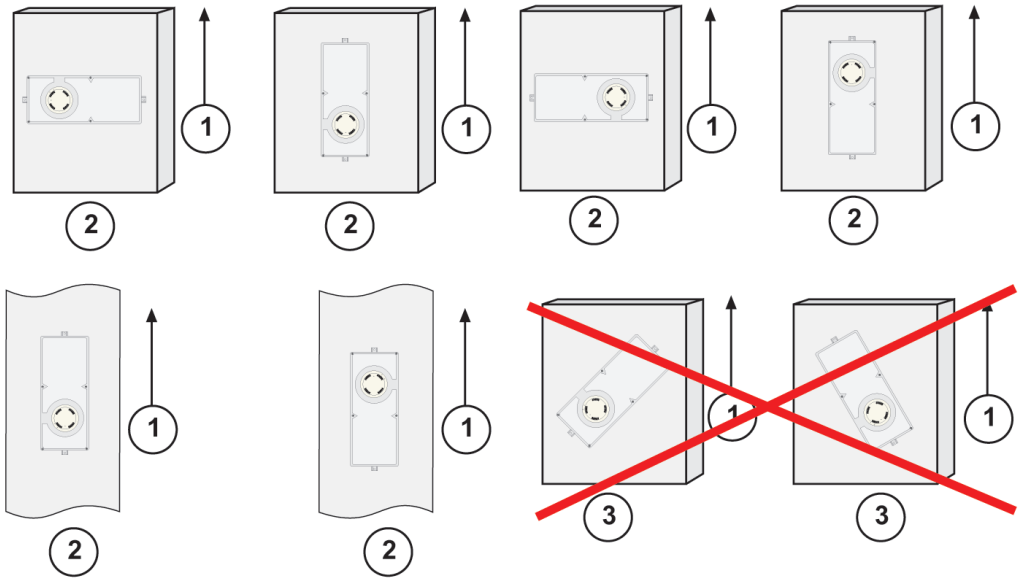

Figure 3.2: Mounting positions

1	Air flow	2	Acceptable mounting positions
3	Unacceptable mounting positions		

3.3 Preparing sample tubes

The sample tubes must extend across the width of the duct. The three sizes of sample tubes are:

– D344-1.5 (1.5 ft [0.46 m])
– D344-3 (3 ft [0.91 m])
– D344-5 (5 ft [1.52 m])

Sample tubes include an end plug that must be installed in the narrow end of the tube. See the following figure.

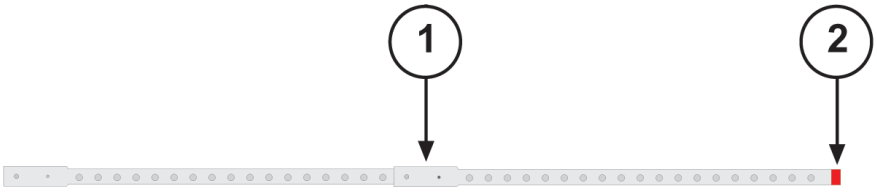

Figure 3.3: Sample tube

1	Set screw	2	End plug

Notice!
Sample tubes must have at least 12 sample holes within the duct. Do not cut a sample tube to less than 12 sample holes.

The D344-1.5 has 19 sample holes, but only 12 are required for normal installations. Depending on the duct width, you might have to cover some of the holes with duct tape. This happens when the duct width is between 12 in. (31 cm) and 18 in. (46 cm). Use even spacing when covering the sample holes to allow an even sample across the width of the duct. See the following figure.

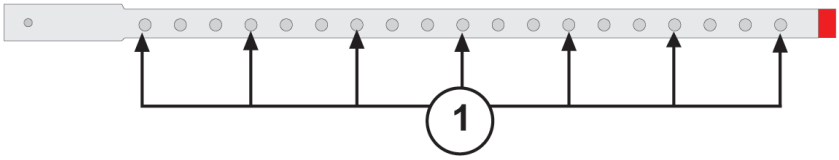

Figure 3.4: Covering sample tube holes

1	Place tape over these sample holes

The maximum length of a sample tube is 10 ft. (3 m. The minimum length of a sample tube is 1 ft. (0.3 m). You can combine or cut sample tubes to make different lengths. For example, you can join a 3 ft. (1 m) and a 5 ft. (1.5 m) to make an 8 ft. (2.4 m) sample tube.

Notice!
Sample tubes over 3 ft. (1 m) must be supported at the end opposite the duct detector. The support hole should be 1 in. to 2 in. (2.5 cm to 5 cm) below the entry hole to allow for possible moisture drainage (see the figure following step 4 of the following procedure).

To combine sample tubes:

1. Remove the roll pin and set screw from one of the sample tubes.
2. Remove the end plug from the other sample tube.
3. Push the flared end over the sample tube you want to lengthen.
4. Align the holes, insert the set screw, and reinstall the end plug. For example, if you want a 7 ft. (2 m) sample tube, combine a 3 ft. (1 m) sample tube and a 5 ft. (1.5 m) sample tube. Then cut 1 ft. (0.3 m) from the narrow end to get the necessary length.

