

Iontophoretic Electrode and Dye Marker



D380 Iontophoretic Dye Marker

For dye marking individual neurons in neuroanatomy research. This unit provides an isolated bipolar constant current output intended for the marking of individual neurons with dyes such as Lucifer Yellow via iontophoresis. Holding currents up to +6nA and injection currents up to +12nA are provided and set by single turn panel mounted dials. A compliance voltage in excess of +6nA allows the full injection current into electrodes with impedances up to 500 MΩ. An LCD continuously shows the polarity and magnitude of the requested injection and holding currents as well as the electrode resistance and the voltage applied. The unit is powered from a single, standard, 9 volt battery.

- Easily reverses injection current polarity
- Provides a precise, repeatable current
- Battery operated
- Low power micro-controller technology

4 Important Injection Parameters

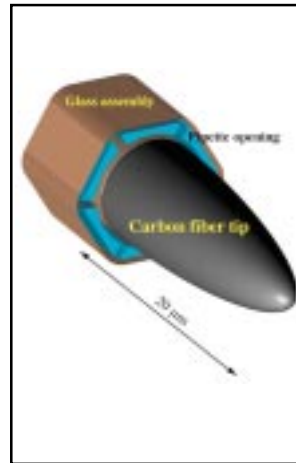
INJECT:	Requested injection current
HOLD:	Requested hold current
RESISTANCE:	Measured electrode resistance
POTENTIAL:	Measured potential applied to electrode

Using the Deblock function allows the user to tell whether an electrode is becoming blocked using these injection parameters. If a rise in resistance is detected, press DEBLOCK button before the electrode is beyond its useful life.

Specifications

Output Current:	
Holding Range	0 to 6.3 nA in 0.1 nA (100 pA) steps
Injection Range	0 to 12.7 nA in 0.1 nA (100 pA) steps
Compliance Voltage Range	> +6 V
LCD Display:	
Inject	Injection current requested, with 100 pA resolution
Hold	Holding current requested, with 100 pA resolution
Resistance	Electrode resistance, with 10 M (resistance)
Potential	Voltage applied to the electrode, with 100 mV resolution
Out of Compliance	'Potential' display will invert and flash
Low Battery Voltage	Indicated by flashing LCD display
Gate In	TTL 'high' (> +3 V) places unit in inject mode for duration
Connection	Standard BNC socket- labeled 'Output'
Power Requirements	1 x PP3, IEC- 6R61 (9 V) battery, Alkaline recommended
Typical Battery Life	In excess of 100 hrs (continuous operation)
Dimensions, H x W x D	175 x 120 x 40 mm (6.9 x 4.7 x 1.5 in)
Weight	400 g (14.1 oz) including battery

Catalog No.	Product
CGS 8048.31	Iontophoretic Dye Marker, Model D380



Combination Recording/Iontophoresis Electrode

Above is an illustration of the tip of a seven barrel combination recording/iontophoresis electrode. The carbon fiber electrode is closely surrounded by 6 fused-together micropipettes allowing combined microiontophoresis and extracellular recording.

Microiontophoresis injection is most often used in conjunction with extracellular recording of neuronal firing. Since extracellular 'spikes' generated by action potentials across the membranes of neurons are typically only a few hundred microvolts in amplitude, they a low noise recording electrode is critical. Traditional electro-

- Low noise recording
- 6 barrels for micro-iontophoresis injections

lyte-filled glass micropipettes in a multibarrel assembly are electrically very noisy. Solid conductor micro-electrodes such as carbon fiber electrodes show significantly less noise in extracellular recordings. Carbon fibers are 5-8 micrometer in diameter are perfect for recording with an excellent signal-to-noise ratio recordings. The Microiontophoresis electrode-pipette assemblies are manufactured from our high quality Harvard-Clark borosilicate capillary tubing. Two standard types of tapers are available: 15 to 25 mm and with a tip length of ~25 mm.

Specifications

Tip Diameter	~7 μm
Tip Length	~25 μm
Tip Taper	Either 15 to 25 mm or 25 to 30 mm
Connector	0.8 mm
Impedance at 1 kHz:	
Carbon Fiber	300 to 500 KΩ
Iontophoresis Barrels	8 to 10 MΩ

Catalog No.	Description
CGS 8049.31	Combination 7 Barrel Recording/Iontophoresis Electrode Standard Taper (Carbostar-7), pkg. of 3
CGS 8050.31	Combination 7 Barrel Recording/Iontophoresis Electrode Long Taper (Carbostar-7LT), pkg. of 3