Inclined and Vertical Portable Manometers
Operating Instructions and Parts List

Parts list. Contact factory for ordering information.

(1) Gage Body
(2) Molded Nylon Connector
(3) Leveling Screw
(4) Scale Screw and Washer
(5) Gage Tube, Washer and Screw
(6) Terminal Tube and Holder
(7) Rubber tubing, 3/16” I.D., 9 ft long
(8) Rapid shut off type.
(9) 3/4 oz. bottle red gage fluid
(10) Magnets, Magnetic Gage Mounting Clips (not shown)
(11) Carrying Case (not shown)

1. Remove gage from case. Set up in a vertical position using (a) the gage stand and leveling screw on a horizontal surface or (b) Magnetcaps, on a vertical steel surface.
2. Turn connectors counter-clockwise 1/2 to 3/4 turn, thus venting gage to atmosphere.
3. Center bubble between cross hairs on spirit level with leveling screw or by shifting gage position.
4. Slide slide to zero mark faces directly behind fluid meniscus, as shown below.

Align fluid meniscus and the reflected image to eliminate parallax error.
5. Add or remove fluid as necessary.
6. Use left hand gage connection for plus (above atmospheric) pressures. Connect to right side for minus (below atmospheric) pressures. Connect to both sides for differential pressures, as with a Pitot tube.

CAUTION:
Use only Dwyer gage fluid. Clean with mild soap and water only. Other fluids, solvents or cleaning agents may damage the gage.

AIR VELOCITY
The total pressure of an air stream flowing in a duct is the sum of the static or bursting pressure exerted upon the sidewalls of the duct and the impact or velocity pressure of the moving air. Through the use of a Pitot tube connected differentially to a manometer, the velocity pressure alone is indicated and the corresponding air velocity determined.

For accuracy of plus or minus 2%, as in laboratory applications, extreme care is required and the following precautions should be observed:
1. Do not use at 4" (10.5 cm) or greater.
2. Make an accurate traverse per sketch at right angles to wall.
3. Provide smooth, straight duct sections 10 diameters in length both upstream and downstream from the Pitot tube.
4. Provide an egg crate type straightener upstream from the Pitot tube.

In making an air velocity check, select a location as suggested above, connect tubing leads from both Pitot tube connections to the manometer and insert the duct with the tip directed into the air stream. If the manometer shows a minus indication reverse the tubes. With a direct reading manometer, air velocities will now be shown in feet per minute. In other types, the manometer will read velocity in inches of water and the corresponding velocity will be found on the curves on the Dwyer website or Dwyer catalog. If circumstances do not permit an accurate traverse, center the Pitot tube in the duct, determine the center velocity and multiply by a factor of 3 for the approximate average velocity. Field tests run in this manner should be accurate within plus or minus 5%.

The velocity indicated is for dry air at 70°F (21.1°C), 29.9 Barometric Pressure and a resulting density of 0.075 lb/ft³. For other variations from these conditions, corrections may be based upon the following data:

Air Velocity = \( \frac{\text{Pw}}{\text{D}} \)

where \( \text{Pw} = \) velocity pressure in inches of water; \( \text{D} = \) Air density in lbs/ft³.

Air Density = \( 1.25 \times \frac{\text{T}}{\text{T}} \)

where \( \text{Pw} = \) Barometric Pressure in inches of mercury; \( T = \) Absolute Temperature (indicated temperature plus 400)

Flow in cu. ft. per min. = Duct area in square feet x air velocity in ft. per minute.

STATIC PRESSURE
In checking inlet and discharge fan and blower pressures, balancing ventilation and dust collection systems, checking exhaust systems and similar installations, air velocities above 700 ft. per min. (12.81 km/hr) can cause an appreciable error. It is recommended that the static connection of the Pitot tube or a static pressure tap be used. In using the static pressure tap or Pitot tube, the tap should be directed into the air stream. For permanent installation, static pressure taps are recommended. If not available, make connections, enter the duct perpendicular to the air stream and finish off flush and smooth on the inside.

FURNACE DRAFT
Connect the terminal tube to the minus pressure gage opening and insert it into the combustion chamber for over fire draft reading, if a drilled port is not available insert through fire door and seal the crack. For test pass or smoke pipe draft, connect into the breeching on the furnace side of any draft control or damper. To determine draft loss through the furnace, make connection as indicated for smoke pipe draft and add a second tube, connecting the manometer differentially to the combustion chamber.

AIR FILTER TEST
To determine the pressure drop across an air filter, connect the manometer differentially with one tubing from the downstream or blower side of the filter to the right hand or minus pressure gage connection. Run the second tubing from the upstream side of the filter to the other gage connection. Use static pressure taps if available, with the taps directed into the air stream, to eliminate possibility of error due to air velocity. Read the pressure drop across the filter in inches of water and follow the filter manufacturer's recommendations for filter cleaning or replacement.

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