SIEMENS

Installation Instructions
Document No. 546-00449
August 10, 2004

UniTrak Sensor Assembly Kit
Horizontal, Vertical, and Combination Sashes

Product Description

The UniTrak™ Sensor Assembly Kit contains the hardware to complete one fume hood sensor assembly. Fume hoods with multiple vertical sashes, including walk-in fume hoods, require multiple UniTrak kits. The following table lists what is included for Vertical and Horizontal kits (See Figure 1):

Item	Vertical	Horizontal
Adhesive-backed UniTrak sensor strips with actuator car and three-pin sensor end connector.	1	2
Three-pin sensor cable assembly.	1	2
Unbent linkages	1	5
Actuator materials: polyvinyl chloride (PVC) and stainless steel.	1	4
Sensor strip materials: polyester and PVC plastics.	1	2

NOTE: Fume hoods may have dimensional variations; however, these variations will have minimal impact on UniTrak Sensor Assembly Kit installations.

Product Numbers

Kit Number	Sensor Length-Active/Usable inches (mm)	Sensor Length-Installed inches (mm)
Horizontal *		
546-00495	34 (863.6)	39.3 (998)
546-00493	43 (1092)	48.3 (1227)
546-00492	52 (1321)	57.3 (1455)
546-00491	70 (1778)	75.3 (1913)
546-00442	84 (2134)	89.8 (2280)
Vertical *		
546-00490	30 (762)	33.3 (846)
546-00489	32 (813)	35.3 (897)
546-00488	35 (889)	39.3 (998)
546-00487	40 (1016)	40.3 (1024)
546-00486	44 (1118)	48.3 (1227)
546-00485	53 (1346)	57.3 (1455)
546-00484	71 (1803)	75.3 (1913)
546-00443	85 (2159)	89.8 (2281)
Sash Sensor Shield **		
	Shield Length-Installed inches (millimeters)	
546-00565	37.3 (947)	
546-00566	46.3 (1176)	
546-00567	55.3 (1405)	
546-00568	73.3 (1862)	
546-00569	87.8 (2230)	

*The following kits must be ordered separately.

** One shield per sensor track is included with each sensor kit.

546-00041	Trim tool kit
546-00215	10 vertical unbent linkages
546-00494	10 horizontal unbent linkages
546-00558	Linkage forming tool

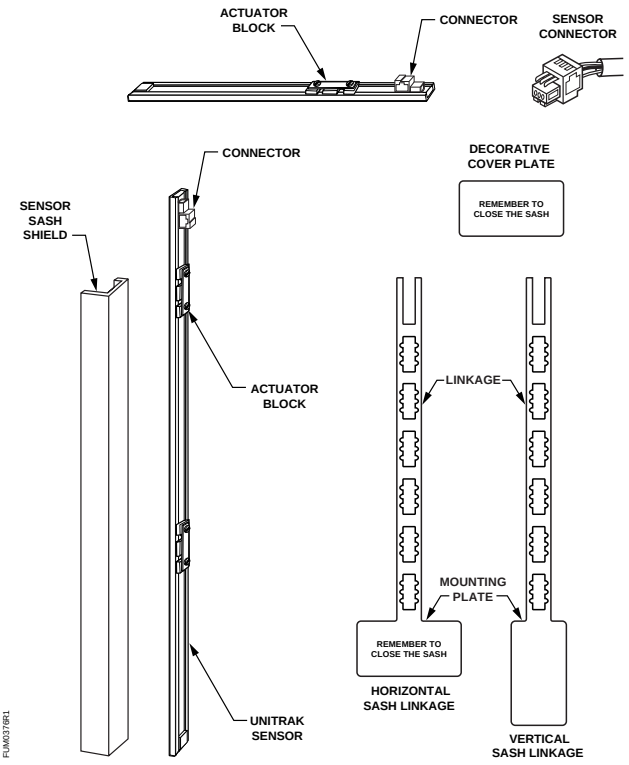


Figure 1. UniTrak Assembly Kit.

Warning/Caution Notations

WARNING:	⚠	Personal injury/loss of life may occur if you do not perform a procedure as specified.
CAUTION:	⚠	Equipment damage or loss of data may occur if you do not perform a procedure as specified.

Required Tools (H = Horizontal; V = Vertical)

	H	V
• 6-foot ladder	✓	✓
• Flat-blade screwdriver	✓	✓
• Medium duty electric drill	✓	✓
• Permanent marking pen	✓	✓
• Tape measure	✓	✓
• Alcohol towelette	✓	✓
• Wire cutters	✓	✓
• Linkage-forming tool	✓	✓
• 3/8-inch drill bit	✓	
• Electrical tape	✓	
• Portable vacuum cleaner	✓	
• 3/32-inch carbide tip drill bit		✓
• 3/8-inch carbide tip drill bit		✓
• Trim tool kit		✓

Expected Installation Time

- 50 minutes with factory bent linkage kit (horizontal)
- 30 minutes (vertical)
- 70 minutes without factory bent linkage kit (horizontal plus vertical)

Prerequisites

- If this is your first UniTrak installation, read these instructions entirely before beginning.
- The fume hood sash panels must be installed to ensure proper fit of the UniTrak sensor.
- For retrofit installations, notify the laboratory safety officer that you will be working in the fume hood. Take the necessary precautions to have the fume hood cleaned, prepared and safety certified.

WARNING:

Do not proceed with these installation instructions until the fume hood has been cleaned and emptied of all hazardous substances including fumes, vapors, toxic materials, contaminants, chemicals, bacteria, etc.

The following prerequisites apply to Vertical:

- For best appearance, mount the UniTrak sensor on the inside of the fume hood.
- The surface on which you mount the sensor strip should be smooth, flat, clean, and free of obstacles such as rivets, screw heads, nozzles, sash stops, and abrasives.
- If corrosive fumes are to be exhausted, mount the UniTrak sensor on the outside of the fume hood.

