



Overview

The NSA-AFS Series Differential Pressure Switches are general purpose proving switches designed for both HVAC and Energy Management applications. These pressure switches can be used to sense positive, negative, or differential air pressures when used in conjunction with an A/SPT or A/VPT Series sampling tube. The plated housing contains a diaphragm, calibration spring and single snap-acting contact closure with either a manual or automatic reset switch depending on the model. The enclosure cover contains a ½" conduit knockout and guards against accidental contact with the live switch terminal screws as well as the set point adjusting screw.

Applications: Monitoring Filter Blockage, Proof of Flow, Prove Excessive or Insufficient Flow, Alarms and Control



Figure 1

Part Numbers

NSA-AFS-222

NSA-AFS-262

NSA-AFS-460

Specifications

| | |
|-------------------------------------|--|
| Input Pressure Range: | NSA-AFS-222: 0.05 +/- 0.02" to 12" wc NSA-AFS-262: 0.05 +/- 0.02" to 2.0" wc NSA-AFS-460: 0.40 +/- 0.06" to 12.0" wc |
| Set Point Range: | NSA-AFS-222: 0.05 +/- 0.02" to 12.0" wc NSA-AFS-262: 0.07" to 2.0" wc NSA-AFS-460: 0.40 +/- 0.06" to 12" wc |
| Field Adjustable "Operate" Range: | NSA-AFS-222: 0.07 to 12.0" wc NSA-AFS-262: 0.07" to 2" wc NSA-AFS-460: 0.46" to 12" wc |
| Field Adjustable "Release" Range: | NSA-AFS-222: 0.04 to 11.2" wc NSA-AFS-262: 0.04" to 1.9" wc |
| Approximate Switching Differential: | Progressive, increasing from 0.02 +/- 0.01" wc @ min set point to 0.8" wc @ max set point |
| Contact (Load) Rating: | NSA-AFS-222/NSA-AFS-262: 300 VA pilot duty @ 115 to 277 VAC, 60 Hz; 15A non-inductive to 277 VAC, 60 Hz NSA-AFS-460: 15A @ 125, 250, or 277 VAC / 1/2A @ 125 VDC, 1/4A @ 250 VDC / ¼ hp @ 125 VAC, ½ hp @ 250 VDC |
| Contact Arrangement: | NSA-AFS-222/NSA-AFS-262: SPDT w/ Automatic Reset NSA-AFS-460: SPST-NC w/ Manual Reset |
| Measured Media: | NSA-AFS-222/NSA-AFS-262: Air or combustion by-products that will not degrade silicone NSA-AFS-460: Air |
| Maximum Pressure: | 0.5 PSI (0.03 Bar) |
| Life Expectancy: | NSA-AFS-222/NSA-AFS-262: 100,000 cycles min @ 1/2 psi (0.03 Bar) max pressure / cycle and max load NSA-AFS-460: 6,000 cycles min @ 1/2 psi (0.03 Bar) max pressure / cycle & max load |
| Operating Temperature Range: | -40 to 180°F (-40 to 82°C) |
| Operating Humidity Range: | 10 to 95% RH, non-condensing |
| Mounting Direction: | Any vertical plane |
| Enclosure Material: | Galvanized Steel |
| Sample Line Connections: | Accepts ¼" OD rigid or semi-rigid metallic tubing using integral compression fitting, ferrule and nut / "-112 Option": Includes two barbed fittings that accept ¼" flexible plastic tubing |
| Electrical Connections: | Screw type terminal with cup washers |
| Conduit Opening: | Accepts ½" Conduit (7/8" (22.3 mm) opening) |
| Agency Approvals: | UL, CUL, FM, CSA, CE, ISO 9001: 2008 |
| Dimensions (H x W x D): | 6.25" x 4.46" x 3.18" (158.8 mm x 113.3 mm x 80.8 mm) |
| Weight: | 1.2 lbs (0.544 kg) |

Specifications subject to change without notice.