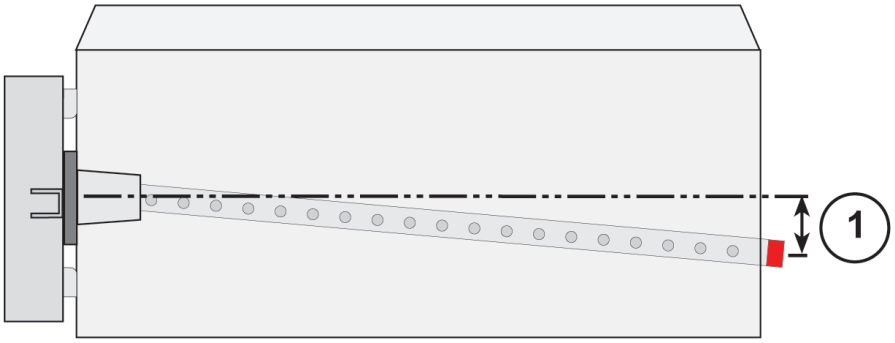

Figure 3.5: Support hole position

1	1 in. to 2 in. (2.5 cm to 5 cm)

5. Seal the gap between duct and sample tube. You can remove up to 6 in. (15 cm) from the D344-1.5 for 1 ft (0.3 m) duct installations.

3.4 Mounting the detector

1. Locate the D340 mounting template and remove it from its backing. Place the template over the desired location on the duct. See the following figure.

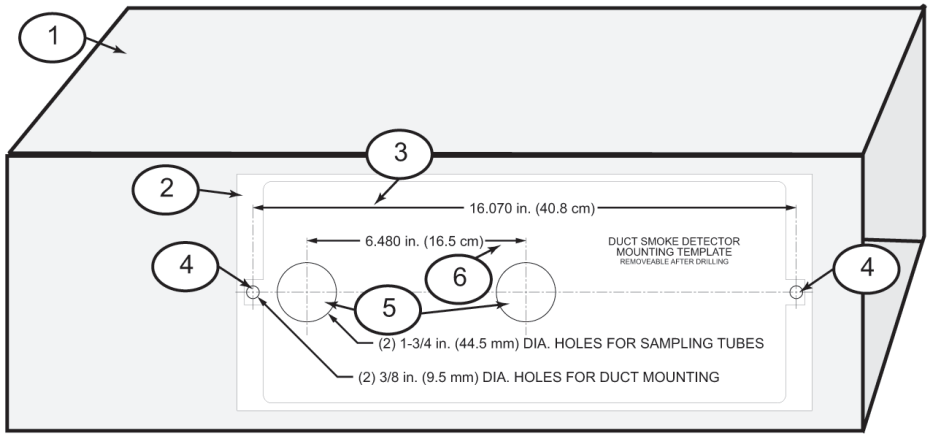

Figure 3.6: Mounting template placement

1	Duct	2	Mounting template
3	16.70 in. (40.8 cm)	4	Two 0.375 in. (9.5 mm) holes for mounting the housing to the duct
5	Two 1.75 in. (45 mm) diameter holes for the sample tubes	6	6.5 in. (16.6 cm)

2. Drill out the required holes and remove any remaining debris.
3. Remove the template.
4. Place a #10-24 jack nut (see the following figure) in each of the 3/8 in. (9.5 mm) holes.

Figure 3.7: Jack nuts

5. Insert the #10-24 x 1 in. machine screws into the jack nuts and firmly tighten. This attaches the jack nuts to the duct. Hold the jack nuts with a installer wrench or a pair of pliers while tightening the screws. This stops the jack nut from spinning in the hole. Remove the screws for later use.
6. Place the two foam gaskets over the sample and exhaust ports on the back of the housing. See the following figure.

