BluVac LTE

Digital Vacuum Gauge

User's Guide

P/N 10527-01 Rev. B

Introduction

Thank you for your purchase of the **AccuTools®** ***BluVac LTE*** **Digital Vacuum Gauge**. Utilizing patent-pending technology, the ***BluVac LTE*** is the most accurate vacuum gauge available.

With the ***BluVac LTE***, you can accurately measure vacuum pressure in Microns, Pascals, Millibar, Millitorr, and mmHg with a resolution of 1 micron. Ideal for the HVAC/R professional, the ***BluVac LTE*** is small, lightweight, rugged and easy to use

Features

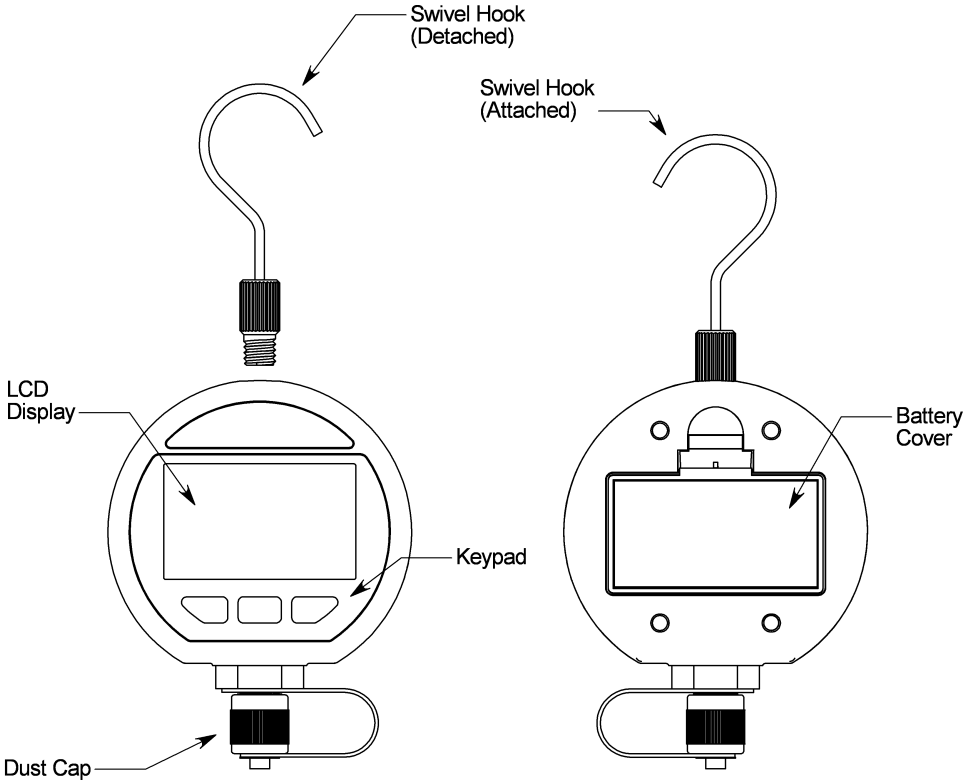
- Large, high-visibility back-lit LCD display
- Measures Vacuum in Microns, Pascals, Millibar, Millitorr and mmHg
- 0 to 25,000 Micron Range with 1 Micron Resolution
- "Analog" Vacuum Level Bar Graph
- Automatic Oil Sensor
- Built-in memory retains all previous settings
- Rugged, Compact Design – About the Size of a Manifold Gauge
- Long Battery Life
- Calibration Self Test -- Can be field calibrated with no special equipment
- Ideal for HVAC/R Service and Industrial Use

