AIRFLOW PRESSURE SENSING SWITCH
(ADJUSTABLE SET POINT 0.03" WC TO 12.0" WC
WITH (ADJUSTABLE 8-SECOND TIMER DELAY)

MODEL AFS-952-55

AFS-952-55 in standard enclosure, rated NEMA-1.

AFS-952-55-1 in NEMA-4 rated enclosure.

AFS-952-55-2 in NEMA-7 & NEMA-9 rated enclosure.

DESCRIPTION & OPERATION

The **AFS-952-55** Differential Pressure Sensing Switch is designed to provide precise operation and convenient features for industrial and commercial air handling applications.

The **AFS-952-55** can monitor positive, negative, or differential pressure (flow) of air and non-combustible gases. It is commonly used to monitor combustion air, furnace pressure, ventilating blower operation, inflatable structure pressure, fume hood operation, bag house air flow, dirt accumulation in air filters, and heat-transfer air flow.

The **AFS-952-55** has a field–adjustable set point range of 0.03" wc to 12.0" wc with an 8-second (± 3 seconds) time delay relay sequence. The time delay prevents nuisance shutdowns due to normal draft fluctuations.

COMMON APPLICATIONS

The most common specific application for the AFS-952-55 is as a High Pressure Cutoff Safety Switch for combustion draft control systems.

The general applications of the AFS-952-55 are:

- High Positive Pressure Cutoff. (Shutdown upon excess pressure.)
- High Negative Pressure Cutoff. (Shutdown upon excess draft.)
- High Differential Pressure Cutoff. (Shutdown upon excess difference between two samples.)

MOUNTING (FIGURE 1)

The **AFS-952-55** is available in 3 enclosures designed for surface mounting on any flat, relatively stable surface free of vibration. To obtain the lowest operating set point specification, mount the AFS-952-55 with the diaphragm in any vertical plane (Fig 1).

The standard NEMA 1-rated enclosure has mounting flanges with four $^{9}/_{32}$" mounting holes as shown in Figure 4 on page 3.

The NEMA-4 rated model has mounting flanges with four $^{5}/_{16}$" mounting holes as shown in Figure 5 on page 4.

The NEMA-7/NEMA-9 rated enclosure has two mounting slots as shown in Figure 6 on page 4.

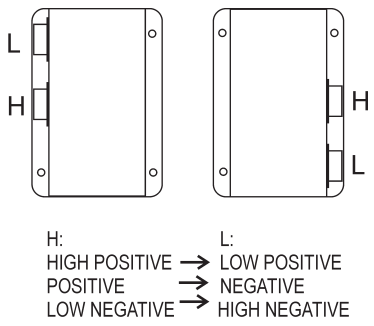


Figure 1

PIPING

The field sample line connectors, two ¼" - 18 NPT female fittings, labeled H (high) and L (low), are located on the side of the enclosure as shown in Figure 1.

Note: Cleveland Controls products combine weatherproof and explosion proof NEMA-rated housings with UL-rated air switches. The combination of these components must be approved for use in each weatherproof and explosion proof application at the installation site by the end user.

1111 Brookpark Rd. Cleveland, OH 44109 • T 216-398-0330 • F 216-398-8558
www.ClevelandControls.com sales@clevelandcontrols.com

CLEVELAND CONTROLS™

Positive Pressure only:

Connect sample line to **H**;

L remains open to the atmosphere.

Negative Pressure only:

Connect sample line to **L**:

H remains open to the atmosphere.

Two Negative Samples:

Connect higher negative sample to **L**:

Connect lower negative sample to **H**.

Two Positive Samples:

Connect higher positive sample to **H**:

Connect lower positive sample to L.

One Negative and One Positive Sample:

Connect positive sample line to **H**:

Connect negative sample line to **L**.

For each right angle bend, add four feet to the computed line length in order to determine correct pipe or tubing size.

If either sample line connector is vented to the atmosphere, attach an elbow to it so that the open end of the connector points downward. This will help protect the switch from contamination.

ELECTRICAL CONNECTIONS

Five numbered terminals are provided for field wiring. Terminals are pressure clamp screw type.

SEQUENCE OF OPERATION

Before pressure and power are applied to the **AFS-952-55**, the SPDT switch contacts are in the normally closed position as shown in **Figure 3** ("shelf" condition), and relay contacts 3 and 5 are closed ("alarm mode").

