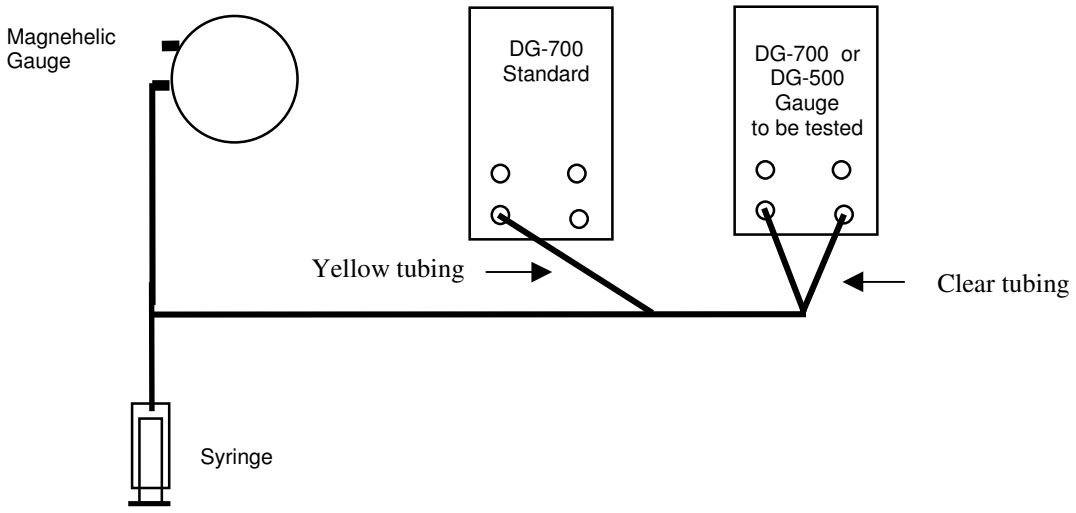
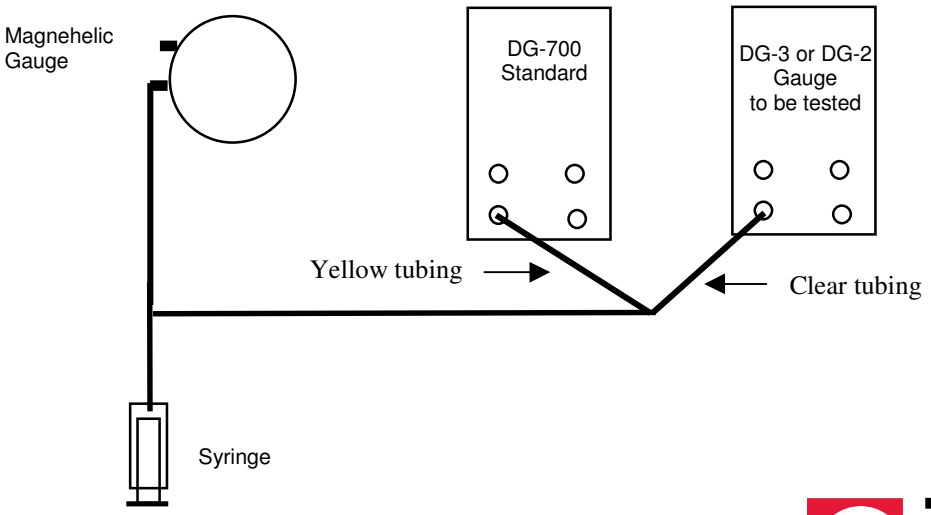
Procedure for Field Calibration Check of Digital Pressure Gauges (Using a DG-700 or DG-500 as the Reference Standard)

1. Pressure Testing Apparatus

Set up the DG-700 (or DG-500) Standard and the gauge to be tested as shown in the diagrams below. Always push the syringe fully "in" before connecting the tubing to the digital gauges. The tubing to the digital gauges should be connected to the **Reference** taps. The purpose of the Magnehelic gauge is to prevent pressure changes introduced by the syringe from easily overpressurizing the digital gauges.

Note: The DG-700 Standard should be recalibrated by The Energy Conservatory once every 6 months and should only be used for calibration checks of other pressure gauges. In lieu of having a separate in-house DG-700 standard, it is acceptable to test your gauges against another DG-700 gauge that has just been returned from calibration at The Energy Conservatory.





