



ePatch

Elements patch clamp Miniaturized Amplifier

VOLTAGE PROTOCOLS

The "Voltage Protocol" Tab

The screenshot displays the 'Voltage Protocol' tab in the Elements Data Reader software. The interface is divided into several sections:

- Controls:** Shows device information (Serial Number: e1P-0007, Bit Rate: 228.00 kbit/s, 5.00 kHz) and file path (C:/Users/apcr/Desktop/Recordings/prove/prove_15).
- Settings:** A red box highlights the 'Voltage Protocols' sub-tab. It contains parameters for protocol type (4), hold voltage (Vhold = 0 mV), step voltage (Vstep = 10 mV), and various time constants (Tpulse, Trest, N).
- RC Estimations:** Displays a 'Parallel RC model circuit' with estimated values: Rt = 0.000 Ω, Ct = 0.000 F, Rs = -, Rm = -, Cp = -, and Cm = -.
- Analysis:** Shows 'Sweep 8/8: Vc = 20mV' with a history of previous sweeps (1/8 to 7/8) and their respective Vc values (10mV to -50mV).
- Graphs:** Two plots are visible: 'Ch 1' showing current (nA) vs time (s) with a step protocol, and 'Vc' showing voltage (mV) vs time (s) with a step protocol.

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Voltage protocols settings and application

The “Voltage Protocols” tab of the “Setting” widget contains a set of customizable voltage protocols, both continuous and episodic.

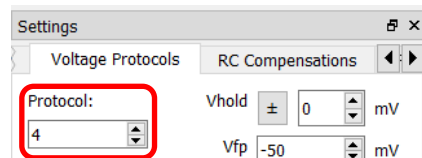
Protocols 1, 2, 3 and 6 are designed for continuous stimulations.

Protocols 4 and 5 are designed for episodic stimulations.

All the protocol stimuli can be visualized in gap free mode but only protocols 2, 4, 5 and 6 can be visualized in both gap free and episodic modality.

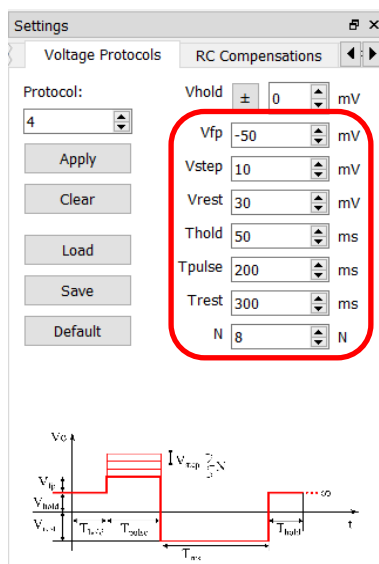
The Voltage Protocol tab allows to:

- i) select the desired acquisition mode, continuous or episodic, by choosing one of the available protocol

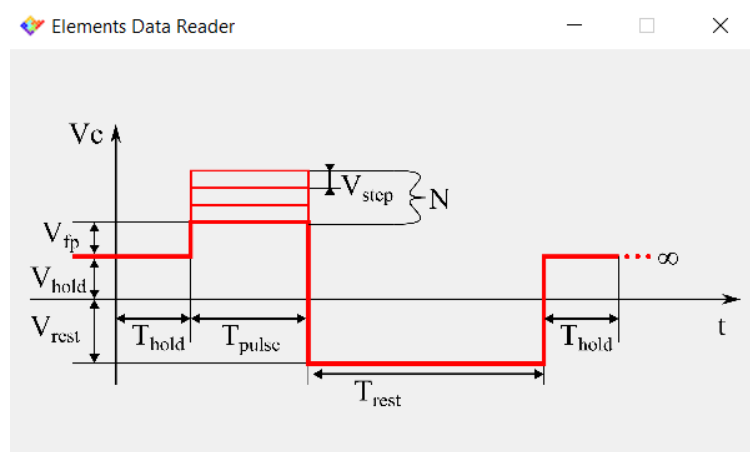


- ii) customize the parameters of each stimulus protocol. An enlarged pop-up window, describing in details all the protocols parameters, comes up when mouse cursor is held over the waveform view.

The protocol parameters



The protocol waveform pop-up window



When the acquisition settings have been configured, these can be saved as a protocol file (.trial) clicking on the “Save” button and reopened later as needed using the “Load button” (Fig. 2).

After setting up the desired protocol (i.e. the n° 2) click on “Apply” button to apply the stimulus and click on “Clear” to stop it. To quickly apply a protocol, use the dedicated shortcuts “CTRL + n° of the protocol” (i.e. “Ctrl + 2”).

Note: the “Apply” button applies the voltage stimulus without saving the data. Click on the red “Quick Save” button to start saving the recording. The “Apply” button can be used to both launch the protocol and save the acquired data only when the “Automatic Episodic Save” option is active (for more details see guide “05 – DATA SAVING”).

Seal test command:

The seal test protocol (protocol n°2) is designed to monitor the gigaohm seal formation during a patch clamp experiment. It consists of a voltage square pulse whose characteristics can be defined by setting the protocol 2 parameters; the steady state current response to this stimulus is used to measure, using Ohm’s law, the seal resistance (calculated as the total resistance, R_t , of the circuit). The “Seal Test” button, located in the “RC Estimation” widget, is designed to quickly call up and apply the protocol 2 in order to assist in the monitoring of the seal formation. When the “Seal Test” button is pressed, the software automatically selects the 20nA current range to ensure the correct measurements of the pipette resistance. Use the “Fit Peaks” and “Fit Plateaus” functions to quickly autoscale the axis view to data for a clearer view of the current signal details. When the “Seal test” button is enabled (i.e. the stimulus is applied), the “Voltage Protocols” tab and the “Auto whole cell compensation” function are temporarily disabled.

The Seal Test function

