

Sophon QPatch Automated Patch Clamp Systems

Sophon QPatch offers you:

- Three systems: QPatch 8, QPatch 16 and QPatch HT cover a wide range of throughput needs
- 8, 16 or 48 simultaneous and individually controlled patch clamp recordings
- Upgradeability between QPatch models
- Uncompromised data quality
- Voltage- and ligand-gated applications
- Single- and multi-hole measurements
- Unattended operation
- On-board cell preparation
- 2, 4 or 8 pipettes for liquid-handling
- Voltage, current and pressure clamp
- 100% R-series compensation
- Comprehensive data analysis software



QPatch - automated patch clamp

The QPatch product line consists of three fully automated patch clamp systems, QPatch 8, QPatch 16 and QPatch HT. The systems cover a wide range of throughput needs and provide the user with genuine whole-cell patch clamp data based on true gigaseals.

Jobs, assay protocols, data inspection and analysis can be defined and submitted from your desktop computer.

Using its liquid handling robot, the QPatch can continuously prepare fresh batches of cells for several hours of unattended patch clamp recordings in parallel with all other liquid handling tasks.

QPatch features

	QPatch 8	QPatch 8X	QPatch 16	QPatch 16X	QPatch HT	QPatch HTX
Basic Configuration						
Ligand- and voltage gated experiments	•	•	•	•	•	•
True gigaseals	•	•	•	•	•	•
R-series compensation	•	•	•	•	•	•
Single-hole experiments	•	•	•	•	•	•
Multi-hole experiments		•		•		•
No. of pipettes	2	2	4	4	8	8
Elevator for QPlate stacking			2	2	2	2
Elevator for compound trays					2	2
Unattended operation			•	•	•	•
Cell handling unit			•	•	•	•
Add-on features						
Fast R-series compensation	•	•	•	•	•	•
Large robot reservoirs	•	•	•	•	•	•
Current clamp*	•		•		•	
Temperature control	•	•	•	•	•	•
Throughput (data point per hour)						
@ 1 compound per measurement site**	15	16	30	32	90	96
@ 4 compounds per measurement site**	60	64	120	128	360	384

*Current clamp only possible in single-hole mode

**Depends on biological conditions and protocols

Add-on features

Several custom-made add-on features are available for QPatch systems, which makes it one of the most flexible automated patch clamp systems on the market.

Fast series resistance compensation (*Fast R-series 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.

Large reservoir for the pipetting robot (Large robot reservoir) permits the QPatch to perform experiments unattended for several hours. The add-on feature consists of a large system reservoir and

QPatch is equipped with the latest generation of multi-gain amplifiers allowing QPatch to perform experiments with both single-hole and multi-hole patch clamping. The amplifiers enable both voltage clamp and current clamp applications.

With QPatch you get a 100 % flexible solution. You can pick and choose the features you need for your QPatch system. Should your requirements change, it is possible to upgrade your QPatch. This makes QPatch the most flexible and future proof automated patch clamp system on the market.

a large waste reservoir with integrated liquid sensors.

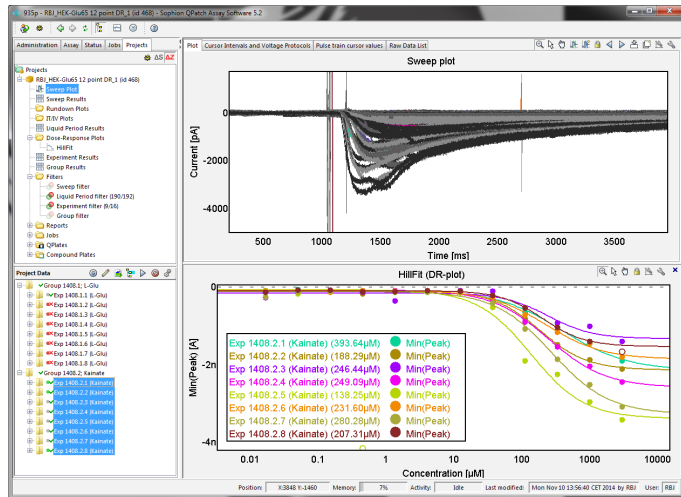
QPatch is the world's first patch clamp system that has the capability to perform current clamp experiments in a fully automated mode. QPatch systems hereby move toward primary- and stem cells by offering current clamp and better handling of cells available in small numbers. The seamless switch between current clamp and voltage clamp makes it possible to investigate ion channels more thoroughly, and to activate action potentials with the use of voltage clamp.

Performing experiments at physiological temperature is in some cases desirable and by using the QPatch temperature box (*QT-box*), one is able to increase temperature in a controlled way, at the exact location where the cells are being patched.

