



EPC 10 PLUS

Patch Clamp Amplifier

The EPC 10 PLUS is a fully computer controlled patch clamp amplifier with a built-in high-end interface board. Continuing the tradition of providing the world's best electrophysiology amplifier, the EPC 10 PLUS has all the features of the EPC 10; but it goes much further in offering many improvements with respect to data acquisition capabilities. The EPC 10 PLUS features an interface with eight 18-bit AD converters with a clock rate of 200 kHz. The premium sampling parameters make the EPC 10 PLUS best suitable for multi-channel high-speed and high-resolution recordings.

For general features of the EPC 10 PLUS patch clamp amplifier please refer to the brochure of the EPC 10 and to the technical specifications of the EPC 10 PLUS.



EPC 10 PLUS Enhanced Acquisition Features

EPC 10 PLUS with ITC-18 built-in:

The fully computer controlled EPC 10 PLUS has an ITC-18 AD/DA converter interface built-in and is connected to the host computer via the PCI-18 interface board.

True 16-bit data resolution:

The ITC-18 uses separate 18-bit AD converters for each channel to provide true 16-bit data resolution.

Current, Voltage and 5 additional AD channels:

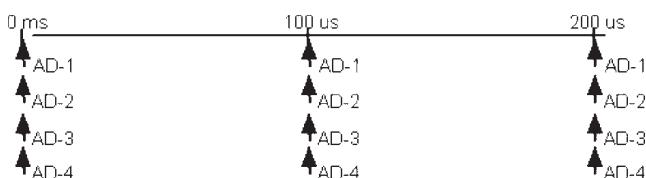
The EPC 10 PLUS can simultaneously record the current and voltage monitor channels of the patch clamp amplifier and five additional AD channels from other devices. The five channels can be used e.g. to record fluorescence signals, amperometric signals, or signals from other amplifiers in parallel to the signals from the clamped cell.

Multi-channel high-speed acquisition:

All seven acquisition channels can be sampled simultaneously and in phase with a maximum frequency of 200 kHz.

Cophasic Acquisition:

The EPC10 PLUS makes use of the separate AD converters for each channel to achieve cophasic acquisition on all input and output channels. With cophasic acquisition, the acquisition board samples all AD-channels at once, and all DA-channels are simultaneously updated to their new output values. Thus, there is no time delay between the different ADC-samples and no delay between setting a DA-channel and acquiring its corresponding AD-channels.



For this reason, cophasic acquisition is the most desirable behavior of an acquisition board.

The EPC 10 PLUS is supported by the software packages PULSE and PATCHMASTER. The full capability of cophasic recording of multiple channels is best achieved with the multi-channel acquisition software PATCHMASTER.

Technical Specifications

EPC 10 Main Unit:

Dimensions (D x W x H):

(31.1 x 48.3 x 14.5) cm, (12.3 x 19.0 x 5.7) inch

Weight:

11.4 kg / 24,8 lbs

Mounts in a 19" rack.

Operates on standard 115 V / 230 V.

EPC 10 Headstage:

Dimensions (D x W x H):

(90 x 17 x 14.5) mm, (3.54 x 0.67 x 0.57) inch

Current measuring resistors:

50 G Ω (high range)

500 M Ω (medium range)

5 M Ω (low range)

Injection/compensation capacitors:

1pF (all ranges); 10 pF (medium and low range)

Noise measured with open input:

(8-pole Bessel filter, high range)

DC to 1 KHz: 0.03 pA RMS

DC to 3 KHz: 0.08 pA RMS

DC to 10 KHz: 0.25 pA RMS

Maximum bandwidth:

100 KHz (medium and low ranges)

60 KHz (high range)

Filters:

The EPC-10 PLUS contains two built-in filters for the current monitor signal. Filter 1 is a 3-pole, 10 to 100 KHz Bessel prefilter. Filter 2 is a 4-pole, 100 Hz to 15 KHz filter with selectable Bessel or Butterworth characteristics.

Capacitance Compensation:

Fast and Slow capacitance compensation is either automatic or manual. There is also capacitance tracking for measuring cell surface area.

C-fast: 0 to 15 pF, 0 to 8 μ s tau

C-slow: 0.2 to 1000 pF

R-series: 1 M Ω to 1 G Ω

Series Resistance Compensation:

Trimming can either be performed automatically or manually. The maximum compensation is 95%; with the optimal setting being dependent on cell capacitance.

Equivalent time constants: 2 μ s / 10 μ s / 100 μ s

Ranges: 1 to 1000 M Ω (medium range); 0.1 to 10 M Ω (low range)

Leak Subtraction:

Linear leak can either be subtracted automatically or manually.

Range:

0 to 2 nS (high range)

0 to 200 nS (medium range)

0 to 20 μ S (low range)

Pipette Offset:

Automatic or manual adjustment within a \pm 200 mV range.

Holding Commands in Voltage Clamp:

Software controlled holding potential with a \pm 1000 mV range.

Current Clamp CC Command Resolution:

1 pA/mV input; up to \pm 1 nA

10 pA/mV input; up to \pm 10 nA

100 pA/mV input; up to \pm 100 nA

Low input capacity allows rapid changes in membrane potential to be followed.

Low Frequency Voltage Clamp:

Automatic CClamp tracking re-adjusts the holding current to fix any slow voltage drift while in CClamp mode.

Stimulation:

Four 18-bit digital-to-analog (D/A) converters are provided by the built-in data acquisition interface.

D/A-Resolution: 18-bit converter, 16 bit data

Settling time: <4 μ s to 0.001%

Maximum update rate: 200 kHz

Stimulation range: \pm 10 V

Data Acquisition:

Separate 18-bit Analog-to-Digital (A/D) converters are provided by the built-in data acquisition interface per differential, optical isolated input channel.

A/D-Resolution: 18-bit digitization, 16 bit data format

Maximum Acquisition Rate: 200 kHz per channel

Telegraphing Inputs: Two 12-bit asynchronous inputs

Related Products

PATCHMASTER

Multi-channel patch clamp data acquisition and analysis software for Windows and MacOS.

EPC 10

The fully computer controlled patch clamp amplifier with built-in LIH 1600 interface.