



GalvanoPlot

The “Test” Feature

Standard Calibration Curve for Automated Concentration Calculation

Tutorial for GalvanoPlot TOUCH

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Terms and Definitions

Experiment

A single run of an electrochemical measurement and its data.

Method

The electrochemical measurement technique. (Amperometry, Chronoamperometry, Multi Step Amperometry, Cyclic Voltammetry, Linear Sweep Voltammetry, Square Wave Voltammetry, Differential Pulse Voltammetry, Electrochemical Impedance Spectroscopy... etc.)

Electrochemical protocol

The set of parameters that define how the measurement is carried out. These include voltage steps (E_i , E_1 , E_2 , E_f), sampling rate (rate), current range, and other configuration values. These parameters determine how the device executes the electrochemical measurement.

Analysis protocol

The set of parameters that define how the analysis is performed to extract meaningful results from raw measurement data. This includes the target peak, time offset (Δt), the equation used to calculate concentration from current values, and thresholds such as height and width for peak detection.

Test

A saved setup that includes both the Electrochemical Protocol (voltage steps, durations, etc.) and the Analysis Protocol (peak selection, Δt , equation, etc.). The electrochemical parameters are taken from the experiment selected at the time the test is saved.

Target Peak

The reference peak (T_i , T_1 , T_2 , or T_f) selected for analysis. The application uses this peak to extract current values at a specific offset time (Δt).

Δt (Delta Time)

The time offset added to the selected Target Peak, determining when the current is sampled relative to the peak.

Equation / Calibration Equation

A polynomial equation entered by the user to convert measured current values (μA) into concentration values (e.g., mg/dL).

Eq. Coefficients

The field where users enter the coefficients of the calibration equation in the app. *Must be written using dot (.) as decimal separator, semicolon (;) as coefficient separator.*

Current Value (Raw / Calculated)

Raw Value (μA): The electrical current measured by the device, displayed without conversion.

Calculated Value (e.g., mg/dL): The result of applying the calibration equation to the raw value, providing a meaningful analytical result.

Unit Button

A toggle button in the Analysis Menu that switches the view between Raw current (μA)
Calculated value (mg/dL or other units based on equation)

Height / Width Threshold

Conditions used to filter peak detection:

Height: The minimum current level required to qualify as a valid peak.

Width: The minimum width of the peak (in mV), used to avoid detecting noise or false positives.

Tutorial for GalvanoPlot TOUCH

This tutorial describes how to analyse current values using the Analysis Menu in the GalvanoPlot TOUCH Android Interface. It also explains how to create a calibration curve and enter equation coefficients for later use.

Step 1: Connect the Device

- Open the GalvanoPlot TOUCH app and establish a connection with the device.
- When the device is powered on, the green LED will light up.

Step 2: Configuring the Electrochemical Protocol

- Define the experiment parameters on the Setup Menu. See the [Quick Guide for GalvanoPlot TOUCH](#) for application basics. The electrochemical parameters should be determined prior to this process.
- Save the parameters as an Electrochemical Protocol by entering a protocol name (e.g., Glucose.01) in the text field at the top and clicking save icon.