Specifications

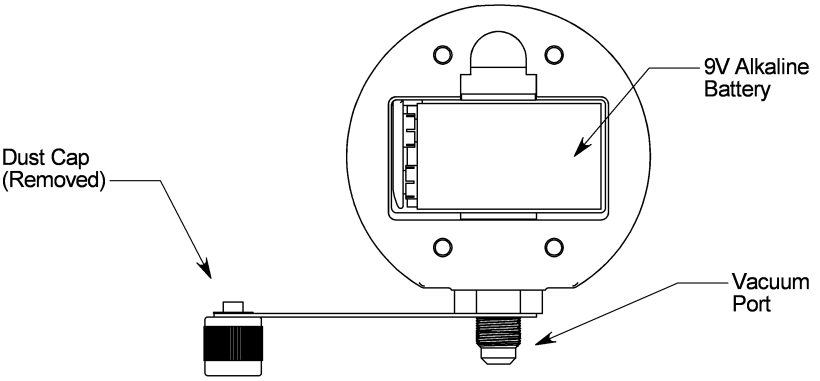
Range:	0 – 25,000 Microns (3333 Pa, 33.330 mBar, 25,000 mTorr, 25.000 mmHg)
Vacuum Accuracy:	5% of Reading +/- 5 Microns
Vacuum Resolution:	1 Micron (1 Pa, 0.001 mBar, 1 mTorr, 0.001 mmHg)
Warm-up Time:	Instant
Response Time:	Instant
Power:	9V Alkaline Battery (9V Lithium recommended for low temperature operation)
Battery Life:	Up to 300 Hours
Operating Temperature:	10°F – 122°F (-12°C – 50°C)
Vacuum Port Fitting:	¼" Male Flare – Nickel Plated for Durability with Dust Cap
Weight:	6 oz. (170g) including Battery and Swivel Hook
Dimensions:	3.5" x 3" x 1.25" (9cm x 7.5cm x 3cm)

WARNING: To avoid personal injury and to prevent damage to the *BluVac LTE* Digital Vacuum Gauge, never exceed 500 PSI.

Parts Diagram

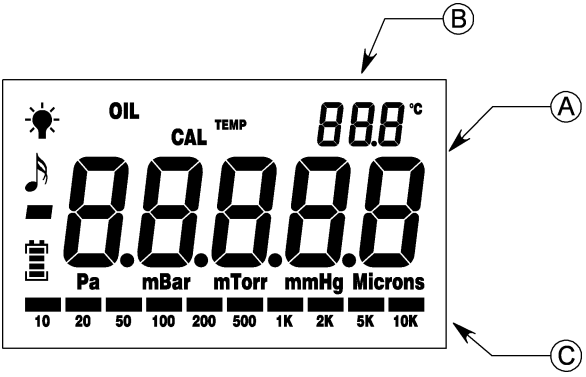


Front View **Rear View**



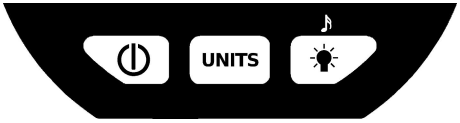
Rear View (Battery Cover Removed)

LCD Display



Item	Function
A	Main Numeric Display
B	Alternate Numeric Display
C	"Analog" Vacuum Level Bar Graph
	Backlight Indicator. Flashing: Temporary, Solid: Always On
	Sound Indicator
	Battery Level Indicator
OIL	Oil Sensor Indicator
CAL	Calibration Mode Indicator
TEMP	Indicates that Temperature is Displayed on the Alternate Numeric Display (during calibration)
°C	Indicates degrees Celsius on the Alternate Numeric Display (during calibration)
Pa	Pascal Units Indicator
mBar	Millibar Units Indicator
mTorr	Millitorr Units Indicator
mmHg	Millimeters of Mercury Units Indicator
Microns	Micron Units Indicator

Keypad



Item	Function
⏻	Press to Turn Power On, Press and Hold to Turn Power Off
UNITS	Press to Change Display Units
💡	Press and Release to Activate Backlight
♪	Press and Hold to Mute/Un-mute Sound

Quick Start

To operate the *BluVac LTE* as a basic vacuum gauge:

1. Install the battery as described in the "Battery Installation" section below.
2. Turn the power on by pressing ⏻. The display will show HI-P to indicate pressure greater than 25,000 Microns.
3. Select the desired units by repeatedly pressing UNITS.
4. Attach the *BluVac LTE* to the system to be evacuated with a high quality vacuum hose. Start the vacuum pump. Read the vacuum level from the Main Display.
5. Turn the power off by pressing and holding ⏻.

