

 LaMotte

pH/TDS/Salt

TRACER
POCKETESTER™



CE

CODE 1766

pH/Conductivity/TDS/Salinity Meter

WARNING! This set contains chemicals that may be harmful if misused. Read cautions on individual containers carefully. Not to be used by children except under adult supervision

TRACER

pH/TDS/SALT POCKETESTER™ • CODE 1766

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INTRODUCTION

Congratulations on your purchase of the pH/TDS/SALT (pH/conductivity/TDS/Salinity) TRACER PockeTester. The TRACER is a revolutionary, first of its kind measurement device that offers direct reading of pH, conductivity, TDS and salinity with one electrode. Careful use and maintenance will provide years of reliable service.

SPECIFICATIONS

Display	2000 count LCD with Bar Graph
pH Range	0.00 to 14.00
pH Accuracy	± 0.01 pH typical
pH ATC Range	32 to 194 °F (0 to 90 °C)
pH Measurement Storage	25 tagged (numbered) readings
pH Reference Junction	Permanent gel, non-refillable
Conductivity Range	0 to 199.9 µS/cm 200 to 1999 µS/cm 2.00 to 19.99 µS/cm
TDS Range	0 to 99.9 ppm and mg/L 100 to 999 ppm and mg/L 1.00 to 9.99 ppt and g/L (variable ratio)
Salinity Range	0 to 99.9 ppm S 100 to 999 ppm S 1.00 to 9.99 ppt S (fixed ratio of 0.5)
TDS Ratio	0.4 to 1.0, adjustable
Salinity Ratio	0.5 fixed
Conductivity ATC	2.0% per °C
Conductivity ATC Range	32.0 to 140.0 °F (0.0 to 60.0 °C)
Temperature Range	23.0°F to 194°F (-5.0°C to 90.0°C)
Temperature Resolution	0.1 up to 99.9, 1 >100
Temperature Accuracy	±1.8°F; 1°C; (from 23 to 122°F; -5 to 50°C) ±5.4°F; 3°C; (from 122 to 194°F; 50 to 90°C)
Conductivity ATC Range	32.0°F to 140°F (0.0°C to 60.0°C)
Accuracy	Conductivity: ±2% FS TDS: ±2% FS Salinity: ±2% FS
Measurement Storage	25 numbered readings
Low Battery Indication	'BAT' appears on the LCD
Power	Four CR2032 Lithium Ion batteries
Auto Power Off	After 10 minutes of no button presses (override available)

Operating Conditions	23 to 122 °F (-5 to 50 °C)
Dimensions	1.6 X 7.9 X 1.6 inches, 40 X 200 X 40 mm
Weight	3.3 oz, 93 g

NOTE: 1 part per thousand (ppt) equals 1000 parts per million (ppm).
 Example: 3.1ppt=3,100 ppm

CONTENTS

pH/CON TRACER PockeTester Kit	Code 1766
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Includes:

Sample Cup w/cap	*
Tablet Crusher	Code 0175
Buffer Tablets, pH 4.0, 7.0 & 10.0	*

*Not sold in this quantity. See below.

PARTS & ACCESSORIES

pH/TDS/SALT Replacement Electrode	Code 1755
Weighted Stand w/Sample Cups (5)	Code 1746
Sample Cups w/caps (24)	Code 1745
pH 4.0 Mini Buffer Tablets (100)	Code 3983A-J
pH 7.0 Mini Buffer Tablets (100)	Code 3984A-J
pH 10.0 Mini Buffer Tablets (100)	Code 3985A-J
Conductivity Standard, 84 µS, 30 mL, 500 mL	Code 6312-G, L
Conductivity Standard, 1413 µS, 30 mL, 500 mL	Code 6354-G, L
Conductivity Standard, 12,880 µS, 30 mL, 500 mL	Code 6317-G, L

METER DESCRIPTION

Front Panel Description

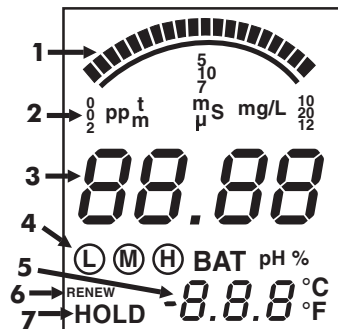
1. Battery compartment cap
2. LCD Display
3. MODE/HOLD button - change mode, hold data, store data
4. CAL/RECALL button - calibration, change temperature units, recall data
5. ON/OFF button
6. Electrode Collar
7. Electrode

(Note: The Electrode cap is not shown)



TRACER Display

1. Bar graph display
2. Measurement units
3. Main display
4. Range calibration and battery indicators
5. Temperature display
6. Renew indicator
7. HOLD indicator



BASIC OPERATION

Powering the TRACER

The Tracer uses four CR 2032 Lithium Ion batteries. If the batteries are weak, the BAT indicator will appear on the display. Press the ON/OFF button to turn the TRACER on or off. The auto power off feature will shut the TRACER off automatically after 10 minutes after the last button push.