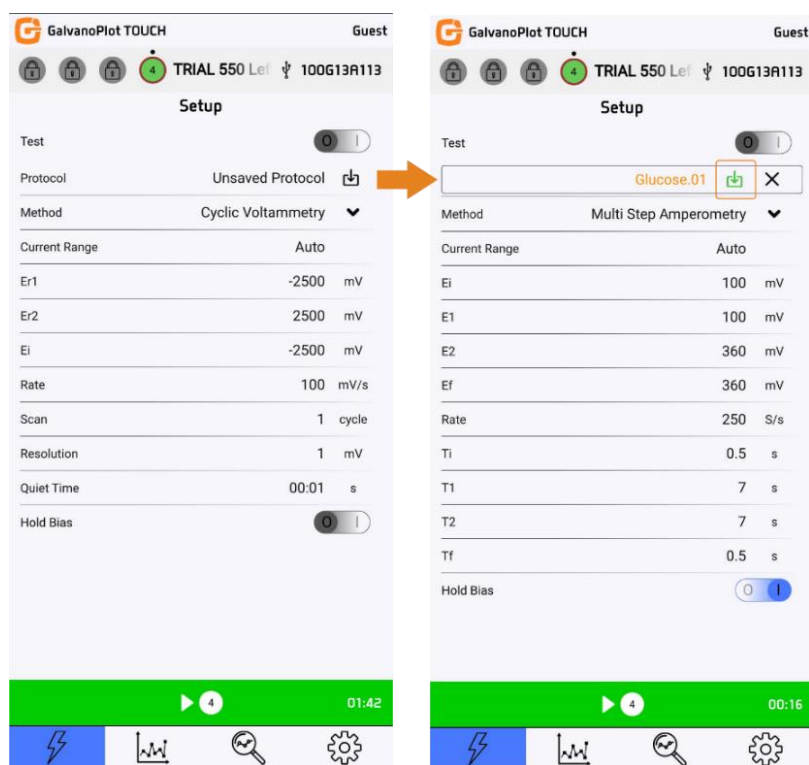


Figure 1: Experiment parameters in the Setup Menu

Step 3: Running Valid Experiments

- To create or save an analysis protocol, you need experiment data. Using samples with high, medium, and low concentrations is recommended to validate the analysis protocol across the full range.

Step 4: Creating Test for Raw Measurements

- Select the experiment and click the Test Parameters button (see Figure 2) in the Analysis Menu.

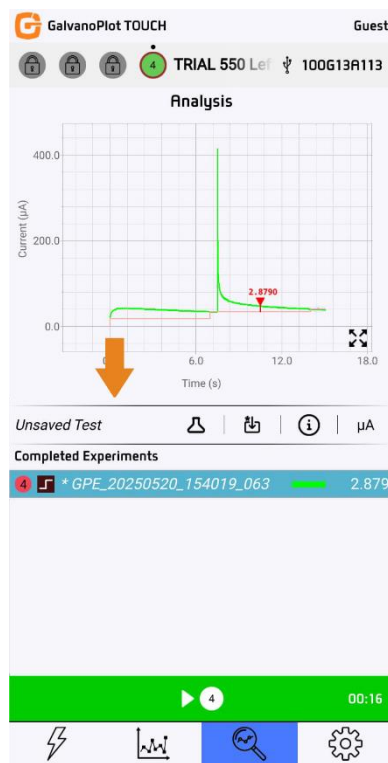


Figure 2: Test Parameters button in Analysis Menu

- Click the Peaks tab (peak icon at the bottom) to navigate to the relevant section.

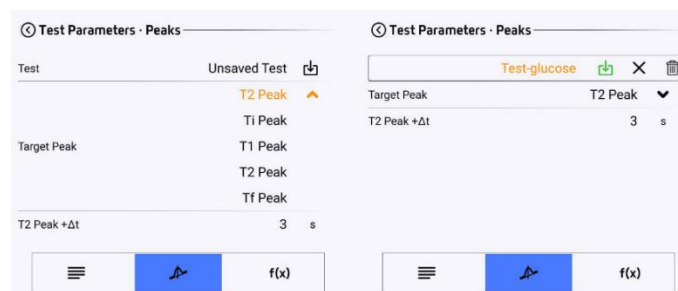


Figure 3: Test Parameters – Peaks

- From the Target Peak dropdown, select one of the available peaks (e.g., T2).
- In the field labelled T2 Peak + Δt , enter the time offset (e.g., 3 s), which defines when the application will retrieve the current after the selected peak.
- Save the configuration as a Test by entering a name (e.g., Test_glucose) and clicking the green save icon. You can discard changes with the X icon or delete the protocol using the trash bin.

Step 5: Activating the Test and Starting Data Collection

- In the Setup Menu, enable Test Mode by toggling the switch.



Figure 4: Load the Test Parameters

- Open the Test Protocol dropdown menu and select your saved test (e.g., Test_glucose).
- The Test protocol is selected; the following information is displayed automatically.
- Once all parameters are confirmed, tap the green play button to begin the experiment.

Step 6: Sample Preparation and Measurements

- Prepare all the concentration samples you plan to measure.
- Label each sample clearly to avoid confusion during testing.