Sophion Analyzer Software

Large data sets are easily obtained with QPatch and this requires a software package for quick and automatic data handling. These requirements are met with the Sophion Analyzer Software developed by Sophion.

Sophion Analyzer is designed to set up experimental assays for any ion channel and subsequently analyses the data. The analysis of data is based on setting up cursors for measurements followed by selection of different analysis methods and fitting procedures.

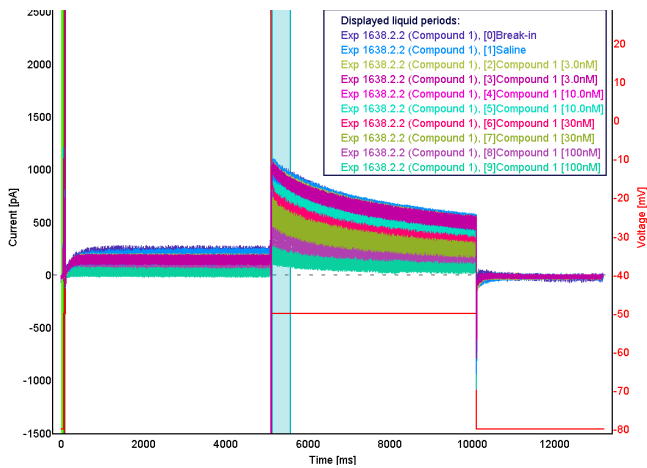


[Fig. 1]: Overview of Sophion Analyzer. Concentration response experiments with glutamate receptor.

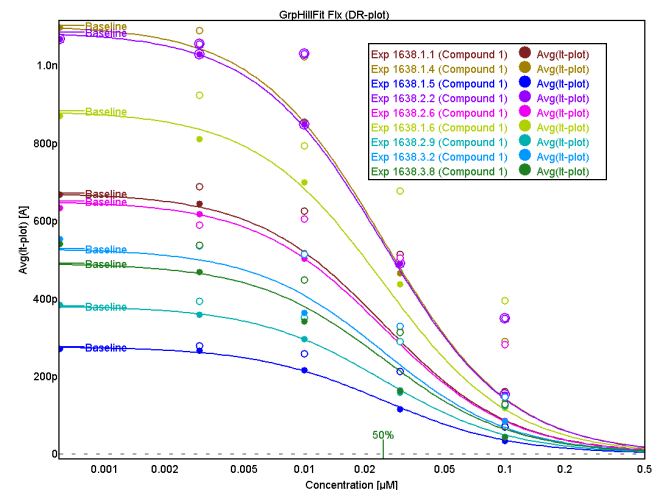
Once the methods have been chosen for one data set additional data can automatically be evaluated with the same methods when included in the analysis project. This leads to a consistent and objective analysis of data. For documentation purposes, reports with user-defined content allow automatic and quick presentation of plots and data tables.

Sophion Analyzer is both fast to use for experts and easy to learn for novice users.

- Sophion Analyzer is a Java application based on a Oracle database
- Sophion Analyzer can run on any PC or MAC
- Remote access to data is possible via LAN or the Internet
- Raw data is protected against modifications
- All changes can be tracked by user
- Advanced analysis methods



[Fig. 2]: Raw current trace of CHO-hERG with accumulation doses of antagonist.



[Fig. 3]: Overlay of concentration response curves on CHO-hERG.

QPatch technical specifications

Screening station

Dimensions

Width	104 cm - open: 164 cm
Depth	95 cm
Height	169 cm - open: 201 cm
Weight	Max. 351 kg - (775 lb)

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 µl
Compound plate formats	MTP-96 (SBS standard)

Parallel recordings

Channels	8, 16, 24, 32, 40 or 48
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Data acquisition

Amplifiers

Number of amplifiers	QPatch HT: 48 parallel QPatch 16: 16 parallel QPatch 8: 16 parallel
Clamp	Voltage, current and pressure
Bandwidth	20 kHz
RMS noise	< 14 pA @ BW=20 kHz < 4 pA @ BW=5kHz < 1.6 pA @ BW=1 kHz
Sampling rate	500 kHz, 16 bit, digitally down sampled to 50 kHz, 16 bit
Current rate	±25 nA ±50 nA ±100 nA

Current voltage

Minimum/maximum	±1000 mV
Resolution	16 bit

Compensations

C-total, C-fast, C-slow, R-series	Digital compensation current, 16 bit out
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QT Box (temperature control box)

Requirements

Main supply	AC 100-240 V, 50-60 Hz / max. 3.5 A
Pressure	7-8 bar (4.2 m ³ / hour)

QVac (vacuum pump)

Requirements

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