Automatic Calibration

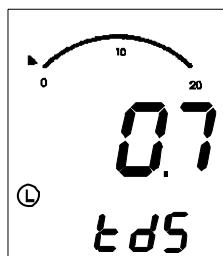
When the TRACER is turned on, it will enter the Automatic Calibration mode. SELF and CAL will appear while the calibration is in progress. After the calibration is completed, the SELF and CAL display icons will extinguish.

TDS Conversion Ratio

The TDS value is determined by multiplying the conductivity measurement by a known conversion ratio factor. The meter allows the selection of a conversion ratio factor in the range of 0.4 to 1.0. The selected ratio will vary with application but is typically set between 0.5 and 0.7. In the salinity mode, the ratio is fixed at 0.5. The stored ratio factor will briefly appear in the lower temperature display when the meter is first turned on or when changing the measurement function to TDS.

To change the ratio while in the TDS measurement mode:

1. Turn the TRACER on.
2. Press and release the CAL/RECALL button twice. The stored ratio will appear in the display.
3. Press the MODE/HOLD button to change the ratio value in steps of 0.1.
4. When the desired ratio is displayed, press and release the CAL/RECALL button to store the value and return to the normal mode.
5. If no buttons are pressed for 5 seconds, the meter will return to the measurement mode.



Changing the Displayed Temperature Units

To change the displayed temperature units between °C or °F:

1. With the TRACER off, press and hold the CAL/RECALL button.
2. With the CAL/RECALL button pressed, momentarily press the ON/OFF button. When SELF CAL appears in the display, release the CAL/RECALL button. The TRACER will return to the operational mode with the temperature displayed in the new units.

Data Hold

Press the MODE/HOLD button to freeze the current reading. The HOLD icon will appear. The reading will be stored. Press the MODE/HOLD key to return to normal operation.

Auto-Power Off

The auto-power off feature will automatically shut the meter off 10 minutes after the last button was pressed. To disable the auto-off feature:

1. Press the ON/OFF button to turn the meter on.
2. Wait for the SELF display screen to appear. This is the second screen to appear after turning on the meter. **IMPORTANT:** Review the instructions for the next 3 steps before proceeding. Step 3 must be followed immediately by Step 4.
3. Press CAL/RECALL button once.
4. Press MODE/HOLD and ON/OFF buttons simultaneously, for approximately 2 seconds.
5. oFF will be displayed on the screen. Watch carefully. It will disappear quickly.
6. To re-enable the auto-off feature, repeat steps 3 and 4. ON will be briefly displayed on the screen.
7. The auto power off feature will be restored automatically when the meter is turned off. Auto-off is the default function when the meter is turned on.

Low Battery Indicator

The “BAT” indicator will be displayed when the batteries become weak. Refer to the Maintenance section for battery replacement information.

TESTING

Getting Started

1. Remove the cap from the bottom of the TRACER to expose the pH electrode, reference junction and the conductivity electrodes.
2. Before the first use or after storage, soak the electrode in tap water or pH 4 buffer for 10 minutes.
3. White KCL crystals may be present in the cap or on the electrode. This is to be expected if the TRACER has been stored for any length of time. The crystals will dissolve with soaking or they can be rinsed off with tap water.
4. Calibrate with pH 7 buffer prior to the first use or after prolonged storage.
5. When the meter is calibrated for conductivity, salinity or TDS the meter must be in the conductivity mode. See page 15.