Instructions

The UniTrak Sash Sensor Installation Instructions consist of the following tasks. Tasks 3 and 5 for the Vertical Install have separate instructions for outside and inside mountings of the UniTrak sensor.

	Tasks	Horizontal	Vertical
1	Measuring the Sash Opening	N/A	Step 1 (p. 3)
2	Mounting the UniTrak	Step 1 (p. 5)	Step 2 (p. 3)
3	Bending Linkages	Step 2 (p. 8)	Step 3 (p. 6)
4	Attaching Linkages to Sash Panels	Step 3 (p. 10)	Step 4 (p. 10)
5	Wiring	Step 4 (p. 12)	Step 5 (p. 11)
6	Installing the Sensor Shield	Step 5 (p. 13)	Step 6 (p. 13)

CAUTION:

Do not bend or kink the sensor strip, as this will damage the sensor. Bends in the sensor strip will cause errors in the sash measurement.

Measuring the Sash Opening (Vertical)

Outside- and inside-mounted sash sensors:

1. For outside-mounted sensors: Measure the length of the mounting surface.
2. With the sash window fully closed, mark the location of the bottom of the sash window with the marker.
3. With the sash window fully open, mark the location of the bottom of the sash window with the marker.
4. Measure the length between the open and closed marks. Add 2 inches (5 cm) to account for over-travel.

   NOTE: For outside mounting: This measurement must not exceed the mounting surface length from Step 1.
5. Erase the marks on the fume hood by using isopropyl alcohol and a soft cloth.

Cutting and Mounting the UniTrak (Vertical Only)

WARNING:

Do not cut horizontal sensors. Operation of the second actuator car will be lost.

1. Compare the actual length of the sensor strip with the required length of the sensor strip determined in *Measuring the Sash Opening.* If necessary, use the trim tool kit to cut the sensor strip. Be sure that the sensor is face up. See Figure 2. If you do not have to cut the sensor strip, skip to Step 3.
2. Separate the two sensor wires and seal the cut ends with the provided silicon (small, unmarked white tube). See Figure 2.

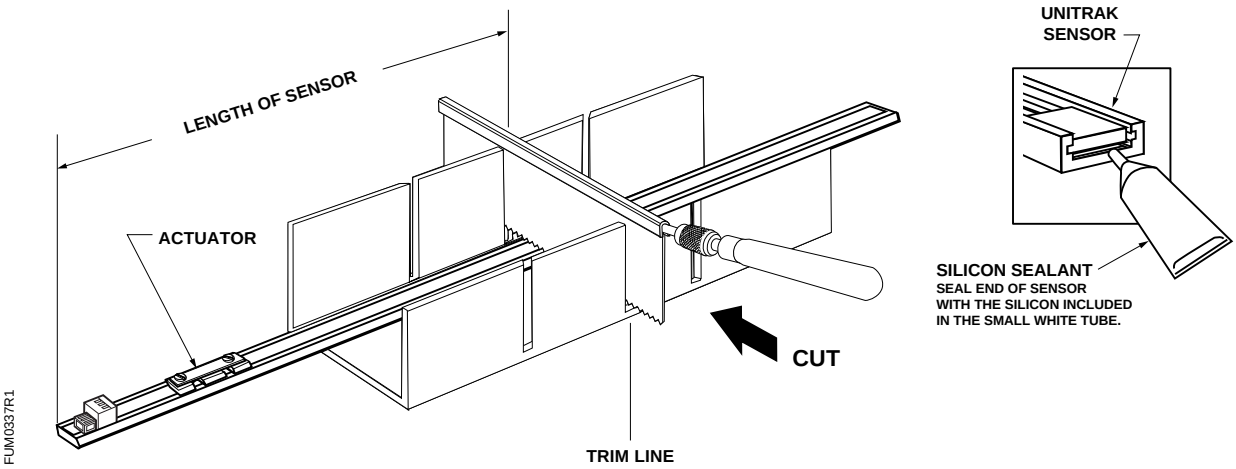


Figure 2. Cutting UniTrak Sensor Using the Trim Tool Kit.

3. Use the alcohol towelette to clean the surface on which the UniTrak sensor is to be applied. Dry the surface thoroughly before mounting the UniTrak.
4. Remove the protective backing from the sensor strip. Make sure the sensor connector is positioned at the top of the sensor.
5. Be certain that there is a gap of least 3/8-inch between the sensor strip and the sash panel.
6. When attaching the UniTrak to the mounting surface, hold one end up and lightly place the opposite end down. The UniTrak should be mounted as straight (parallel to the sash) as possible.

   NOTE: If applied without pressure to the mounting surface, you may remove and reapply the UniTrak if necessary. If pressure is applied, the adhesive is permanent.
7. Locate the correct mounting area for the UniTrak sensor. See Figure 3 and Figure 4.
8. Slide the actuator block to the bottom of the UniTrak sensor strip.

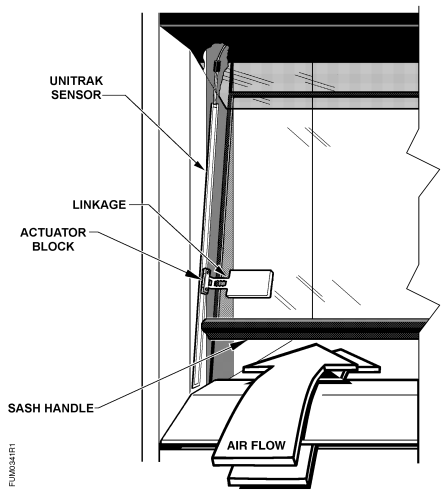


Figure 3. Outside Installation of UniTrak Sensor.