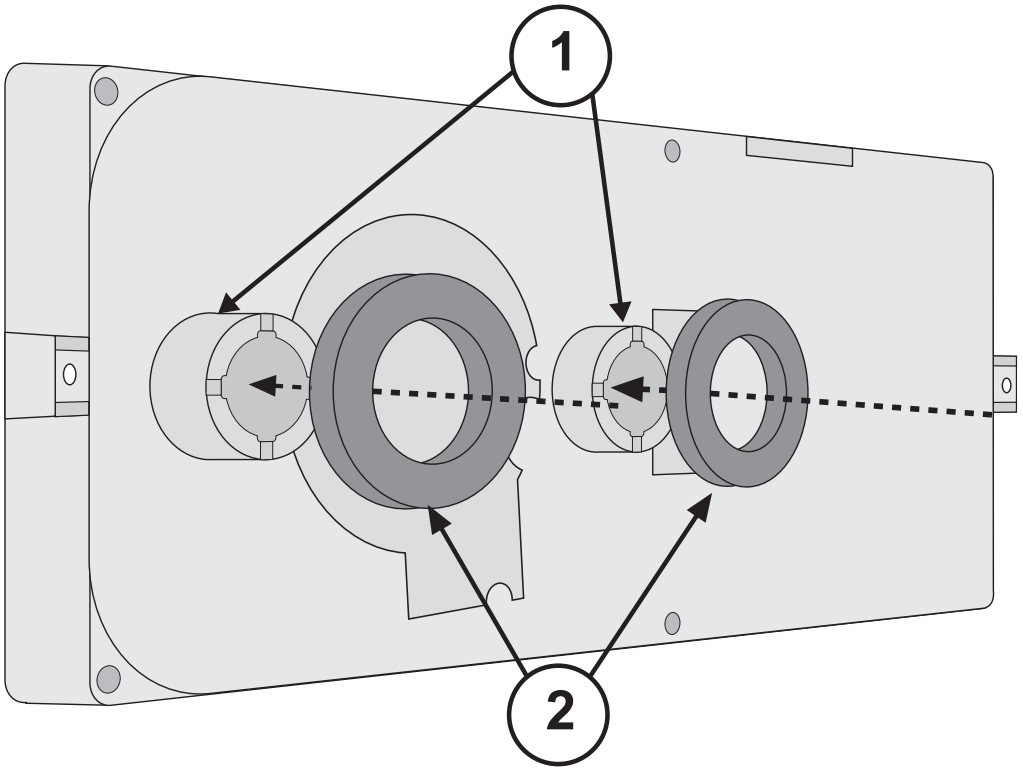

Figure 3.8: Foam gaskets

1	Sample/exhaust tube posts	2	Foam gaskets

7. Mount the housing to the jack nuts using the supplied machine screws. See the following figure. Remember that over-tightening the screws can cause excessive bowing of the duct.

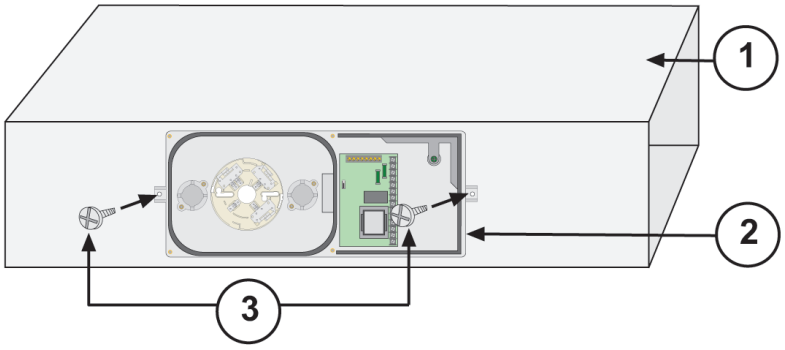

Figure 3.9: Mounting the housing

1	Duct	2	Housing
3	Machine screws (supplied)		

8. Determine and remove the appropriate wire knockouts for power and for any remote indicator wiring. See the following figure.

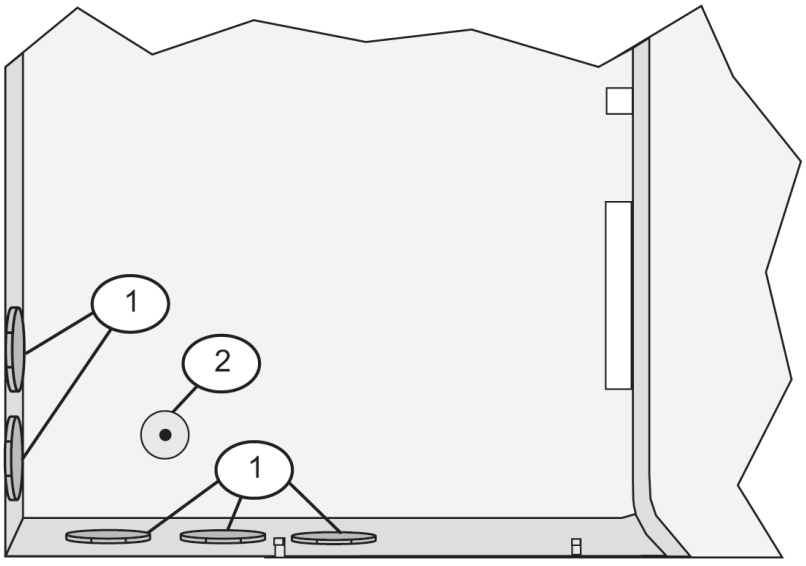

Figure 3.10: Wiring knockouts and earth ground

1	Wiring knockouts	2	Earth ground screw

9. Locate the sample and exhaust tubes. Ensure the sample tube has a plug installed at the narrow end of the assembly. See the following figure.

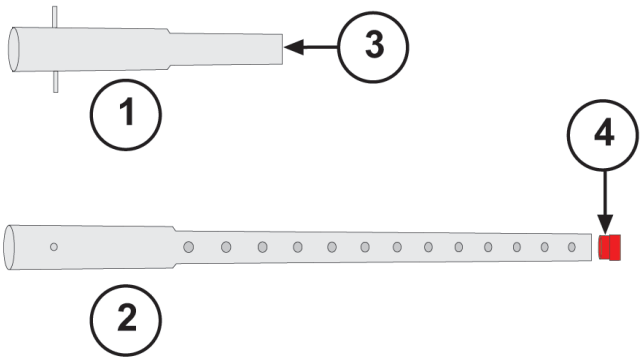

Figure 3.11: Exhaust/sample tubes

1	Exhaust tube	2	Sample tube
3	Leave end open	4	Insert plug

10. Note the direction of the airflow in the duct. The sampling holes in the sample tube must face into the air flow (see the first figure below). The exhaust tube must exhaust downwind from the sample tube (see the second figure below).