Changing the Measurement Function

The meter can be set to measure Conductivity, pH, Salinity (ppm), TDS(ppm), or TDS (mg/L). To change the mode:

1. Turn the TRACER on.
2. Press and hold the MODE/HOLD button for 2 seconds. The display will begin to scroll through the units.
 - μS or mS (Conductivity)
 - pH
 - ppm S or ppt S (Salinity)
 - ppm or ppt (TDS)
 - mg/L (TDS)

NOTE: 1 part per thousand (ppt) equals 1000 parts per million (ppm).
Example: 3.1ppt=3,100 ppm

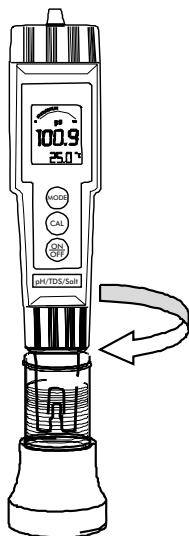
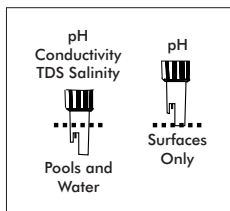
3. Release the MODE/HOLD key when the desired mode is displayed.

NOTE: The “HOLD” function can not be used when changing the measurement function. If “HOLD” is displayed in the lower left corner of the display, briefly press the MODE/HOLD button to turn it off.

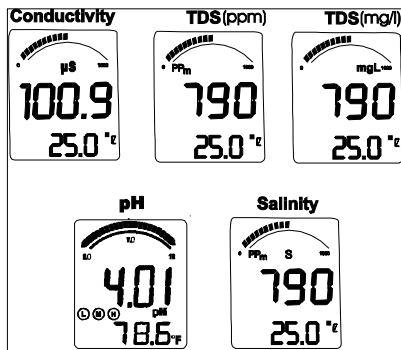
MEASUREMENT PROCEDURE

Measurement

1. For small samples fill a sample cup to the 20 mL line with the test sample. Sample depth must be greater than or equal to 1.5 inches. pH can also be measured by contact of the electrode tip with a wet surface. For larger samples, like pools, go to step 2
2. Press the ON/OFF button. (8888 and then SELF CAL will appear in the display during the initial diagnostics).
3. Press and hold the MODE/HOLD button to scroll to the desired measurement mode.
4. Immerse the TRACER electrode in the sample. Make sure the electrode is completely submersed.
5. Slowly stir the sample with the TRACER to remove air bubbles if in the Conductivity, TDS or Salinity mode.
6. If the TRACER is in the Conductivity, TDS, or Salinity mode, the meter will automatically auto-range to the proper range and then display the reading. The display will flash "0000" while autoranging.
7. If the TRACER is in the pH mode, the reading will flash until it has stabilized. This may take several seconds depending on the buffer capacity of the sample.
8. Rinse the electrode in distilled water. Replace the cap.



NOTE: 1 part per thousand (ppt) equals 1000 parts per million (ppm).
Example: 3.1ppt=3,100 ppm



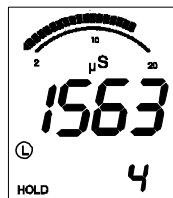
NOTE: When measuring samples with low conductivity, thoroughly rinse the probe with distilled or deionized water before placing it in the sample to avoid contamination of the sample with electrolyte from the pH reference electrode. Also increase the sample size to 200 to 500 mL to decrease the chance of contamination. If a sample cup is used, do not allow the probe to sit in the sample for any longer than necessary to avoid electrolyte leakage into the sample. Leakage will raise the conductivity level.

Measuring the TDS of Soil

1. Fill a 50 mL beaker with the soil sample. Tap the beaker lightly on a hard surface to remove trapped air. Remove excess soil from the surface.
2. Empty the soil into a 250 mL wide-mouth flask.
3. Add 100 mL of distilled water. Stopper and shake vigorously.
4. Wait 30 minute. (Shake the flask vigorously three or four times during this period.)
5. Filter the contents of the flask. Collect the filtrate in a beaker.
6. Rinse the electrode with distilled or deionized water to remove impurities.
7. Press the ON/OFF button to turn the TRACER on. Make sure the meter is in the TDS mode.
8. Immerse the electrode in the filtrate. Make sure the tip of the electrode is completely immersed.
9. Stir the filtrate with the electrode to create a homogeneous solution.
10. Gently stir the filtrate with the electrode. Read the TDS value of the filtrate from the display.
11. Rinse the electrode in distilled water. Replace the cap.