- Run the Test for all prepared concentrations. Navigate to the Analysis Menu in the GalvanoPlot TOUCH application to check the test results as raw values.

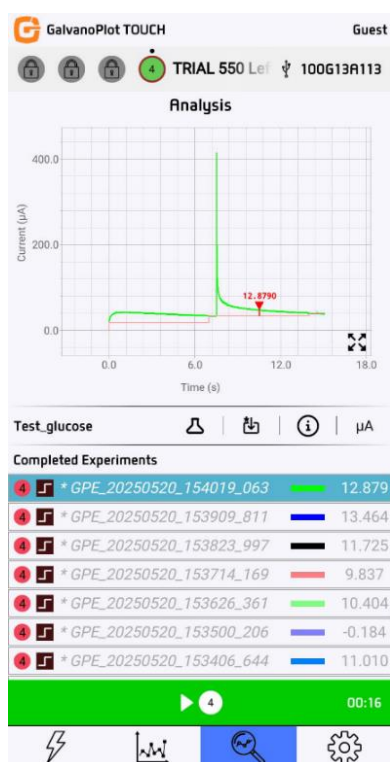


Figure 5: Analysis Menu with Test

Step 7: Creating a Calibration Curve in Excel

- Record the current value corresponding to each concentration. Open an Excel file and manually enter values.
 - Column A: Corresponding current values (e.g., in μA)
 - Column B: Prepared concentration values (e.g., in mg/dL)
- Insert a scatter plot from the data.
- Add a trendline (e.g., 2nd or 3rd order) to the graph. Enable the "Display Equation on chart" to visualize the equation.

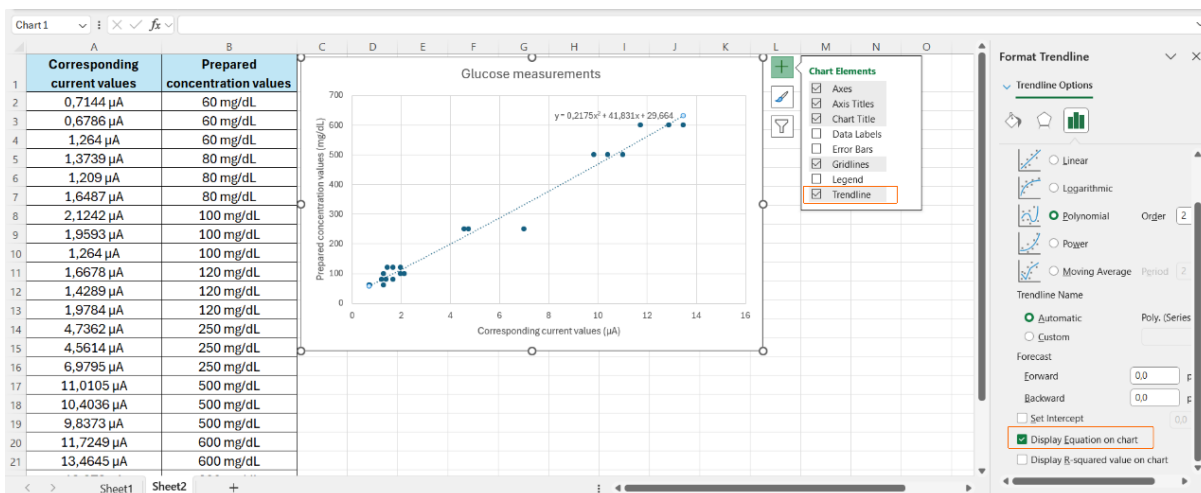


Figure 6: Calibration curve showing the relationship between prepared glucose concentrations and the corresponding manually entered current values

Step 8: Creating Test for Concentration Measurement.

- Open the Analysis Menu and go to Test Parameters - Equation.
- Enter the analysis parameters as step 4.
- Enter the coefficients into the Eq. Coefficients field. Use dot (.) as the decimal separator and use semicolon (;) to separate the coefficients.

