

Airfoil Pitot™ Installation Sheet

Required Tools

- Flat Blade Screwdriver
- Power Drill
- Drill Bit Assortment
- 3/4" Hole Saw
- Hand Grinder/Sander

Parts List

- Airfoil Pitot, 1 ea.
- Mounting Brackets
- 6-32x3/8" Slotted Pan Head Screws
- 1/4" Flat Washers, 2 ea.
- 1/4"-20 Hex Nuts, 2 ea.

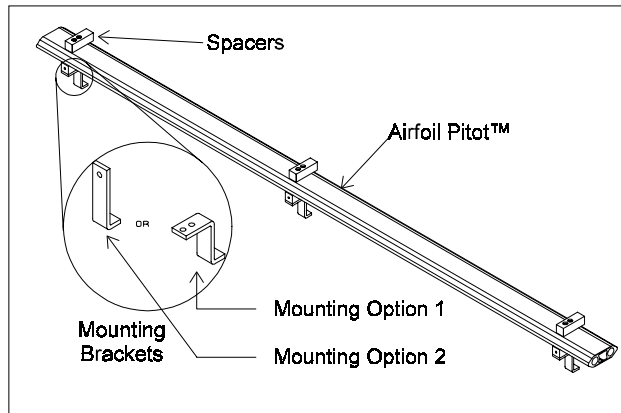


Figure 1

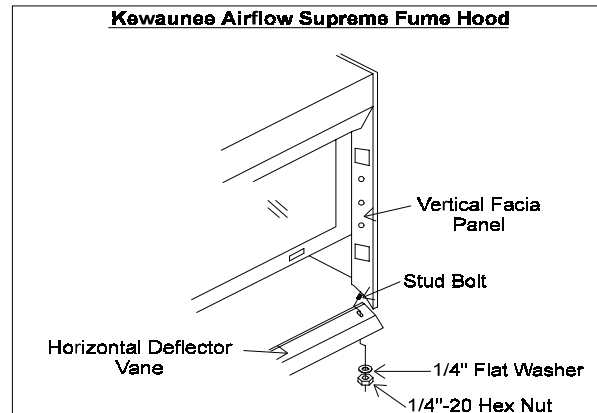


Figure 2

THESE INSTRUCTIONS ASSUME THE FUME HOOD IS INSTALLED AS PER THE MANUFACTURER'S INSTRUCTIONS

1. Unpack all Airfoil Pitot™ parts and check against above list.
2. These instructions are intended as general guidelines for installation on most types of bench top fume hoods.
3. Ensure the work top overhangs the cabinet in front by 1". Check the horizontal deflector vane (airfoil) to see whether it extends underneath the facia panels on either side.
4. Remove the factory deflector vane from your fume hood. If a center support bracket or clamp exists, it will have to be removed. Do this by carefully grinding away the weld, or by drilling away spot welds.
5. The factory deflector vane requires raising to allow room for the Airfoil Pitot™.
If the deflector vane (airfoil) extends underneath the vertical facia panels:
6. A contour must be scribed parallel to and 5/8" above the existing contour. Remove the rubber molding before scribing. Use a hand grinding tool (such as a Dremel Moto-Tool) to cut the facia panels. Be careful not to cut the stud bolts on these panels.
If the deflector vane (airfoil) does not extend underneath the facia panels:
6. Unbolt it and position it 5/8" higher than its original position and drill new mounting holes in the facia panel.

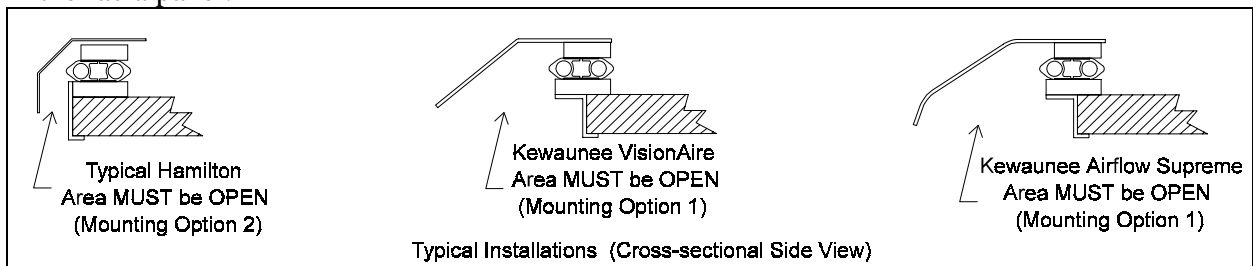


Figure 3

7. In order to determine which mounting bracket your particular installation requires, the following guidelines are offered: The rear of the Airfoil Pitot™ should not extend past the rear of the deflector vane; the front edge of the Airfoil Pitot™ should not touch the underside of the deflector vane. Before holes are drilled in the hood wall, dry fit the Airfoil Pitot™ once with each set of mounting brackets to see which will best suit your installation. See Figure 3.
8. After determining the best mounting brackets for your installation, attach preferred brackets to pitots using the 6-32 screws provided. Place the Airfoil Pitot™ in position on the work top with the fittings against the right inside wall. Mark the location of each fitting on the right inside wall.
9. Use a 3/4" hole saw to cut 2 holes through the inside wall of the fume hood where the fittings touched the wall in the previous step.
10. Replace the factory deflector vane. If it is held in place by stud bolts use the 1/4" flat washers and 1/4"-20 hex nuts to secure the deflector vane. Otherwise, use the new mounting holes drilled previously. The Airfoil Pitot™ will provide additional support. Refer to Figure 2.
11. Insert the Airfoil Pitot™ into the fume hood, making sure the fittings will line up with the 3/4" holes in the right inside wall.
12. The mounting brackets provided are designed to snap onto a standard 1-1/4" thick work top. Be sure these clips are fully engaged to ensure maximum stability of the Airfoil Pitot™.
13. If TBK-1 was ordered the tubing is cut to length and color coded. Push the appropriate tube onto its fitting, matching the color to the band on the pitot tubes. Excess tubing should be neatly coiled taking care not to crimp the tubing. Crimping the tubing will render the system inoperable. Do not cut tubing. Length is designed for optimum response.
14. The opposite ends of the tubing will be connected to the color coded fittings on the pressure transmitter. Refer to the Pressure Transmitter Installation Sheet.

OPERATION NOTES

- Do not attempt to calibrate until pitot is permanently installed - any movement of the pitot may change calibration.
- Be sure that there is nothing between the hood work top and the pitot such as double faced tape.
- Keep the tubing runs 12-15 feet for best response. (The flow signal should reach the transmitter about the same time it reaches the control damper.)
- A hood may have flow through it, even if the fan is off. Because of this, never "zero" the transmitter with the pitot connected. Disconnect the pitot or place the ends of the tubing close to one another in a quiet location. This should give a good zero signal. Also, the best method of transmitter zero is by use of a Calibrator.
- Firmly tie pressure tubing down and the total and static together. Air at these pressures "sloshes" like water and "flows" like molasses. Securing this tubing prevents errors in readings.