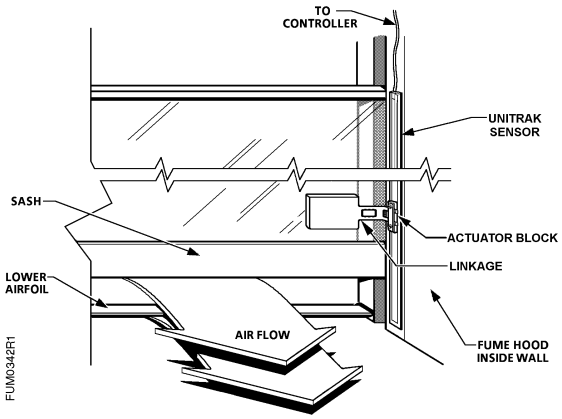


Figure 4. Inside Installation of UniTrak Sensor.

Mounting the UniTrak (Horizontal)

1. Remove the fume hood front access panel. If the fume hood does not have an access panel, remove the top front airfoil to make installing the UniTrak sensor easier (Figure 5).

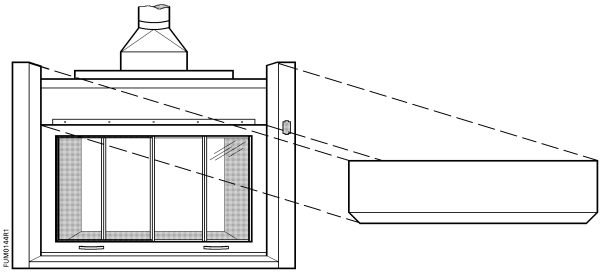


Figure 5. Removal of Front Access Panel.

2. Locate the correct mounting area for the UniTrak sensor. See Figure 6, Figure 7, and Figure 8.

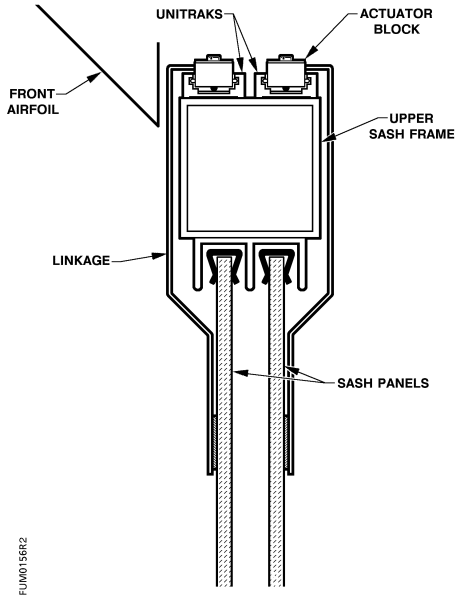


Figure 6. UniTrak Mounting for Kewaunee Visionaire and Kewaunee Airflow Supreme (Combination-Style Fume Hoods).

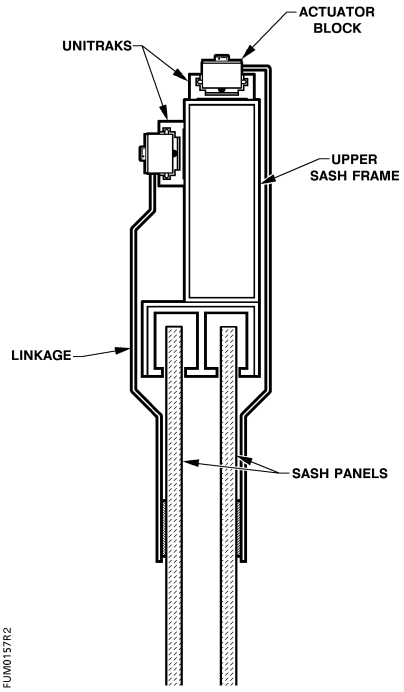


Figure 7. UniTrak Mounting for Hamilton Safeair (Combination-Style Fume Hood).

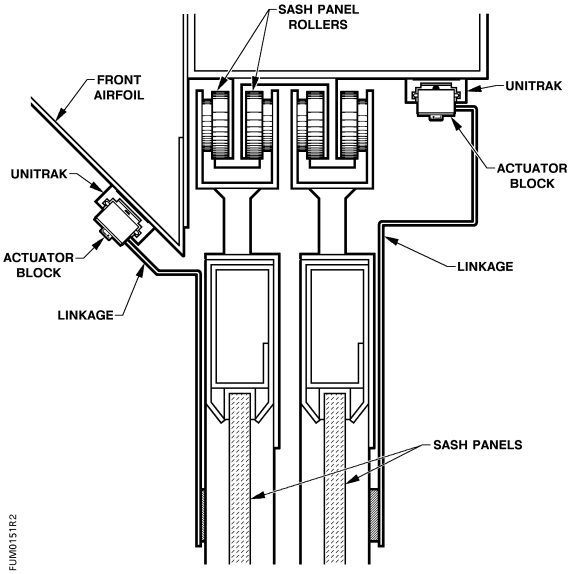


Figure 8. UniTrak Mounting (Horizontal-Style Fume Hood).

3. Use the alcohol towelette to clean the surface on which the UniTrak is to be applied. Dry the surface thoroughly before mounting the UniTrak.
4. Measure and mark with the pencil the midpoint of the fume-hood mounting surface. Measure and mark with the pencil the midpoint of the UniTrak sensor.
5. Remove the protective backing from the UniTrak sensor.
6. Align the two marks made in Step 4. When attaching the UniTrak to the mounting surface hold one end up and lightly place the opposite end down. The UniTrak must be mounted as straight as possible.

   NOTE: If applied without pressure to the mounting surface, you may remove and reapply the UniTrak if necessary. If pressure is applied, the adhesive is permanent.

