Free and Total Chlorine Tester

Patent Pending

Model CL500
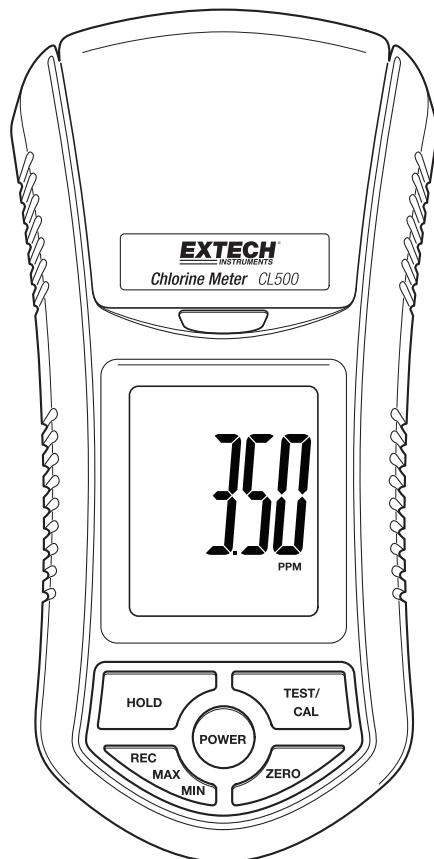
Introduction

Congratulations on your purchase of the CL500 chlorine tester. The CL500 is a revolutionary first of its kind measurement device that measures free and total Chlorine from 0.00 to 3.50 ppm. The electrode method employed is approved by the U.S. Environmental Protection Agency (EPA) as an acceptable method for wastewater compliance monitoring of total chlorine. For this type of electrode method, a reagent tablet must be added to the measurement solution before testing. The advantages of the CL500 for the user include: easy to use and maintain, high accuracy, self-calibration, and fast response. This meter is shipped fully tested and calibrated and, with proper use, will provide years of reliable service. Please visit our website (www.extech.com) to check for the latest version of this User Guide, Product Updates, and Customer Support.

Applications

The CL500 can be used wherever a measurement of the total chlorine in water as needed. This is also referred to as total residual chlorine. It measures the total of all chlorine present in all forms, including dissolved free chlorine, chloramines, hypochlorous acid, and hypochlorite ion. Typical applications include Total Chlorine measurements of discharge water from water treatment plants, public drinking water supplies and cooling towers, and free chlorine measurements of the disinfectant properties in swimming pools and cooling water applications.

Meter Description

CL500 Front Panel Description

1. Test Bottle Chamber
2. Test Bottle Chamber latch
3. LCD display
4. POWER button
5. HOLD button
6. REC-MAX-MIN button
7. ZERO button
8. TEST-CAL button
9. Test bottle
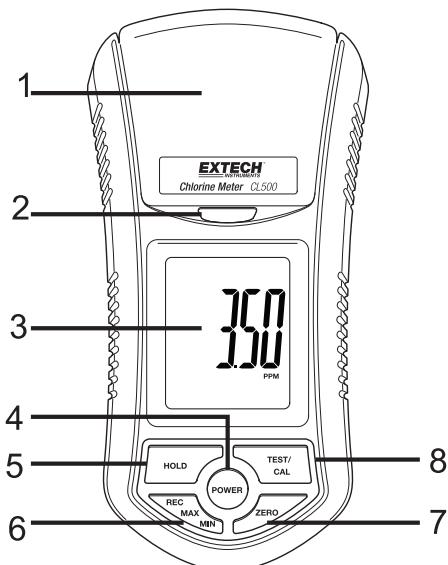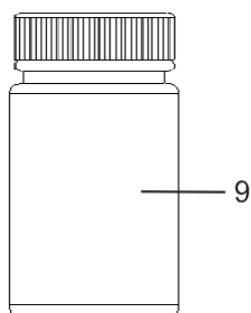
Getting Started

Equipment Required

A chlorine test requires a 10ml sample bottle, reagent powder for testing Free and Total chlorine, and the CL500 meter.

