Fieldpiece

Draft Simulator

OPERATOR'S MANUAL

Model
DDSM1

Description

Correct pressure switch operation is integral to the safety of a furnace environment.

The DDSM1 teams with your accurate manometer to accurately test pressure switches. The DDSM1 creates a negative pressure (vacuum) and detects a closed switch. Your manometer tells you what the pressure is when the switch activates.

General Setup

Controls and Ports

A Pressure dial (Clockwise increases vacuum.)
B Ports to negative side of switch and your manometer. (Close one OFF if only using one.)
C Power button: High Speed>OFF>Low Speed>OFF (some models use a rocker switch: I=Low, II=High)
D Closed-switch LED indicator.
E Jacks to switch terminals.

Functions

Test a Pressure Switch

WARNING: Turn off power to furnace prior to testing to avoid low voltage shorting.

1. Connect leads to normally open and common terminals of the pressure switch. It does not matter which lead goes to which terminal.
2. Connect both hoses to the ports on the top of DRAFT SIMULATOR. Connect one hose to the negative side of the pressure switch and the other to your manometer. It does not matter which hose is connected to the manometer and the pressure switch.
3. IMPORTANT: Before starting the DRAFT SIMULATOR, ensure the pressure dial is completely open by turning the dial counter-clockwise as far as it will go. Turn on and "zero" your manometer. There are two major speeds to accommodate different pressure switch ratings – a low speed and a high speed. The speeds are accessed alternately by pressing the power button multiple times as shown below: OFF – HIGH – OFF – LOW

4. Turn on the DRAFT SIMULATOR. It is a good idea to start the DRAFT SIMULATOR in high speed to warm-up the motor for 10 seconds.
5. Set the DRAFT SIMULATOR to the major speed needed for testing the pressure switch. Use low speed to test pressure switches rated between -0.10 inches of water column and -1.50inWC. Use high speed to test pressure switches rated 1.50inWC to 12.00inWC.
6. Slowly close the pressure dial by turning it clockwise (increasing the vacuum) paying attention to the indicator light on the front of the DRAFT SIMULATOR and the readings on the manometer.
7. The light will come on when the pressure switch closes. Note the reading on the manometer. Manufacturers have a rating when the pressure switch should close. A good pressure switch will close within 10% of the manufacturer's rating.
8. To see when the switch opens, slowly open the pressure dial by turning it CCW. When the light of the DRAFT SIMULATOR goes off, note the reading of the manometer. The reading should be within 10% of the rating on the pressure switch.

NOTE: Most pressure switches have bleed ports in them to drain moisture. This also helps to avoid excess pressure created by the draft inducer and controls the amount of pressure required to close the switch. The amount of pressure required to close and open the switch should still be within 10% of the manufacturer's rating. The pressure required to close the switch should never exceed the amount of pressure created by the draft inducer.

NOTE: Many pressure switches have an orifice in the port. This increases the time it takes to close or open the pressure switch. This does not mean it takes more or less pressure to close the pressure switch. The pressure switch should still close and open within 10% of the rating.

NOTE: Dual-port manometers are usually setup to use the positive port (P1) with the DRAFT SIMULATOR.

Indications of a Pressure Switch out of calibration, weak or bad diaphragm or a bad micro switch in the pressure switch:

- o The pressure switch will not close or open within 10% of its rating.
- o The indicator light on the DRAFT SIMULATOR "flickers" on and off rapidly.
- o Manometer readings fluctuate when no adjustments are made to the pressure dial on the DRAFT SIMULATOR.
- o The measured readings are greatly affected when the hose to the pressure switch is pinched.

Pinch Test - Proving the Diaphragm

- o Test the pressure switch and note the findings using the DRAFT SIMULATOR.
- o Pinch the hose closed to the pressure switch while performing the test.
- o If the pressures differ more than 20% from the original findings, you may have a bad, cracked, or leaking diaphragm in the pressure switch. If the pressure doesn't differ you may have a blocked bleed port.

Prove or Rule Out the Inducer

- o If the pressure created by the inducer measures more than enough to close the pressure switch but the DRAFT SIMULATOR proves the pressure switch to be good, the inducer may not be providing enough cfm (cubic feet per minute) to close the switch. The inducer should be replaced.

Calibrate an Adjustable Pressure Switch

1. IMPORTANT: Be sure to use an adjustable pressure switch that will calibrate to the pressure rating of the pressure switch that is being changed out. Connect leads to the front jacks of the DRAFT SIMULATOR. Connect the leads to the normally open and common terminals on the pressure switch. It does not matter which lead goes to which terminal.
2. Connect both hoses to the ports on the top of DRAFT SIMULATOR. Connect one hose to the negative side of the adjustable pressure switch and connect the other hose to the manometer. It does not matter which hose is connected to which port.
3. IMPORTANT: Before starting the DRAFT SIMULATOR ensure the pressure dial is completely open by turning the dial counter-clockwise as far as it will go. Turn on and "zero" your manometer. Note the DRAFT SIMULATOR has two major speeds to accommodate different pressure switch ratings – a low speed and a high speed. The speeds are accessed alternately by pressing the switch multiple times: OFF – HIGH – OFF – LOW
4. Turn on the DRAFT SIMULATOR. It is a good idea to start the DRAFT SIMULATOR in high speed to warm-up the motor for 10 seconds.
5. Set the DRAFT SIMULATOR to the speed needed to calibrate the adjustable pressure switch. Use low speed to calibrate an adjustable pressure switch rated between -0.10inWC and -1.50inWC. Use high speed to calibrate an adjustable pressure switch rated between 1.50inWC to 12.00inWC.
6. IMPORTANT: An adjustable pressure switch must open at the desired pressure. Adjust the pressure dial on the DRAFT SIMULATOR until the desired pressure is reached as indicated on the manometer.