Bending Linkage (Vertical)

NOTE: Bends will reduce overall length by 1/2 inch to 1-1/2 inches.

Outside sash UniTrak mount

1. Estimate the mounting position of the linkage (approximately 1 inch from the edge of the sash) (Figure 9).

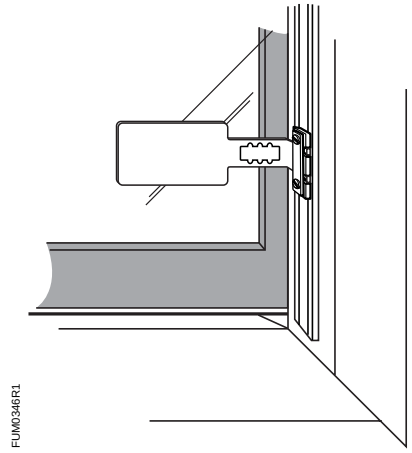


Figure 9. Location of Vertical Linkage.

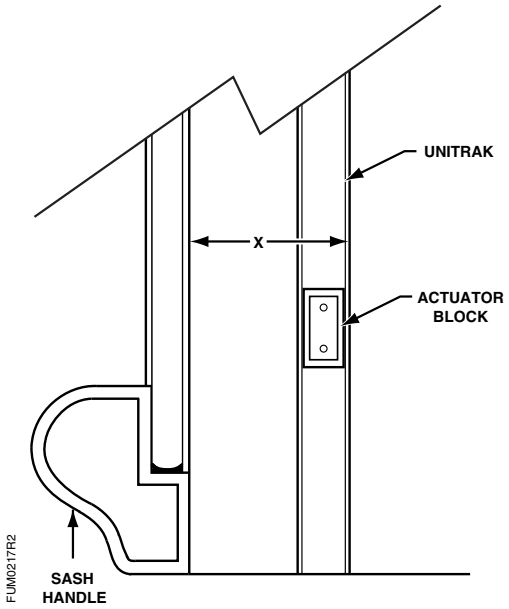


Figure 10. Measuring Between Sash and UniTrak Sensor.

2. Measure the distance from the edge of the sash frame to the far edge of the actuator block = X (Figure 10).
3. Add 1-1/2 inches to X.
4. Using the 1-1/2 inches + X value, measure from the outer edge of the mounting plate and mark this location (Figure 11).

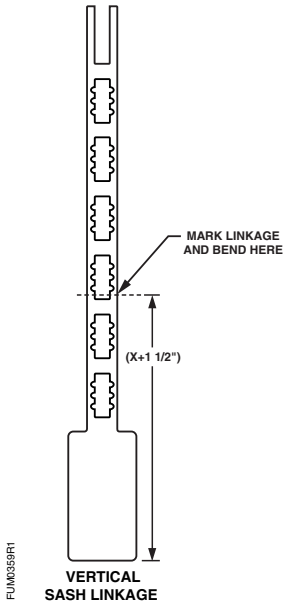


Figure 11. Marking First Linkage Bend.

5. **For sensors mounted at a 45-degree angle,** using the linkage-forming tool, bend the linkage at a 45-degree angle on the mark so the linkage is parallel to the sash (Figure 12).

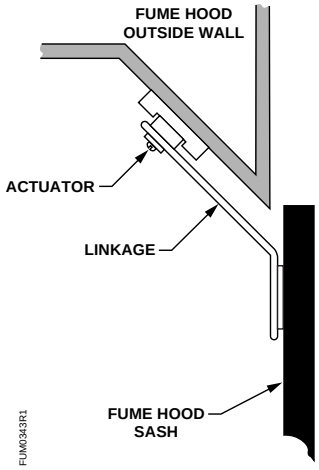


Figure 12. Linkage on 45° Angle.

6. **For sensors mounted at a 90-degree angle,** bend the linkage at a 90° angle on the mark so the linkage is parallel to the sash (Figure 13).

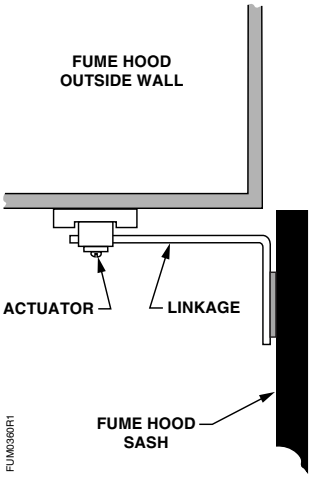


Figure 13. Linkage on a 90° Angle.

7. Clear any obstacles between the sash and the actuator with additional linkage bends.

8. Place linkage against the sash; mark an approximate location to trim the excess linkage.

   NOTE: When trimming off excess linkage, make sure there is enough of a fork to fit through the actuator. See Figure 14 and Figure 15.

9. Using the linkage-forming tool, cut or score location that will be broken off (Figure 14). Bend the linkage back and forth until it breaks.

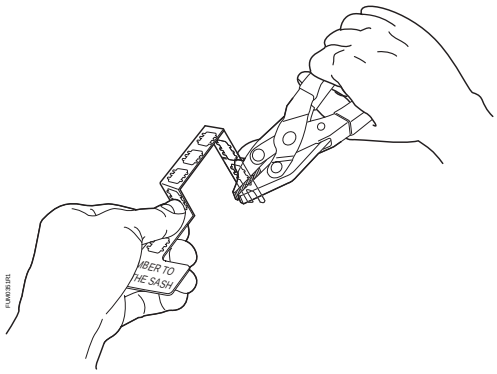


Figure 14. Cutting the linkage.

10. Clean the mounting area with an alcohol towelette and allow drying.

11. Attach the linkage to the actuator car by inserting it through the holes on the side of the actuator car (Figure 15).