WARNING: To avoid damaging the BluVac, only hand-tighten sensor connection. If greater torque is required, support the sensor housing with a ¾" wrench.

NOTE: To assist in the use of this gauge and the interpretation of vacuum information, please refer to the *Frequently Asked Questions* Section at the end of this guide.

Battery Installation & Replacement

1. Remove the battery cover from the rear of the *BluVac LTE* by compressing tab at the base of the battery cover.
2. If necessary, remove and detach old battery from battery clip.
3. Attach battery clip to new battery and insert into battery compartment. Replace battery cover by aligning tab and snapping back into place.

IMPORTANT: TO PREVENT DAMAGE FROM LEAKING BATTERIES, DO NOT LEAVE A DEAD BATTERY INSIDE THE *BluVac LTE*. REMOVE BATTERY IF THE *BluVac LTE* IS NOT TO BE USED FOR AN EXTENDED PERIOD OF TIME.

Battery Level Indicator

The battery level indicator shows the relative strength of the battery. Four bars indicate full power. As the battery is depleted, the number of bars displayed decreases, until no bars are left. At this point, it is necessary to replace the batteries (refer to the Battery Installation section above). If the battery power drops to the point where the *BluVac LTE* can no longer function accurately, the alarm will beep 10 times and the power will turn off automatically. When the battery is replaced, and the *BluVac LTE* is turned back on, the *BluVac LTE* will resume operation with all previous settings intact.

Hi-Pressure Indication

If the sensed vacuum pressure exceeds 25,000 Microns (3333.1 Pa, 33.331 mBar, 25,000 mTorr, or 25.000 mmHg), the display will show  .

Sleep Mode

Unlike other Digital Vacuum Gauges, the *BluVac LTE* helps to conserve battery life through advanced power management. After 5 minutes of displaying  , the *BluVac LTE* will enter "Sleep Mode" in which the sensor and backlight are turned off, thus reducing the load on the battery and extending the battery life up to 300 hours or more. While in this mode, the display will show  . Approximately every 35 seconds, the gauge will automatically check the pressure and exit Sleep Mode if the pressure is less than 25,000 Microns. The gauge can be manually brought out of Sleep Mode by pressing any key on the keypad. While in Sleep, the gauge will beep twice every 5 minutes to remind you that it is on. The *BluVac LTE* will not sleep in the Calibration Mode (see the Calibration section below).

Auto Power-Off

After 1 hour in "Sleep Mode" the *BluVac LTE* will automatically turn itself off to further conserve battery power.

Units

Change the displayed units by pressing the UNITS key on the keypad. The appropriate units indicator on the LCD display will show **Pa**, **mBar**, **mTorr**, **mmHg**, or **Microns** depending on the units set.

Range and Resolution

The *BluVac LTE* has a broad vacuum pressure measurement range and very high resolution according to the table below:

	Vacuum Range	Resolution
Pascals (Pa)	0 — 3,333.1	0.1 Pa
Millibar (mBar)	0 — 33.331	0.001 mBar
Millitorr (mTorr)	0 — 25,000	1 mTorr
mmHg (mmHg)	0 — 25.000	0.001 mmHg
Microns (Microns)	0 — 25,000	1 Micron

"Analog" Vacuum Level Bar Graph

The *BluVac LTE* also displays a Vacuum Level Bar Graph allowing for a quick visual determination of the vacuum level achieved. Each bar corresponds to a vacuum pressure range depending on units according to the following table:

