TEST iNSTRUMENTS™

Instruction Manual

DMG200

Digital Micron Gauge

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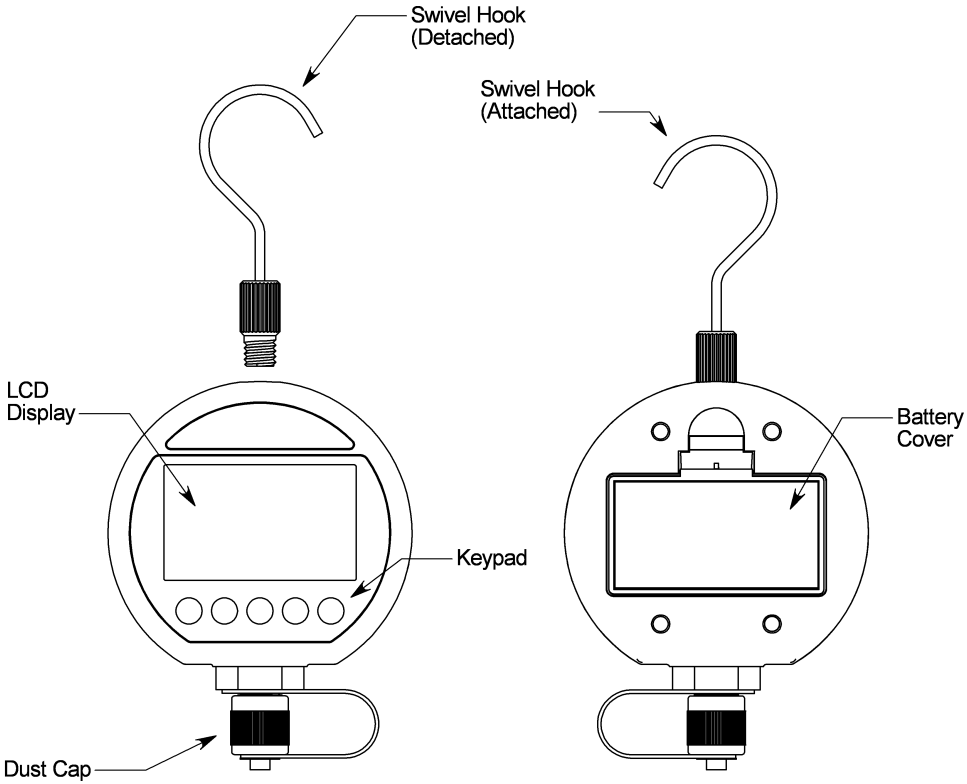
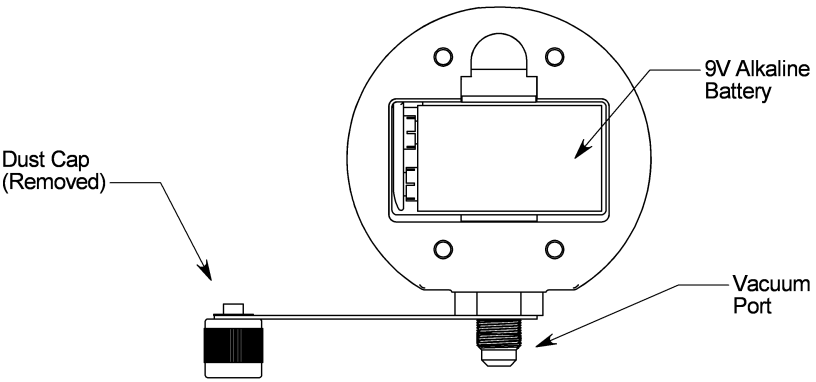
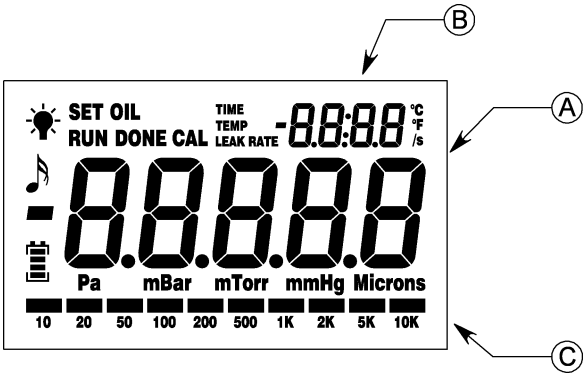
Parts Diagram