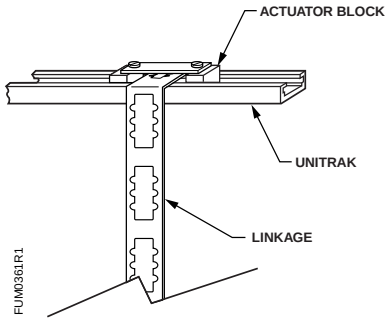


Figure 15. Attaching Linkage to Actuator Block.

12. Remove the protective paper from the adhesive backing on the mounting plate.

13. Close the sash; move the actuator and linkage to your estimated mounting position.

14. Lightly press the mounting plate onto the sash.

    NOTE: Make sure that the plate is mounted so that the sash can travel without running the actuator block off the track or interfering with any obstacles.

15. Adjust the mounting plate if necessary and firmly attach the mounting plate to the sash.

Bending Linkages (Horizontal)

NOTE: If more than one UniTrak is mounted on the fume hood, repeat the following steps for each UniTrak.

Bends will reduce overall length by 1/2 inch to 1-1/2 inches.

A 45-degree angle will clear most obstacles.

1. Estimate the mounting position of the linkage (approximately 1 inch from the top edge of the sash) (Figure 16).

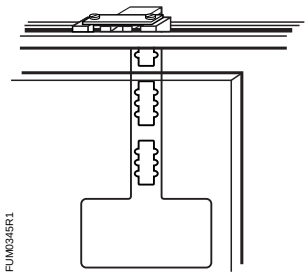


Figure 16. Location of Horizontal Linkage.

2. Using the permanent marker, mark the linkage where it is even with the UniTrak actuator car.
3. Measure the distance from the edge of the sash frame to the far edge of the actuator car = X (Figure 17 and Figure 18).

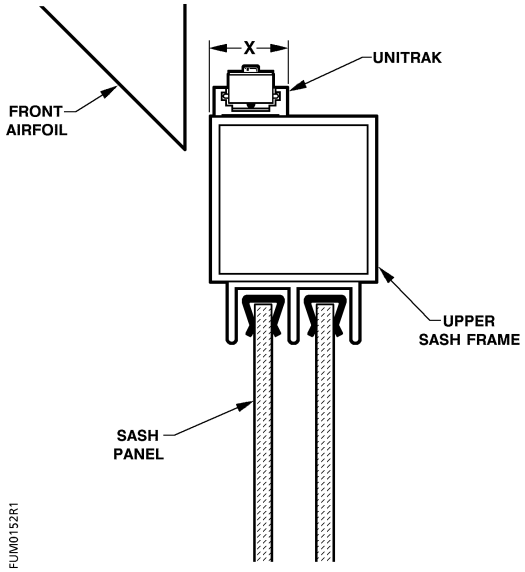


Figure 17. Linkage Clearance Measurement.

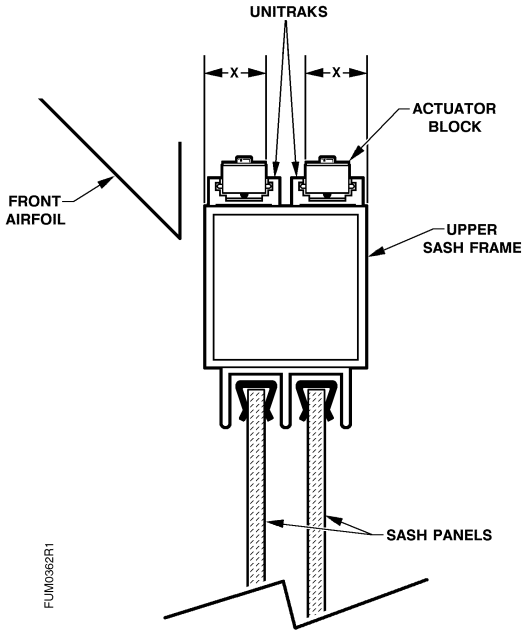


Figure 18. Linkage Clearance Measurement for Dual UniTrak sensors.

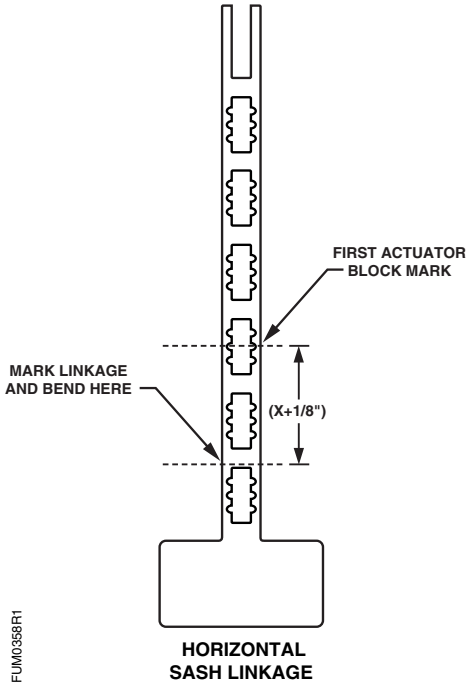


Figure 19. Marking the First Linkage Bend.

4. Add 1/8 inch to X.
5. Using the 1/8 inch + X value, measure from the first actuator car mark toward the mounting plate, mark this location (Figure 19).

6. Using the linkage-forming tool, bend the linkage at a 45-degree angle on the second mark so the linkage is parallel to the sash (Figure 20).