	Units				
Bar Value	**Microns**	**Pa**	**Millibar**	**Millitorr**	**mmHg**
10K	10,000 — ATM	1,000 — ATM	10 — ATM	10,000 — ATM	10 — ATM
5K	5,000 — 10,000	500 — 1,000	5 — 10	5,000 — 10,000	5 — 10
2K	2,000 — 5,000	200 — 500	2 — 5	2,000 — 5,000	2 — 5
1K	1,000 — 2,000	100 — 200	1 — 2	1,000 — 2,000	1 — 2
500	500 — 1,000	50 — 100	0.5 — 1	500 — 1,000	0.5 — 1
200	200 — 500	20 — 50	0.2 — 0.5	200 — 500	0.2 — 0.5
100	100 — 200	10 — 20	0.1 — 0.2	100 — 200	0.1 — 0.2
50	50 — 100	5 — 10	0.05 — 0.1	50 — 100	0.05 — 0.1
20	20 — 50	2 — 5	0.02 — 0.05	20 — 50	0.02 — 0.05
10	10 — 20	1 — 2	0.01 — 0.02	10 — 20	0.01 — 0.02

Oil Sensor

It is necessary to prevent oil from being drawn into the Vacuum Sensor. For HVAC/R service, always recover refrigerant prior to attaching gauge. If possible, always close the blank-off valve on the vacuum pump prior to turning the vacuum pump off. Over time, oil vapor and other materials may contaminate the sensor. The *BluVac LTE* has a built in Oil Sensor that will detect this condition. If the **OIL** indicator on the display illuminates, this is an indication that the vacuum sensor has been contaminated and is no longer functioning accurately. If the sensor becomes completely saturated with oil to the extent that it cannot function properly at all, the message -OIL- will show on the display. Prior to further use of the *BluVac LTE*, clean the sensor as describe in the "Cleaning the Vacuum Sensor" section below.

Backlight

To activate the Backlight temporarily, press  once. The  indicator on the display will flash, and the backlight will turn off automatically after 1 minute. To activate the Backlight permanently, press  again. The  indicator on the display will show solid. Turn off the backlight by pressing  repeatedly until the  indicator turns off. During Sleep Mode, the backlight will turn off to help conserve battery power, but will turn on again automatically upon resumption of normal operation if it was previously set in the permanent-on mode.

Sound

The *BluVac LTE* has an internal speaker that will emit a beep for each valid key press, and also functions as an alarm in the Calibration mode (see the Calibration section below). It will also beep every 5 minutes in Sleep Mode. For silent operation, the sound can be muted by pressing and holding the ♪ key. The Calibration mode alarm is not affected by the mute status. The ♪ indicator on the LCD display indicates that the sound is on (not muted).

Swivel Hook

The *BluVac LTE*'s removable stainless steel swivel hook enables hanging of the gauge and will allow it to swivel freely in any direction. The gauge may be operated with or without the hook attached. When fastening the hook to the gauge, turn it finger tight only. Use of a tool to tighten the hook may result in damage to the *BluVac LTE* case.

Maintenance

The *BluVac LTE* should provide many years of service with no maintenance required. When not in use, the dust cap should remain in place over the sensor port. Clean the plastic enclosure with a damp (not wet) rag. Mild detergent is acceptable, but use no solvents. Take care not to expose the vacuum sensor to oil. If the Oil Sensor (described above) indicates a contaminated sensor, follow the Sensor Cleaning Procedure below.

Cleaning the Vacuum Sensor

If the vacuum sensor becomes contaminated with oil (as indicated by the Oil Sensor), carefully follow this procedure:

1. Turn the *BluVac LTE* power off.
2. Shake the gauge to remove any large quantities of oil from the sensor.
3. Apply a few drops of rubbing alcohol inside the sensor vacuum port. (**DO NOT INSERT ANY OBJECT INTO THE PORT, AS THIS WILL PERMANENTLY DAMAGE THE SENSOR**).
4. Place your finger over the port and shake for a few moments.
5. Remove your finger and shake out the alcohol.
6. Repeat steps (3) – (5) at least three times.
7. Allow the sensor to air dry over at least an hour, or pull a vacuum on the sensor to dry it more quickly.
8. Replace the battery and turn on the gauge. The Oil Indicator should be off. If it is still on, repeat the cleaning procedure.
9. If full accuracy is desired, perform a calibration cycle as detailed in the Calibration section below.