Storing Readings

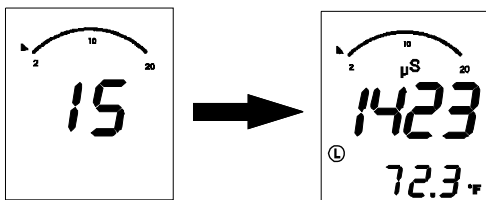
1. After the reading is displayed press and hold the MODE/HOLD button to store the current reading. The meter will enter the HOLD mode and HOLD will be displayed. The storage location number (1 through 25) will be displayed on the lower display followed by the reading being stored.
2. Press the MODE/HOLD button to exit the HOLD mode and return to normal operation.
3. If an attempt is made to store more than 25 readings, the stored readings will be overwritten starting with the first reading.



Recalling Stored Readings

NOTE: First ensure that the HOLD symbol is not displayed. If it is, exit the HOLD function by pressing the MODE/HOLD button.

1. Press the CAL/RECALL button and then press the MODE/HOLD button. The location number (1 through 25) will briefly appear and then the value stored in that location will appear. The displayed units will flash, indicating that the storage recall mode is active.



2. The last stored reading taken will be displayed first. To advance to the previously stored readings, press the MODE/HOLD button. The location number is displayed first, followed by the reading stored in that location.
3. To exit the storage mode, press the CAL/RECALL button and the TRACER will return to normal operation after displaying "End".

Clearing Stored Memory

Turn the TRACER on. Press and hold the ON/OFF button for 4 seconds. The display will briefly display "clr" when the memory is cleared.

CALIBRATION

For the most accurate results, allow sufficient time for the temperature of the probe to reach the temperature of the sample before calibrating. This will be indicated by a stable temperature reading on the display.

pH

The TRACER can be calibrated at 1, 2 or 3 points. For the most accurate results with a two point calibration, calibrate the TRACER with a pH 7 buffer first, then calibrate with either a pH 4 or pH 10 buffer whichever is closest to the pH value of the sample to be tested. When performing a three point calibration, calibrate with the pH 7 buffer first, followed with the pH 4 buffer and then the pH 10 buffer.

Preparation of Buffers

1. Fill a sample cup with 20 mL of distilled or deionized water.
2. Add one buffer tablet:

pH 4.0	Code 3983A
pH 7.0	Code 3984A
pH 10.0	Code 3985A
3. Use the tablet crusher (0175) to crush the tablet. Stir until the tablet has disintegrated.

NOTE: Buffers should be prepared fresh daily.

Calibration

1. Fill a sample cup to the 20 mL line with a buffer solution.
2. Press the ON/OFF button to turn the TRACER ON.
3. Place the electrode in the buffer solution. Press and hold the CAL/RECALL button until "CAL" appears in the lower display. The meter will automatically recognize the buffer and calibrate itself to that value. The circled number on the display will match the value of the buffer.

NOTE: If the buffer solution is more than 1 pH unit off from 4, 7, or 10, or the electrode slope is low, the meter will assume that there is an error and the calibration will be terminated. END will be displayed.

4. During the calibration the pH value on the display will flash. When the calibration is complete, the TRACER will display "SA" and "End" and return to normal operation.
5. The appropriately circled indicator (L, M or H) will appear on the display when a calibration has been completed within one power on cycle.

6. For a two or three point calibration, repeat steps 1 – 5 with the remaining buffers.
7. When the TRACER is turned off, the circled indicator configuration and the calibration data will be memorized.

Calibration Reminder

The “CAL” indicator will appear when the TRACER is in the pH mode and a calibration is required. The “CAL” indicator will appear if the meter has not been calibrated after 15 on/off cycles of the meter. Some applications may require more frequent calibrations than others. The “CAL” indicator is only a reminder and will not affect function in any way. The indicator will no longer be displayed when the pH electrode is recalibrated.

RENEW Indicator

A flashing “RENEW” indicator will appear on the display to warn that the electrode is not performing to expected specifications. If cleaning or recalibration does not cause the RENEW indicator to disappear, the electrode should be replaced. The RENEW indicator will appear when the pH electrode slope falls below 70% of a nominal slope.