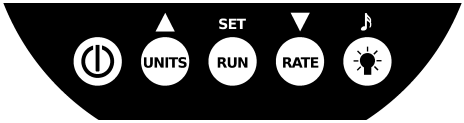
Rear View (Battery Cover Removed)

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
SET	Set Mode Indicator
RUN	Run Mode Indicator
DONE	Run Mode Complete Indicator
OIL	Oil Sensor Indicator
CAL	Calibration Mode Indicator
TIME	Indicates that Time is Displayed on the Alternate Numeric Display
TEMP	Indicates that Temperature is Displayed on the Alternate Numeric Display
LEAK RATE	Indicates that the Vacuum Leak Rate is Displayed on the Alternate Numeric Display
°C °F	Indicates either Celsius or Fahrenheit Degrees are Displayed
/S	Indicates that the Vacuum Leak Rate is Displayed in UNITS/second.
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 and Release to Change Display Units Press and Hold to Change Temperature Display Units (°F or °C)
RUN	Press and Release to Enter RUN Mode Press and Hold to Cancel RUN Mode
RATE	Press to Switch Between Temperature Display and Leak Rate Display
💡	Press and Release to Activate Backlight
▲▼	Press or Press and Hold to Change Programmed Pressure or Time in SET mode
SET	Press and Hold to Enter SET Mode Press and Release to Switch to Next Setting Press and Hold to Exit SET Mode
♪	Press and Hold to Mute/Un-mute Sound

Quick Start

To operate the DMG200 as a basic vacuum gauge:

1. Install the battery as described in the "Battery Installation" section (see pg. 5).
2. Turn the power on by pressing ⏻. The display will show H 1-P to indicate pressure greater than 25,000 Microns.
3. Select the desired units by repeatedly pressing UNITS.
4. Attach the DMG200 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 ⏻.

Battery Installation & Replacement

1. Remove the battery cover from the rear of the DMG200 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 DMG200. REMOVE BATTERY IF THE DMG200 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. Full power is indicated by four bars. 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 DMG200 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 DMG200 is turned back on, the DMG200 will resume operation with all previous setting 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 Micron Gauges, the DMG200 helps to conserve battery life through advanced power management. After 5 minutes of displaying , the DMG200 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 DMG200 will not sleep in the Set Mode (see pg. 8) or the Calibration Mode (see pg. 10).

Auto Power-Off

After 1 hour in "Sleep Mode" the DMG200 will automatically turn itself off to further conserve battery power.

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 DMG200 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 will show on the

display. Prior to further use of the DMG200, clean the sensor as describe in the "Cleaning the Vacuum Sensor" on pg. 9.

Units

Change the displayed units by pressing and releasing 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. The units cannot be changed in the Set Mode (see pg. 8) or the Run Mode (see pg. 9).

Range and Resolution

The DMG200 has a broad vacuum pressure measurement range, and the highest resolution of any gauge. The display range and resolution depends upon the units displayed and the vacuum pressure reading, according to the table below:

	Vacuum Range	Vacuum Pressure Reading	Resolution
Pascals (Pa)	0 — 3,333.1	1,000.0 — 3,333.1	0.1 Pa
		0 — 999.99	0.01 Pa
Millibar (mBar)	0 — 33.331	10.000 — 33.331	0.001 mBar
		0 — 9.9999	0.0001 mBar
Millitorr (mTorr)	0 — 25,000	10,000 — 25,000	1 mTorr
		0 — 9,999.9	0.1 mTorr
mmHg (mmHg)	0 — 25.000	10.000 — 25.000	0.001 mmHg
		0 — 9.9999	0.0001 mmHg
Microns (Microns)	0 — 25,000	10,000 — 25,000	1 Micron
		0 — 9,999.9	0.1 Micron