OPERATION AND INSTALLATION INSTRUCTIONS

Slack Membrane™ Transmitter MODELS FVR-1, SPR-1

READ CAREFULLY BEFORE ATTEMPTING TO ASSEMBLE, INSTALL, OPERATE OR MAINTAIN THE PRODUCT. PROTECT YOURSELF AND OTHERS BY OBSERVING ALL SAFETY INFORMATION. FAILURE TO COMPLY WITH INSTRUCTIONS COULD RESULT IN PERSONAL INJURY AND/OR PROPERTY DAMAGE AND VOIDING OF PRODUCT WARRANTY. RETAIN INSTRUCTIONS FOR FUTURE REFERENCE.

Description

The Slack Membrane™ Transmitter measures extremely low differential pressures. Its response is fast, smooth, and free of noise generated by "ringing" associated with conventional low volume transmitters. The FVR-1 models are designed for use on fume hoods and similar devices, where the SPR-1 models are designed for slightly higher differential pressures such as room containment applications. See individual spec sheets for more information.

▲ WARNING ▲

NOT INTENDED FOR HAZARDOUS DIVISION 1 OR DIVISION 2 LOCATIONS OR FOR OUTDOOR USE.

DO NOT BLOW INTO OR OTHERWISE OVER-PRESSURE THE TRANSMITTERS. IT IS POSSIBLE TO EXCEED THE FULL SCALE VALUE OF THE TRANSMITTERS BY 150,000 TIMES WITH ONLY YOUR BREATH.

Installation

Parts List

- FVR or SPR Unit
- (4) Mounting Screws

Unpack all parts and check against above list.

1. Refer to Figs. 1 & 2. Fig. 1 shows the mounting option which provides optimum performance of the pressure transmitter. Fig. 2 shows an alternative mounting option which will provide adequate performance. The aforementioned Figs. do not apply to the SPR models. These models may be mounted in any plane; however, if moisture contamination is possible, the transmitters should be mounted with the ports pointing down.
2. Where possible, the FVR models may be mounted in the wall space of the fume hood. If this method is not acceptable, mounting the FVR

models to a wall or to the outside of the fume hood is acceptable.

3. The SPR models are designed to mount inside a standard 4" wall. For retro-fitting purposes this may not be practical. Virtually any sturdy permanent structure will provide sufficient mounting requirements.
4. When determining the mounting configuration, consideration needs to be given to accessibility of the transmitters. Electronic adjustment may be required in the field, so the transmitter should remain fairly accessible.
5. Position the transmitter where it will be mounted. Mark the location of the four mounting holes. A pilot hole is recommended when mounting on materials which may be split or cracked by self-tapping screws.
6. If necessary, drill the four marked holes with the proper drill bit size.
7. Install the transmitter using the four self-tapping screws.
8. The pressure ports are color coded to the tubing supplied in any of the TBK kits. Push the appropriate color tube onto the fitting marked with the same color. The port marked blue is the low (static) pressure connection, and the port marked red is the high (total) pressure connection. Refer to Figure 4.

Wiring

1. Refer to Fig. 3. The required power supply voltage is 24 - 32 volts dc.

Operation

Note: If zero setting is between 0 and 7.5% of full scale, it does not require adjustment. This is an acceptable range of zero. If zero setting is not in this range, adjustment is required. If only a small adjustment is required, make the adjustment at the receiver. See Figure 3.

1. To check zero setting of unit:
 - (a) Ensure that there is no differential across the transmitter high and low ports or use a calibrator. If a calibrator is not available, this can be done by connecting two short pieces of tubing to the high and low ports of the transmitter and the free ends to a tee fitting. Leave the third connection of the tee fitting open.
 - (b) To connect a mA meter in series with the unit, disconnect the positive (+) wire from the transmitter, connect the positive terminal of the power supply to the mA input on the meter, and connect the common input of the meter to the positive (+) terminal on the transmitter.
 - (c) For a 4-20mA configuration, 4mA is 0% of full scale, and 5.2mA is 7.5% of full scale. Any reading between 4mA and 5.2mA is acceptable. **Do Not Adjust the Zero Setting.**
 For a 2-10V configuration, 2V is 0% of full scale, and 2.6V is 7.5% of full scale. Any reading between and including 2V and 2.6V is acceptable. **Do Not Adjust the Zero Setting.**
 For a 1-5V configuration, 1V is 0% of full scale, and 1.3V is 7.5% of full scale. Any reading between and including 1V and 1.3V is acceptable. **Do Not Adjust the Zero Setting.**
2. To adjust zero setting of unit:
 - (a) Ensure that there is no differential across the transmitter high and low ports or use a calibrator.
 - (b) Remove the zero adjust plug to gain access to the zero adjust pot. Refer to Figure 4. Clockwise rotation of the pot increases the output.
 - (c) Always replace zero adjust plug and tighten slightly.
3. Span adjustment is a factory setting. If adjustment is required, the unit must be returned to the factory.
4. Do not operate transmitter at less than 50% of full scale.