When the sample lines are connected as shown in **Figure 1**, and power is applied to terminals 1 and 2, the following sequence occurs.

Initially the circuit is in alarm mode. The red lamp is off, indicating that differential pressure is less than set point. The SPDT switch contacts remain in the NC position for as long as differential pressure remains less than set point; the TD1 time delay is energized after 8 seconds, energizing the K1 coil and opening K-1 contacts 3 and 5. The circuit is now in normal operating mode.

When differential pressure reaches set point, the SPDT switch contacts change to NO immediately so that the red lamp comes on, and the TD1 heater is de-energized. If the TD1 time delay remains de-energized for 8 (± 3) seconds continuously, the TD1 contacts open, de-energizing the K-1 coil and closing K-1 load contacts 3 and 5: the circuit is now in alarm mode.

Whenever differential pressure drops below the set point, the SPDT switch contacts change to NC immediately, turning the red lamp **off**, and de-energizing the TD1 time delay. The K-1 load contacts for terminals 3 and 5 remain closed unless differential pressure remains less than set point for 8 seconds continuously. After this 8-second period, K-1 load relay contacts 3 and 5 open while K1 contacts 3 and 4 close.

FIELD ADJUSTMENTS

To adjust the operating set point in the field, remove the protective plug button on the side of the control enclosure (standard model only) and insert a standard blade-type screwdriver, at least 3 inches long.

The adjustment range is 0.03 +.02/-0.00" wc to 12.0" wc. To adjust the set point, turn the adjusting screw counterclockwise until motion has stopped. Next, turn the adjusting screw 4 complete turns in a clockwise direction to engage the spring.

For the next 10 turns, each full turn represents approximately 1.2" wc. At higher operating pressures, there is a slight increase in the switching differential.

Please note: To properly calibrate an air pressure sensing switch, use a digital manometer or other measuring device to confirm the actual set point.

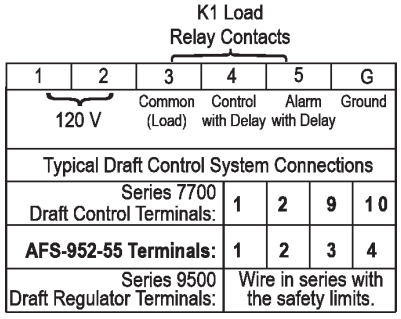


Figure 2: Electrical Connections

SPECIFICATIONS
MODEL AFS-952-55

Mounting Position:
Mount with the silicone diaphragm in any vertical plane.

Set Point Range:
0.03" wc + 0.02" wc/ -0.00" wc to 12.0" wc (0.76 to 305 mm wc; 0 to 0.43 psi).

Field Adjustable "Operate Range":
0.07" wc to 12.0" wc

Field Adjustable "Release Range":
0.04" wc to 11.2" wc

Approximate Switching Differential:
Progressive, increasing from 0.02± 0.01" wc at minimum set point to approximately 0.8" wc at maximum set point. (0.5 ± .25 mm to approximately 20.3 mm).

Operating Temperature Range:
0 °F to 130 °F (-18 to 54.4 °C).

Measured Media:
Air or combustion by-products that will not degrade silicone.

Maximum Pressure:
½ psi (0.03 bar).

Life: 100,000 cycles minimum at ½ psi maximum pressure each cycle and at maximum rated electrical load.

Electrical Rating–Relay Switching Capacity:
720 va at 120 V ac at 50/60 Hz.
10 amps at 120 V ac,
5 amps at 240 V ac resistive load.

Power consumption:
4.5 watts at 120 V ac

Contact Arrangement:
SPDT- NC (single pole, double-throw snap action switch; contacts are in normally closed position before pressure is applied to the diaphragm.)

Electrical Connections:
5 numbered, pressure-clamp screw terminals

Conduit Opening:
⅞" diameter opening accepts ½" conduit.

Sample Line Connectors:
Two ¼"—18 NPT female fittings.

Shipping Weight:
AFS - 952-55 (std. enclosure): 5 lbs.
AFS - 952-55 - 1 NEMA 4 enclosure: 8 lbs.
AFS - 952-55 - 2 NEMA 7/9 enclosure: 18 lbs.