"Analog" Vacuum Level Bar Graph

The DMG200 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

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 DMG200 has an internal speaker that will emit a beep for each valid key press, and also functions as an alarm in the Programming (see pg. 8) and Calibration modes (see pg. 10). 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 alarm is not affected by the mute status. The ♪ indicator on the LCD display indicates that the sound is on (not muted).

Alternate Numeric Display

The DMG200 has an Alternate Numeric Display that can indicate Vacuum Leak Rate, Ambient Temperature, or Programming Time/Progress. Please refer to the "Programming" section (see pg. 8) for programming instructions. During normal operation, the Alternate Numeric Display may show either Vacuum Leak Rate or Sensor Temperature. Select the display mode by pressing the RATE key until either **LEAK RATE** or **TEMP** illuminates on the display.

Vacuum Leak Rate Indicator

The Vacuum Leak Rate Indicator displays the rate of change of vacuum per second in the selected units when the **LEAK RATE** indicator is illuminated. The reading is positive for increasing pressure and negative of decreasing pressure. The Leak Rate Indicator is useful for determining the size of a vacuum leak, if one exists. Under high-pressure conditions, the leak rate indicator shows - - - -.

Ambient Temperature Indicator

Internally, the DMG200 uses a very high accuracy temperature sensor to maintain proper calibration throughout the entire operating temperature range. This temperature is shown on the Alternate Numeric Display when the **TEMP** indicator is illuminated. The accuracy of the temperature sensor is 0.2°F or 0.1°C. The temperature display units can be toggled between Fahrenheit and Celsius by pressing and holding the UNITS key while in the temperature display mode.

Swivel Hook

The DMG200'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 DMG200 case.

Programming

The programming feature of the DMG200 allows for unattended evacuation of large systems, and will sound an audible/visual alarm when the evacuation program has been completed. The program consists of both a target pressure (vacuum level) and a time period through which the system must remain at or below that pressure. There are 16 possible target pressures, depending upon the units displayed, as shown in the table below:

Units				
Microns	**Pascal**	**Millibar**	**Millitorr**	**mmHg**
50	5.0	0.050	50	0.050
75	10.0	0.100	75	0.075
100	15.0	0.150	100	0.100
150	20.0	0.200	150	0.150
200	30.0	0.300	200	0.200
300	50.0	0.500	300	0.300
500	75.0	0.750	500	0.500
750	100.0	1.000	750	0.750
1000	150.0	1.500	1000	1.000
1500	200.0	2.000	1500	1.500
2000	300.0	3.000	2000	2.000
3000	500.0	5.000	3000	3.000
5000	750.0	7.500	5000	5.000
7500	1000.0	10.000	7500	7.500
10000	1500.0	15.000	10000	10.000
15000	2000.0	20.000	15000	15.000

The evacuation time period may be programmed between 0 seconds and 100 minutes. To program the DMG200:

Programming (Set Mode)

1. Turn the power on by pressing ⏻.
2. Select the desired units by repeatedly pressing UNITS.
3. Activate the Program Set Mode by pressing and holding **SET**. The **SET** indicator will show on the display, as well as the currently programmed target pressure and time.
4. While the pressure display is flashing, press and/or hold the ▲ or ▼ keys to increase or decrease the target pressure. When compete, press and release the **SET** key.
5. While the minutes display is flashing, press and/or hold the ▲ or ▼ keys to increase or decrease the minutes. When compete, press and release the **SET** key.
6. While the seconds display is flashing, press and/or hold the ▲ or ▼ keys to increase or decrease the seconds. When compete, press and release the **SET** key. The gauge will beep three times (if sound is enabled), and return to normal mode.
7. At any point in the Program Set Mode, pressing and holding the **SET** key will result in saving the current program and returning to normal mode.
8. Once programmed, the DMG200 will remember the settings until changed again, even if the power is turned off or the battery removed.