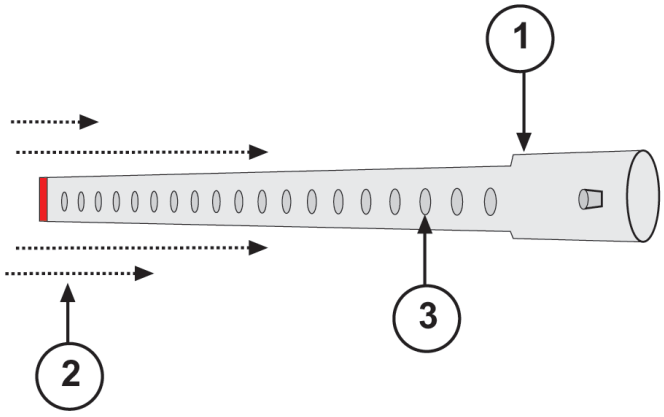

Figure 3.12: Airflow direction

1	Sample tube	2	Airflow direction
3	Sampling holes		

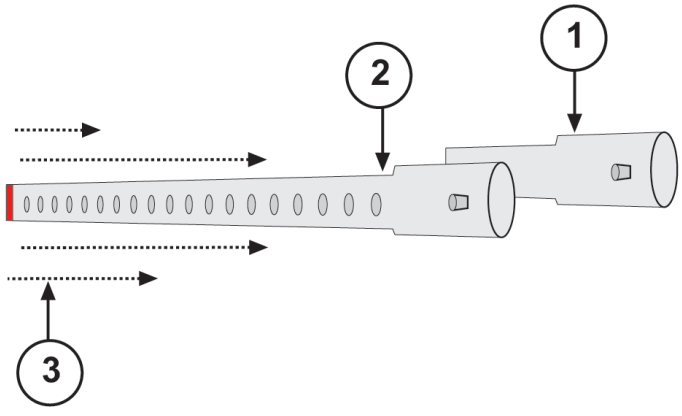

Figure 3.13: Exhaust/sample tube placement

1	Exhaust tube	2	Sample tube
3	Airflow direction		

11. Insert the sample and exhaust tubes into the housing. Ensure the sample tube holes face into the air flow. Ensure the tube alignment pin is set into the housing.
12. Secure the tubes in place using the tube clamps provided. See the following figure.

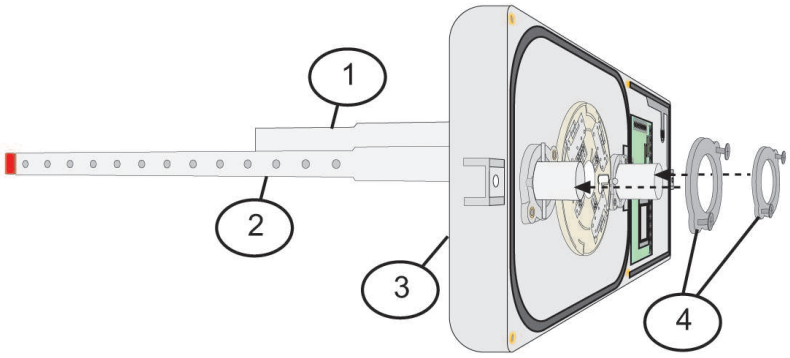

Figure 3.14: Mounting tubes in housing

1	Exhaust tube	2	Sample tube
3	Housing	4	Tube clamps

13. Place the tube filters over the open ends of the sample and exhaust tubes. See the following figure.

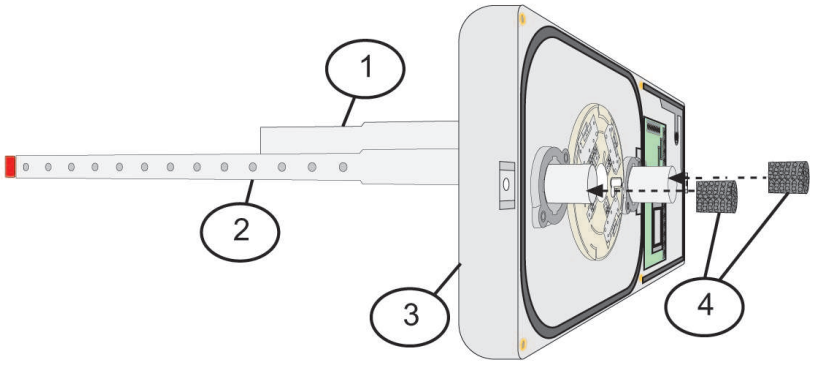

Figure 3.15: Tube filters

1	Exhaust tube	2	Sample tube
3	Housing	4	Tube filters

4 Wiring

The housings/detectors are designed for 4-wire loops. The D341/D341P uses a primary power of 24 VDC, 24 VAC, or 120 VAC. The D342/D342P uses a primary power of 24 VDC, 24 VAC, 220 VAC, or 240 VAC.