Installation & Wiring Drawings

Mounting Option 1

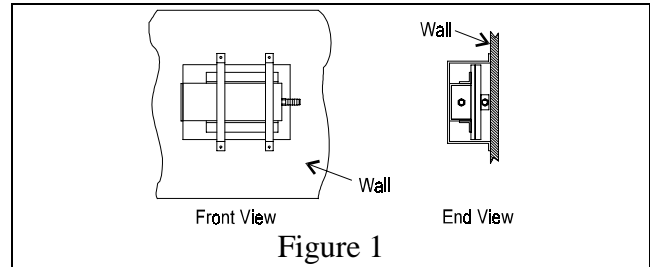


Figure 1

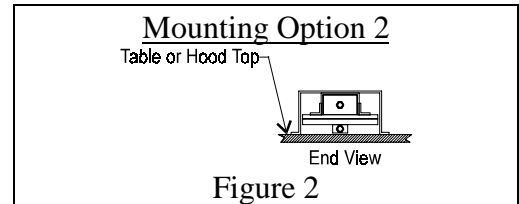


Figure 2

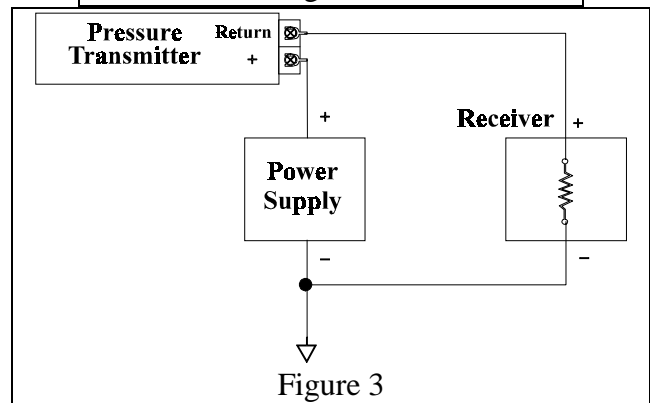


Figure 3

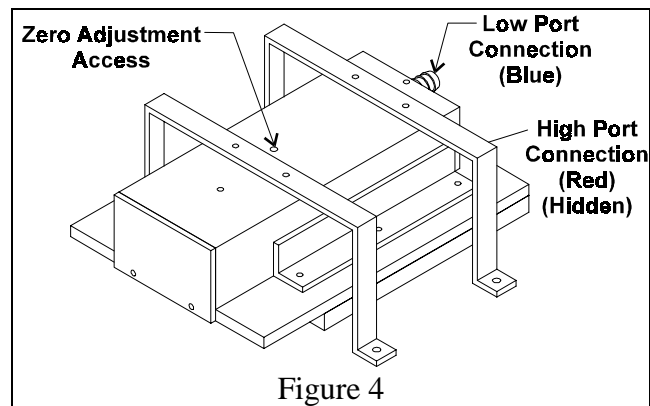


Figure 4

Troubleshooting Chart

Symptom	Possible Cause (s)	Corrective Action
No Output	1. Miswiring of transmitter	a. Ensure transmitter is wired according to Figure 3.
	2. Power Supply	a. Disconnect power supply. b. Check DC voltage from power supply (reading should be 24-32 Vdc.)
No Change in Output	1. Error in AFP installation	a. Ensure Airfoil has adequate open area underneath for air movement. b. Ensure AFP is securely mounted. Slight movements will affect AFP coefficient.
	2. Error in tubing installation	a. Ensure correct pitot to transmitter connection.



		<ul style="list-style-type: none">b. Check tubing for leaks.c. Make sure tubing is tight around fitting.d. Make sure there are no kinks in tubing.e. Ensure tubing is mounted securely.
	3. Transmitter malfunction	<ul style="list-style-type: none">a. Return for repair. NOTE: Do not attempt to service unit. Attempted service will void warranty.
Zero Position Change	1. Zero Position Change	<ul style="list-style-type: none">a. Refer to Operations Section.



OPERATION AND INSTALLATION INSTRUCTIONS

PVC Damper Assemblies MODELS PDA, CPP, CDM

READ CAREFULLY BEFORE ATTEMPTING TO ASSEMBLE, INSTALL, OPERATE OR MAINTAIN THE PRODUCT. PROTECT YOURSELF AND OTHERS BY OBSERVING ALL SAFETY INFORMATION. FAILURE TO COMPLY WITH INSTRUCTIONS COULD RESULT IN PERSONAL INJURY AND/OR PROPERTY DAMAGE AND VOIDING OF PRODUCT WARRANTY. RETAIN INSTRUCTIONS FOR FUTURE REFERENCE.

Description

The Damper Assembly is a mechanical device used in conjunction with the Linear Actuator w/ Positioner to control intake or exhaust flow from a room or fume hood. There are several different versions of damper assemblies available to serve varying requirements; PDA (Precision Damper Assembly), CPP (Combination Manifold Pitot & Precision Damper Assembly), and CDM (3/4" d assembly). See each spec sheet for more information.

General Safety Information



PROPER INSTALLATION IS ULTIMATELY THE RESPONSIBILITY OF THE END USER. SECURE MOUNTING AND PROPER AIRFLOW ARE REQUIRED. IMPROPER OPERATION MAY RESULT IF INSTRUCTIONS ARE NOT CAREFULLY FOLLOWED.

Installation

Parts List
• Damper Assembly
• Pivot Plate (if unit is PDA or CDM)
• #10-32 Hex Head Screws for Pivot Plate.

Unpack all parts and check against above list.

Note: Due to the many different possibilities for mounting the Damper Assemblies, it is more reasonable to give guidelines for mounting rather than try to outline each particular installation. When guidelines are followed, the Damper Assemblies will perform according to specs.

1. Where it is required that the damper assembly be mounted in an existing duct, it is recommended that PVC couplings of the proper

size be used at each end of the damper assembly.

2. When mounting the damper assembly, take care to note the direction of airflow and install the assembly according to the directional arrow on the damper assembly. The damper assembly must be installed at least one diameter downstream from any turn or obstacle.
3. Do not mount the damper assembly anywhere the movement of the transfer arm will be restricted. Different LAP mounting options on some models require different space requirements. See Fig. 3.
4. Do not use flexible expandable duct to connect the damper assembly to existing ducts or fume hoods. This type of duct material does not provide rigid mounting and may cause performance problems.

LAP Mounting Options

Note: CPP models have only one mounting option. The pivot plates are shipped permanently attached to the mounting bracket. This section addresses only the PDA and CDM models.

1. The LAP units may be installed on the PDA or CDM assemblies in either "In-Line" or "Horizontal" positions.
2. A Pivot Plate is provided separate from the damper assembly. The plate has a series of holes to allow for each mounting option. Each hole in the plate is marked either "I" or "H", "I" indicating the hole is used for "In-Line" mounting, and "H" indicating the hole is used for "Horizontal" mounting. In Fig. 1, the pivot plate is shown in each configuration.
3. Determine which mounting option will best serve your needs. Three #10-32 Hex Head screws are provided to facilitate mounting the Pivot Plate. The mounting bracket on the damper assemblies has four holes in it. Two of the holes

AUTO-FLOW®

are not marked as they are common to both mounting options. The remaining two holes are marked "I" and "H".