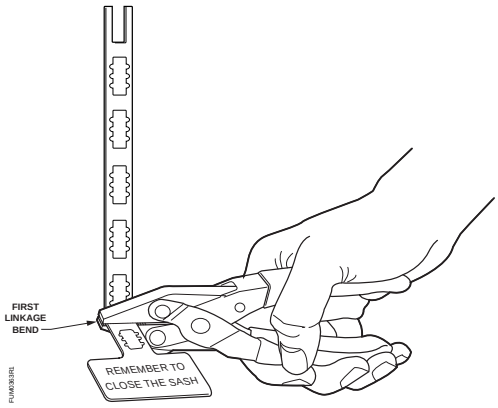


Figure 20. First Linkage Bend.

7. **Bend 2—**Bend the linkage down toward the sashes at a 45-degree angle 1/2 inch from Bend 1. (Figure 21).

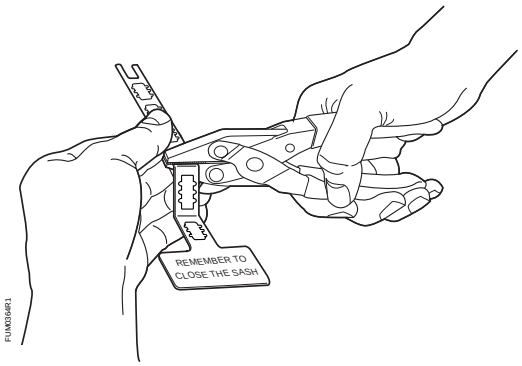


Figure 21. Second Linkage Bend.

8. **Final Linkage Bend—**Place linkage against sash, mark where the linkage aligns with the actuator (Figure 22).

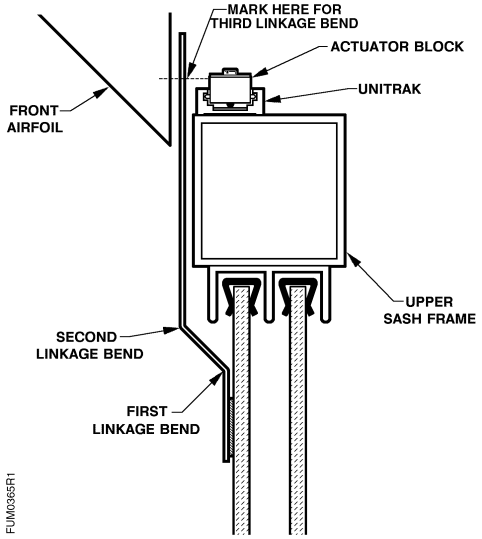


Figure 22. Marking the Final Linkage Bend.

9. Bend linkage toward sash at 90-degree angle (Figure 23).

10. Clear any obstacles between the sash and the actuator with additional linkage bends.

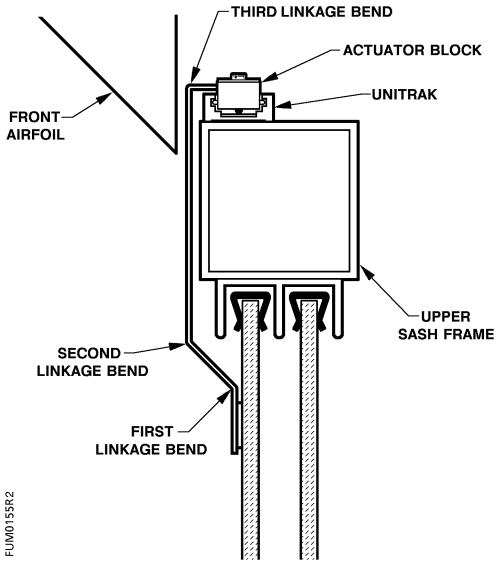


Figure 23. Completed Horizontal Linkage.

11. Use the completed linkage to mark the three required bends on another unbent linkage. Bend the new linkage so that it is identical to the first.

12. Repeat Steps 1 through 11 for the second UniTrak.

13. Place linkage against the sash; mark an approximate location to trim the excess linkage.

    NOTE: When trimming off excess linkage, make sure there is enough fork to fit through the actuator. See Figure 14 (p. 7) and Figure 15 (p. 7).

14. Using the linkage-forming tool, cut the linkage at location. Bend the linkage back and forth until it breaks.

15. Clean the mounting area with an alcohol towelette and allow drying.

16. Attach the linkage to the actuator car by inserting it through the holes on the side of the actuator car. See Figure 15 (p. 7).

17. Remove the protective paper from the adhesive backing on the mounting plate.

18. Close the sash; move the actuator and linkage to your estimated mounting position.

19. Lightly press the mounting plate onto the sash.

    NOTE: Make sure that the plate is mounted so that the sash can travel without running the actuator block off the track or interfering with any obstacles.

20. Adjust the mounting plate if necessary and firmly attach the mounting plate to the sash.

Attaching Linkages to Sash Panels

NOTE: If applied without pressure to the mounting surface, then you may remove and reapply the linkage if necessary. If pressure is applied, then the adhesive is permanent.

1. For best performance and appearance, mount the linkage squarely and uniformly on the sash panel. Also, use the palms of your hands and press the mounting blocks and decorator plates firmly on the sash glass.

   - **For horizontal:** To determine the linkage mounting block location, hold the free end of the linkage flat against the sash panel.

     As a general rule, the linkage should be mounted toward the inside edge of the sash panel. However, for two-sash configurations it is recommended that the linkage blocks be mounted on the center of the sashes (Figure 24).

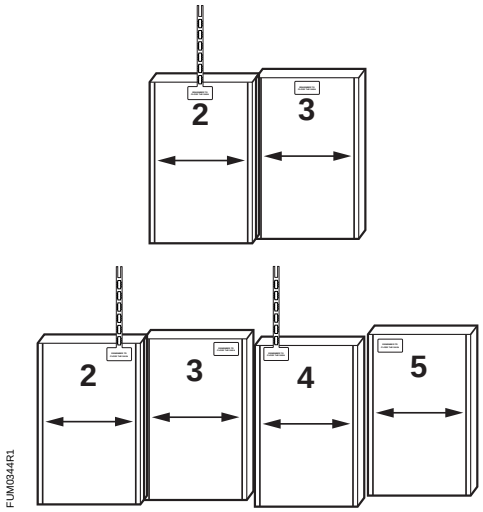


Figure 24. Linkage Mounting Block Locations (Two and Four sash configurations).

