



DESIGNING INNOVATIVE VACUUM
GAUGES AND CONTROLLERS FOR
OVER 30 YEARS

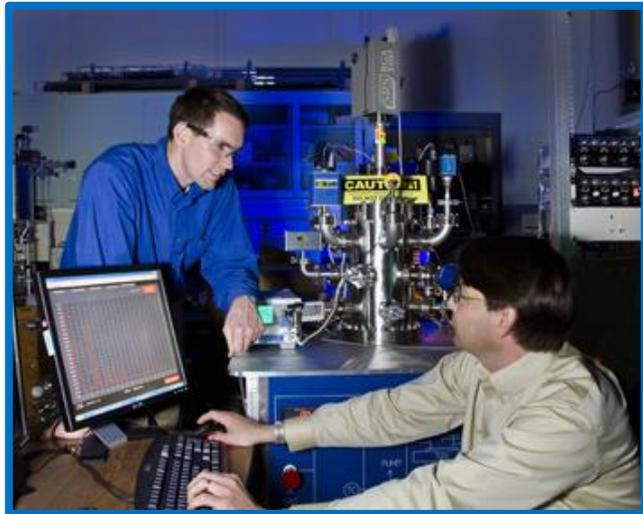
APPLICATION NOTE **BENEFITS OF HAVING A PRE-CALIBRATED BACK-UP VACUUM SENSOR**

PROBLEM: Damage to sensors and units alike is an inevitable facet of field work that can put undue stress on even a well-prepared crew, especially when time is of the essence.

Vacuum sensors are calibrated on air. However, sensor contamination can occur easily in real-world applications leading to failure or false readings.

Some sources of sensor contamination:

- Oil contamination is common in vacuum systems.
- Improper shut down of the vacuum pump after evacuation or power loss will suck back oil and contaminate the hose
- Refrigerant gas or oil is drawn into the sensor



If the vacuum sensor/tube resides in a high vacuum situation it can become contaminated by the gases evolved in the system. Many times it is oil vapor, but can be just about anything. There are two "noble" wires in the transducer head that measure the potential drop from one wire to the other. The two wires present that measure the potential become coated with impurities or get dirty and when dirty they tend to read high toward atmosphere. Supposedly, it is possible to "clean" pressure sensors; although our efforts to date have consistently met with failure. In high vacuum processes the organic solvents used to clean-up contaminants, such as acetone and trichloroethylene (TCE), are more tenacious contaminants than the oil they are designed to remove. Because they can out-gas into the system.



Other sources of vacuum sensor failure include: damage in structure due to fatigue, erosion, impact damage and corrosion.

WHAT DO YOU DO IF YOUR VACUUM SENSOR ISN'T WORKING?

Accuracy in your vacuum instrumentation is of paramount importance; however, returning your unit for factory calibration in every instance of sensor failure is not feasible.

Top 3 Reasons You Need To Have a Back-up Vacuum Sensor

- Your sensors have a shorter-than-average lifespan due to contamination, vibration or burnout
- Your sensors are prone to physical damage due to being transported frequently (HVAC, transformer work, etc.)
- Your vacuum process is taking place in a remote location where replacement parts and/or several days of factory repair time are unacceptable

Review [here](#) how swapping any given tube onto the unit is unlikely to produce accurate results. Each unit is calibrated to a specific sensor, all of which have small electrical differences between them, and the calibration data will be different for any given unit/sensor pair. Once a specific unit is calibrated to a specific sensor, they can be considered a mated pair (e.g., a unit paired with a random sensor stands little chance of reading accurate vacuum without factory calibration).

Will an emergency non-calibrated replacement tube work for you?

It depends on two factors:

1. The pressure range that is relevant to your work
2. The need/lack of need for pinpoint accuracy in your pressurized system

Our [Bullseye Precision Gauge \(BPG\)](#) can be supplied with any number of replacement sensors that will work perfectly with the gauge and require minimal user effort in order to be vacuum-ready.

OVERVIEW OF DIGITAL SENSOR CALIBRATION OPTION

Step 1: DigiVac will [calibrate your unit](#) to a given sensor under actual vacuum in our facility.

Step 2: We take note of the calibration "offsets". These are numbers programmed into the unit that adjust the calibration curve, ensuring that the unit reads accurate vacuum from just a few microns all the way up to atmosphere.

Step 3: We label the sensor with its respective offset numbers.

WHAT TO EXPECT

Digitally calibrated sensors will arrive with a label on them looking much like this, except with different numbers:



These numbers, or “offsets”, when entered correctly into the calibration menu, will automatically calibrate your BPG to the assigned tube without additional testing.

In addition to any calibrated sensors you have ordered, the Bullseye Precision Gauge comes standard with a sensor, like all DigiVac instruments. This sensor will have its calibration offsets of its own, so the instrument can be readjusted to work with both the standard tube and the additional tubes.

SENSOR SWAPPING & RECALIBRATION PROCEDURE

- 1. Power up & secure sensor:** *This adjustment need not be performed under vacuum.* Start by powering up the gauge with the PWR/ENT button and allow several seconds for the unit to “wake up” and display a vacuum reading. Secure the sensor in the upright position with the threads pointing downward for an accurate reading.

The image to the right shows a Bullseye Precision Gauge on our testing manifold showing a properly positioned sensor.



- 2. Get to calibration screen & enter off-sets:** Enter the menu screen by pressing the circular arrow button. Select calibrations and hit PWR-ENT. This is the calibration screen where the offsets are adjusted. *Note that the calibration offsets shown should match those labeled on the original sensor.*





The text in the upper-right corner under the battery level indicator shows which function you have chosen. Shift from function to function using the circular arrow button. When F/ATM is shown under the battery indicator, press both the Up and Down arrows simultaneously.

The unit will beep and the screen will flash, after which the ATM setting will show a 0 instead of its previous offset number. Repeat this process with both the MID and VAC settings as well. F/STOR will save your settings to zero. This [video](#) demonstrates how to “zero out” the existing offsets.

3. Attach replacement sensor & Save: Remove sensor cable carefully from sensor and attach to desired replacement sensor. Once again, enter the calibration menu, and selecting F/ATM first, adjust the offset to the number on the sensor label by pressing and holding the Up or Down button as shown below. Repeat with F/MID and F/VAC. Again, select F/STOR and press the Up and Down arrows simultaneously to save your settings. This [video](#) demonstrates how to enter the new offsets from the replacement tube.

4. Ready to go: Your Gauge is now calibrated to its replacement sensor.

NOTE: While cycling through the functions, you will notice F/2T, F/700T and F/2mT. These functions are for use in DigiVac factory calibration only. Attempting to adjust these settings using the arrows will not affect the offsets. If you’re having no luck adjusting the offsets, first ensure you are using the correct function.

TROUBLESHOOTING

If desired, the Bullseye Precision Gauge’s new calibration can be checked against another trusted instrument. If the BPG displays inaccurate vacuum, consider the following:

- Has the technician saved the new offsets after adjustment using F/STOR?
- Have the offsets been entered correctly, and under the corresponding labels (e.g., is the ATM offset number actually saved under MID)?
- Is the sensor you’ve attempted to use physically damaged in any way, via contamination, burnout or physical damage?

Please contact The DigiVac Company for [technical support](#) or any further questions. We also offer [NIST calibration services](#).