Installation & Mounting Options Drawings

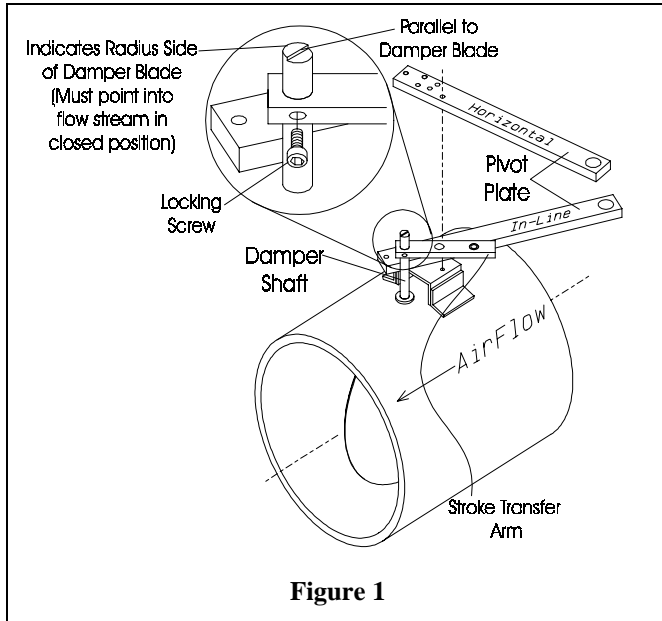


Figure 1

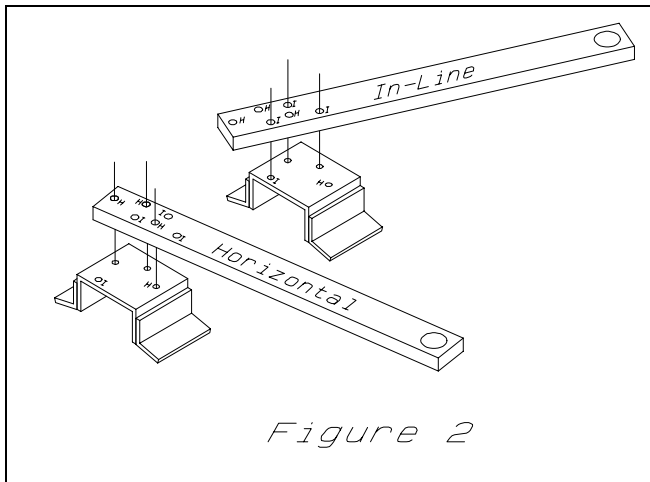


Figure 2

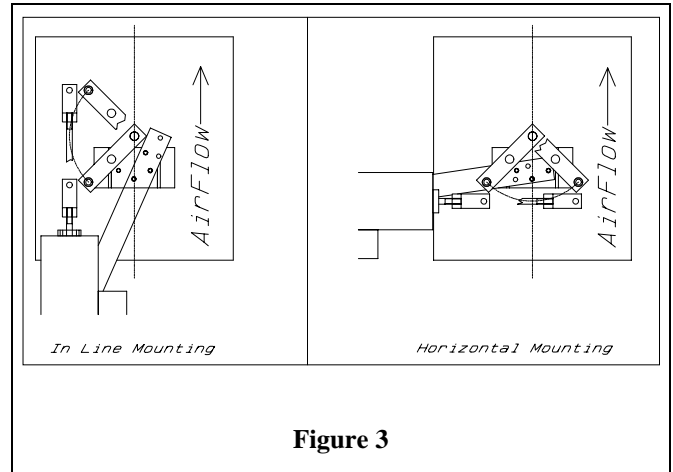


Figure 3

- Align the pivot plate (lettered side up) as shown in Fig. 2 for the mounting option previously determined.
- After mounting the pivot plate in the desired position, refer to Fig. 1. The Damper Blade has a radius on one side of it, and airflow must be directed toward that side of the blade when the damper blade is in the closed position. Note that the damper shaft has a notch cut in the end that allows a visual check of the position of the damper blade. The rounded portion of the shaft end designates the side of the blade that has the radius.
- Note the stroke arc for each mounting option in Fig. 3. **These are the only two positions in which the damper blade will operate from fully open to fully closed.** It is possible to install the actuator on the damper assembly to operate from 1/2 open to 1/2 closed. Care must be taken to ensure correct orientation of the stroke transfer arm. Improper operation will result from incorrect installation.

Operation

Note: The Damper Assemblies are factory set and shipped in the normally open position. In certain installations, the normally closed position may be desirable.

To change the damper blade position from normally open to normally closed:

- Remove the locking screw from the stroke transfer arm.
- Rotate the damper shaft 90° clockwise.



3. Reinstall the locking screw, making sure it is tight.

Troubleshooting Chart

Symptom	Possible Cause (s)	Corrective Action
Damper Blade does not fully open or fully close	1.Stroke arc incorrect.	a. Ensure LAP is installed correctly according to Fig. 3.
	2.Stroke restricted or blocked.	a. Ensure there is enough clearance throughout the LAP operating stroke.
Holes in pivot plate do not line up with holes in mounting bracket	1.Incorrect orientation of pivot plate.	a. Make sure lettered side is facing up. b. Pivot Plate will not be true horizontal or vertical in either mounting option. Rotate slightly each direction until holes line up. c. Make sure to match lettered hole in mounting plate with corresponding letter in pivot plate. See Fig. 2.
Damper Assembly is noisy when in operation	1.Incorrect damper blade orientation.	a. Make sure radius side of damper blade is toward the airflow. See step 5.
	2.Assembly is not mounted securely.	a. Assembly must be mounted as rigidly as possible. Do not use flexible expandable duct material.

Space Pressure Primary Installation Sheet

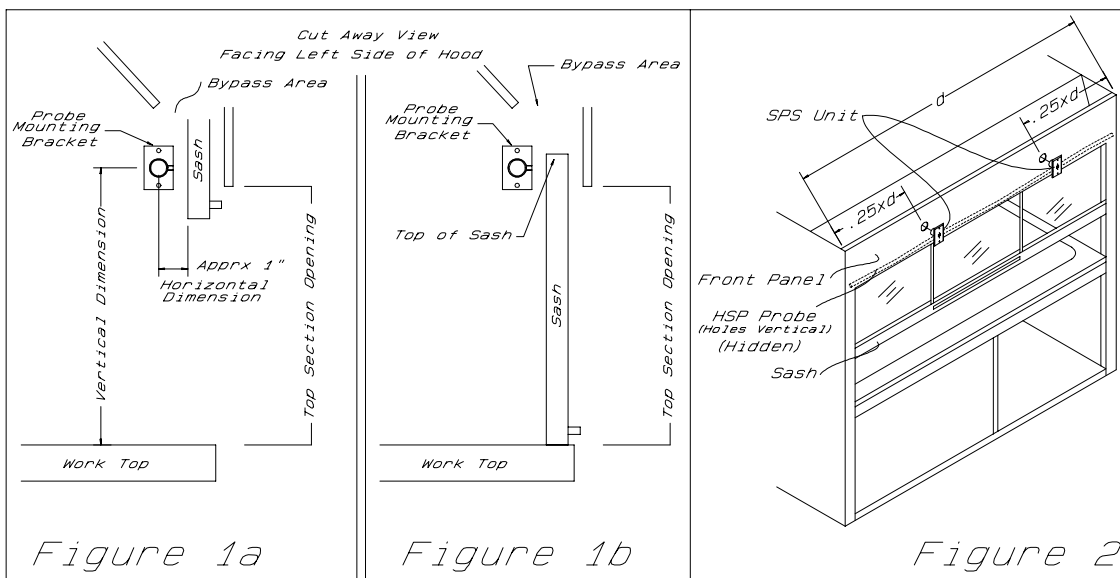
For Hamilton's Walk-In and Similar Fume Hoods