Note: The units cannot be changed while in the Set Mode.

Executing the Program (Run Mode)

1. Press and release RUN. The **RUN** and **TIME** indicators will illuminate on the display.
2. Start the vacuum pump.
3. When the vacuum pressure drops to less than the target pressure, the timer will start. Subsequently, if the pressure exceeds the target pressure, the timer will stop and resume counting when the pressure again drops to less than the target pressure.
4. When the timer expires, the DMG200 will sound an alarm, flash the backlight, and blink the **DONE** indicator. Press any key to silence the alarm. The program is complete.
5. At any time during the Run Mode, the program can be canceled by pressing and holding RUN.
6. While in the Run Mode, the gauge may sleep after 5 minutes of high pressure. The gauge will wake and continue the program normally once the pressure drops below 25,000 Microns. The gauge may be manually wakened from sleep by pressing any key. **In the Run Mode, the Auto Power-Off feature is disabled.**

Note: The units cannot be changed while in the Run Mode. Also, the Leak Rate and Ambient Temperature Indicators are disabled.

Maintenance

The DMG200 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 DMG200 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 DMG200 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 DMG200 is calibrated to factory specifications. Test the calibration as follows:

1. Turn the DMG200 power off.
2. **Important:** Expose the DMG200 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 DMG200 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 DMG200 power off. If necessary, install a fully charged battery into the gauge.
3. Place the dust cap over the vacuum fitting.
4. Hold RUN while pressing ⏻. As soon as the power turns on, release RUN and then press it 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 DMG200 in a clear Ziploc (resealable zipper storage) bag, press out any extra air, and seal.
6. Place the bagged DMG200 into a freezer with a temperature of less than –5°C (23°F).
7. Allow the DMG200 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 DMG200 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 DMG200 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 DMG200 is now calibrated to factory specifications.

Note: For accurate calibration, it is necessary to allow the DMG200 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 DMG200 or by pressing and holding RUN. 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 DMG200 power off.
2. Hold RUN while pressing ⏻. As soon as the power turns on, release RUN and then press it 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 RUN.
4. The gauge will beep 5 times and return to normal operation. The DMG200 is now reset to the original factory calibration.

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 or Run Mode	Sensor Contaminated	Clean the Vacuum Sensor
		Ambient Temperature too Low	Turn the DMG200 off, warm the vacuum port with your hand, turn the DMG200 back on.
	Calibration	Sensor Contaminated	Clean the Vacuum Sensor and Restart Calibration
Error	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.

Low Temperature Operation

The DMG200 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.

For satisfactory battery life at low temperatures, a 9V Lithium battery is recommended.

DMG200 Digital Micron Gauge
Limited Warranty

The ***DMG200*** Digital Micron Gauge is warranted to be free from defects in materials and workmanship for a period of one year from the date of purchase. If within the warranty period your instrument should become inoperative from such defects, the unit will be repaired or replaced at UEi's option, This warranty covers normal use and does not cover damage which occurs in shipment or failure which results from alteration, tampering, accident, misuse, abuse, neglect or improper maintenance. Batteries and consequential damage resulting for failed batteries are not covered by warranty.

Any implied warranties, including but not limited to implied warranties of merchantability and fitness for a particular purpose, are limited to the express warranty. UEi shall not be liable for loss of use of the instrument or other incidental or consequential damages, expenses, or economic loss, or for any claim or claims for such damage, expenses or economic loss. A purchase receipt or other proof of original purchase date will be required (when repairable) for a service charge.
For return authorization and a service number contact UEi or visit us online.
Return the unit postage paid and insured to:

8030 SW Nimbus Avenue, Beaverton OR 97008

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This warranty gives you specific legal rights.
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