   - **For vertical:** Generally, the linkage should be mounted approximately 1 inch from the inside edge of the sash panel. See Figure 9 (p. 6).

     To secure linkage to the vertical sash frame use a 3/16-inch sheet metal screw.

   - **For combination:** Make sure that the block is mounted so that the sash can travel without running the actuator block off the track or interfering with any obstacles.

2. **For linkage blocks mounted inside of the fume hood and on the glass.** Align a decorator plate (that is the same size as the mounting block) on the front of the sash glass. Clean the decorator plate mounting area with the alcohol towelette. Peel the protective backing from the decorator plate. Line up the edges of the decorator plate with the edges of the linkage. Press the plate firmly to the sash glass.

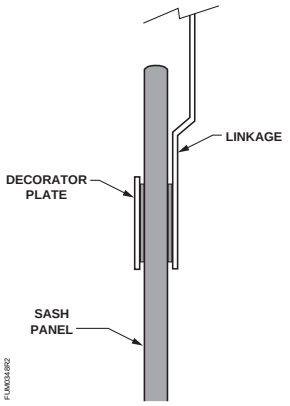


Figure 25. Linkage mounted inside fume hood with decorator plate.

Wiring (Vertical)

Outside sash UniTrak mount:

1. Plug the sensor connector into the connector on the end of the UniTrak strip.
2. Route the sensor and attached wiring so that when the vertical sash is moved up and down the wires will not interfere with the sash movement.

Inside sash UniTrak mount:

1. Remove the access panel on the inside wall of the fume hood.
2. Drill a 3/8-inch hole through the inside wall of the fume hood.

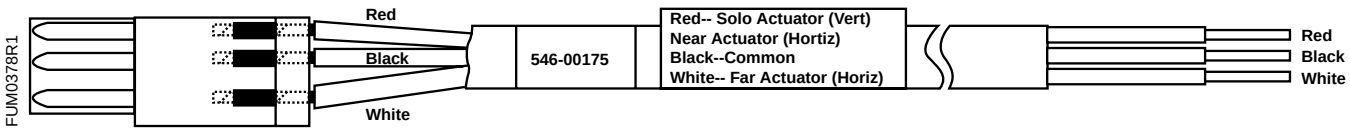


Figure 26. FHC Wiring.

3. Route the sensor wires between the fume hood and the bottom of the airfoil, and to the controller.
4. At the FHC, wire the sensors as per the application. The black wire is common and the red wire is the signal. The white wire is not used for vertical (single actuator car) sensors. See Figure 26. Secure the wires with the wire tie mounts and nylon wire ties. Trim the wire ties with the wire cutters.
5. If there are multiple sashes, use the wire marker labels to number the end of the sensor wires. See Figure 27 for proper sash numbering.

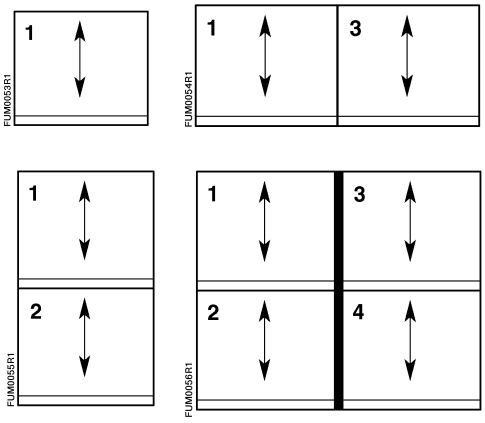


Figure 27. Sash Wire Numbering.

6. Bundle multiple wires together every 12 inches (30 cm).
3. Insert the white plastic bushing in the 3/8-inch hole.
4. Route the sensor wires through the hole, and fill the bushing with the silicon in the white tube. See Figure 28.

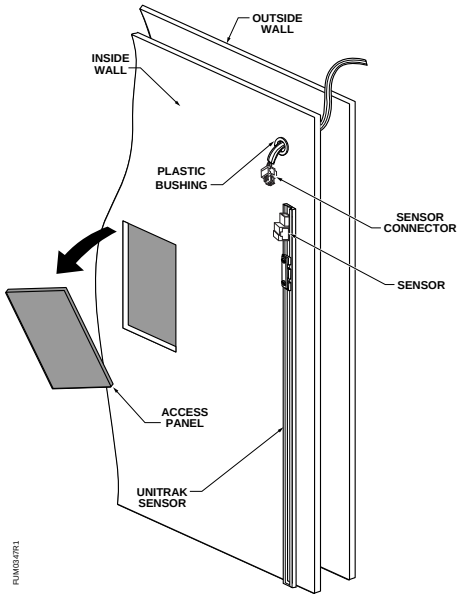


Figure 28. Routing Wires Through Fume Hood Wall.

5. Reach through the access panel opening (between the inside and outside walls of the fume hood).
6. Route the wires to the controller.
7. At the FHC, wire the sensors as per the application. The black wire is common and the red wire is the signal. The white wire is not used

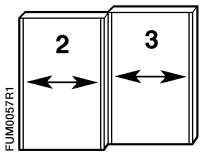
for vertical (single actuator car) sensors. See Figure 26.

8. Secure the wires with the wire tie mounts and nylon wire ties. Trim the wire ties with the wire cutters.
9. If there are multiple sashes, use the wire marker labels to number the end of the sensor wires. See Figure 27 for proper sash numbering.
10. Bundle multiple wires together every 12 inches (30 cm).