Required Tools

- Flat Blade Screwdriver
- Power Drill
- Center Punch
- 2" Hole Saw
- #36 Drill Bit
- #27 Drill Bit
- 41/64" Drill Bit
- 5/64" Allen Wrench

Parts List

- HSP Probe, 1ea.
- Tubing, 3/8" ID, Red (same length as HSP Probe)
- End Fitting (w/O-Rings), 1ea.
- Fitting, 1/8"NPT x 3/8" ID Tube, HDPE, 90° Elbow, 1ea
- Mounting Brackets(w/Set Screws), 2ea.
- #6 Mounting Screws (For Use With Mounting Brackets)
- SPS-1 Unit, 2ea
- #6-32 mounting screws, 4ea
- #6 hex nuts, 4ea
- Fitting, 3/8" ID Tube, HDPE, Barbed Tee, 1ea
- Fitting, 1/8"NPT x 3/8" ID Tube, HDPE, Straight, 2ea



THESE INSTRUCTIONS ASSUME THE FUME HOOD IS INSTALLED AS PER THE MANUFACTURER'S INSTRUCTIONS

1. Unpack all Space Pressure Primary (SPP) parts and check against above list.
2. When determining the vertical position of the HSP probe, give consideration to the following guidelines. The HSP probe is intended to be mounted inside the fume hood just above the opening of the top section of the fume hood so that when you are facing the hood, it cannot be seen (see Fig 1a). When installing this probe on models where this position will be in the bypass area, the probe will have to be mounted in a lower position. When the sash is in the fully closed position, the probe should be below the top of the sash framing. Refer to Fig 1b.
3. The horizontal position of the HSP probe should be approximately 1" away from the framing of the sash (see Fig 1a) so that it is in a quiet area (no air velocity or currents).
4. The HSP probe is provided with (2) mounting brackets. The probe will slip in the center hole of the mount and be secured by tightening the set screw found in the side of the mounting bracket. Place the mounting bracket on the inside wall of the fume hood where the HSP probe will be mounted, and mark the mounting holes for the mounting bracket.

5. If necessary, pre-drill the holes using a #36 drill bit and install the mounting bracket using the (2) #6 sheet metal screws provided, ensuring the set screw that secures the probe is towards the rear of the fume hood to allow access to it.
6. The second mounting bracket will be installed on the opposite wall of the fume hood in the same relative position. Mark the center of the exit point of the probe from the inside of the fume hood.
7. Remove the exterior wall of the fume hood.
8. Drill a 41/64" hole through the inside wall of the fume hood at the marked location.
9. From outside the fume hood, insert the HSP probe (plugged end first) through the 41/64" hole in the inside wall of the hood. Before slipping the probe into the mounting bracket on the far wall of the hood, be sure to slip the second mounting bracket onto the probe making sure the set screw for securing the probe is towards the rear of the fume hood.
10. **Rotate the HSP probe so that the holes in it are vertical (i.e.-that the holes are on the top and the bottom of the probe).** Slip the plugged end of the probe into the mounting bracket attached to the wall. Use the 5/64" allen wrench to snug the set screw against the probe.
11. Position the second mounting bracket against the wall where the probe enters the hood. Fasten the bracket to the wall (See Step 6).
12. Use the 5/64" allen wrench to snug the set screw against the probe.
13. Locate the end fitting and ensure that it has (2) O-rings in the grooves on the smaller end. Push this fitting into the open end of the HSP probe. If the HDPE 90° Elbow fitting is not installed in the end fitting, wrap the threads with Teflon® thread sealant tape and install it into the end fitting by hand.
14. The next step is to install the SPS Units on your fume hood. Multiply the length of your hood by 0.25. This number is the distance from the outside wall of the hood to the center of the unit. Mark this location from each end of the hood using a pencil. The vertical dimension will be determined by the height of the front panel. The SPS Units should be mounted so that they are centered vertically in the front panel. See Fig. 2.
15. Cut the marked locations using a 2" hole saw.
16. Insert one of the SPS Units through one of the holes just cut. Mark the location of the mounting holes. Remove the unit and pre-drill the marked locations using a #27 drill bit. Repeat for other SPS Unit.
17. Replace the SPS Unit and attach it to the top panel of the fume hood using the #6-32 screws and nuts. Make sure the fitting hole in the round part of the SPS Unit is pointed towards the center of the fume hood or towards the ceiling.
18. Locate the (2) HDPE straight barbed fittings and wrap the threads with Teflon® thread sealant tape. Install these fittings snugly into the fitting holes located in the round part of the SPS Units.
19. Locate the red tubing which is the same length as the HSP Probe. Cut the length of tubing in half. Push a length of the tubing onto each of the units. Push the opposite end of the tubing onto the 3/8" ID barbed Tee provided.
20. Push a 12-1/2' length (MINIMUM) of 3/8" ID red tubing onto the remaining port of the tee fitting. The other end of this red tubing will connect to the HIGH PORT of the FVR-1B. Refer to the Pressure Transmitter Installation Sheet.
21. Push a 12-1/2' length (MINIMUM) of 3/8" ID blue tubing onto the 90° fitting installed in the HSP probe. The other end of this blue tubing will connect to the LOW PORT of the FVR-1B. Refer to the Pressure Transmitter Installation Sheet.



SPACE PRESSURE SENSOR INSTALLATION SHEET

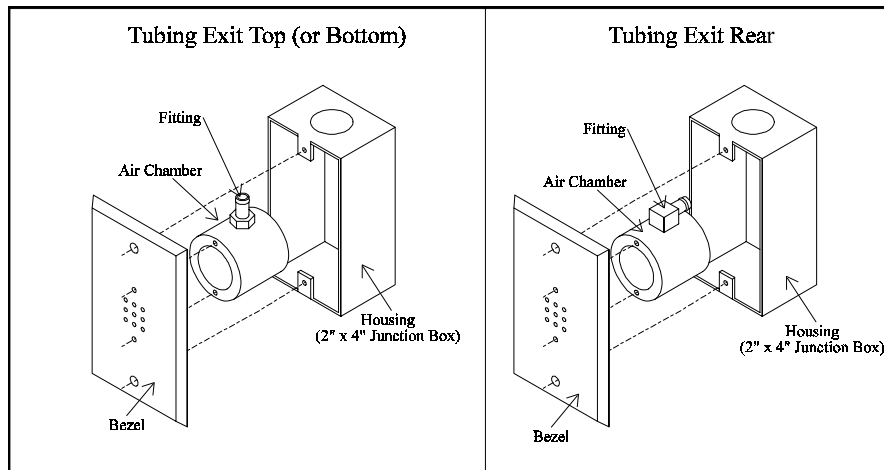
Wall and Ceiling Mount

Required Tools

- Hammer and Nails
- Thread Tape
- Adjustable Wrench
- Flat Blade Screwdriver

Parts List

- SPS Sensor Unit
- Fitting (1/8"NPT x 1/4" ID Tube Barb, Straight)
- Fitting (1/8"NPT x 1/4" ID Tube Barb, Elbow)
- Housing (2" x 4" Junction Box)