NOTE: It is important to remove all alcohol vapors from the sensor, either through air-drying or via vacuum. Any remaining vapors will cause an incorrect vacuum reading.

Calibration Test

The *BluVac LTE* should rarely require recalibration, though it may be necessary to know that your gauge is calibrated properly for full accuracy. The Calibration Test mode assures you that the *BluVac LTE* is calibrated to factory specifications. Test the calibration as follows:

1. Turn the *BluVac LTE* power off.
2. **Important:** Expose the BluVac LTE to atmospheric pressure.
3. Press and hold (do not release) the ⏻ key for about 5 seconds.
4. The display will show **CAL** Good if the instrument is calibrated properly.
5. The display will show **CAL** Soon if the instrument requires calibration. Please see the Calibration section below.

Calibration

If the Calibration Test indicates recalibration is required, the gauge may be recalibrated. Unlike any other vacuum gauge, the *BluVac LTE* can be easily recalibrated to factory specifications without any special equipment, with the following procedure:

1. For best results, clean the sensor with alcohol prior to calibration. Ensure the sensor is completely dry before proceeding.
2. Turn the *BluVac LTE* power off. If necessary, install a fully charged battery into the gauge.
3. Place the dust cap over the vacuum fitting.
4. Hold UNITS while pressing ⏻. As soon as the power turns on, release UNITS and ⏻ and then press UNITS quickly at least three times. The **CAL** indicator should illuminate, and Cold should show on the Main Numeric Display. If not, turn the power off again and repeat.
5. Place the *BluVac LTE* in a clear Ziploc (resealable zipper storage) bag, press out any extra air, and seal.
6. Place the bagged *BluVac LTE* into a freezer with a temperature of less than –5°C (23°F).
7. Allow the BluVac LTE to cool to below -2°C (28.4°F). At this point, the alarm will sound and the display will change to Hot.
8. Remove from freezer and press any key to silence the alarm.
9. Place the *BluVac LTE* undisturbed in an area with a room temperature of at least 23°C (73.4°F) but no greater than 30°C (86°F).
10. Allow the *BluVac LTE* to warm to 20°C (68°F). At this point, the alarm will sound, and HI-P will show on the display.
11. Press any key to silence the alarm. The *BluVac LTE* is now calibrated to factory specifications.

NOTE: For accurate calibration, it is necessary to allow the *BluVac LTE* to warm slowly. Attempting to accelerate the warming by using a heat source will not provide satisfactory results. During the cooling/warming process, the temperature will be indicated on the Alternate Numeric Display in degrees Celsius. The calibration process may be canceled at any time by turning off the *BluVac LTE*. The previous calibration will be unchanged.

Restoring Factory Calibration

The original factory calibration can be restored at any time by the following procedure:

1. Turn the *BluVac LTE* power off.
2. Hold UNITS while pressing ⏻. As soon as the power turns on, release UNITS and ⏻ and then press UNITS quickly at least three times. The **CAL** indicator should illuminate, and Cold should show on the Main Numeric Display. If not, turn the power off again and repeat.
3. Press UNITS five times followed by ⏻.
4. The gauge will beep 5 times and return to normal operation. The *BluVac LTE* is now reset to the original factory calibration.

Low Temperature Operation

The *BluVac LTE* can operate accurately at temperatures as low as 10°F (-12°C). While operating below freezing (32°F/0°C), the display update rate will slow from 3.5 readings every second to one reading every two seconds.

A standard alkaline battey may not provide acceptable battery life at temperatures below 0°C (32°F). For low temperature operation, a 9V Lithium battery is recommended.