NSA-AFS Series Differential Pressure Switches

#NSA-AFS-222, NSA-AFS-262, NSA-AFS-460 – 11/14/2019

Installation and Operation

Dimensional Drawing

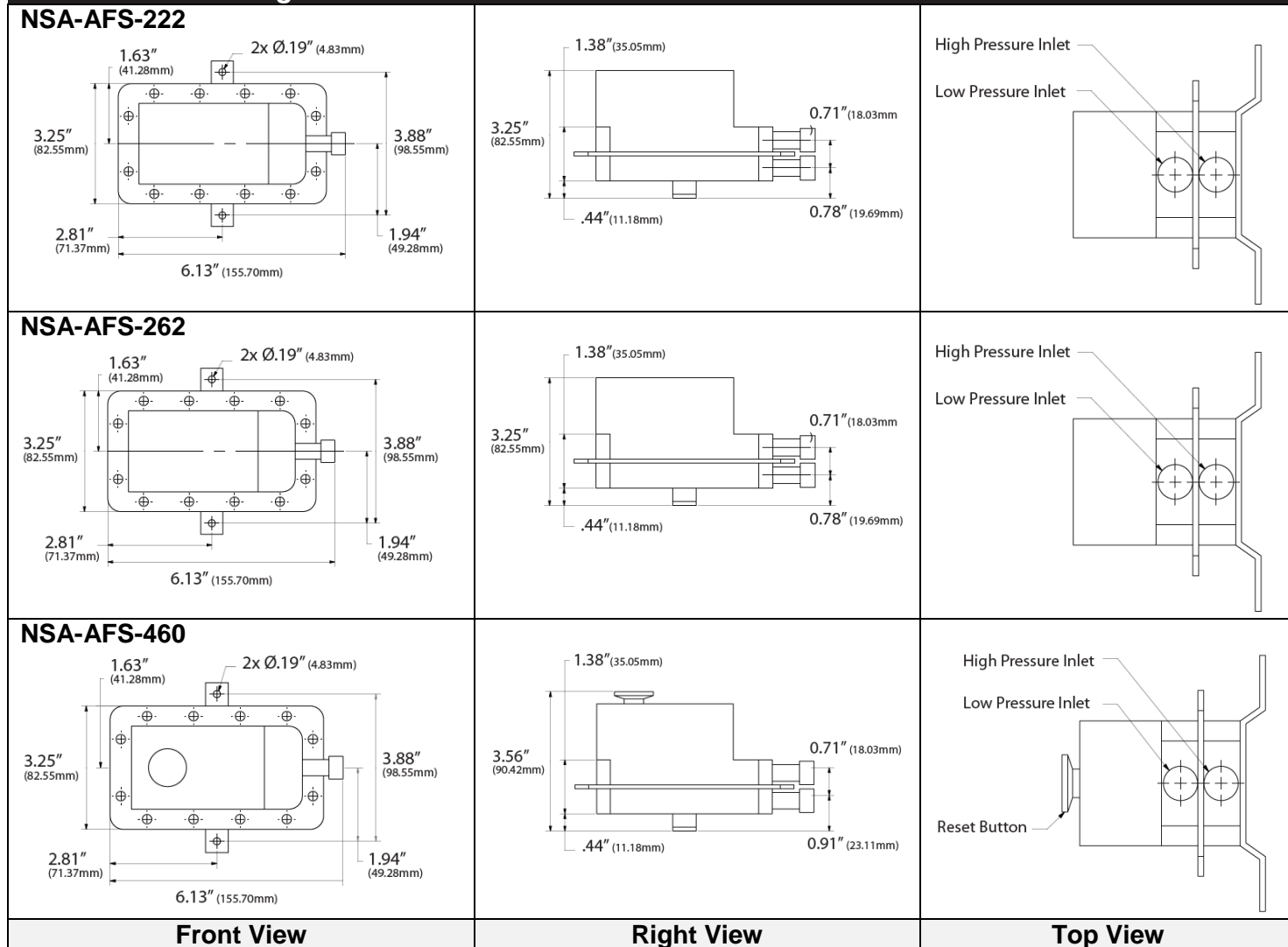


Figure 2

Installation - NSA-AFS-222, NSA-AFS-262

Select a location that is free from vibration. The NSA-AFS Series pressure switches must be mounted in any vertical plane in order to be able to reach the lowest specified operating setpoint. Avoid mounting with the sample line connections in the “up” position. Surface mount via the (2) 3/16” diameter holes in the integral mounting bracket. The mounting holes are 3 7/8” apart. See Figure 3.