1. Unpack all parts and check against above list.
2. At least two Space Pressure Sensors are required for each system installed. One must be mounted in the low pressure area and one in the high pressure area.
3. Determining the location of your Space Pressure Sensor (SPS) involves a decision between mounting the SPS in a wall or in a ceiling. When making this decision, consider the air currents in the room. The SPS should be mounted in a quiet location, away from HVAC vents and doorways. If air currents exist everywhere in a particular room, use a "Tee" fitting to join two SPS units together. Locate one SPS in each of the two quietest areas of the room.
4. When the location is determined, consideration must be given to the room around the unit. Two different fittings have been provided to serve in most applications. The straight fitting will exit the standard 2" x 4" junction box housing at the top (or bottom), and the elbow fitting will exit the housing toward the rear. Once it is decided where the tubing will exit the housing, remove the corresponding knock-out from the housing.
5. After determining the best location for the SPS, remove the housing (DO NOT REMOVE THE AIR CHAMBER FROM THE BEZEL.) from the SPS and mount it as you would any other junction box.

6. If the tubing is to exit the housing toward the rear, install the elbow fitting into the air chamber which is attached to the bezel. If the tubing is to exit toward the top (or bottom) install the straight fitting into the air chamber which is attached to the bezel. Be sure to use thread tape on the fittings before installation.
7. The Pressure Transmitter fittings are color coded (Red = High, Blue = Low). Push the appropriate color tubing onto its fitting. Route the Red tubing to the SPS in the High area, and the Blue tubing to the SPS in the low area.
8. Bring the tubing into the housing of the SPS through the knock-outs removed earlier. Push the tubing onto the fitting installed in the air chamber.
9. Position the bezel in place over the housing and fasten in place.

Pressure Transmitter Installation Sheet

Face Velocity and Space Pressure Versions

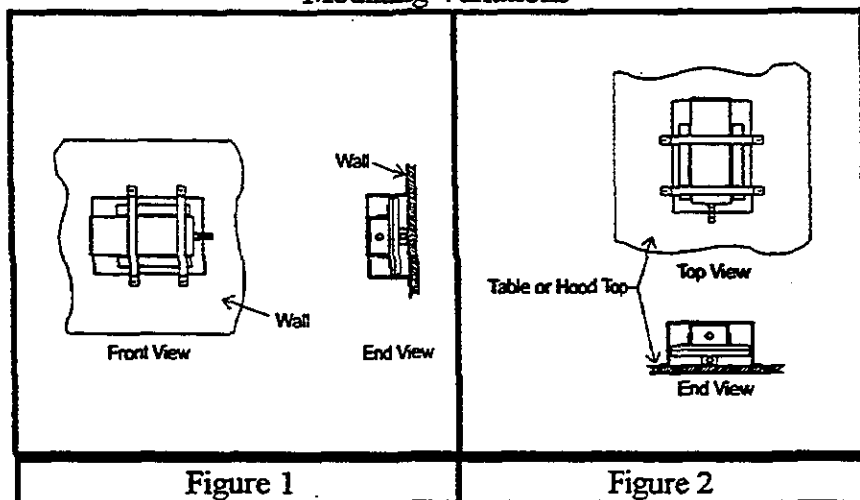
Required Tools

- Flat Blade Screwdriver
- Power Drill
- #36 Drill Bit

Parts List

- Pressure Transmitter Unit with Mounting Bracket
- #6 x 1/2" Slotted Pan Head Sheet Metal Screws

Mounting Variations



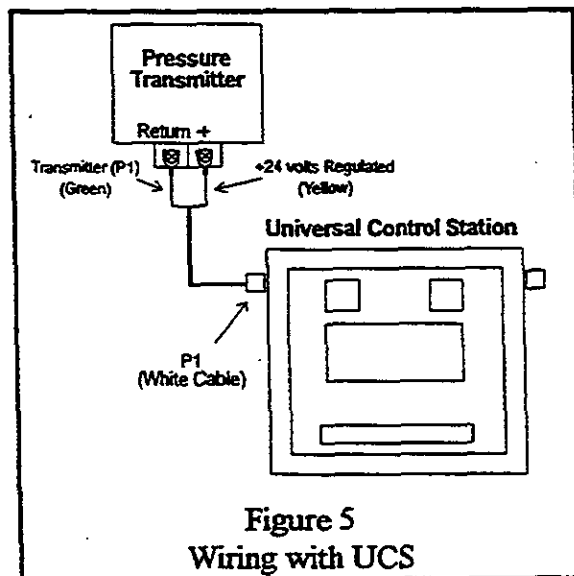
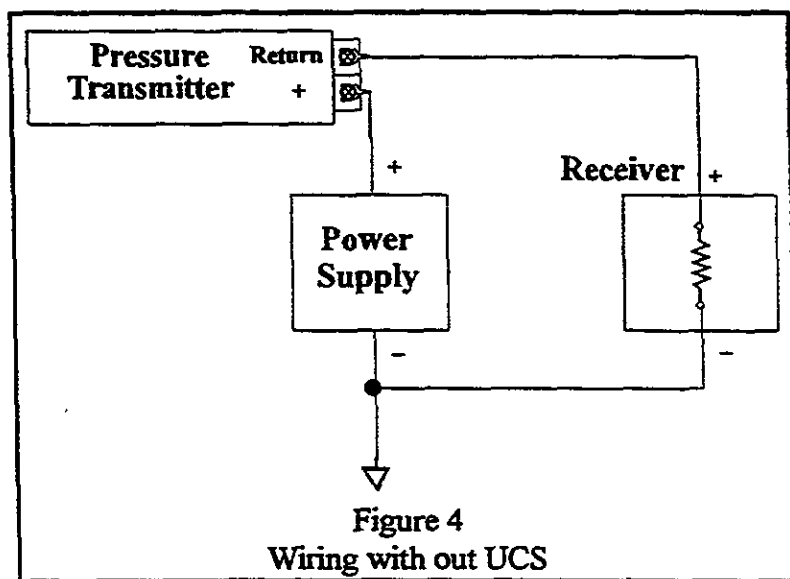
1. Unpack all parts and check against above list.
2. Figure 1 above shows the mounting option which provides optimum performance of the Pressure Transmitter. Figure 2 above shows an alternative mounting option which will provide adequate performance.
3. Where possible, the Face Velocity Pressure Transmitter (FVR-1) should be mounted in the wall space of your fume hood. However, if this method is not acceptable, mounting the FVR-1 to a wall or to the outside of the fume hood are acceptable options.
4. The Space Pressure Transmitter (SPR-1) is designed to be mounted inside a standard 4" wall. For retro-fitting purposes, this may not be practical. Virtually any sturdy permanent structure will provide sufficient mounting requirements.
5. When determining the mounting configuration, consideration needs to be given to accessibility of the transmitter. Electronic adjustment may be required in the field, so the transmitter should remain fairly accessible.
6. Position the transmitter where it will be mounted. Mark the location of the four mounting holes. A pilot hole is recommended when mounting on materials which may be split or cracked by self-tapping screws.
7. If necessary, drill the four marked holes with a #36 drill bit.