Troubleshooting

Under certain conditions, the display may read -OIL- or Error. Please use the table below to determine and fix the problem:

Display	Mode	Possible Problem	Solution
-OIL-	Normal Operation	Sensor Contaminated	Clean the Vacuum Sensor
		Ambient Temperature too Low	Turn the BluVac off, warm the vacuum port with your hand, turn the BluVac back on.
	Calibration	Sensor Contaminated	Clean the Vacuum Sensor and Restart Calibration
Error	Normal Operation	Sensor Failure	Contact Customer Service
	Calibration	Gauged Warmed too Quickly	Restart Calibration. Allow the Gauge to Warm Slowly
		Gauge Disturbed During Calibration	Restart Calibration. Leave the Gauge Undisturbed During Warming Phase.

Frequently Asked Questions

Q. How often must I calibrate the BluVac LTE?

A. Calibration of the BluVac LTE is only necessary when the Calibration Test indicates that calibration is required. Regardless, frequent cleaning and/or calibration will not adversely affect the long-term reliability of the instrument. For best results, ensure the sensor is clean and dry, and the dust cap is in place, prior to calibration.

Q. Can I use the BluVac LTE to check the proper operation of my vacuum pump?

A. Yes. Attach the BluVac directly to the pump with a short hose or coupler. Turn the pump on, open the blank-off valve, and close the ballast. A good pump with clean and dry oil will typically pull very quickly to less than 100 microns (generally around 25 microns for a two-stage pump). Always close the blank-off valve and/or disconnect the BluVac prior to turning off the pump so as to avoid oil contamination of the sensor.

Q. The BluVac LTE does not indicate acceptably low pressure when I test my pump.

A. Ensure the pump oil is clean and dry (it should be completely clear when viewed through the pump's sight glass). Replace the oil. Ensure the pump ballast is completely closed and the blank-off valve is completely open, and all fittings are tight and seals are not damaged. If low pressure is still not achieved, the pump may be damaged or worn.

Q. I've attached the BluVac LTE directly to my pump with a short hose or coupler. As soon as I blank off the pump, the indicated pressure rises rapidly. Is the BluVac sensor leaking?

A. No. There will always be molecular-sized leaks, outgassing, and/or permeation in any hose or fitting, and the pump's blank-off valve may not be entirely gas tight. The indicated pressure will rise due to the small internal volume of the hose or coupler.

Q. What is the recommended method for attaching the BluVac LTE for evacuation service?

A. Ideally, the BluVac LTE should be as close to the internals of the system under evacuation, and as far from the vacuum pump as possible. Attaching the BluVac LTE to the auxiliary port of a vacuum-rated core removal tool (CRT) connected directly to a service port is the best method. The ball-valve of the CRT can be closed to completely isolate the system from the pump and hoses, thereby allowing for an accurate rise-time test at the completion of evacuation. Additionally, removing the Schrader core(s) via the CRT and using large diameter hoses will greatly speed the evacuation process.

Q. I accidentally exposed the BluVac LTE to high-pressure refrigerant. Did I damage the BluVac LTE?

A. No. The BluVac LTE sensor is rated to 500 PSI overpressure, and can be directly exposed to gas/liquid refrigerant. At worst, the sensor may be exposed to oil, in which case the oil indicator will activate and cleaning/calibration may be required.

Q. I removed the BluVac LTE from the system under vacuum, but the indicated pressure rises slowly and/or the gauge does not return to Hi-P. Is the BluVac LTE damaged?

A. No. The slow rise in pressure is due to residual refrigerant gas captured in the sensor. Gently blowing air into the sensor to remove the residual gas will effect an immediate rise to Hi-P.

Q. My BluVac LTE reads a different pressure than my other vacuum gauge from another manufacture. Which gauge is correct?

A. Unlike all other micron gauges, the accuracy of the BluVac LTE is independent of temperature and pressure. Therefore, you can be confident that the BluVac LTE's reading is correct. Other gauges are calibrated at a specific temperature and pressure (i.e. 500 microns and 77°F (25°C)). The accuracy of those gauges is necessarily derated when operated at pressures and temperatures different than the calibration values.

Q. I am still having problems using the BluVac LTE and/or understanding the readings it is giving me. What should I do?

A. Please, contact us! Use our website at www.accutools.com or call us at (954) 227-0781 between 9:00AM and 5:30PM EST. We will be happy to help.