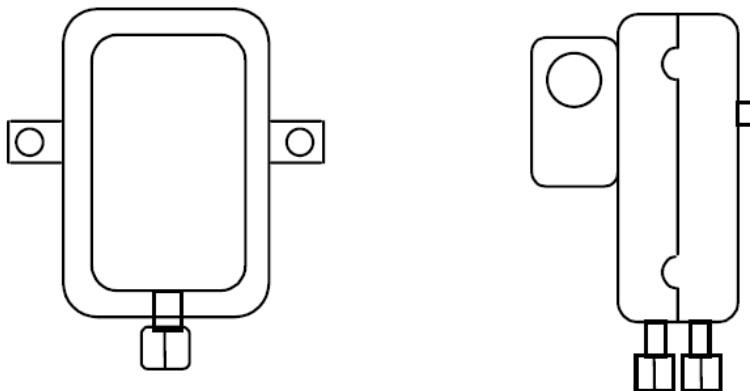


Figure 3

Air Sampling Connection

The NSA-AFS is designed to accept firm-wall sample lines of 1/4” O.D. tubing by means of a ferrule and nut compression fitting. An optional 1/4 adaptor, suitable for slip-on flexible tubing is available. For sample lines of up to 10 feet, 1/4” O.D. tubing is acceptable and for lines up to 20 feet, use 1/4” I.D. tubing. For lines from 20-60 feet, use a 1/2” I.D. tubing. A 1/4” O.D. Adaptor, suitable for slip-on flexible tubing is available. Locate the sampling probe a minimum of 1.5 duct diameters downstream from the air source. Install the sampling probe as close to the center of the airstream as possible. Refer to the figure below to identify the high pressure inlet (A) and the low pressure inlet (B). Select one of the 5 application options listed below, and connect the sample line as recommended.

| | |
|--|--|
| Positive Pressure Only: | Connect the sample line to inlet A; inlet B remains open to the atmosphere. |
| Negative Pressure Only: | Connect the sample line to inlet B; inlet A remains open to the atmosphere. |
| Two Negative Samples: | Connect the higher negative sample to inlet B; connect the lower negative sample to inlet A. |
| Two Positive Samples: | Connect the higher positive sample to inlet A; connect the lower positive sample to inlet B. |
| One Positive and One Negative Sample: | Connect the positive sample to inlet A; connect the negative sample to inlet B. |

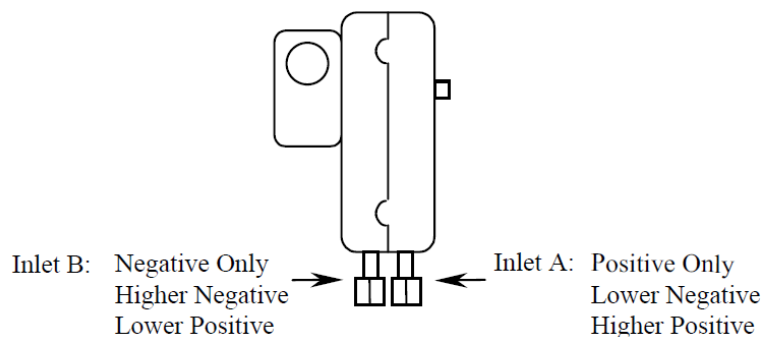
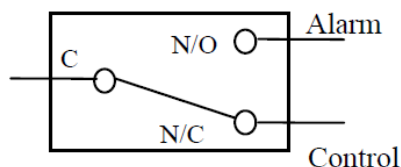


Figure 4

Electrical Connections

Before pressure is applied to the diaphragm, the switch contacts will be in the Normally Closed (NC) position. The snap switch has screw top terminals with cup washers. Wire alarm and control applications as shown in Figure 5.

To prove excessive air flow or pressure:



To prove insufficient air flow or pressure:

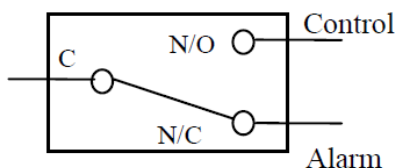


Figure 5

Field Adjustment

The adjustment range of the **NSA-AFS-222** Air Switch is 0.05 to 12.0" w.c. +/- 0.02" w.c. Whereas the adjustment range of the **NSA-AFS-262** Air Switch is 0.05 to 2.0" w.c. +/- 0.02" w.c.

To adjust the Setpoint: Turn the adjusting screw counter-clockwise until the motion has stopped. Next, turn the adjusting screw 4 complete turns in a clock-wise direction to engage the spring. From this point, the next 10 turns will be used for the actual calibration. Each full turn represents approximately 0.2" w.c. (**NSA-AFS-262**), or 1.2"W.C. (**NSA-AFS-222**).

NOTE To properly calibrate an Air Switch, a digital manometer, or other measuring device should be used to confirm the actual setpoint.

Installation - NSA-AFS-460

The plated housing contains a diaphragm, a calibration spring and a snap-acting SPST– NC switch with a manual reset button. The sample line connections located on each side of the diaphragm accept $\frac{1}{4}$ " OD rigid or semi-rigid tubing via the integral compression ferrule and nut. An enclosure cover protects the operator from accidental contact with the live switch terminal screws and the set point adjusting screw. The enclosure cover has a $\frac{7}{8}$ " opening provided to accept a $\frac{1}{2}$ " conduit connection. Select a mounting location which is free from vibration. The NSA-AFS-460 must be mounted with the diaphragm in any vertical plane in order to obtain the lowest specified operating set point. Avoid mounting with the sample line connections in the "up" position. Surface mount via the two $\frac{3}{16}$ " diameter holes in the integral mounting bracket. The mounting holes are $3\frac{7}{8}$ " apart. See Figure 6.