8. Install the transmitter using the four #6 self-tapping screws.
9. The pressure ports are color coded to the tubing supplied with your Airfoil Pitot Assembly. Push the appropriate color tube onto its fitting.

OPERATION NOTES

1. The transmitter will have to be "zeroed" after it is first installed. To do this, you must:
 - (a) Ensure that there is no differential across the transmitter or use a Calibrator.
 - (b) Remove the zero plug screw on the transmitter to gain access to the zero adjust pot.. Clockwise rotation of the pot increases the output.
 - (c) Always replace zero plug screw and tighten slightly.
2. The transmitter normally will not require span adjustment. If it does, a Calibrator is the best method.
3. Never blow into or otherwise over-pressure the transmitter - you can put 150,000 times full scale with your breath.
4. Refer to the Pressure Transmitter Operations Sheet for more detailed notes.

WIRING



1. In applications not using the Universal Control Station (UCS), wire the transmitter as shown in Figure 4. The required power supply voltage is 24 volts dc to 32 volts dc.
2. In applications using the UCS, wire the transmitter as shown in Figure 5. Refer to the drawing UCS-ELEC for the wiring diagram for a typical application using the UCS.

LAP-1/Damper Assembly Installation Sheet

Tools Required

- *Flat Head Screwdriver*
- *1/16" Hex Key*

Parts List

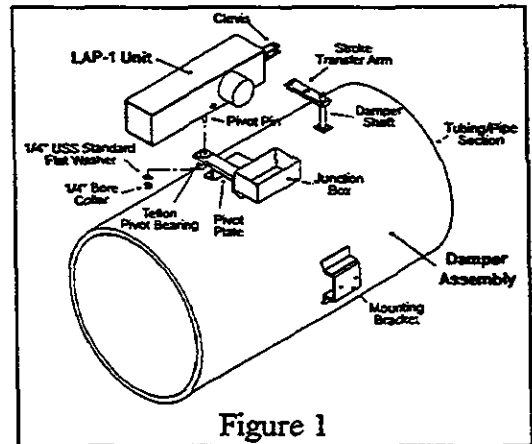
- *LAP-1*
- *Damper Assembly*
- *Clevis Pin*
- *1/4" Flat SS Washer (2 ea.)*
- *1/4" Wave Washer*
- *Hairpin Cotter*
- *1/4" USS Standard SS Flat Washer*
- *1/4" Bore Collar w/4-40 set screw*

Note: It is required that two (2) Duplex Wall Outlets be installed within 5 ft of the LAP-1/Damper Assembly when mounted to the duct. These outlets will be used for the LAP-1 Transformer and the UCS Power Supply.

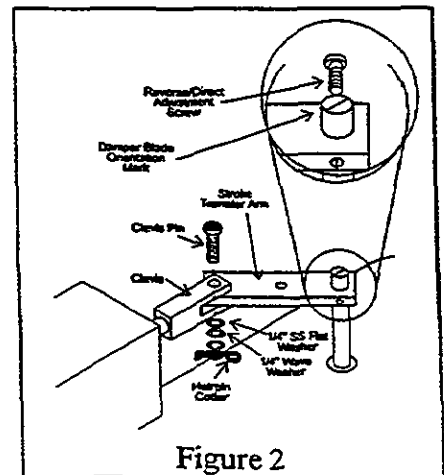
Unpack all parts and check against above list. Note: If LAP-1 is already attached to the Damper Assembly, then proceed with Section II, Wring.

I LAP-1 Installation:

1. LAP-1 is attached to the Damper Assembly by inserting the Pivot Pin into the Teflon Pivot Bearing in the Pivot Plate, (See Figure 1), making sure the Clevis is pointing in the direction of the Stroke Transfer Arm.



- Slide the 1/4" USS Standard SS Flat Washer on to the Pivot Pin.
- Slide the 1/4" Bore Collar on the Pivot Pin and tighten the #4-40 set screw with an 1/16" hex key.
- Next attach the Clevis to the Stroke Transfer Arm. This is done by pulling the Clevis and rotating the Stroke Transfer Arm until they meet. The hole in the Clevis should line up with the hole in the end of the Stroke Transfer Arm.
- Insert the Clevis Pin through the mating parts, making sure the hole in the Clevis Pin is closest to the Damper Assembly (See Figure 2).
- Slide one (1) of the 1/4" SS Flat Washers onto the pin.
- Slide the 1/4" Wave Washer onto the pin next.
- Slide the final 1/4" SS Flat Washer onto the pin.



9. Slide the Hairpin Cotter into the hole that is through the Clevis Pin. Make sure that the cotter is securely in place so as not to lose the washers.

II Wiring :

1. Take the 5 conductor cable which is exiting from the side of the unit and insert it into the top of the junction box that is attached to the Damper Assembly. Screw down the spade connectors to the right side of the terminal block inside the junction box as per the enclosed wiring diagram (UCS-ELEC). At this point the strain relief clamp that is attached to the junction box can be tightened.
2. Next the UCS Power Supply and the LAP-1 Transformer can be wired to the terminal block inside the junction box. The ends of these cables can run into the junction box on the side opposite the LAP-1 unit. Their spade connectors can be screwed down to the terminal block as per the enclosed wiring diagram (UCS-ELEC). Do not tighten the strain relief clamp that is attached to the side of the junction box because one more cable, the Controller Output Cable, must be run through it first.
3. At this point the only remaining cable to be wired to the terminal block is the Controller Output Cable. This is the black modular cable with the modular plug on one end. If this wire is not to be sent through a conduit, then it can be attached to the terminal block as per the enclosed wiring diagram (UCS-ELEC). If this cable must be fed through a conduit, then it can be wired after the Damper Assembly (w/ attached LAP-1 unit) is mounted to the duct.

III Damper Assembly (w/ attached LAP-1 unit) Mounting:

Due to the many different possibilities for mounting the Damper Assembly it is more reasonable just to give some guidelines for mounting rather than to try to outline each particular case. If followed, the Damper Assembly (w/ attached LAP-1 unit) should perform according to specs.