Test Parameters - Equation

Test: Test_glucose

Equation: $f(x) = 0.2175x^2 + 41.831x + 29.664$

Eq. Coefficients: 0.2175;41.831;29.664

Unit: mg/dL

Figure 7: Test Parameters - Equation

- Save the new test. Now, you have a test with both analysis protocol and standard equation. The electrochemical parameters come from the experiment you used while creating this Test.
- Details of the test, including the calibration equation, are summarized in the Test Parameters - Summary section.

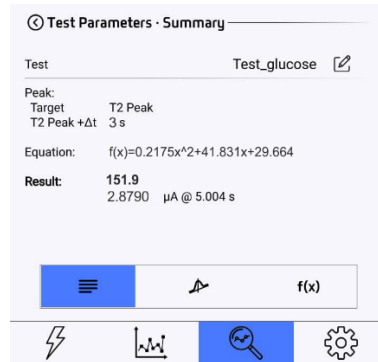


Figure 8: Test Parameters – Summary

Step 9: Reusing a Saved Test

- In the Setup Menu, the saved test is stored and is ready for use in other experiments to measure directly concentration value.
- Enable Test Mode by toggling the switch on.
- From the Test Protocol dropdown, select a previously saved protocol.
- The app will automatically load associated parameters (e.g., peak, Δt, method, voltage steps).

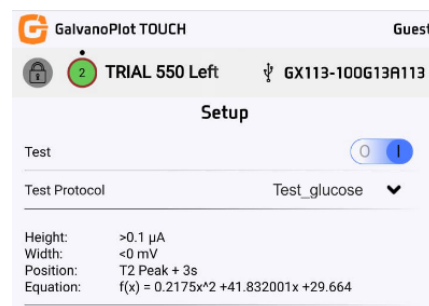


Figure 9: Setup Menu showing a loaded test protocol in the GalvanoPlot TOUCH Android interface.

Step 10: Switching Between Raw and Calculated Data

- Use the Unit Button in the Analysis Menu to be switching between the calculated values based on the saved test and the measured raw current values.

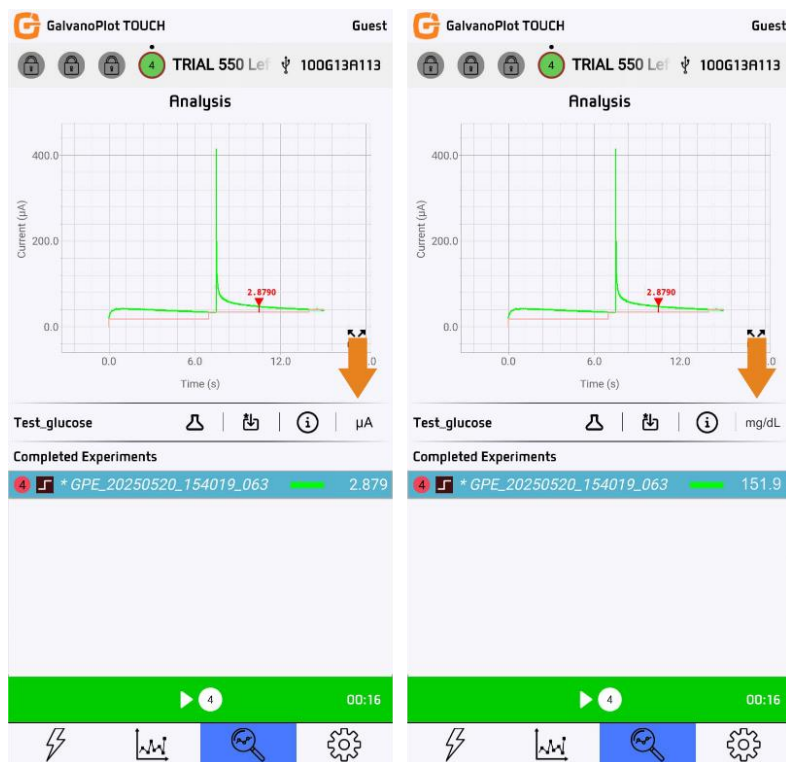


Figure 10: Raw and calculated current values in the Analysis Menu

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If you have any questions or recommendations
with the GalvanoPlot products, please contact us.



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