Testing Negative Pressure Switches
By HBB and Associates

High efficiency heating equipment uses negative pressure switch(s) to check for proper activation of the induced draft blower. The induced draft blower causes a negative pressure in the blower housing. A tube connects the blower housing to the negative pressure switch. The switch has an internal diaphragm that senses the negative pressure which closes the micro-switch contacts.

Most manufacturers’ design the integrated furnace control (IFC) so that it verifies the pressure switch is in the open position once a call for heat has been given. If the IFC detects that the switch is stuck closed, been jumpered or shorted out, it will not allow an attempt for ignition.

When the IFC determines the pressure switch is open, it energizes the inducer motor. When the switch closes, the IFC detects completion of the 24 volt circuit and allows the ignition sequence to begin.

The tubing from the inducer housing runs to the barbed fitting on the right side of the diaphragm housing.

As the inducer fan pressurizes the switch, the diagram pushes up against the micro switch and closes the switch which allows the furnace to operate.

The plunger on the top of the diaphragm pushes the micro switch and closes the circuit.
In most cases the blower must produce a negative pressure of at least 0.1 water column inches or 25 Pa below the switch specifications.

When the switch closes, the appliance lights off and run sequence begins operation.

Typically, a label on the body of the negative pressure switch states the pressure required to close the switch. Generally, the induced draft blower must generate a negative pressure at least 0.1 WC” (Water Column Inches) or 25 Pascals lower than the actual rating.

If you are using a digital gauge that measures only in Pascals and you would prefer to use that unit of measurement (or vise versa) the formula to make the conversion is:

\[ \text{Pascals} \times 0.004 = \text{Water Column Inches (WC”)} \]

\[ \text{Water Column Inches} \div 0.004 = \text{Pascals} \]

On this switch the rating is 1.30 WC” or 325 Pascals. Ratings vary widely so always refer to the manufacturer’s specifications.

In order to close the switch, the induced draft blower must generate a negative pressure at least 0.1WC” (25 Pa) lower than the rating actual. (Again, this could vary depending on the manufacturer).
Use a manometer with sufficient resolution to check for correct operation of the switch:

1. Replace the existing hose which runs to the inducer housing with another having a ‘T’ to run to the manometer. Or cut the hose and insert a ‘T’ with a tube running from the third leg of the ‘T’ to the manometer (remember you will need to splice the tubing back together when finished).

2. Energize the induced draft blower.

3. Record the negative pressure on the manometer.

4. Use an ohmmeter to measure the resistance of the contacts. A zero ohm reading confirms the switch is closed.
Example

A fan assist 80+ appliance has a negative pressure switch rated at .35WC”. The manufacturer’s operations manual states that the sensor must be under a minimum pressure of 0.1” below the rating.

\[
\begin{align*}
.35\text{WC”} \\
-0.1 \text{ WC”} \\
\hline
.25\text{WC”}
\end{align*}
\]

The reading on the manometer would have to be at least -.25WC” for the switch to close.

To convert the same readings to Pascals:

\[
\begin{align*}
.35\text{WC”} \div .004 = 87.5 \text{ Pa} \\
0.1\text{WC”} \div .004 = 25.0 \text{ Pa}
\end{align*}
\]

\[
\begin{align*}
87.5 \text{ Pa} \\
-25.0 \text{ Pa} \\
62.5 \text{ Pa}
\end{align*}
\]

The reading on the manometer would have to be at least -62.5 Pa for the switch to close.

There are several reasons why a pressure switch would not close.

- Not venting properly
- Blockage in the pressure tubing (frequently condensate).
- Deteriorated/leaking pressure tubing
- Damaged/leaking blower housing gasket
- Corroded/Damaged inducer fan
- Burned out inducer motor
- Damaged fan blades or obstruction
- Blocked flue
- Plugged condensate line (90%)

Remember, manufacturer’s specifications on troubleshooting may vary, check with the manufacturer of a specific product to verify procedures.