The Energy Conservatory

2. Comparing Pressure Measurements to the Digital Gauge Standard

This procedure will involve comparing pressure readings from the DG-700 Standard with the gauge being tested at a number of different pressures. These pressures will be created by adjusting the syringe. At each comparison point (called a **Pressure Station**) the difference in the pressure reading between the two gauges will be determined and compared with the maximum acceptable difference for that Pressure Station shown in Table 1. If the difference in readings is less than or equal to the maximum acceptable error shown in Table 1, the gauge being tested is still within the manufacturer's calibration specification. If the difference is greater than the maximum acceptable error for any of the Pressure Stations, the digital gauge being tested should be returned to The Energy Conservatory for recalibration.

a. Procedure for Checking Calibration of DG-700 (or DG-500) Gauge:

1) Turn on both the DG-700 gauge to be tested and the DG-700 Standard and leave them both in the **PR/PR** mode.
2) SLOWLY pull "**out**" on the syringe. The pressure readings should increase on both digital gauges. Adjust the syringe until **Channel A** on the DG-700 Standard reads about +500 Pa (+/- 30 Pa). Place the syringe on the table.
3) After the pressure readings have stabilized, determine the difference in the pressure reading between the DG-700 Standard and both **Channel A** and **Channel B** on the DG-700 gauge being tested. (**Note:** If the pressure readings are dropping too quickly to make an accurate comparison between the 2 gauges, there is a leak somewhere in the pressure testing apparatus. First check the tubing connections, the syringe, and the tubing itself for leaks. If you are unable to eliminate the air leak, it may be located in the gauge being tested, or possibly the DG-700 standard. Call TEC at 612-827-1117 for further help in diagnosing the problem).

Table 1: Maximum Acceptable Gauge Error

Pressure Station (Pa)	Max Acceptable Difference (Pa)
+500	5
+50	0.5
-500	5
-50	0.5

4) Compare the pressure difference found with the maximum acceptable difference shown in Table 1 above for the +500 Pressure Station. (**Note:** If the difference is less than or equal to the maximum allowable error, the gauge is still within it's calibration specification.)
5) Slowly push "**in**" the syringe until the DG-700 Standard reads approximately +50 Pa (+/- 5 Pa). After the pressure readings have stabilized, determine the pressure difference between the Standard and both channels on the gauge being tested. Now compare this difference with the maximum acceptable difference found in Table 1 for the +50 Pressure Station.
6) Remove the clear tubing from the digital gauge being tested (keep the yellow tubing connected to the DG-700 Standard). Push the syringe completely "**in**". Reconnect the clear tubing to both **Input** taps on the DG-700 gauge being tested.

7) SLOWLY pull "**out**" on the syringe. Adjust the syringe until the DG-700 Standard is at about +500 Pa (+/- 30 Pa). The pressure readings on the digital gauge being tested will display a negative sign. Place the syringe on the table.

8) After the pressure readings have stabilized, determine the difference in the pressure reading between the DG-700 Standard and both channels on the gauge being tested. (**Note:** When determining the reading difference, ignore the negative sign on the gauge being tested.)

9) Compare the pressure difference found with the maximum acceptable difference shown in Table 1 for the -500 Pressure Station.

10) Slowly push "**in**" the syringe until the DG-700 Standard reads approximately +50 Pa (+/- 5 Pa). After the pressure readings have stabilized, determine the pressure difference between the gauges. Now compare this difference with the maximum acceptable difference found in Table 1 for the -50 Pressure Station.

11) The calibration check procedure is complete. Turn off both gauges and remove the clear tubing from the digital gauge being tested.

b. Procedure for Checking Calibration of DG-3 or DG-2 Gauge:

1) Set up the DG-3 or DG-2 gauge to be tested by turning the **CHANNEL** knob to "**A**", push the **RANGE** switch up to **2000 Pa** (High Range – 1 Pa resolution), and turn the gauge on in the **PRESSURE** mode with 1 second average readings.

2) Set up the DG-700 Standard by turning the gauge on and leaving it in the **PR/PR** mode.

3) SLOWLY pull "**out**" on the syringe. The pressure readings should increase on both digital gauges. Adjust the syringe until **Channel A** on the DG-700 Standard reads about +500 Pa (+/- 30 Pa). Place the syringe on the table.

4) After the pressure readings have stabilized, determine the difference in the pressure reading between the DG-700 Standard and the gauge being tested. (**Note:** If the pressure readings are dropping too quickly to make an accurate comparison between the 2 gauges, there is a leak somewhere in the pressure testing apparatus. First check the tubing connections, the syringe, and the tubing itself for leaks. If you are unable to eliminate the air leak, it may be located in the gauge being tested, or possibly the DG-700 standard. Call TEC at 612-827-1117 for further help in diagnosing the problem).

5) Compare the pressure difference found with the maximum acceptable difference shown in Table 1 below for the +500 Pa Pressure Station. (**Note:** If the difference is less than or equal to the maximum allowable error, the gauge is still within it's calibration specification.)

6) Slowly push "**in**" the syringe until the DG-700 Standard reads approximately +50 Pa (+/- 5 Pa). Set the **RANGE** switch on the DG-3 or DG-2 gauge being tested down to **200.0 Pa** (Low Range – 0.1 Pa resolution). After the pressure readings have stabilized, determine the pressure difference between the gauges. Now compare this difference with the maximum acceptable difference found in Table 1 for the +50 Pa Pressure Station.

7) Remove the clear tubing from the digital gauge being tested (keep the yellow tubing connected to the DG-700 Standard). Push the syringe completely "**in**". Reconnect the clear tubing to the **Channel A Input** tap on the gauge being tested.

8) Set the **RANGE** switch on the gauge being tested back up to **2000 Pa**.