Warning!
Avoid Mixed Voltages
The housings/detectors are designed for one power source only! Do not connect a high-voltage AC source and a low-voltage AC/DC source to the same housing.

For wiring, see the following figure.

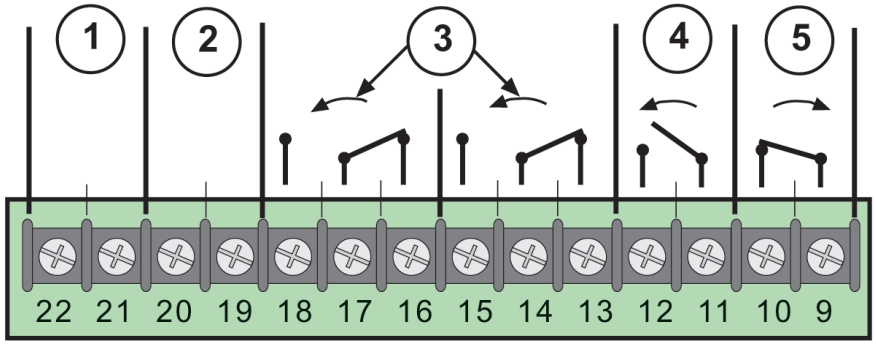

Figure 4.1: D341/D342 wiring terminals

1	120 VAC for the D341 220 VAC or 240 VAC for the D342	2	24 VAC or 24 VDC fort he D341 or D342
3	Alarm relay auxiliary contacts	4	Alarm contacts
5	Trouble contacts		

4.1 Wiring to D344-RT

Notice!
NFPA Requirement
NFPA-72 requires that where in-duct smoke detector housings are installed in concealed locations more than 10 ft (3 m) above the finished floor or in arrangements where the detector's alarm indicator is not visible to responding personnel, the detectors have remote alarm indicators.

Notice!
Do not exceed 500 ft (152 m) between the D344-RT (D307) Remote test/indicator plate and the housing. Use 18 AWG (ISO 0.75 mm^2) or larger wire.

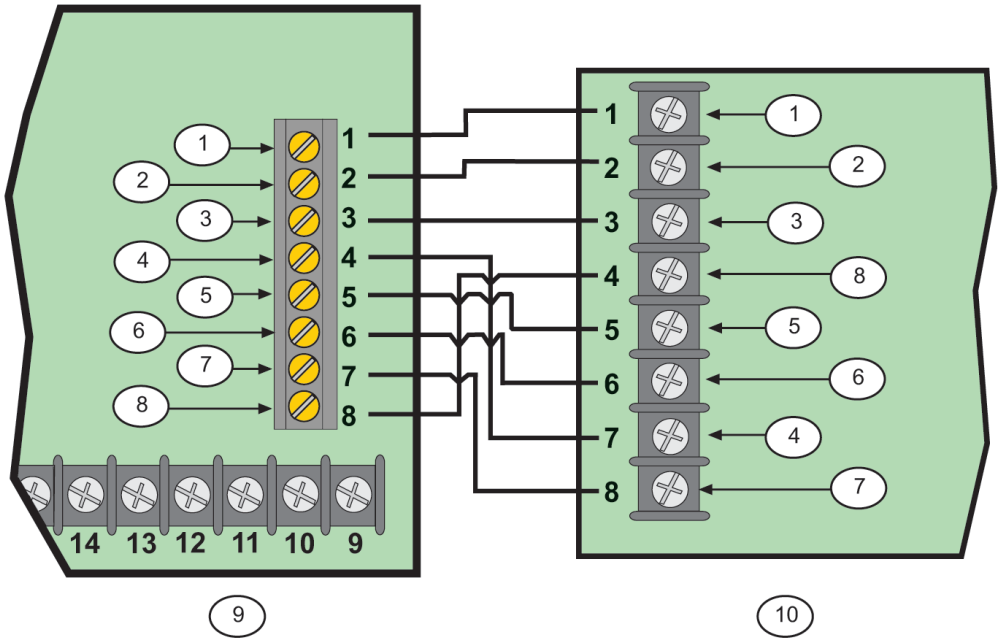

Figure 4.2: Wiring a D341/D342 to a D344-RT

1	Green	2	Yellow
3	Red	4	Black
5	Blue	6	Orange
7	+OUT	8	+IN

4.2 Wiring to D344-RL

Notice!
Do not exceed a distance of 500 ft (152 m) between the D344-RL (D306) Remote indicator plate and the housing. Use 18 AWG (ISO 0.75 mm2) or larger wire.

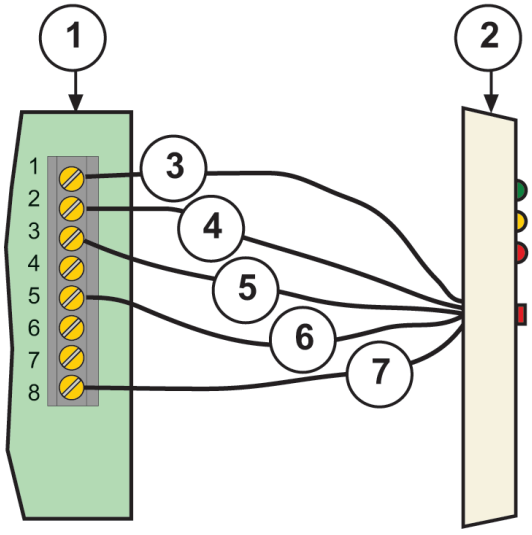

Figure 4.3: Wiring a D341/D342 to a D344-RL

1	D341/D342 power card	2	D344-RL (D306)
3	Green wire	4	Yellow wire
5	Red wire	6	Violet wire
7	Black wire		

4.3 Wiring to DRA-5

Notice!
Do not exceed a distance of 500 ft (150 m) between the DRA-5 Remote indicator plate and the housing. Use 18 AWG (ISO 0.75 mm2) or larger wire.

