The OC-725C Oocyte Clamp is designed for two-electrode, whole-cell voltage clamping of Xenopus oocytes.

- High compliance voltage (±180 V)
- Unique bath clamp circuitry
- Ideal for clamping large cells and cell structures
  e.g. squid axons
- Extended current measuring range
- Decreased noise level and 4-pole Bessel filter
- An internal switch permits measurements of the current in series with the current electrode instead of in the bath
- Optional differential voltage headstages

Fast Stable Voltage Clamping

The OC-725C combines high AC and DC gains and a voltage compliance of ±180 volts to insure fast, non-saturating clamp performance under nearly any condition. The AC clamp gain is variable up to 2000. An additional DC gain of 1 x 106 may be employed for high conductance cells (leaky Oocytes).

Two clamp speeds are available: The Slow mode is used for screening oocytes or for applications not requiring fast response times. The Fast mode is used for accurate voltage clamp of fast whole cell currents. Clamp response time in the Fast mode is 350 µsec (10-90% rise time) when applying a 100 mV step to a model cell.

Improved Bath Clamp Headstage

The current measuring range of the OC-725C bath clamp headstage has been extended at both ends by the addition of a 3 position range multiplier. Smaller currents are amplified to usable levels and larger currents up to 1 mA can be recorded without output saturation. The unique design of the bath clamp eliminates

the need for series resistance compensation. It provides an accurate measurement of bath current by creating a virtual ground in the bath while simultaneously clamping the bath potential at zero.

Voltage Headstage Probe

The voltage measuring headstage is a single-ended, high-impedance probe. Its small size, convenient mounting rod and 2 meter cable make for easy attachment to a micropositioner. The headstage input is a 2 mm diameter pin. An electrode holder with a 2 mm jack (supplied) mounts directly on the headstage.

Voltage and Current Meters

Independent meters provide simultaneous displays of membrane voltage Vm and membrane current Im. To assure proper impalement of the current electrode, the current meter displays membrane potential Ve from the current electrode before the clamp circuit is turned on.

Clamp Commands

The internal Hold control is a digital push button control with two ranges; ±1 to 99 mV (x1) and ±2 to 198 mV (x2). Hold can be incremented in steps of 1, 2, 10 and 20 mV for I-V studies. External command signals applied to Command IN ÷10 are attenuated to reduce noise from the command source. Hold and external commands are summed.

Additional Features

- Buzz controls (1 kHz square wave) for each electrode aid in penetration of cell membranes with a minimum of leakage
- Overload alarm (audible and visual) indicate when the compliance voltage is exceeded safeguarding the Oocyte and indicating that current records are subject to saturation
- DC Offsets for both voltage and current electrodes
- Electrode Test for both electrodes
- Capacity Compensation for the Vm voltage input

Electrode Holders

Two vented electrode holders with silver wires are typically required with the clamp; a straight type for use with the voltage headstage and a 45° type with mounting handle for use with current electrodes. Vents have been added to the electrodes to prevent pressure build-up inside the electrode which can damage oocytes. These holders are available separately. Select the holder based on your glass outer diameter. Unvented holders are available and have a 'N' at the end of the model number. Vented holders have a 'V' on the end of the model number. A two meter length cable assembly is provided to connect the current electrode holder to the clamp.

Dual Oocyte Studies

Some studies, such as voltage control across gap junctions, require the clamping of two oocytes in a common bath using two voltage clamps. The combined currents from the two Oocytes cause problems because the bath clamp headstage cannot separate the individual currents and therefore cannot provide effective clamping.

OC-725C has two features to address these problems:

- An internal switch permits measurements of the current in series with the current electrode instead of in the bath
- Optional differential voltage headstages (Model 7255 DI): The differential measurement subtracts the voltage drop across the series resistance in the bath, which is normally eliminated by the bath clamp

Supplied Hardware

The OC-725 is supplied with:

- 7250V voltage headstage
- 7251I bath clamp headstage
- 7259C current cable
- Model cell, rack mount hardware
- Specify line operating voltage if othe than 100-130 VAC
- One straight and one 45º electrode holder is also needed. Purchased separately.

BioMedical Instruments
Zur Schoenen Aussicht 26
07751 Zoellnitz
Germany

phone: +49 3641 395985
fax: +49 3641 478178
mail: joachim.guendel@t-online.de
web: www.biomedical-instruments.de

Specification

Test Condition #1	Model cell used to obtain specifications. Model membrane: 1 MΩ in parallel with 220 nF. Current and voltage electrodes both 1 MΩ impedence.	
Test Condition #2	Noise measurements made with an 8-pole Bessel filter.	
Voltage Recording Channel (Vm)	V Probe Input Impedance	0.5 x 1012Ω, 1 pF
	Output Resistance	100Ω
	DC Offset	± 200 mV at input. Variations from zero with 10 turn control (20 mV/turn).
	Noise (0-10 kHz)	3 µV RMS with input grounded 20 µV RMS with model cell
	Electrode Test	10 mV/MΩ read on meter 100 mV/MΩ at Vm x10 output
	Meter Range	± 199.9 mV full scale
	Capacity Compensation	0 - 90 pF
Current Sensing Channel (Bath Clamp) (Im)	Noise (0-1 kHz)	4.5 nA RMS with bath clamp 10 nA RMS in output leg
	I Monitor Output	1 nA/mV to 1 mA/10V in 7 steps and 3 ranges, x0.1, x1, and x10.
	Gain Telegraph Output	0.2 to 2.6 V in 7 steps (200 mV/step) and 3 ranges, x0.1, x1, and x10. Compatible with data acquisition software*
	Meter Range, full scale	Clamp Current: ± 199.9 µA
	Electrode Voltage (Ve)	± 199.9 mV; current meter reads Ve when clamp mode switch is off.
Current Electrode Channel	Compliance Voltage	± 180 V
	Clamp Speed	350 µsec; (10-90%) with 100 mV square wave command applied to model cell
	Gain	Variable AC/DC: 0 to 2000
	Fixed DC Gain	Switch selected: 1 x 106
	Ve DC Offset	± 200 mV at input (20 mV/turn)
	Electrode Test	10 mV/MΩ read on current meter 100 mV/MΩ at Ve x10 output rear panel
Commands	Hold	Manually set with digital potentiometer, 2 digit resolution and 2 ranges: x1 range: ± 1 to 99 mV in 1 mV steps x2 range: ± 2 to 198 mV in 2 mV steps
	External	Signals applied to COMMAND IN÷10 are attenuated by a factor of 10, 1 V applied = 100 mV command
Physical Dimensions	Case	8.9 cm H x 43.2 cm W x 30.5 cm D
	Voltage Headstage	12.5 mm D x 5 cm L with 1.8 m cable
	Mounting Handle	4.8 mm D x 6.3 cm L
	Bath Headstage	2.3 cm H x 3.5 cm W x 4.2 cm L with 1.8 m cable
Shipping Weight	6.8 kg	
Warranty	Three years, parts & labor	
Power Requirements	100-130 V or 220-240 VAC, 50/60 Hz, 20 VA	

BioMedical Instruments
Zur Schoenen Aussicht 26
07751 Zoellnitz
Germany

phone: +49 3641 395985
fax: +49 3641 478178
mail: joachim.guendel@t-online.de
web: www.biomedical-instruments.de

BioMedical Instruments