9) SLOWLY pull "**out**" on the syringe. Adjust the syringe until the DG-700 Standard is at about +500 Pa (+/- 30 Pa). The pressure reading on the digital gauge being tested will display a negative sign. Place the syringe on the table.

10) After the pressure readings have stabilized, determine the difference in the pressure reading between the DG-700 Standard the gauge being tested. (**Note:** When determining the reading difference, ignore the negative sign on the gauge being tested.)

11) Compare the pressure difference found with the maximum acceptable difference shown in Table 1 for the -500 Pa Pressure Station.

12) Slowly push "**in**" the syringe until the DG-700 Standard reads approximately +50 Pa (+/- 5 Pa). Set the **RANGE** switch on the DG-3 or DG-2 gauge being tested down to **200.0 Pa**. After the pressure readings have stabilized, determine the pressure difference between the gauges. Now compare this difference with the maximum acceptable difference found in Table 1 for the -50 Pa Pressure Station.

13) The calibration check procedure is complete. Turn off both gauges and remove the clear tubing from the digital gauge being tested.

3. General Maintenance Information for Energy Conservatory Digital Pressure Gauges

- Operating temperature range: 32 F to 120 F.
- Storage temperatures - 4 F to 160 F (best to keep it warm during cold weather).
- Avoid conditions where condensation could occur, for example taking a gauge from a hot humid environment into a cool environment.
- Do not store gauge in the same container as your chemical smoke. The smoke can and does cause corrosion.
- Use alkaline or rechargeable batteries.
- Avoid exposing the gauge to excessive pressures, such as caused by tubing slammed in a door.
- Check the tubing (used to connect the digital gauge to the fan, outdoors and/or duct system) for air leaks. Inspect both ends of the tubing to make sure they are not stretched out or split. Periodically trim off a small piece from each end of the tubing. To check the remainder of the tubing for leaks, seal off one end of the tubing by doubling it over on itself near the end. Now create a vacuum in the tubing by sucking on the open end. Let the end of the tubing stick to your tongue due to the vacuum. The tubing should stick to your tongue for at least 5 seconds. Replace the tubing if it fails this test.

For more information or to send your gauge to TEC, visit www.energyconservatory.com.

Calibration Check Form
Digital Pressure Gauges (DG-700 Gauge)

Company: ____

Gauge Serial # ______________ **Date** ____________ **Technician** ____________________________

Last Factory Calibration Date ____________

Pressure Station (Pa)	DG-700 Standard (Pa)	Channel A DG-700 Being Tested (Pa)	Channel B DG-700 Being Tested (Pa)	Channel A Difference (Pa)	Channel B Difference (Pa)	Maximum Allowable Difference (Pa)
+500						5 Pa
+50						0.5 Pa
-500						5 Pa
-50						0.5 Pa

Gauge Serial # ______________ **Date** ____________ **Technician** ____________________________

Last Factory Calibration Date ____________

Pressure Station (Pa)	DG-700 Standard (Pa)	Channel A DG-700 Being Tested (Pa)	Channel B DG-700 Being Tested (Pa)	Channel A Difference (Pa)	Channel B Difference (Pa)	Maximum Allowable Difference (Pa)
+500						5 Pa
+50						0.5 Pa
-500						5 Pa
-50						0.5 Pa

Gauge Serial # ______________ **Date** ____________ **Technician** ____________________________

Last Factory Calibration Date ____________

Pressure Station (Pa)	DG-700 Standard (Pa)	Channel A DG-700 Being Tested (Pa)	Channel B DG-700 Being Tested (Pa)	Channel A Difference (Pa)	Channel B Difference (Pa)	Maximum Allowable Difference (Pa)
+500						5 Pa
+50						0.5 Pa
-500						5 Pa
-50						0.5 Pa

TEC
The Energy Conservatory

Calibration Check Form
Digital Pressure Gauges (DG-3 or DG-2 Gauge)

Company: _____

Gauge Serial # _____ **Date** _____ **Technician** _____

Last Factory Calibration Date _____ **Gauge Model (circle):** **DG-3** **DG-2**

Pressure Station (Pa)	DG-700 Standard (Pa)	Gauge Being Tested (Pa)	Difference (Pa)	Maximum Allowable Difference (Pa)
+500				5 Pa
+50				0.5 Pa
-500				5 Pa
-50				0.5 Pa

Gauge Serial # _____ **Date** _____ **Technician** _____

Last Factory Calibration Date _____

Pressure Station (Pa)	DG-700 Standard (Pa)	Gauge Being Tested (Pa)	Difference (Pa)	Maximum Allowable Difference (Pa)
+500				5 Pa
+50				0.5 Pa
-500				5 Pa
-50				0.5 Pa

Gauge Serial # _____ **Date** _____ **Technician** _____

Last Factory Calibration Date _____

Pressure Station (Pa)	DG-700 Standard (Pa)	Gauge Being Tested (Pa)	Difference (Pa)	Maximum Allowable Difference (Pa)
+500				5 Pa
+50				0.5 Pa
-500				5 Pa
-50				0.5 Pa

TEC
The Energy Conservatory