Note: Cleveland Controls products combine weatherproof and explosion proof NEMA-rated housings with UL-rated air switches. The combination of these components must be approved for use in each weatherproof and explosion proof application at the installation site by the end user.

PRESSURE CONVERSION

	" wc	" Hg	mm wc	psi	Pa
1" wc		0.07	25.4	0.036	248.8
1" Hg	13.6		345.3	0.491	3376.9
1 mm wc	0.04	0.003		0.001	9.81
1 psi	27.7	2.04	703.1		6894.6
1 Pa	0.004	0.0002	0.102	0.0001	

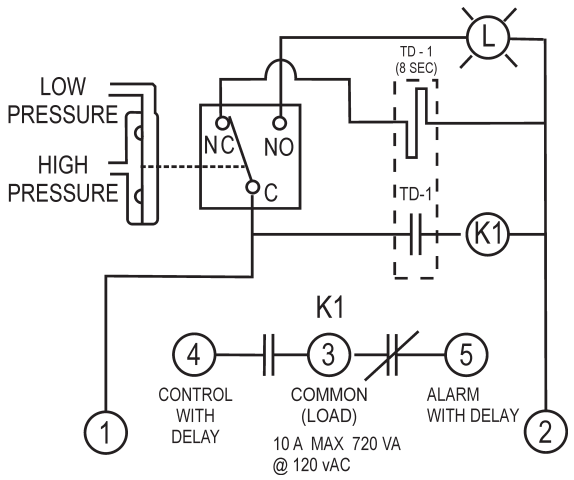
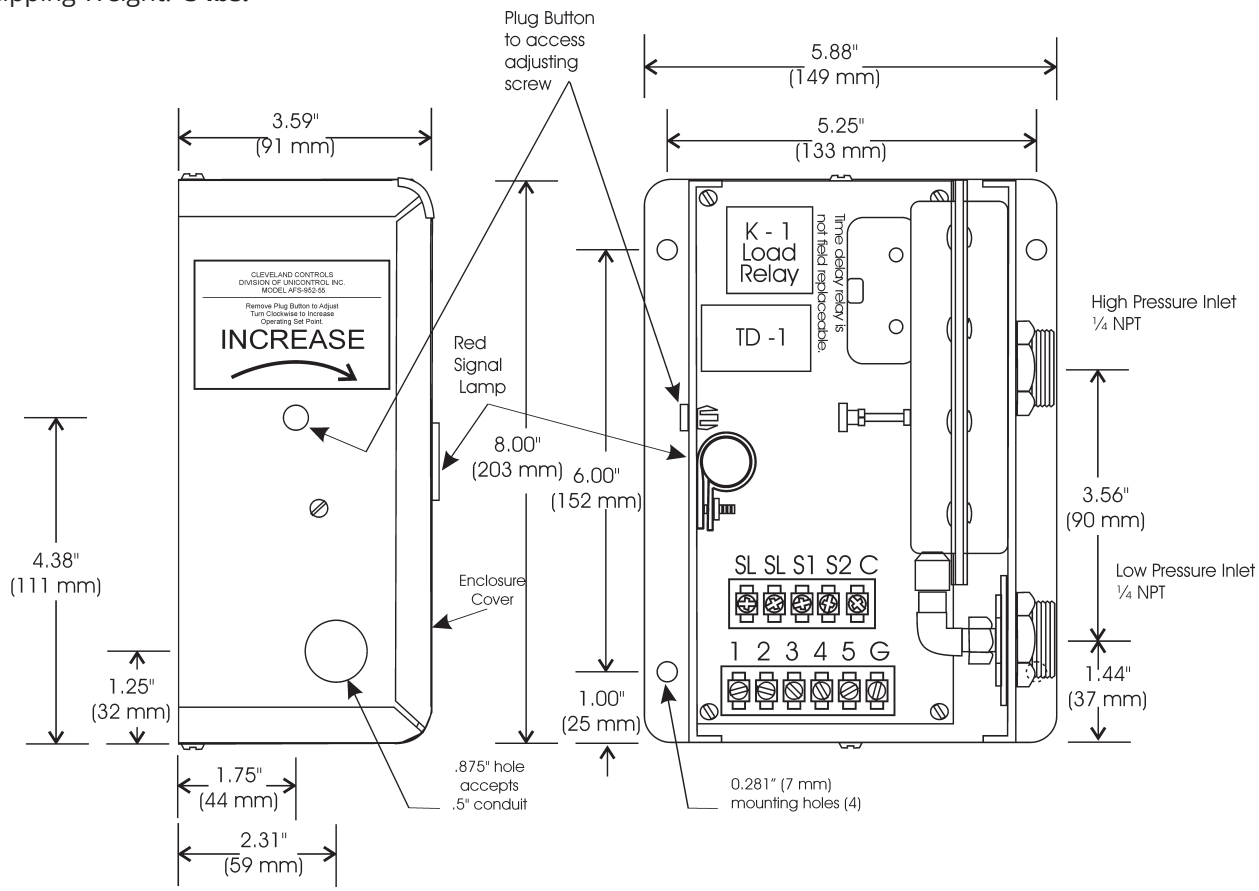


