

Product Specification

QPatch II Automated Patch Clamp System

- Full automation from cell handling to data analysis
- Automated cell preparation
- Individually controlled pipettes for liquid-handling
- Simultaneous and individually controlled patch clamp recordings
- Single- and multi-hole measurements
- Voltage and ligand-gated applications
- Current and voltage clamp
- 100% R-series compensation
- QPlate measurement plate with embedded electrodes
- Comprehensive data analysis software



QPatch II overview

QPatch II is a fully automated patch clamp system with 48 parallel recording channels. It has an easy to use interface with predefined assay protocols and it takes less than 10 minutes to learn how to operate QPatch II. The control software gives a fast, precise and reliable operation which provide consistent high-quality data. The amplifiers allow experiments with both single-hole and multi-hole patch clamping, as well as voltage clamp and current clamp applications.

The instrument design offers a small footprint for easier laboratory placement, a simplified work plane that gives better robustness and the cell handling unit prepare fresh batches of cells for unattended patch clamp recordings. New features for QPatch II such as adaptive protocols, predefined protocols and corresponding analysis templates are added to the endless list of valuable features that are found on the system which means that QPatch II meets tomorrows demands today.

QPlate measurement plate

QPlate is the biochip used on QPatch II and it provides a non-compromised testing environment. Each measurement site has a glass microfluidic flow channel that allows for precise solution exchange and avoids compound adsorption. The integrated dual electrodes per measurement site eliminate maintenance and electrode drift. The silicon chip substrate for patch clamping enables true-gigaseal recordings in physiological ringers, without the need for seal enhancers. The QPlate is available in both single- and multi-hole versions.

- Gigaseal technology
- No seal enhancer needed
- Microfluidic flow channel for precise solution exchange
- No electrode maintenance
- Glass-based for low adsorption



Add-on features

Multi-hole experiments (X-mode)

The multi-hole technology allows simultaneous recording of 10 cells in parallel per recording site thereby increasing the signal to noise ratio and the success rate. The multi-hole QPlates has 10 patch holes per recording site.

Fast series resistance compensation (Rs)

Fast series resistance compensation utilizes a Sophion exclusive patented method (Alembic Instrument; US6163719 and US6700427B1) which makes it possible to improve R-series compensation to a higher percentage by limiting the feedback bandwidth. This allows series resistance compensation up to 100% and at a speed which is qualified for sodium channels, or in short, QPatch II gets a wider usage spectrum.

- Increase clamp accuracy
- Up to 100% Rs compensation using patented algorithms
- Automatic clip detection increases data throughput while maintaining high-quality recordings

Current Clamp

Current clamp moves toward primary-and stem cells, by offering current clamp and better handling of cells available in small numbers. The seamless switch between current clamp and voltage clamp make it possible to investigate ion channels more thoroughly, and to activate action potentials with the use of voltage clamp. Current clamp experiments are only possible in single-hole mode.

- Individual and automated current regulation and control
- Current clamp or mixed voltage/current clamp recordings in the same sweep
- Easy to upgrade, no new hardware needed
- Avoid cell loss with automated individual clip detection

Screening station software

QPatch II screening station software is an icon-based operator user interface that makes it easy to learn and to run experiments.

- Reduce human errors
- Ensure fast training and on-boarding
- Enable fluent staff rotation
- Eliminate operator to operator variation

Analyzer Software

Thousands of data points are easily obtained with QPatch II and they can be handled and analyzed in our Sophion Analyzer software. The software is designed to set up experimental assays and then subsequently analyze the data. The analysis is based on setting up cursors for measurement followed by the selection of different analysis methods and fitting procedures. Once the methods have been chosen for one data set, additional data is automatically evaluated with the same methods when included in the analysis project. This approach is fast, consistent and objective when analyzing data. Customized reports can be created with user-defined content that allows for a quick presentation of plots and data tables. It is also possible to automate the process of project generation, cursor analysis and report generation based on a standard or user-defined assay.

- Sophion Analyzer is a Java application based on an Oracle database
- Remote data access via LAN or Internet
- Raw data is protected against modifications
- All changes are tracked
- Reporting possibilities
- Standalone server (all you need for data analysis)

QPatch II basic configuration

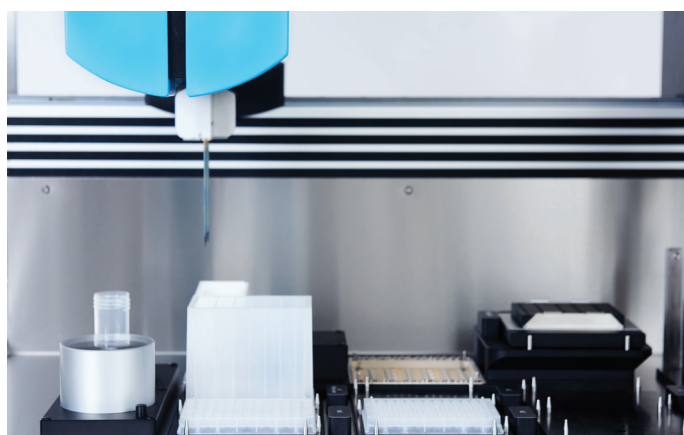
Ligand- and voltage gated experiments	Yes
True gigaseals in physiological IC/EC solutions	Yes
Use of seal enhancement agents	Optional
Series resistance compensation >400 ms	Yes
Single-hole experiments	Yes
Cell handling unit	Yes
Adaptive whole cell protocols	Yes
Adaptive voltage protocols	Yes
No. of channels	48
Number of pipettes	8

Add-on features

Multi-hole experiments	Available
Current clamp	Available
Fast series resistance compensation <400 μ s*	Available
Temperature control	Available**

*Patented

** A new temperature control is being developed for QPatch II. Estimated availability Q2 2019.



Data acquisition

Amplifiers

Number of amplifiers	48 parallel
Clamp	Voltage, current and pressure
Bandwidth	20 kHz
RMS noise	< 14 pA @ BW = 20 kHz < 4 pA @ BW = 5 kHz < 1.6 pA @ BW = 1 kHz
Sampling rate	500 kHz, digitally down sampled to 50 kHz, 16 bit
Current range	\pm 25 nA \pm 50 nA \pm 100 nA

Voltage range

Minimum/maximum voltage in clamp voltage mode	\pm 1000 mV
Minimum/maximum voltage in current clamp mode	\pm 750 mV
Resolution	16 bit

Compensations

C-total, C-fast, C-slow, R-series	Digital compensation current, 16 bit out
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QPatch II screening station - technical specifications

Dimensions

Width	104 cm
Depth	78 cm - open: 121 cm
Height	174 cm - open: 199 cm
Weight	Max. 400 kg - (882 lbs)

Requirements

Main supply	AC 100-240 V, 50-60 Hz / 8-3.5 A
Pressure	4-8 bar (1 m ³ / hour)
Vacuum	0.7-0.9 bar (1 m ³ / hour)

Test compounds

Volume applied	Min. 2 μ l. Recommended 5 μ l.
Compound plate formats	MTP-96 (SBS standard)

QVac (vacuum pump)

Requirements

Main supply	AC 100-240 V, 50-60 Hz / 1.1 A
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