

Genuine Axon CNS components for every experiment.



Headstages, holders, model cells, cables, odd bits

Headstages

HS-2 and HS-2A unity-gain headstages

The HS-2 and HS-2A headstages are used with Axoclamp 2 and GeneClamp amplifiers. They are all unity-gain voltage recording headstages but they come in a variety of different current-passing gains for applications as diverse as extracellular recording, bath-potential recording, ion-sensitive recording, ionophoresis and intracellular recording from small or large cells. For ultra-high impedance electrodes, special circuitry inside the headstage prevents any DC current from leaking into the input through the capacitance neutralization circuit.

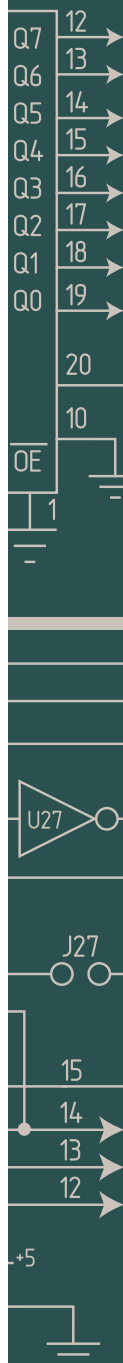
HS-4-x1MGU relay-switched unity-gain headstage

HS-4 headstages may be used with Axoclamp 2 amplifiers to maximize the voltage across the electrode during two-electrode voltage clamp. In all other modes the HS-4 acts like an HS-2 headstage. Available only with current-passing gain x1MG. The VG-2 headstage must be used for current measurement.

Optional CV-5 Series Headstages for the GeneClamp 500B amplifier

- CV-5-100GU patch-clamp headstage (100 mV/pA)
- CV-5B-100GU bilayer patch-clamp headstage (100 mV/pA)
- CV-5-1GU macro-patch headstage (1 mV/pA)
- CV-5-100MU voltammetry headstage (100 mV/nA)

CV-5 headstages operate with the GeneClamp 500 amplifier. Each headstage has one feedback resistor for current-to-voltage conversion. The transfer resistance of the 100G, 1G and 100M versions are 100 G Ω , 1 G Ω and 100 M Ω , respectively. The "B" version has an extended capacitance compensation range suitable for bilayers. The 100G version is ideal for single-channel recording and vesicular-release amperometry. The 1G version is suitable for macropatch applications. The 100M version is used for fast cyclic voltammetry using carbon-fiber microelectrodes.



Mechanical Mounting Options

A 4" (102 mm) long removable insulated mounting rod is provided at no charge with most headstages. Diameter is 5/16" (7.9 mm) unless 1/4" or 3/8" (6.3 or 9.5 mm) is specified by purchaser. Additionally, all headstages include an insulated mounting plate. Many manufacturers of micromanipulators provide custom mounting brackets for Axon CNS headstages.

VG-2 virtual-ground headstage

The VG-2 virtual ground headstage may be optionally used with Axoclamp 2 amplifiers to measure whole-bath current. Standard current-measurement gains are x0.1, x1 and x10. x100 is also available. Current recording ranges for these virtual ground headstages are: $\pm 0.1 \mu\text{A}$ (x0.1), $\pm 1 \mu\text{A}$ (x1), $\pm 10 \mu\text{A}$ (x10), $\pm 100 \mu\text{A}$ (x100).

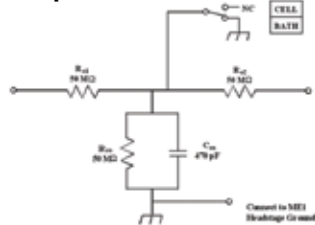
VG-2A-x100 bath clamp headstage

The VG-2A-x100 bath-clamp headstage may optionally be used with Axoclamp 2 or GeneClamp amplifiers to clamp the bath potential at zero volts. This eliminates the effect of series resistance in the bath grounding electrode and the bath solution. It can also minimize the extent of DC voltage shifts resulting from changes in the bath solution or temperature.

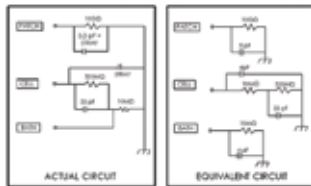
Holders

Headstage pipette holders and replacement parts available for all Axon CNS Instruments headstages. Please see our web page: http://www.autom8.com/amp_headstages.html for complete parts list.

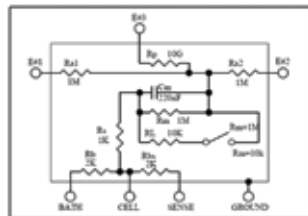
Clamp 1U-model cell



Patch 1U-model cell



MCO 2U-oocyte model cell



Model cells

CLAMP-1U model cell

Suitable for evaluating two-electrode voltage clamp and discontinuous single-electrode voltage clamp. Contains two "electrodes" that can be connected to the "bath" or the "cell." Connectors are suitable for U-type HS series headstages. Provided at no charge with all Axoclamps amplifiers.

PATCH-1U model cell

Simulates whole-cell clamp and single-channel patch-clamp conditions. Connectors are suitable for U-type CV series headstages. Provided at no charge with all Axopatch amplifiers.

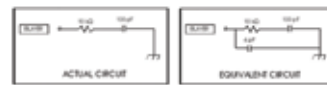
MCO-2U oocyte model cell

Simulates the membrane resistance, membrane capacitance and a membrane-bound component of the series resistance. Resistors simulate the intracellular electrodes, a patch-clamp electrode and the bath grounding and sensing electrodes. A switch enables testing the amplifier under conditions of high current/low membrane resistance. Connectors are suitable for U-type HS series headstages.