Figure 3: "Shelf" Condition

CONTACT POSITION			
Condition	K-1 Load Relay Contacts 3 - 4	3 - 5	Red Lamp
On Shelf (Figure 3).	Open	Closed	Off
Power Applied; Differential Pressure above Set Point (Immediate).	Open	Closed	Off
Power Applied; Differential Pressure above Set Point (After 8 seconds).	Closed	Open	Off
Power Applied; Differential Pressure below Set Point (Immediate).	Closed	Open	On
Power Applied; Differential Pressure below Set Point (After 8 seconds).	Open	Closed	On

Figure 4: Model AFS-952-55 in Standard NEMA-1 rated housing:

- Flat black epoxy powder coated steel finish.
- Shipping Weight: **5 lbs.**

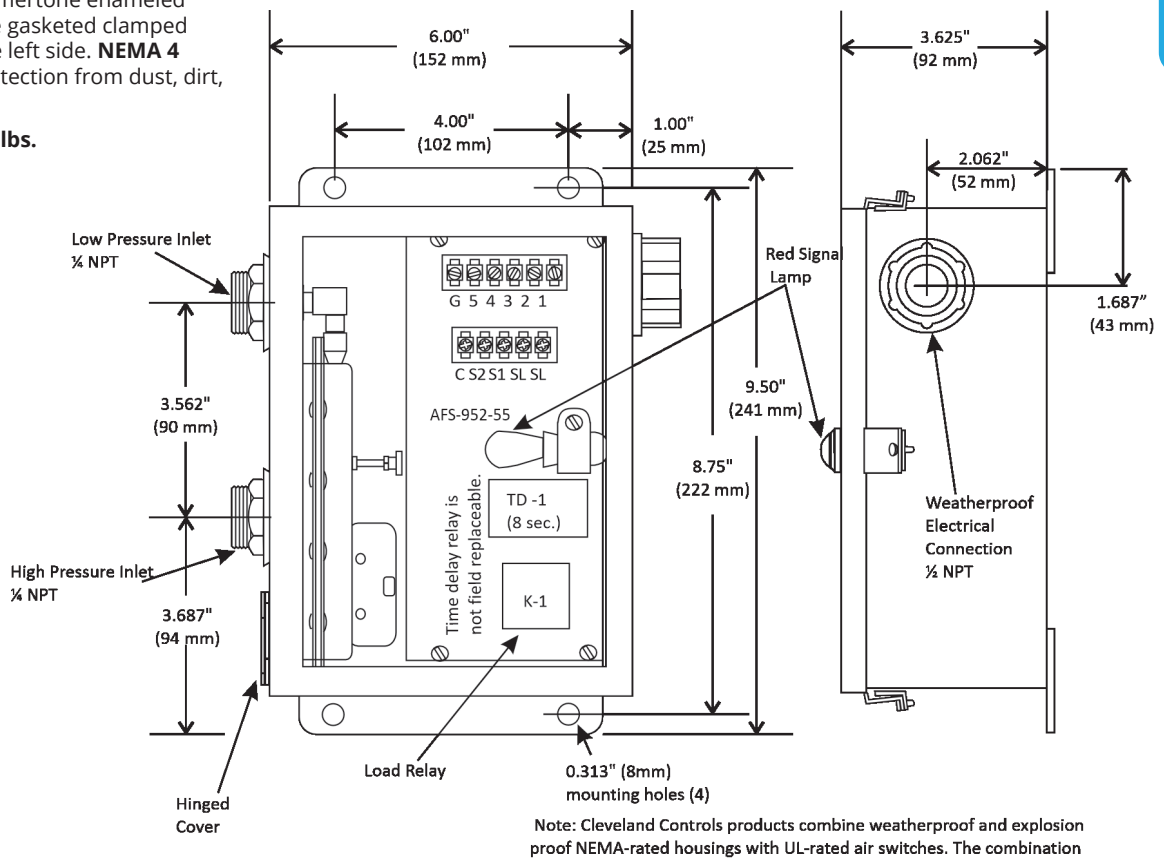


ENCLOSURE SPECIFICATIONS & DIMENSIONS

Figure 5: Model AFS-952-55-1

14-gauge grey hammertone enameled steel with neoprene gasketed clamped cover hinged on the left side. **NEMA 4** rated: provides protection from dust, dirt, oil, and water.