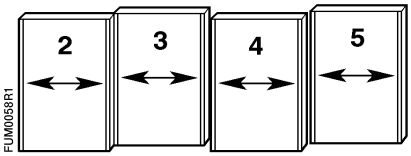
The installation is now complete.

Wiring (Horizontal)

1. Use the wire marker labels to number the sensor connector wire ends according to Figure 29.



Two Horizontal Sash Panels.



Four Horizontal Sash Panels.

Figure 29. Sash Wire Numbering.

NOTE: For combination sash fume hoods, route the wiring so that when the vertical sash is moved up and down the cables will not interfere with the sash movement. Use the wire ties and wire tie mounts to hold the wires.

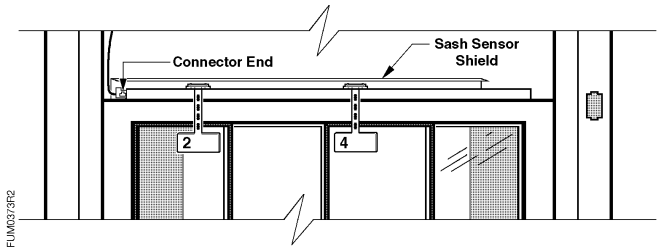


Figure 30. Sash Sensor on Combination Fume Hood.

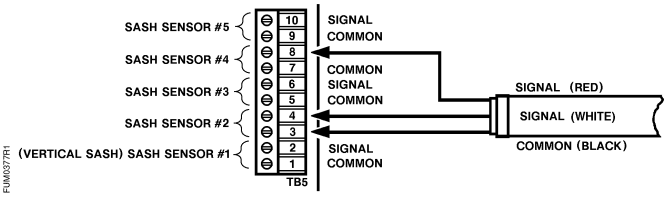


Figure 31. Wire terminations for sash 2 and 4 (for Figure 30)

2. For outside-mounted UniTrak sensors (horizontal fume hoods), drill a 3/8-inch (9.5 mm) hole through the front airfoil or the fume hood frame approximately 2 inches (51 mm) from the end of the UniTrak. Remove metal filings with the portable vacuum cleaner.

CAUTION:

Before drilling, ensure that metal filings will not fall on laboratory equipment such as beakers and heating elements. Remove metal filings with the portable vacuum cleaner after drilling.

3. Snap a plastic bushing into each hole and route the sensor connectors on the ends of the UniTrak through the hole (Figure 32). For inside-mounted UniTrak sensors, route the wiring through existing openings.

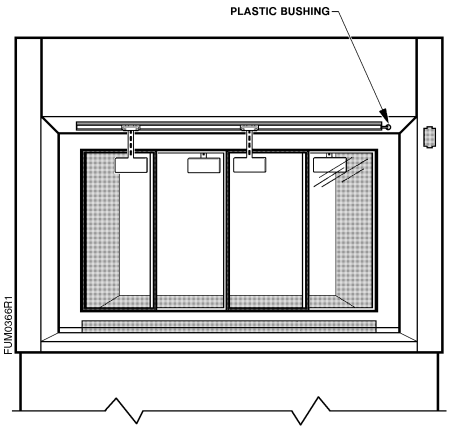


Figure 32. Bushing Placement for Outside Mounted UniTrak Wiring.

4. Plug the connectors in to the UniTrak sensor.
5. Route the wires to the controller. Use wire ties and wire tie mounts to hold wires in place. Bundle multiple wires together every 12 inches (30 cm).

6. The black wire is common and the red wire is the signal for the actuator car nearest the connector end of the sensor track. The white wire is the signal for the actuator car farthest from the connector. See Figure 26.
7. See Figure 31 for the hood setup wiring in Figure 30.

Installing the Sensor Shield

NOTE: The Sash Sensor Shield is an optional protectant for the sensor track. Some setups and hoods may not allow for use of the shield. Trimming the shield may also be required. All this should be analyzed prior to installation.

NOTE: The Sash Sensor Shield is installed last, after operation and wiring of the sensor track has been verified.

1. Test fit the sensor shield before removing the adhesive cover. See Figure 33 and Figure 34.
2. If necessary trim the shield using the trim tool kit. If you do not have to cut the sensor shield, continue to step 3.

NOTE: If you apply the sensor shield without pressure to the mounting surface, you may remove and reapply the shield. Once pressure is applied the sensor shield will be difficult to remove.

3. Remove the protective backing from the adhesive strip.

For Vertical Sash Sensors: Position sensor shield on sensor track as shown in Figure 33. Position the shield over the end of the UniTrak at the bottom of the Fume Hood to protect the sash sensor from the working area.

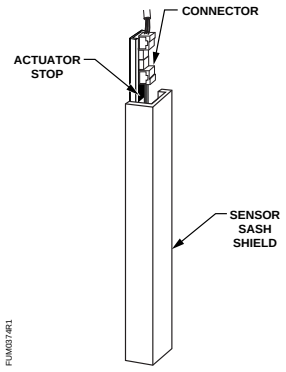


Figure 33. Sash sensor shield on vertical sensor

For Horizontal Sash Sensors: Position the sensor shield on the sensor track, as shown in Figure 34. Position the shield over the connector end of the UniTrak to allow service access on the opposite end.

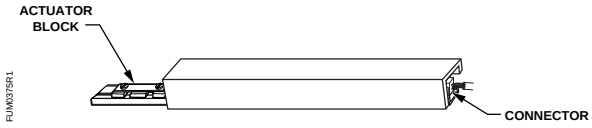


Figure 34. Sash sensor shield on horizontal sensor.

4. Apply full and even pressure along the entire shield to fully secure its position on the UniTrak.

The installation is complete.