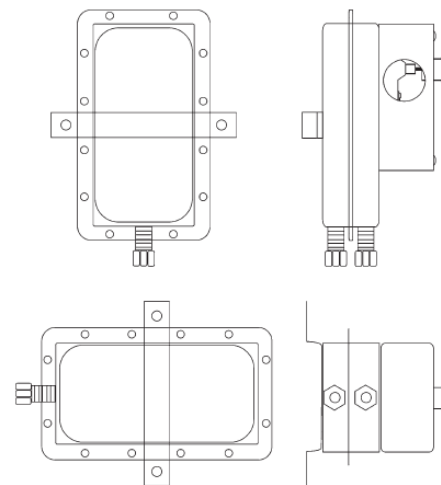


Figure 6

Air Sampling Connection

The sample line connections located on each side of the diaphragm accept $\frac{1}{4}$ " OD rigid or semi-rigid tubing via the integral compression ferrule and nut. However, an optional adapter (P/N 18311) is available for slipping on $\frac{1}{4}$ " ID flexible tubing. For sample lines up to 10 feet, $\frac{1}{4}$ " OD tubing is acceptable. For lines up to 20 feet, use $\frac{1}{4}$ " ID tubing. For lines up to 60 feet, use $\frac{1}{2}$ " ID tubing. Locate the sampling probe a minimum of $1\frac{1}{2}$ duct diameters downstream from the air source. Install the sampling probe as close to the center of the airstream as possible. Refer to Figure 7 to identify the high pressure inlet (H) and the low pressure inlet (L). Select one of the following five application options, and connect the sample lines as recommended.

- **Positive Pressure Only:** Connect the sample line to inlet H; inlet L remains open to the atmosphere.
- **Negative Pressure Only:** Connect the sample line to inlet L; inlet H remains open to the atmosphere.
- **Two Negative Samples:** Connect the higher negative sample to inlet L. Connect the lower negative sample to inlet H.
- **Two Positive Samples:** Connect the higher positive sample to inlet H. Connect the lower positive sample to inlet L.
- **One Positive and One Negative Sample:** Connect the positive sample to inlet H. Connect the negative sample to inlet L.

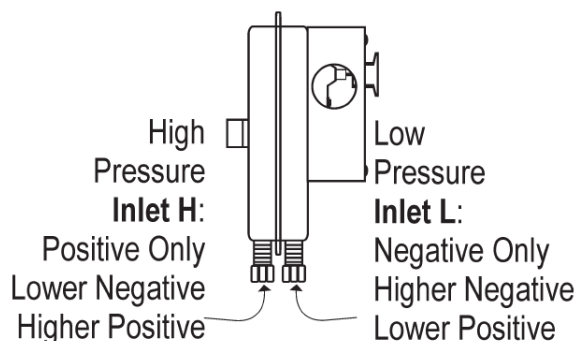


Figure 7

Electrical Connections

Before pressure is applied to the diaphragm, the switch contacts will be in the normally closed (NC) position as shown in Figure 8. The snap switch has screw top terminals with cup washers. Wire alarm or control application as shown in Figure 9.

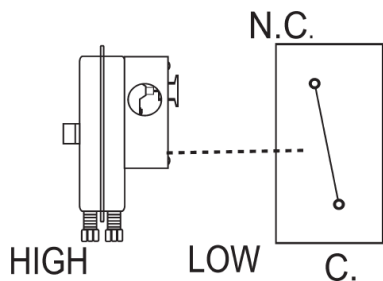


Figure 8

To prove excessive or insufficient air flow or pressure:

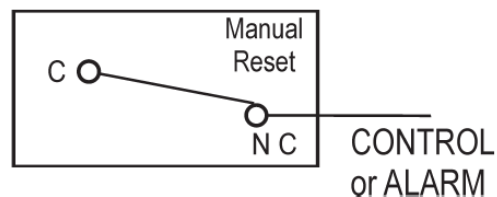


Figure 9

Field Adjustment

The adjustment range of an AFS-460 Air Switch is $0.4" \pm 0.06"$ w.c. to 12.0" w.c. To adjust the set point, turn the adjusting screw counterclockwise until motion has stopped. Next, turn the adjusting screw four complete turns in a clockwise direction to engage the spring. From this point, the next ten turns will be used for the actual calibration. Each full turn represents approximately 1.16" w.c. Please note: To properly calibrate an air switch, a digital manometer or other measuring device should be used to confirm the actual set point.