If LED is OFF (switch is closed)– Slowly loosen the adjustment screw on the adjustable pressure switch until the LED light turns ON.

If LED is ON (switch is closed) – Slowly tighten the adjustment screw on the adjustable pressure switch until the LED light turns OFF. The adjustable pressure switch is now calibrated within manufacturer's specifications.

Note: Pressures may slightly fluctuate during adjustments. You can fine tune an adjustable pressure switch by "closing the gap". Slightly increase or decrease the pressure on the DRAFT SIMULATOR and tighten or loosen the adjustment screw on the switch until the switch is opening exactly at the desired rating.

Note: When testing a "Dual Pressure Switch" it is only necessary to test the negative side as this switch only has one spring and one diaphragm similar to any negative pressure switch.

Test a Pressure Transducer

1. Connect one hose to the low side of the transducer the other hose to a manometer.
2. Connect a voltage meter to the transducer's terminals.
3. As you increase the vacuum, the voltage across the terminals will change based on the transducer's rating. Compare observed voltage to rated voltage to determine the health of the switch.

Specifications

Operating environment: 32°F to 118°F (0°C to 48°C) at <80% RH
Storage temperature: -4°F to 140°F (-20°C to 60°C), 0 to 80% RH (with battery removed)
Power: 4 x AA batteries
Battery life: approx 15 hours typical alkaline (7 hrs on high speed)

Maintenance

Clean the exterior with a dry cloth. Do not use liquid.

Safety Information

The Pressure Switch is a safety device that prevents the furnace from running in an unsafe condition. An unsafe condition can result in injury, loss of property or even loss of life.

1. Before every use, check the DRAFT SIMULATOR and the tubing for breaks or blockage. Check the tubing for any moisture as well.
2. Check for the presence of water in the pressure switch before using the draft simulator. Do not use the draft simulator on a pressure switch that has water in it. Water can damage the DRAFT SIMULATOR and VOID the warranty. Check the tubing for moisture build-up as well.
3. The DRAFT SIMULATOR is designed to produce a precise amount of negative pressure. Always use a manometer that is properly calibrated. Using a manometer that is out of calibration will give you incorrect readings.
4. Fieldpiece is not responsible for incorrect readings by faulty test equipment or untrained personnel.
5. In the interest of Safety, the DRAFT SIMULATOR should only be used by trained, competent professionals who understand the hazards and consider the risks of working on and with tools and equipment.
6. The pressure rating for the pressure switch is either stamped on the pressure switch or on a sticker attached to the pressure switch. Otherwise, contact the vendor or manufacturer of the furnace to get that information.
7. Fieldpiece is not liable for any damages incurred by the misuse of the DRAFT SIMULATOR.

Note: Pressure switches have a rating of "(pressure) WC PF". This means that it is a (pressure) in inches of Water Column on Pressure Fall. Example: A -0.40 WC PF rating would mean that it should open at a negative 0.40 inches of water column. The pressure switch should close and more importantly "open" within 10% of the manufacturer's rating.

⚠ WARNINGS ⚠

Turn off power to furnace prior to testing to avoid low voltage shorting.

If the pump stops while adjusting the pressure dial, immediately turn CCW to allow more airflow. The bleed port on the pressure switch may be blocked or you may need to use a different speed.

Limited Warranty

In the USA, this instrument is warranted against defects in material or workmanship for one year from date of purchase. Fieldpiece will replace or repair the defective unit, at its option, subject to verification of the defect.

This warranty does not apply to defects resulting from abuse, neglect, accident, unauthorized repair, alteration, or unreasonable use of the instrument.

Any implied warranties arising from the sale of a Fieldpiece product, including but not limited to implied warranties of merchantability and fitness for a particular purpose, are limited to the above. Fieldpiece shall not be liable for loss of use of the instrument or other incidental or consequential damages, expenses, or economic loss, or for any claim of such damage, expenses, or economic loss.

State laws vary. The above limitations or exclusions may not apply to you.

Obtaining Service

In the USA, call Fieldpiece Instruments for one-price-fix-all out of warranty service pricing. Send check or money order for the amount quoted. Send the meter freight prepaid to Fieldpiece Instruments. Send proof of date and location of purchase for in-warranty service. The meter will be repaired or replaced, at the option of Fieldpiece, and returned via least cost transportation. Outside of the USA, please visit www.fieldpiece.com for service contact information.

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