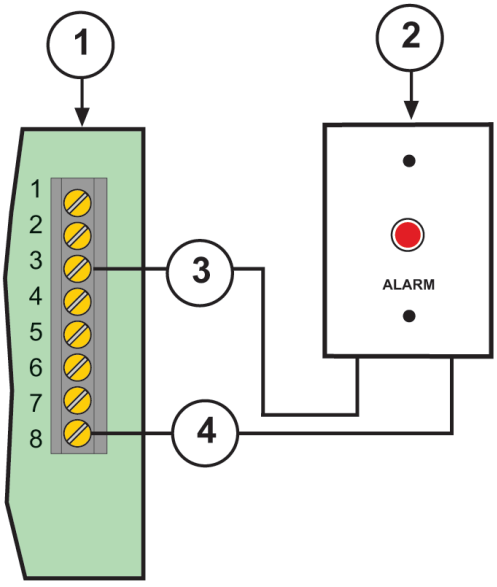

Figure 4.4: Wiring a D341/D342 to a DRA-5

1	D341/D342 power card	2	DRA-5
3	Red wire	4	White wire

4.4 Wiring to FACP

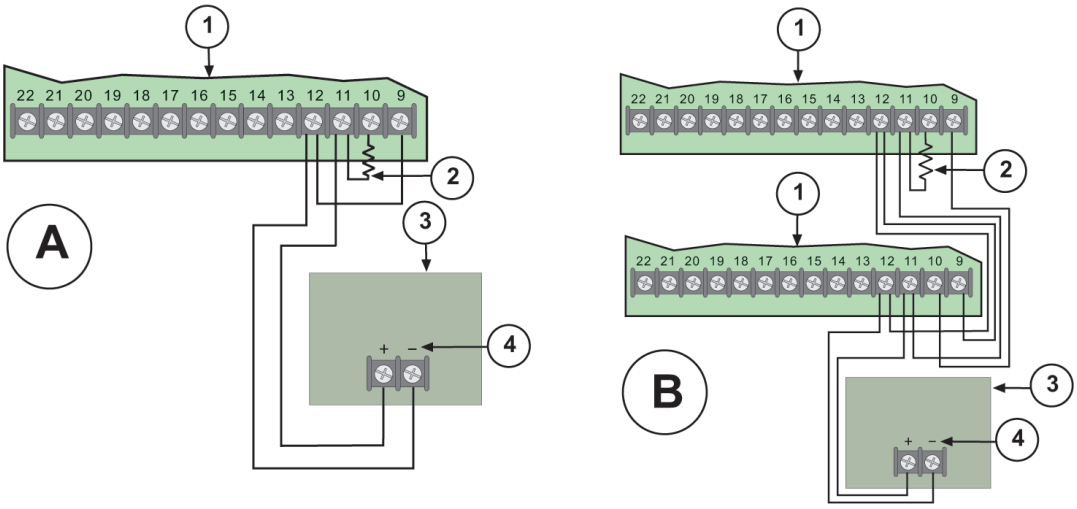

Figure 4.5: Wiring D341/D342 detector(s) to the FACP

A	Single D341/D342	B	Multiple D341s/D342s
1	D341/D342	2	EOL resistor
3	FACP	4	Alarm loop

4.5 Wiring to MUX point modules

Mount the small mux point modules inside the D341/D342 on the power card side (see the following figure).