- a. For mounting in line to a duct, or to the end of an exhaust, mounting brackets have been attached to the tube/pipe section of the assembly. There is at least two brackets on the assembly, on opposite sides from one another, but there could be more depending on the length of the tube/pipe section. These mounting brackets have two holes in them, 1.5 inches center to center, to allow a 1/4 inch bolt to pass through them.
- b. It is recommended that when connecting a duct section to the assembly that the duct be placed around the O.D. of the Damper Assembly. The duct can then be attached with a clamp or some other similar device.
- c. Due to possible performance problems, flexible expandable duct is not to be used to connect the Damper Assembly to the existing duct. Note: It is important to have the whole assembly as rigidly mounted as is possible.
- d. When mounting the assembly take note to install it with the airflow in the direction noted by the directional arrow on the Damper Assembly. Also note that the LAP-1 unit is a moving unit and must, when the assembly is mounted, be free from any obstacles that might interfere with that motion.

LAP-1,1c /Damper Assembly Installation Sheet

Tools Required

- Flat Head Screwdriver
- 1/16" Hex Key

Parts List

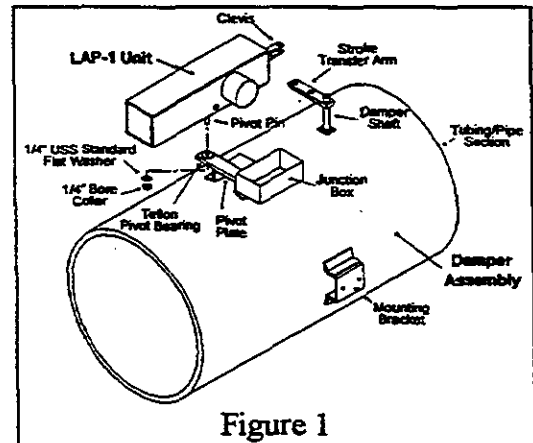
- LAP-1
- Damper Assembly
- Clevis Pin
- 1/4" Flat SS Washer (2 ea.)
- 1/4" Wave Washer
- Hairpin Cotter
- 1/4" USS Standard SS Flat Washer
- 1/4" Bore Collar w/4-40 set screw

Note: It is required that two (2) Duplex Wall Outlets be installed within 5 ft of the LAP-1/Damper Assembly when mounted to the duct. These outlets will be used for the LAP-1 Transformer and the UCS Power Supply (If using with Universal Control Station).

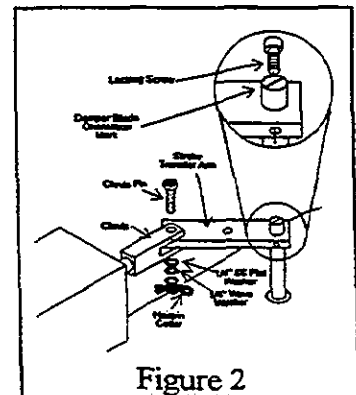
Unpack all parts and check against above list. Note: If LAP-1 is already attached to the Damper Assembly, then proceed with Section II, Wiring.

I LAP-1,1c Installation:

1. LAP-1 is attached to the Damper Assembly by inserting the Pivot Pin into the Teflon Pivot Bearing in the Pivot Plate, (See Figure 1), making sure the Clevis is pointing in the direction of the Stroke Transfer Arm.
2. Slide the 1/4" USS Standard SS Flat Washer on to the Pivot Pin.
3. Slide the 1/4" Bore Collar on the Pivot Pin and tighten the #4-40 set screw with an 1/16" hex key.



4. Next attach the Clevis to the Stroke Transfer Arm. This is done by pulling the Clevis and rotating the Stroke Transfer Arm until they meet. The hole in the Clevis should line up with the hole in the end of the Stroke Transfer Arm. Note that the Damper Blade position can be changed between reverse and direct action (see Figure 2). The Damper Blade Orientation Mark is provided to allow a visual check of the Damper Blade position. To change the damper blade position (Direct/Reverse Action), remove the locking screw and rotate the damper blade shaft 90° either direction. Reinstall the locking screw, making sure it is tight.
5. Insert the Clevis Pin through the mating parts, making sure the hole in the Clevis Pin is closest to the Damper Assembly (See Figure 2).
6. Slide one (1) of the 1/4" SS Flat Washers onto the pin.
7. Slide the 1/4" Wave Washer onto the pin next.



8. Slide the final 1/4" SS Flat Washer onto the pin.
9. Slide the Hairpin Cotter into the hole that is through the Clevis Pin. Make sure that the cotter is securely in place so as not to lose the washers.

II Wiring :

1. Take the 5 conductor cable which is exiting from the side of the unit and insert it into the top of the junction box that is attached to the Damper Assembly. Screw down the spade connectors to the right side of the terminal block inside the junction box as per the enclosed wiring diagram (UCS-ELEC). At this point the strain relief clamp that is attached to the junction box can be tightened.
2. Next the UCS Power Supply and the LAP-1 Transformer can be wired to the terminal block inside the junction box. The ends of these cables can run into the junction box on the side opposite the LAP-1 unit. Their spade connectors can be screwed down to the terminal block as per the enclosed wiring diagram (UCS-ELEC). Do not tighten the strain relief clamp that is attached to the side of the junction box because one more cable, the Controller Output Cable, must be run through it first.
3. At this point the only remaining cable to be wired to the terminal block is the Controller Output Cable. This is the black modular cable with the modular plug on one end. If this wire is not to be sent through a conduit, then it can be attached to the terminal block as per the enclosed wiring diagram (UCS-ELEC). If this cable must be fed through a conduit, then it can be wired after the Damper Assembly (w/ attached LAP-1 unit) is mounted to the duct.

III Damper Assembly (w/ attached LAP-1 unit) Mounting:

Due to the many different possibilities for mounting the Damper Assembly it is more reasonable just to give some guidelines for mounting rather than to try to outline each particular case. If followed, the Damper Assembly (w/ attached LAP-1 unit) should perform according to specs.

- a. For mounting in line to a duct, or to the end of an exhaust, mounting brackets have been attached to the tube/pipe section of the assembly. There is at least two brackets on the assembly, on opposite sides from one another, but there could be more depending on the length of the tube/pipe section. These mounting brackets have two holes in them, 1.5 inches center to center, to allow a 1/4 inch bolt to pass through them.
- b. It is recommended that when connecting a duct section to the assembly that the duct be placed around the O.D. of the Damper Assembly. The duct can then be attached with a clamp or some other similar device.
- c. Due to possible performance problems, flexible expandable duct is not to be used to connect the Damper Assembly to the existing duct. Note: It is important to have the whole assembly as rigidly mounted as is possible.
- d. When mounting the assembly take note to install it with the airflow in the direction noted by the directional arrow on the Damper Assembly. Also note that the LAP-1 unit is a moving unit and must, when the assembly is mounted, be free from any obstacles that might interfere with that motion.