Measurement Procedure

Calibration considerations

1. Ensure that the meter has been calibrated prior to use.

2. Refer to the calibration section for this procedure.

Test sample "Zero" measurement

Note: Prior to testing, set the meter mode to FREE or TOTAL based on the desired test method. See Mode Selection.

1. The meter should be in the OFF position.

2. Place the test sample into the sample bottle up to the 10mL line (minimum). Place the cap on the bottle and tighten.

3. Clean and dry the outside of the sample bottle to ensure a clean surface.

4. Open the cover of the test chamber and insert the bottle completely into the chamber.

5. Line up the white mark on the bottle with the white mark of the test chamber.

6. Close the cover and lock it in place.

7. Press the "POWER" button to turn the meter ON. The display will show 'Free' or 'Total' for 1 second and then 'CAL0'. The meter is now ready for the "zero" test.

8. Press the "Zero" button, the display will flash "tEST" and then "0.00"ppm. The Zero Test is now complete. Do not power down the meter.

Measurement of Test Solution

1. Open the test chamber and remove the test bottle.

2. Add the required DPD powder (Free or Total) into the sample and then shake for 20 seconds until combined. Place the cap on the bottle and tighten.

   For the Free Chlorine test, use the Free Chlorine DPD powder

   For the Total Chlorine test, use the Total Chlorine DPD powder

3. Clean and dry the outside of the sample bottle to ensure a clean surface.

4. Wait 2 minute before placing the test bottle into the meter to allow time for the solution to mix thoroughly.

5. Open the cover of the test chamber and insert the bottle completely into the chamber.

6. Line up the white mark on the bottle with the white mark of the test chamber.

7. Close the cover and lock it in place.
8. Press the "Test" button. The display will flash "tEST" for about 10 seconds and then the results will appear.

Note: Clean and rinse the test bottle with distilled water after each test.

Data HOLD

Press the HOLD button once while taking a measurement to freeze the value on the display. Press HOLD again to release the data hold function.

Data Record (MAX/MIN Readings)

1. The Data record function records the MAX and Min readings.
2. Press "REC" button once to begin Data recording. The LCD will display the "REC" symbol.
3. To view the MAX value while in the recording mode press "REC" once. The display will show the maximum reading and "REC MAX" will show on the LCD display.
4. Press "REC" button once again and "REC MIN" will display on the LCD along with the minimum reading.
5. To erase the Max value and continue recording, while in the record mode, momentarily press the "Rec" button. The display will show "REC MAX". Momentarily press the "HOLD" button, the display will now show "REC". The Max value has been erased.
6. To erase the Min value and continue recording, while in the record mode, momentarily press the "Rec" button. The display will show "REC MAX". Press the "REC" button once again and now the display will show "REC MIN". Momentarily press the "HOLD" button, the display will now show "REC". The Min value has been erased.
7. To exit Record mode, press the "REC" button for 3 seconds. The display will return to the current reading.

Mode Selection – Free or Total

1. The meter should be powered OFF.
2. Press the "HOLD" and "REC" buttons simultaneously and then momentarily press the "Power" button.
3. Press the "TEST" button to select the desired function (Free or Total) Chlorine.
4. Press the "REC" button to confirm and save the selection into memory.
5. Momentarily press the "Power" button to turn off the meter.

Auto-Power OFF

The auto power off feature automatically switches the CL500 OFF 10 minutes after the last key press.

Calibration Procedure

The CL500 can be calibrated for Free or Total Chlorine measurements.

Prior to calibration, set the Meter to either the Free or Total mode.

