

Test Instrument Maintenance/Calibration: A Quick Guide for Contractors

Good project decisions depend on accurate test results. Keeping test instruments and equipment in good working condition is a two-part process: (1) use field best practices for regularly monitoring test instrument and equipment performance and (2) get the units recalibrated on a regular basis. This guide provides recommended calibration schedules and in-field equipment monitoring best practices to ensure test instruments and equipment are giving accurate, reliable results for project planning. Be sure to refer to the equipment manuals cited below for full details.

PRESSURE GAUGES

Calibration helps maintain the instrument's accuracy specifications of 1% of ready (or 0.15 Pa, whichever is greater.)

DG-700 Pressure and Flow Gauge — Energy Conservatory

Recommended calibration schedule. Energy Conservatory recommends DG-700 gauges should be calibrated every two years.

The cost to calibrate a digital pressure gauge is \$80 (price includes return shipping.)

To submit a DG-700 gauge for re-calibration, fill out the Equipment Return Form, which can be fill out digitally or by hand, and send it to the address on the form.

http://www.energyconservatory.com/sites/default/files/documents/equipment_return_form.pdf

The turnaround time is typically two to three business days following receipt of the gauge(s). It can take longer if repairs are needed.

Verify gauge accuracy between factory calibrations.

Between factory calibrations, regular maintenance includes replacing batteries as needed with Alkaline or rechargeable batteries. The low battery icon "BAT" will blink on the display screen when the batteries are low. Best practice: Turn off the gauge, then remove the battery compartment cover, remove the old batteries, insert new batteries with the correct polarity as illustrated on the inside of the batter compartment, and replace the compartment cover.

Troubleshooting. If the gauge locks up or appears to display inconsistent readings, (1) turn off the gauge for



five seconds and turn back on; if that does not work (2) remove the batteries, hold down the ON/OFF button for ten seconds to fully discharge the gauge's internal electronic components, and insert the batteries per instructions provided above. If neither of these actions solves the problem, the unit needs to be sent to The Energy Conservatory for servicing.

DG-700 manual:

<http://www.energyconservatory.com/sites/default/files/documents/dg-700.pdf>

DM-2 Pressure Gauge — Retrotec

Recommended calibration schedule. Retrotec recommends the DM-2 gauge should be calibrated every two years, and the entire flow measurement system (fan and gauge) should be checked every five years.

The cost to calibrate the DM-2 pressure gauge is \$165, plus \$10 to \$14 for return shipping/handling.

Verify gauge accuracy between factory calibrations.

There are two factors that cause a gauge to produce inaccurate results: (1) loss of calibration (low error level, an infrequent cause) and (2) tube issues (10% to 90% error level, frequent cause).

Checking the gauge tubes on a regular basis is a best practice that ensures they will not become blocked or pinched, or leak. The DM-2 manual (pages 36-39) provides step-by-step instructions for performing a weekly tube check that takes just a few seconds, but can prevent problems leading to inaccurate results.



Basic Tube Check. As noted in the Retrotec DM-2 manual (page 36):

1. Press [Mode] until “Mode” displays “PrB”
2. Turn Auto Zero Off
3. Press [Exit] to ensure that there is no Baseline pressure in the upper left of the gauge
4. Connect a tube between Channel A & B on the gauge
5. Check that the readings are within 2%
6. Repeat with each tube between other ports
7. Connect the yellow tube from the yellow to the red port on the gauge which should be set to Pressure on Channel B. If the readings are within one percent and don't drop rapidly, you have confirmed the yellow tube does not leak, the tube and gauge is not blocked and the gauge has a 99.9% chance of being accurate. Disconnect the yellow and connect the Blue tube from Blue to Green to check that tube and the negative side of the gauge. Disconnect the Blue and connect the Green from the Green port to the Red Port to check that tube and the negative versus positive calibration of the gauge.

The manual also includes instructions for performing a cross port, T-connection Fan Pressure, and syringe checks, each of which can identify tube-related issues that affect reading accuracy.

<http://www.retrotec.com/sites/default/files/manual-guides-specs/Manual-DM-2%20Operation.pdf>

BLOWER DOOR FAN

Blower Door Fan — Retrotec

Recommended calibration

schedule. The fan should maintain calibration unless physical damage occurs, such as if the motor or blades become misaligned with the fan housing, the flow sensors are damaged, or leaks occur in the sensor or tubing from the flow sensor to the fan pressure tap.

Verify good running

performance. The manufacturer recommends the following monthly equipment checks to detect damage that may require an equipment service (see Air Leakage Test Systems Manual, pages 39 to 40)

<http://www.retrotec.com/sites/default/files/manual-guides-specs/Manual-Door%20Fan%20Operation.pdf>



- **Check the motor and fan blade position** as it corresponds to the fan housing. Note if the C8 Range Plate is sitting properly on the Range Ring B.
- **Check for flow sensor leaks:** (a) Attach a piece of tubing to the yellow connector on top of the fan; leave the other end of the tubing open; (b) temporarily seal the four evenly spaced holes on the red plastic coving the motor with masking tape; (c) suck on the open end of the tube to create a vacuum in the tubing, then cover the end of the tube with your finger; if the tubing sticks for at least five seconds, a vacuum is present and the flow sensor does not leak; the sound of air moving through the tubing can be heard, that indicates a disconnection inside the fan; (d) remove the masking tape from each hole individually and ensure air can be sucked through that particular hole. Use this method to check each of the four pressure sensing points in turn.
- **Perform monthly field verification:** The field verification test can be performed using a doorway, manufacturer's Verification Plate, or Flex Duct. Note: For best results also perform a field verification check on the DM-2 pressure gauge prior to testing the fan unit.
 - **Doorway:** (a) Install cardboard panel with 20-by-20-inch hole in upper doorway in a room with all the exhaust and supply registers sealed; (b) set Time Averaging to 10s and Press the [@] key until “50.0 Pa” appears; (c) perform a Door Fan test and record the EqLA at 50 Pa with the hole open and again with it sealed; (d) Subtract the first results from the second results; the value should to 400 sq. in. (at least +/- 10%) or about 3,100 CMF50.
 - **Flex Duct:** (a) Secure the Flex Duct to the outlet side of the fan; (b) attach a Verification Plate or cardboard panel with 20-by-20-inch hole to the open end of the Flex Duct; (c) run a blue tube from the gauge (blue port) to the panel and insert it into the Flex Duct; (d) perform a Door Fan test and record the EqLA at 50 Pa with the hole open and again with it sealed; (d) Subtract the first results from the second results; the value should to 400 sq. in. (at least +/- 10%) or about 3,100 CMF50.

FOR MORE INFORMATION

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