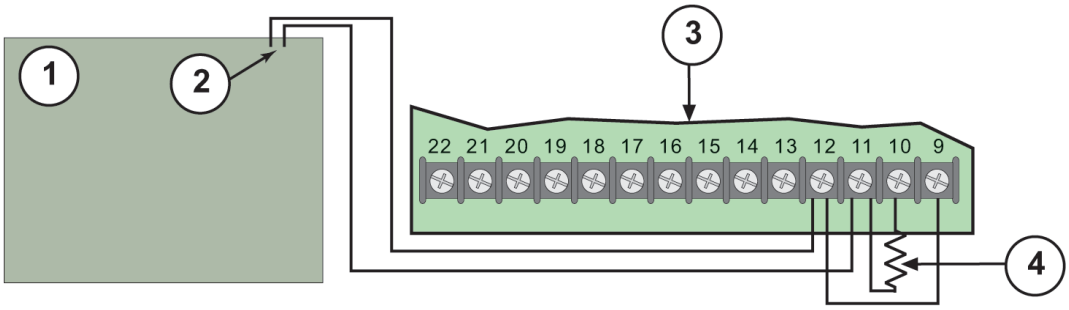

Figure 4.6: Wiring a D341/D342 to a MUX point module

1	MUX point module	2	Zone
3	D341/D342	4	EOL resistor

4.6 Wiring for fan control

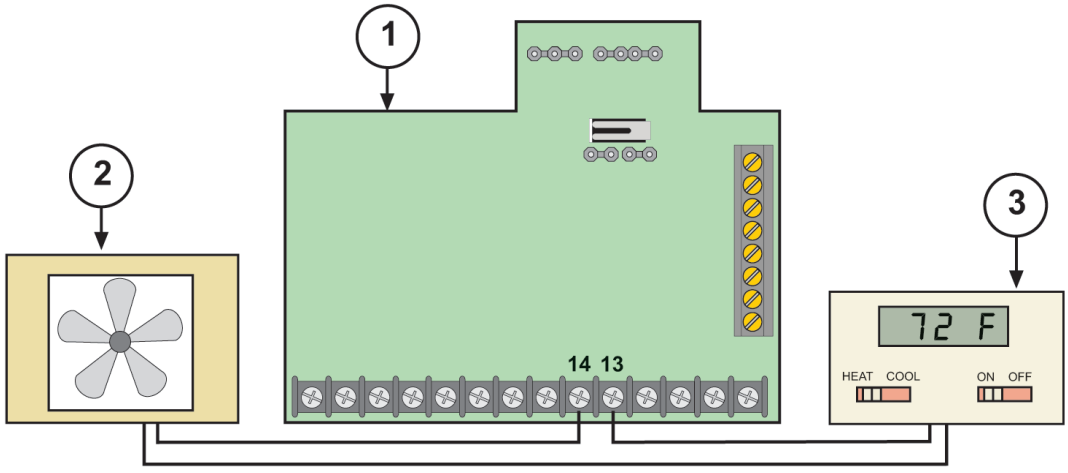

Figure 4.7: Wiring a D341/D342 for fan control

1	D341/D342 power card	2	Fan control
3	System control/thermostat		

5 Testing and Maintenance

5.1 Testing the installation

Verify the airflow to ensure the system is operating properly. Use a manometer to verify the correct velocity pressure readings. The readings should range from 300 ft./min to 4000 ft./min (1.5 m/s to 20 m/s). Ensure the pressure differential between sampling tubes is between a:

– minimum of 0.01 in. (0.25 mm) of water and
– maximum of 1.8 in. (45.7 mm) of water

1. Check the wiring from the control panel to the last duct detector on each run. Check for proper polarity and continuity.
2. Ensure each run terminates with an EOL resistor as specified by the control panel manufacturer.
3. Apply power to the system, and check for alarms.
   Note which smoke detectors are in alarm (if any) and shut down the system.
   Remove the detectors in alarm from their duct housing and recheck the duct housing for proper wiring. If the problems persist, replace the affected smoke detectors or swap them with known good units. This determines if the problem is caused by the detector or the duct housing.
   If there is a system alarm with no detector alarms present, remove all smoke detectors. Check the wiring at each duct housing. Pay close attention to the wiring of each EOL resistor.
4. When the system is free of alarms, check each detector. Ensure the red LED indicator flashes approximately every 4 sec for the D285DH. This verifies the detector is receiving power and operating properly.
5. Test each detector to ensure it causes a control panel alarm. Reset the control panel after each test.
6. Test the detectors by doing one of the following:
   Place a magnet against the duct housing's test point notch on the front cover. See the following figure.

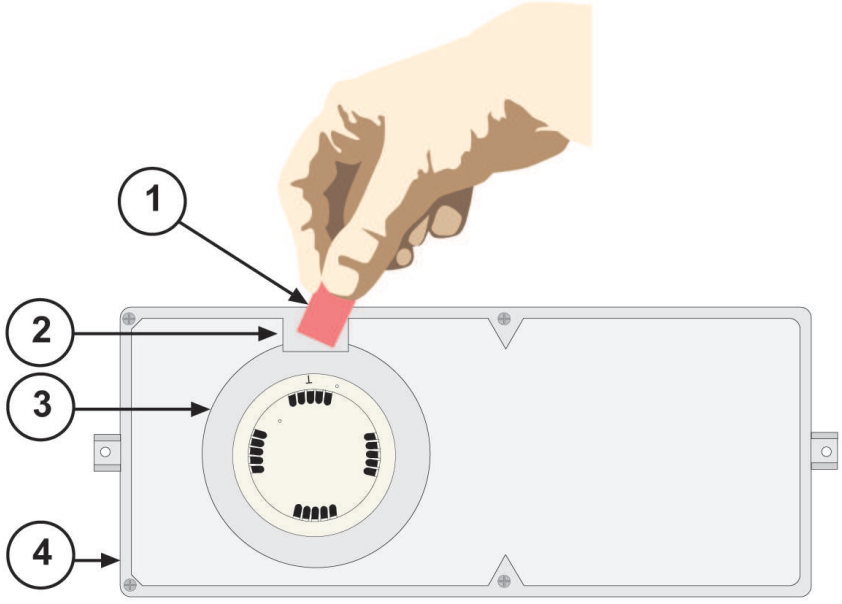

Figure 5.1: Testing the detector

1	Magnet	2	Test point notch
3	Detector	4	Duct housing

Notice!
When a detector alarms, the red LED indicator activates and latches to the ON position. Clear the alarm before proceeding to the next detector.