Conductivity

Meter accuracy verification should be performed on a periodic basis as needed. **If calibration is required, the meter must be in the conductivity mode to perform all calibrations for conductivity, TDS and salinity.** The meter can perform a calibrations and store the data for each of the three ranges – low, medium and high. The automatic calibration recognition procedure will recognize conductivity standards of 84 μ S (Low), 1413 μ S (Medium) or 12,880 μ S (12.88mS) (High). (See Page 6). Always calibrate in the range closest to the expected measurement value. **For salinity samples within the range of 1.00 to 9.99 ppt salinity, calibrate with a 12,880 μ S calibration standard.**

1. Fill a sample cup to 20 mL line with a conductivity standard.
NOTE: The meter allows for a 1, 2, or 3 point calibration. If calibration is done for more than one point, the lowest concentration should be done first to obtain the best accuracy. Calibrate the ranges from low to high
2. Press the ON/OFF button to turn the TRACER on. Insert the electrode into the standard. Tap or stir the sample with the Tracer to dislodge air bubbles.
3. Press and hold the CAL/RECALL button for approximately 2 seconds until the display begins to flash.

4. The meter will automatically recognize and calibrate to the conductivity standard. The display will briefly indicate “SA” and “End” and then return to the measurement mode.
NOTE: “SA” will not appear if the calibration fails.
5. The calibration range indicator will appear on the display for each range that is calibrated during a power on cycle.

Ⓕ Low Range, 84 $\mu\text{S}/\text{cm}$

Ⓜ Medium Range, 1413 $\mu\text{S}/\text{cm}$

ⓗ High Range, 12.88 mS/cm (12,880 $\mu\text{S}/\text{cm}$)

NOTE: Each time the calibration mode is entered all calibration range indicators will be cleared, but only the calibration data for the currently selected range will be replaced. The calibrations for the other two ranges will be saved even though the indicators for those ranges are no longer displayed. Calibration of all three ranges must be performed during one power on period for all three calibration range indicators to be displayed.

NOTE: As with all combination pH/conductivity probes, at low conductivity levels the flow of the pH electrolyte may affect the readings and result in artificially high conductivity readings. To eliminate the interference, low level conductivity or TDS measurements should be taken with a meter that measures conductivity only.

OPERATIONAL MATRIX

Function/ Resulting Action	Power	Mode	Key Press Sequence
On/Off	On or Off	Any	Momentary press of ON/OFF button
Calibration	On	pH or Con	Press & hold CAL/RECALL button for 2 seconds until CAL is displayed
Store Reading	On	Any	Momentary press of MODE/HOLD button
Hold Release	On	Hold	Momentary press of MODE/HOLD button
Enter Memory Retrieval	On	Any Measurement Mode	Momentary press of CAL/RECALL button followed by a momentary press of MODE/HOLD button within 4 seconds.
Scroll Stored Readings	On	Memory Recall	Momentary press of MODE/HOLD button. Displays last in first out.
Exit Memory Retrieval	On	Memory Recall	Momentary press of CAL/RECALL button
Clear Stored Memory	On	Any Memory Mode	Press and hold the ON/OFF button for 4 seconds until “clr” is displayed.

Function/ Resulting Action	Power	Mode	Key Press Sequence
Change Measurement Mode	On	Any	Press and hold the MODE/HOLD button for at least 2 seconds. Modes will scroll by until button is released.
Enter CON/TDS Ratio	On	TDS (ppm or mg/L)	Press and release the CAL/RECALL button twice in succession.
Change CON/TDS Ratio	On	TDS (ppm or mg/L)	Momentary press of MODE/HOLD button. Each press increases ratio by 0.1 from 0.4 to 1.0.
Exit CON/TDS Ratio	On	TDS (ppm or mg/L)	Momentary press of CAL/RECALL button.
Change Temperature Units	Off	Off	Press and hold CAL/RECALL button then momentarily press ON/OFF button. Release CAL/RECALL button after "Self Cal" is displayed.
Override Auto Power Off	On	Any Measurement Mode	Momentarily press CAL/RECALL button then simultaneously press and hold ON/OFF and MODE/HOLD buttons for 2 seconds until "oFF" is displayed.
Default Reset	Off	N/A	Simultaneously press ON/OFF, CAL/RECALL and MODE/HOLD buttons momentarily. "dFlt" will be displayed.

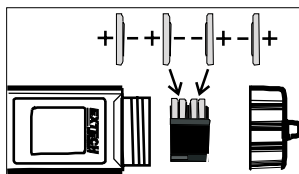
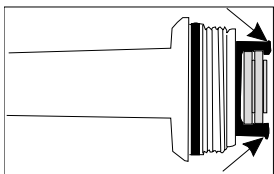
MAINTENANCE

Storage

1. Rinse the electrode in distilled or deionized water.
2. Store the electrode with the cap on. Keep the sponge in the cap soaked with tap water or pH 4 buffer solution.
3. Always rinse the electrode in deionized water between measurements to avoid cross contamination. Double rinsing is recommended when high accuracy is required.
4. Salt deposits may build up in the storage cap and should periodically be rinsed away. These deposits could affect measurements at low conductivity.