Zero Calibration Procedure

1. Press the "Power" button to turn the meter ON. The display will show Free or Total and then "CAL 0".
2. Press the "Zero" button, the display will flash "tEST" for about 10 seconds and will then show "0.00". ppm.
3. Press and hold the CAL button until "CAL" appears on the display. Release the CAL button.
4. Clean the sides of the Zero Chlorine solution bottle and insert it into the testing chamber.
5. Line up the white mark on the bottle with the white mark in the chamber and close the cover and latch it.
6. Press "CAL" once more and the display will flash "tEST" and show the following:

```
        0.00

CAL           ppm
```
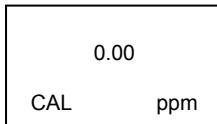
7. The meter is now ready for "zero chlorine" calibration.
8. Press "CAL" button once. The LCD will flash "CAL" for 10 seconds and will then show the following display:

```
         CAL

0.00          ppm
```
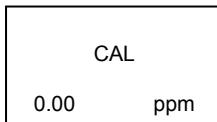
9. The LCD will then display:

```
        1.00

CAL           ppm
```
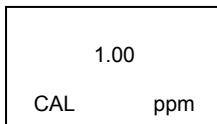
10. Zero Chlorine calibration is now complete. The meter is now ready for the 1.00 ppm Test solution calibration.

1.00-ppm Test solution calibration

1. Clean the sides of the 1.00-ppm Chlorine standard (Free or Total) solution bottle and insert it into the testing chamber.

2. Line up the white mark on the bottle with the white mark in the chamber, close, and latch the cover.

3. Press "CAL" once more; the display will flash "CAL" and then show the following:

```
        CAL

1.00           ppm
```
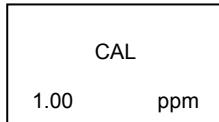
4. When calibration is complete the LCD will return to the normal operating mode and measure the test solution. The display should show 1.00 ppm.

5. The meter is now ready to measure test solutions.

Maintenance

Low Battery Indication

When the batteries become weak the "⌷⧅⌷" icon will appear in the display. Refer to the battery replacement information below.

Battery Replacement

1. On the back of the meter, remove the 2 screws holding the battery cover in place.
2. Replace the six (6) AAA batteries, observing polarity.
3. Replace the battery compartment cover

Battery Safety Reminders

1. Never dispose of batteries in a fire. Batteries may explode or leak.
2. Never mix battery types. Always install new batteries of the same type.

Never dispose of used batteries or rechargeable batteries in household waste. As consumers, users are legally required to take used batteries to appropriate collection sites, the retail store where the batteries were purchased, or wherever batteries are sold.

Disposal: Do not dispose of this instrument in household waste. The user is obligated to take end-of-life devices to a designated collection point for the disposal of electrical and electronic equipment.

Electrode considerations

The CL500 Chlorine Electrode arrives in a factory-cleaned condition and is ready to be used. The electrode will perform best and yield more stable readings after the first few tests.

Cleaning the Meter

Occasionally wipe the meter housing with a damp cloth. Do not use abrasives or solvents.

Specifications

Display	LCD size: 1.6 x 1.3" (41 mm x 34 mm)
Operating conditions	0 to 50°C (32 to 122°F) and < 80% RH
Chlorine range	0.00 to 3.50 ppm (Total Chlorine) 0.00 to 3.50 ppm (Free Chlorine)
Resolution	0.01 ppm
Accuracy	0.02 ppm@1.00 ppm
Light Source	LED, 525 nm
Light Detector	Photo Diode
Response Time	Less than 10 seconds
Sample Volume	10mL minimum
Sample Time	Approximately 1 second
Power	Six 1.5 V batteries
Power Consumption	Stand-By Mode: approx. 4mADC Testing Mode: approx. 12mADC
Dimensions	155 x 76 x 62mm (6.1 x 3.0 x 2.4"); 320g (0.70lbs.)
Auto Power OFF	Automatically switches OFF 10 minutes after the last key press
Method	The measuring method is an adaptation of the USEPA method 330.5 and standard method 4500-Cl G