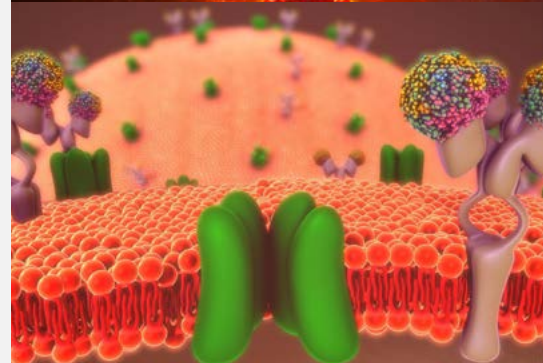
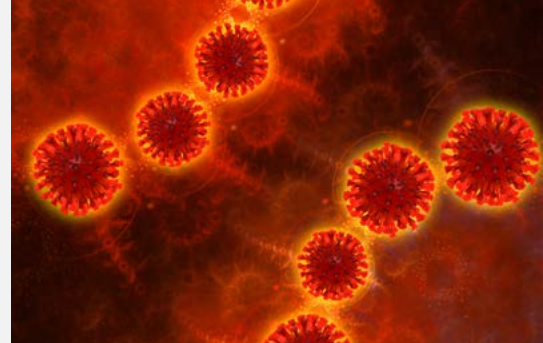
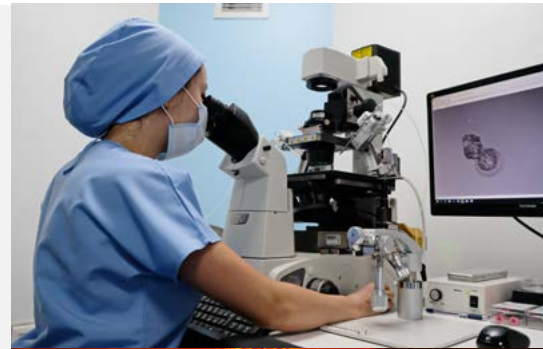


RAPID KINETICS



# RSC-200.

Rapid Solution Changer



# Patch Clamp: The **complete solution** for managing ion concentration changes

The study of neurotransmitters, ligands, and ion concentration changes are major issues in modern patch-clamp experiments. BioLogic's Rapid Solution Changer, the RSC-200, is a simple and easy-to-use system that allows scientists to easily and efficiently manage ion concentration changes in patch-clamp experiments. The RSC-200 uses the "sewer pipe principle" in which the cell, or the tip of the electrode, (in excised-patch mode) is positioned close to the output of a capillary.

The solution to be assayed flows out of the capillary at a moderate flow rate gravimetrically. The cell, exposed to this stream, rapidly equilibrates in the perfusion solution. The fact that all the solutions flow in individual tubes right to their end eliminates any problems relating to dead volumes, washing and cross-contamination between the solutions. This perfusion principle has been used in many laboratories, where its value has been proven as a tried and tested system for solution assays.

## Fast and automated solution changes : How it works...

The solutions to be assayed are driven to the RSC-200's rotating head. The solution exchange is performed by a highly precise rotation of the RSC-200 head which exposes the patch pipette or the cell to the flow of one of the tubes. The rotation time from one tube, to the adjacent one, can be programmed from 5 to 800 ms. The motor is light and vibration free thanks both to its disk rotor technology, and to the micro-step command delivered by the controller. Due to the high number of tubes installed on the rotating head, it is possible to have one tube for every solution being assayed. Compared to fixed tube devices, the rotating head allows fast changing of the perfusion solution around the patch pipette, without any contamination from the previous solution.



## The straight head: A user-friendly approach and increased accuracy

One of the important features of the RSC head is the ease with which the tubing, which delivers solutions, can be changed. This eliminates the need for washing and the risk of residual contaminations. By reducing the risks associated with manual error, users will obtain more accurate results.

Every RSC-200 system is supplied with one head. The straight head has been designed to carry standard, OD 1.00 mm, capillary glass.

The head is made of Delrin, reinforced by an internal metal rod, for optimum shape stability. The external head diameter is manufactured with the highest precision ( $\pm 10$  microns) to give excellent reproducibility in the positioning of the tube. The head is equipped with two guiding pins to provide straight and parallel positioning of capillaries. The capillaries are kept in their position by two O-rings for easy installation and alignment. The capillaries are connected to a short piece of polyethylene tubing, which is connected to larger tubing passing through electro valves into the reservoir syringes.

### This unique design gives the following advantages:

- Capillaries protrude, giving a better approach to a cell
- Users can choose the number of installed capillaries
- Capillaries take-up minimum space in the cuvette.
- Easy changing of capillaries
- Easy attachment to the flexible tubing

### Unique features

- Fast and automated solution change
- No dead volumes
- No cross contamination between solutions
- Up to 36 channels
- Compatible with Axon and Heka software

### Unique straight head design

Increased efficiency means  
Increased accuracy



## Software control 9-electrovalves EVH-9

The RSC-200 instrument is delivered with a 32-bit Windows software able to perform the following operations:

- Manual positioning of the head,
- Manual opening of the valves,
- Resting Vhold setting.

