

*made to measure*

Perform intracellular CC recordings in bridge mode,  
extracellular recordings with high gain,  
and juxtacellular filling with

# BA-03X

**Intracellular Bridge Mode and Extracellular Amplifier**



## Benefits:

- ⇒ **True current clamp** operation with direct measurement of membrane potential and complete cancellation of series resistance and stray capacitance
- ⇒ Can be used with **sharp microelectrodes**, or **patch pipettes** in whole-cell, cell-attached and perforated-patch configuration
- ⇒ Can be used for **extracellular recordings** of sub millivolt signals as well
- ⇒ POTENTIAL OUTPUT GAIN: 10, 20, 50, 100, 200, 500, 1k
- ⇒ POTENTIAL HIGHPASS filter: DC, 0.1, 0.3, 0.5, 1, 3, 5, 10, 30, 50, 100, 300, 500, 800, 1k, 3k Hz
- ⇒ POTENTIAL LOWPASS filter: 20, 50, 100, 200, 300, 500, 700, 1k, 1.3k, 2k, 3k, 5k, 8k, 10k, 13k, 20k Hz
- ⇒ CURRENT OUTPUT SENSITIVITY: 0.1, 0.2, 0.5, 1, 2, 5, 10 V / nA
- ⇒ Digital DISPLAYS for current, voltage and electrode resistance
- ⇒ BUZZ and ELECTRODE CLEAR facility, AUDIO monitor
- ⇒ OSCILLATION SHUT-OFF unit prevents cells from damage
- ⇒ TTL gated stimulus input with amplitude setting by 3-digit potentiometer and digital read-out of holding current
- ⇒ Enhanced (x10) current range for **juxtacellular recordings**, **electroporation** or **iontophoresis**



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Why use an expensive patch-clamp amplifier for current clamp experiments??

The more economic and accurate instrument is npi's

## BA-01X

### Intracellular Bridge Mode Amplifier



## Benefits:

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- ⇒ Can be used with **sharp microelectrodes**, or **patch pipettes** in whole-cell, cell-attached and perforated-patch configuration
- ⇒ Digital DISPLAYS for current, voltage and electrode resistance
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- ⇒ Enhanced (x10) current range for **juxtacellular recordings**, **electroporation** or **iontophoresis**



- ⇒ Bridge Amplifier Headstage available with mounting plate, holding bar or dovetail



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# BA-01M

Intracellular Bridge Mode Amplifier  
Module for the EPMS-07 System



Combine with

- ➔ EXT-10C (extracellular amplifier module)
- ➔ DPA-2FX (amplifier/filter module)
- ➔ ISO-STIM 01M (stimulus isolator module)
- ➔ TMR-02M (timer module)

and get a complete system for stimulating,  
extracellular and intracellular recording  
in one 19" rackmount cabinet



Many other modules are available:  
Iontophoretic or pneumatic drug application modules, breakout boxes for CellWorks,  
signal processors, voltammetric/amperometric amplifiers



## Technical Data for BA-03X

Technical data for BA-01X and BA-01M differ slightly due to their reduced functions  
Please contact npi electronic for details or visit [www.npielectronic.com](http://www.npielectronic.com)

<u>Headstage:</u>		Potential LP filter:	4-pole BESSEL filter (other options available)
Input voltage range:	± 10 V	attenuation:	-24 dB/octave
Operating voltage:	± 15 V	corner frequencies (Hz):	20, 50, 100, 200, 300, 500, 700, 1k, 1.3k, 2k, 3k, 5k, 8k, 10k, 13k, 20k
Enclosure:	size: 23 x 70 x 26 mm, grounded	Potential HP filter:	1-pole filter (other options available)
Mounting plate:	size: 70 x 50 mm	attenuation:	-6 dB/octave
or (on request)		corner frequencies (Hz):	DC, 0.1, 0.3, 0.5, 1, 3, 5, 10, 30, 50, 100, 300, 500, 800, 1k, 3k
Holding bar:	length 150 mm, diameter 8 mm	Telegraph potential LP filter:	-8...+7 V, 1V/step
Dove tail:	size: 70 x 17 x 3 mm	Telegraph potential HP filter:	-8...+7 V, 1V/step
		Telegraph potential output sensitivity:	+1...+7 V, 1 V/step
		Telegraph current output sensitivity:	+1...+7 V, 1 V/step
Electrode connector:	BNC with driven shield	<u>Digital displays:</u>	
Ground connector:	2.4 mm connector	Display mV/MΩ:	3 ½ digits, XXXX mV or XXX MΩ
Input resistance (CC):	> 10 <sup>13</sup> MΩ	Display current:	3 ½ digits, XX.XX nA (RANGE: x1) 3 ½ digits, XXX.X nA (RANGE: x10)
Current range x1:	± 12 nA into 1 GΩ	Audio Monitor	Acoustic monitoring of membrane potential (frequency coded)
Current range x10:	± 120 nA into 100 MΩ		
<u>Electrode parameter controls:</u>		<u>Inputs:</u>	
Offset:	range ±200 mV, ten-turn control	Input impedance analog:	100 kΩ
Capacity compensation:	range 0-30 pF, ten-turn control	Input range:	± 12 V
Bias compensation:	range ± 150 pA, trim potentiometer	Input impedance digital (TTL):	10 kΩ
		Input range TTL:	0-5 V
Bridge balance:		Current stimulus input CC:	BNC connectors, sensitivity 1 nA/V or 0.1 nA/V
0-100 MΩ	adjustable with ten-turn control	Current stimulus input CCx10:	BNC connectors, sensitivity 10 nA/V or 1 nA/V
0-1000 MΩ	adjustable with ten-turn control	Step gate input:	BNC connector (TTL)
selected by RANGE switch		Gated stimulus CC:	with digital potentiometer resolution: 10 pA, range: ± 10 nA
Electrode resistance test:		Gated stimulus CCx10:	with digital potentiometer resolution: 100 pA, range: ± 100 nA
Sensitivity 1 mV / MΩ	application of square current pulses of ± 1 nA, activated by push button	Polarity:	selectable with toggle switch
Display:	3 ½ digits, XXX MΩ	<u>Dimensions:</u>	
Bandwidth and speed response (CC mode, optimal cap. comp.):		19" rackmount cabinet	
Full power bandwidth (R <sub>el</sub> = 0 MΩ):	> 30 kHz, rise time (10%-90%)	19" (483 mm), 10" (250 mm), 3.5" (88 mm)	
	< 10 μs (R <sub>el</sub> = 100 MΩ)	<u>Power requirements:</u>	
	< 5 μs (R <sub>el</sub> = 5 MΩ)	115/230 V AC, 60/50 Hz, fuse 0.4/0.2 A, slow, 25 W	
<u>Outputs:</u>		<u>Weight</u>	
Output impedance:	50 Ω	5.0 kg	
Max. voltage:	± 12 V		
Current output:	BNC connector, sensitivity 0.1...10 V/nA		
Current output sensitivity:	Rotary switch, 0.1, 0.2, 0.5, 1, 2, 5, 10 V/nA		
Current display:	3 ½ digits, XX.XX nA (RANGE: x1) 3 ½ digits, XXX.X nA (RANGE: x10)		
Potential output x1:	BNC connector, sensitivity 1 V/V		
Potential output:	BNC connector, sensitivity 10...1k V/V		
Potential output gain:	10, 20, 50, 100, 200, 500, 1k selected by rotary switch		
Potential output resolution in AC:	50 μV		

## For more information contact:

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