MCB-1U bilayer model cell

Contains a series resistor and capacitor to simulate a bilayer membrane. Connectors are suitable for U-type CV series headstages. The MCB-1U is provided with the Axopatch 200B patch clamp.

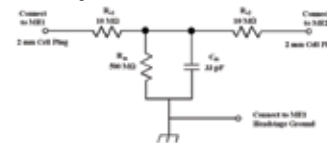
MCb 1U-bilayer model cell



MCW-1U whole-cell model cell

Simulates a whole-cell patch-clamp recording system. Connectors are suitable for U-type HS series headstages. Provided at no charge with the Axoclamp900A amplifier.

Clamp 1U-model cell



HS and CV headstages are connected to model cells through 1 or 2 mm pin connectors. We supply adapters on request that facilitate connections between headstages and model cells of different types. All adapters have a socket on one end and a pin on the other end. Adapter descriptions and Axon CNS Part Numbers (APN #) are given in the table below.

Model Cells	Headstages		
	HS non-U type 2 mm socket	CV non-U type 1 mm socket	HS & CV U type 1 mm socket
Non-U type 2 mm pins Clamp-1, MCB-1, MCO-1 E1, E2*, MCW-1	No adapter needed	2 mm socket to 1 mm pin APN 1-2200-063	2 mm socket to 1 mm pin APN 1-2200-063
Non-U type, recessed 1 mm pins MCO-1 E3*, Patch-1	1 mm socket to 2 mm pin APN 1-2200-083	1 mm socket to 1 mm pin APN 1-2200-062	1 mm socket to 1 mm pin APN 1-2200-062
U type 1 mm pins Clamp-1U, MCB-1U, MCO-1U E1, E2, E3*, MCW-1U, Patch-1U	1 mm socket to 2 mm pin APN 1-2200-083	1 mm socket to 1 mm pin APN 1-2200-062	No adapter needed

*E - electrode input # All ground connections on model cells and headstages have 2 mm sockets, except the CV203BU headstage, which has a 1 mm ground socket.

Cables

APN 1-2100-0623 PC serial cable

25-to-9 pin serial cable connects PC computers to computer-controlled amplifiers (MultiClamp 700A, GeneClamp 500B and CyberAmp 380/320). This null-modem cable requires a 9-pin serial port connector on the computer.

APN 1-LU-1 link-up cable

Allows the sample rates of two Axoclamp 2 amplifiers to be synchronized.

EX-1 five-foot (1.5 m) extension cable

The EX-1 extension cable works with HS-2, HS-2A, HS-4, VG-2 and VG-2A headstages.



Odd Bits

1-HLP-0 pack of 5 general-purpose 2 mm plugs

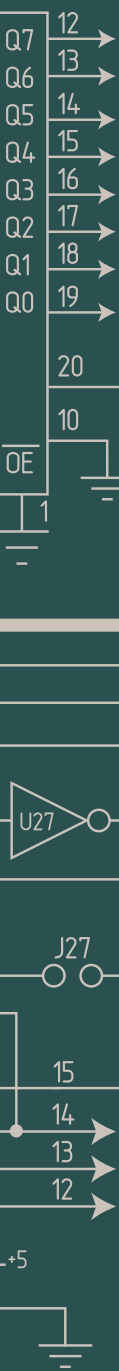
2 mm plugs are used with the grounding jack of older headstages. These plugs also fit the input of non-U-type HS, VG and BH series headstages, and many SmartProbe adapters.

1-RD-1-n headstage mounting rods

4 inch (100 mm) long insulated rods screw into back of all headstages. Replace "n" with diameter 1/4, 5/16 or 3/8 inch (6.3, 7.9 or 9.5 mm). RD-1-5/16 is supplied standard with all headstages.

Remote Buzz Box 1-2950-0366

Hand-held control to enable the Buzz duration on the Axoclamp 900A amplifier to be controlled in the range 0.1-500 ms. Provided at no charge with all Axoclamp 900A amplifiers.



MDS Analytical Technologies/Axon CNS Ordering Information

Part No.	Product Description	Price
MultiClamp	MultiClamp 700B computer-controlled current & patch clamp amp	\$ 15,215
Axoclamp	Axoclamp 900A computer-controlled current & voltage clamp	\$ 10,166
Axopatch	Axopatch 200B-2 capacitor feedback patch clamp amp	\$ 13,025
SoftPanel	SoftPanel (USB) optional control panel	\$ 1,065
Digidata	Digidata 1440A data acquisition system	\$ 5,694
pCLAMP	pCLAMP 10 Standard electrophysiology software (Windows)	\$ 5,150
pCLAMP Upgd	pCLAMP 10 Upgrade available for previous versions of pCLAMP	\$ 469+
Axoprotator	Axoprotator 800A single-cell electroporator	\$ 7,060
Mo-1-CV-7B	Headstage CV-7B patch clamp (standard) for MultiClamp 700B	\$ 3,045
Mo-HL-U	Electrode holder for all Universal (U)-type headstages	\$ 185
Mo-HS-9A-X10U	HS-9A headstage for Axoclamp 900A (choose x0.1, x1, x10 U)	\$ 569
	Complete Axon CNS cellular neuroscience product line avail.	

U.S./Canada prices shown. International prices add 15%. Email or visit web store for latest prices.