Sequences can be easily programmed by setting the following:

- Duration of stay in the active position for a given tube number
- Speed of solution change (head rotation),
- Stimulation pulse level (range  $\pm 10$  V),
- TTL signal activation (4 lines of signal available),
- Triggering of other auxiliary instruments.

Duration (s)	Tube	Speed (ms/Tube)	Valves	Voltage (mV)	Trigger In	Trigger Out
10.	1	10	1	-70		
3	2	10	2	-70		
1			2,3	-70		1
5	3	10	3	-70		1
7			3	-70		1,2
0.1	1	10	1	0		1,2
0.1	9	2	9	-40		3
10			5	-70		
1	1	10	1	-70		

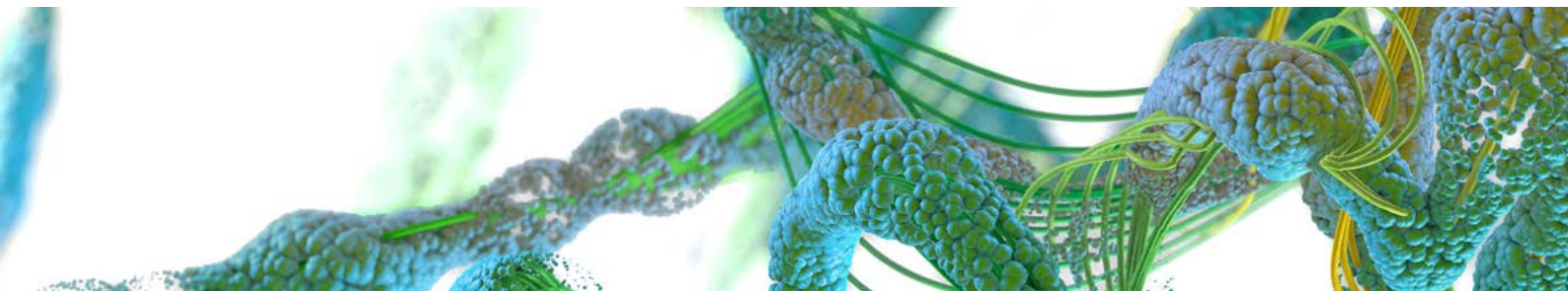
The RSC-200 can also be controlled through external user interfaces, such as those provided by Heka and Axon. The patch clamp and the perfusion system are then controlled from this same software.

The EVH-9 is an important peripheral, made up of a set of 9 valves, and one such device is included with the RSC-200. The RSC-200's throughput can be further increased by adding up to three additional EVH-9s (36 flow channels in total). The valves used for the RSC200 are normally-closed pinch valves. These valves can be controlled from the front panel of the controller or by software. All the valves can be programmed to open or close synchronously with a tube position change. More than one valve can be opened at a time, or valves can be opened or closed independently of the head rotation. For example, the flow in the next tube to be tested can be established a few seconds before rotation occurs. This unique design gives the user unparalleled levels of flexibility in experiment management.



The EVH-9 can increase throughput to up to 36 channels in total

## Specifications



Stepping motor	
Control	Electronic micro-step drive
Type	Low inertia rotor
Delay to adjacent tube	5 ms to 800 ms
EV number	Maximum 36 electrovalves Can be used as 36 TTL outputs
Stimulator	
Resolution	16-bit (0.50 mV step)
Linearity	±3 bit
Rise time	7 µs
Noise	1 mV peak to peak
Analog control input	
Maximum ratings	-1 V to 5.5 V
Not under analog control	0 V
Tube voltage step	100 mV/tube ±40 mV
Pulse width	10 ms minimum
Analog control output	
Tube voltage step	100 mV/tube ±20 mV
During head motion	0 V
Trigger input	
In Auto mode	A rising edge TTL synchronisation
TTL levels	
logic low level or '0'	0.8 V max
logic high level or '1'	3.15 V min
General	
Input voltage range	100-240 Vac Power
Power	100 W max
Frequency	47 to 63 Hz
PC interface	Windows 7, 8 or 10 ( 32 or 64 bytes)
Communication	USB
Size	140 x 430 x 360 mm (H x W x D)
Weight	9 kg
EVH-9	
Electrovalves	Normally closed micro pinch electro-valves
Valve number	9
Power	12 V (2 A)
Command	TTL input
Weight	2 kg

## Ordering information

### RSC200: Pack details

The RSC-200 is delivered complete with:

- Command box
- Stepping motor
- Driving software
- One syringe rack with 18mm holes,
- One straight head and a tubing kit made up of:

- 100 x glass capillaries with an exterior diameter 1.00 mm (ref: GB 100TF 8P - thin wall with filament, ID: 0.78 mm, length: 8 cm, ire polished ends),

- polyethylene tubing (5 meter length, ID: 0.3 mm, OD: 0.70 mm),

- C-Flex tubing (7,5 meter length, ID: 0.5 mm, OD: 2.1 mm),

- 9 x luer lock female.

- 9 x 10 ml plastic syringe - 2 x O-Rings

### Contents

RSC-200 rapid solution changer	025-50/2
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### Optional

EVH-9 9-electrovalve unit	025-00/13
Syringe rack holder (1 or 2 racks)	025-00/06
Syringe rack 18 mm holes	025-00/05
Syringe rack 32 mm holes	025-00/27