The Model 2400 Patch Clamp Amplifier is a low noise, full featured patch clamp designed for voltage clamping using patch electrodes on single channels or whole cells. Amplifier current gain can be matched to your experimental needs by selecting one of the three available dual resistive feedback probes. Currents with outputs of 10mV/nA to 1mV/fA can be recorded. (See Specifications on the reverse side for details).

Unlike other patch clamp amplifiers, the Model 2400 has a voltage follower in the probe. This allows this amplifier to be a true fast current clamp amplifier with no instability. An integrated four pole low pass Bessel filter provides flexible signal conditioning. Fine tuning capacity compensation is available to eliminate virtually all electrode-induced transients. Calibrated whole cell compensation provide easy display of membrane capacitance and access resistance. A host of command potentials include an automatic tracking command to zero the membrane current, manual controls for offset and holding potentials, and an easily readable digital display. For signals that are more complicated, an external command input with different scaling factors is available for use with any signal source.

A digital meter provides accurate values of command signals and membrane currents or voltages, the true RMS noise of the amplifier and experimental setup, the cut off frequency of the low pass filter, and the overall gain of the amplifier plus probe. Series resistance compensation provides the researcher with the option of introducing either or both predictive and corrective compensation from zero to 100%. Fine and coarse controls for lag provide sensitive control to minimize oscillation produced by compensation close to 100%. Separate compensation controls exist for eliminating transients seen during current clamp experiments when the bridge balance is used.

Telegraph outputs, which provide analog voltage equivalents of amplifier mode, gain, Cmembrane, RMS noise, and the low pass filter settings, allow your system software to record the Model 2400's front panel settings during the course of your experiment.

The Model 2400 Patch Clamp Amplifier can be your lab's workhouse amplifier for a fraction of the price of other instruments on the market. Perfect for research or teaching applications.

- Full-function Patch Clamp for both whole cell and patch recordings
- True current clamp due to voltage follower in headstage
- Switchable dual resistive feedback headstage
- Capacity, series resistance, and whole cell compensation
- 4-pole low-pass Bessel filters
- Internally generated test signals
- Telegraph outputs for all major front panel controls
- Built-in display for critical values
- Includes rack mount hardware
- 3-year warranty
Model 2400
Patch Clamp Amplifier

Specifications

<table>
<thead>
<tr>
<th>Feedback Resistor</th>
<th>Probe Gain</th>
<th>Maximum Current</th>
<th>Minimum Bandwidth</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 Megohm</td>
<td>10 mV/nA</td>
<td>1000 nA</td>
<td>100 kHz</td>
</tr>
<tr>
<td>100 Megohm</td>
<td>100 mV/nA</td>
<td>100 nA</td>
<td>100 kHz</td>
</tr>
<tr>
<td>1 Gigohm</td>
<td>1 mV/pA</td>
<td>10 nA</td>
<td>60 kHz</td>
</tr>
<tr>
<td>10 Gigohm</td>
<td>10 mV/pA</td>
<td>1 nA</td>
<td>40 kHz</td>
</tr>
</tbody>
</table>

Probe Gain and Bandwidth

Probe Gain: 10 mV/nA, 100 mV/nA, 1 mV/pA, 10 mV/pA
Maximum Current: 1000 nA, 100 nA, 10 nA, 1 nA
Minimum Bandwidth: 100 kHz, 100 kHz, 60 kHz, 40 kHz

Noise

Voltage clamp modes measured with internal 4 pole Bessel filter:

- Headstage Resistor (ohms): 10M, 100M, 1G, 10G
- Bandwidth = 1kHz: 0.003nA, 0.5 pA, 0.17 pA, 0.08 pA

Current clamp modes have noise levels less than 20µV with inputs shorted.

Membrane Current Output Range

<table>
<thead>
<tr>
<th>Probe Feedback Resistor</th>
<th>Membrane Current Output Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 Meg</td>
<td>10mV/nA-1V/nA</td>
</tr>
<tr>
<td>100 Meg</td>
<td>100mV/nA-10V/nA</td>
</tr>
<tr>
<td>1 Gig</td>
<td>1mV/pA-100mV/pA</td>
</tr>
<tr>
<td>10 Gig</td>
<td>10mV/pA-1V/pA</td>
</tr>
</tbody>
</table>

Membrane Voltage Output Range

10mV/mV-1V/mV

Filter

4 pole Bessel filter: 0.5 kHz, 1.0 kHz, 2.0 kHz, 5.0 kHz, 10.0 kHz, 20.0 kHz, and open.
Capacity Compensation

Voltage clamp: FAST1: 0-10pF, 0.2-2µs FAST2: 0-1pF, 0.1-10ms
Current clamp: FAST1: 0-10pF No FAST2

Whole Cell Compensation

Raccess: 0-100 megohm, Cmembrane: 0-100pF
Series Resistance

RsPre: 0-100% RsComp: 0-100% LagCoarse: 1-100µs LagFine: 1-10µs

DC Balance

Up to the value of the low feedback resistor in the probe

References


Ordering Information

For use on 220 V / 50 Hz power systems: Product #880005 Country-specific power cords are not supplied.
For use on 110 V / 60 Hz power systems:

<table>
<thead>
<tr>
<th>Headstage Options:</th>
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<tbody>
<tr>
<td>Product #880000</td>
</tr>
<tr>
<td>1 Gig / 10 Meg feedback resistors</td>
</tr>
<tr>
<td>Product #880101</td>
</tr>
<tr>
<td>10 Gig / 10 Meg feedback resistors</td>
</tr>
<tr>
<td>Product #880118</td>
</tr>
<tr>
<td>10 Gig / 100 Meg feedback resistors</td>
</tr>
</tbody>
</table>

All units include a product manual and rack mounts. One Product #8802xx Headstage probe must be purchased at time of ordering for proper operation of the instrument.

Distributed By:

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