Battery Replacement

1. Twist off the battery compartment cap.
2. Hold the battery housing in place with one finger. Remove the battery carrier by pulling on the small tabs.
3. Replace the four CR2032 batteries. Observe polarity.
4. Replace the battery compartment cap.



Electrode Care

1. Always rinse the electrode in distilled or deionized water between measurements to avoid cross-contamination of the samples. Double rinsing is recommended when high accuracy is required.
2. Do not touch the electrodes. Touching the surface of the platinized electrodes may damage and reduce the life of the electrodes.

REPLACING THE ELECTRODE

1. Unscrew and remove the electrode collar. Turn collar counter-clockwise.
2. Gently rock the electrode side to side, while pulling it away from the meter, until it disconnects from the electrode socket.
3. To attach an electrode, align the slots and carefully plug the electrode into the meter socket.
4. Firmly tighten the electrode collar to create a seal with the rubber gasket between the electrode and the meter.

Electrode Cleaning Recommendations

Do not soak the electrode in the solutions for longer than the recommended length of time. To do so may cause a reference potential shift which will cause a degradation in performance or failure. When cleaning the electrode, take care not to scratch or damage the sensing surface or the platinized electrode surfaces.

Contaminant	Cleaning Solution	Procedure
Water soluble	Deionized water	Soak or scrub with a soft brush. Recondition in pH 4 or 7 buffer for 1 hour.
Grease and oil	Warm water and household detergent	Soak or scrub with a soft brush, maximum 10 minutes. Rinse thoroughly with DI water. Recondition in pH 4 or 7 buffer for 1 hour.
Heavy grease	Alcohol	Soak for a maximum of 5 minutes. Scrub with a soft brush. Rinse thoroughly with DI water. Recondition in pH 4 or 7 buffer for 1 hour.
Lime and hydroxide coatings	10% Acetic acid	Soak until coating dissolves, maximum 5 minutes. Rinse thoroughly with DI water. Recondition in pH 4 or 7 buffer for 1 hour.

TROUBLESHOOTING

Problem	Cause	Action
Reading is frozen	HOLD mode	Press MODE/HOLD button to exit HOLD mode.
“BAT” message	Batteries low	Replace batteries
Meter will not calibrate in pH	Clogged or contaminated reference junction	Clean junction
	Damaged or worn sensing membrane	Replace electrode
	Contaminated pH buffers	Use fresh buffers
Meter will not calibrate in conductivity mode	Trapped air bubbles	Tap probe or stir a sample to release air bubbles
	Dirty probe	Clean conductivity probe
	Damaged probe	Replace probe
	Contaminated conductivity standards	Use fresh Standards
Meter will not turn on	Batteries low or dead	Replace batteries
	Battery polarity	Replace batteries with correct polarity
“RENEW” message	pH sensor needs recalibration	Recalibrate meter with fresh buffers
	pH sensor slope has fallen below acceptable limits	Recalibrate meter with fresh buffers

WARRANTY

This instrument is guaranteed to be free from defects in material and workmanship for a period of one (1) year from the original purchase date. The probe is guaranteed to be free from defects in material and workmanship for a period of six (6) months from the original purchase date. In the event that a defect is found during the warranty time frame, LaMotte Company agrees that it will be repaired or replaced without charge except for the transportation costs. This guarantee does not cover batteries.

This product can not be returned without a return authorization number from LaMotte Company. For warranty support or a Return Authorization Number, contact LaMotte Company at 1-800-344-3100 or tech@lamotte.com.

Limitations

This guarantee is void under the following circumstances:

- Damage due to operator negligence, misuse, accident or improper application.
- Damage or alterations from attempted repairs by an unauthorized (non-LaMotte) service.
- Damage due to improper power source, AC adapter or battery.
- Damage caused by acts of God or natural disaster.
- Damage occurred while in transit with a shipping carrier.

LaMotte Company will service and repair out-of-warranty products at a nominal charge.



LaMOTTE COMPANY

Helping People Solve Analytical Challenges®

PO Box 329 • Chestertown • Maryland • 21620 • USA
800-344-3100 • 410-778-3100 (Outside U.S.A.) • Fax 410-778-6394
Visit us on the web at www.lamotte.com