Reset duct detectors with the D344-RT (D307) Remote test/indicator plate installed. Reset by moving the key switch to the appropriate position and observing the alarm LED. Reset the detector by momentarily removing power or by placing a magnet in the reset notch located near the rear of the housing. See the following figure.

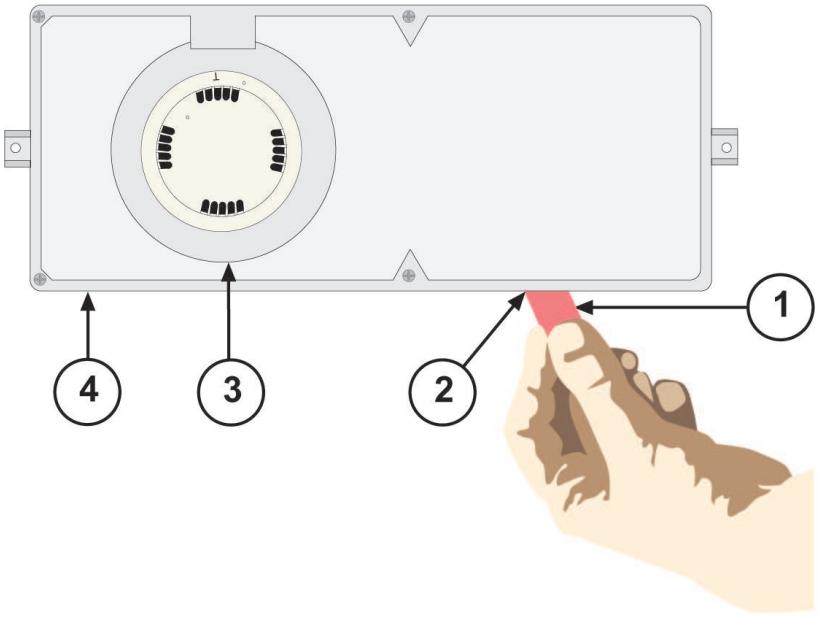

Figure 5.2: Resetting the detector

1	Magnet	2	Test point notch
3	Detector	4	Duct housing

7. Check the overall loading of the alarm loop by measuring the voltage across each EOL resistor. This voltage should equal or exceed the minimum specified by the control panel manufacturer.

5.2 Maintenance

Notice!
NFPA Requirement
NFPA-72 requires a semi-annual visual inspection of duct smoke detectors. Clean or replace the tube filters during this inspection. Order part DS294-TF for replacements as needed.

Notice!
Notify all concerned parties before and after completing maintenance on or testing of the fire alarm system.

Clean the detector and base annually using a vacuum or with clean, dry compressed air.

6 Specifications

Electrical

Voltage, operating				
– D341	20 VDC to 29 VDC, 24 VAC, or 120VAC			
– D342	20 VDC to 29 VDC, 24 VAC, 220 VAC, or 240 VAC			
RMS ripple, maximum	25 percent of DC input			
Power-up time	22 sec maximum			
Outputs				
– Alarm	Form A Normally Open (NO and C) contacts 0.5 A at 24 VDC and 24 VAC, 0.1 A at 120 VAC			
– Auxiliary	Two Form C Normally Open and Normally Closed (NO and C and NC) contacts 10 A at 24 VDC, 24 VAC, 120 VAC, or 240 VAC			
– Trouble	Form “A” Normally Open (NO/C) contacts 0.5 A at 24 VDC, 24 VAC, 0.1 A at 120 VAC			
Current Draw - Nominal Primary Voltage (D341/D342)				
Condition	24 VDC	24 VAC	120 VAC	230 VAC
– Alarm	65 mA	200 mA	110 mA	30 mA
– Standby	15 mA	85 mA	100 mA	25 mA
– Trouble	15 mA	85 mA	100 mA	25 mA
Current Draw - D344-RL/D344-RT when connected to the D341/D342				
Condition	24 VDC	24 VAC	120 VAC	230 VAC
– Alarm	15 mA	0 mA	0 mA	0 mA
– Standby	10 mA	0 mA	0 mA	0 mA
– Trouble	10 mA	0 mA	0 mA	0 mA
– Alarm and Remote Coil (ON)	150 mA	150 mA	25 mA	20 mA

Environmental

Relative humidity	0 to 95%, non-condensing
Temperature, operating	+32°F to +120°F (0°C to +49°C) *For UL Listed requirements, the operating temperature is +32°F to +100°F (0°C to + 37.8°C)*

Mechanical

Package Dimensions (LxWxH)	19.6 in. x 7.6 in. x 8 in. (49.8 cm x 19.2 cm x 20.2 cm)

Product Dimensions (LxWxH)	15.5 in. x 4.25 in. x 6.5 in. (39.5 cm x 11 cm x 16.5 cm)
Material	High-impact fire-retardant polymer plastic
Weight Gross Net	 4.67 lb. (2.11 kg) 4.07 lb. (1.84 kg)

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