Shipping Weight: **8 lbs.**



Note: Cleveland Controls products combine weatherproof and explosion proof NEMA-rated housings with UL-rated air switches. The combination of these components must be approved for use in each weatherproof

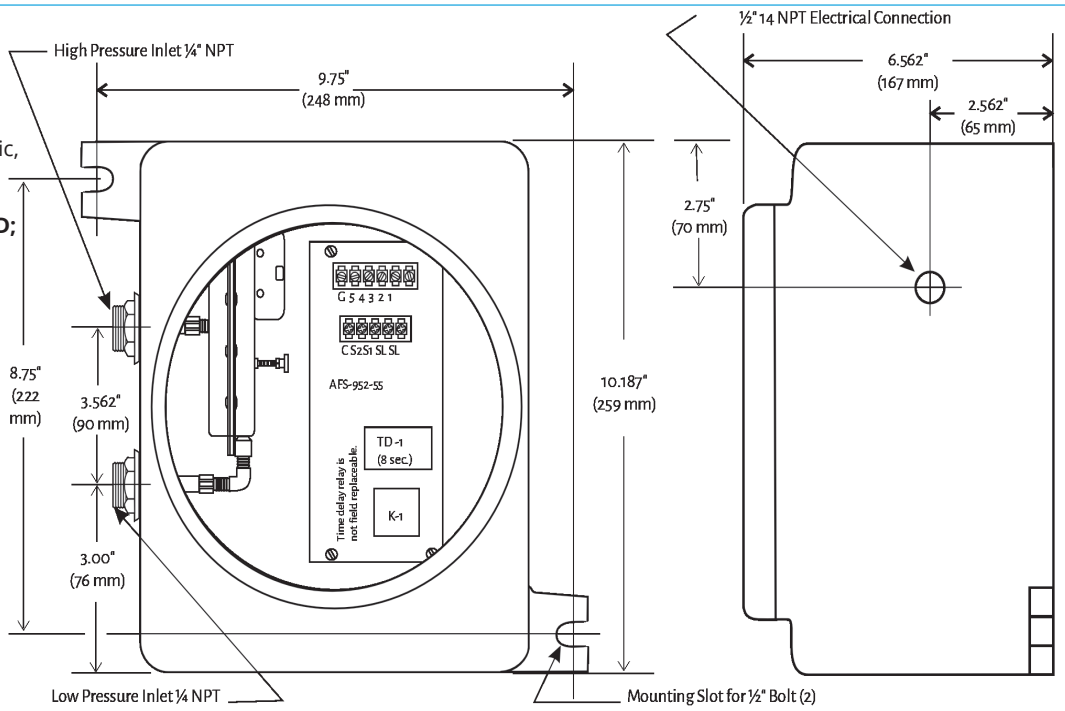
Figure 6: Model AFS-952-55-2

Red lamp is not available.

Cast aluminum alloy, nonmagnetic, non-sparking, and non-rusting. **NEMA 7** and **NEMA 9** rated. **UL** approved for **Class 1, Group D; Class II, Groups E, F, G.**

Piping: Either pressure inlet, if not connected to a pressure sample, must be piped and vented to a nonhazardous area.

Shipping Weight: **18 lbs.**



Note: Cleveland Controls products combine weatherproof and explosion proof NEMA-rated housings with UL-rated air switches. The combination of these components must be approved for use in each weatherproof and explosion proof application at the installation site by the end user.