

Digitimer

Medical Systems - NeuroPhore Drug Application System



MS-2 Power Supply Unit not illustrated

- Up to 5 Channels of Iontophoretic or Pneumatic Drug Delivery
- Modular Design Allows Upgrades in the Future
- Low Noise & Automatic Current Compensation Circuitry
- Aids Troubleshooting with Unbalance & Out of Compliance Indicators
- External or Internal Control of Timing & Ejection Parameters

In the past few decades, the application of drugs and other dissolved agents from multibarrel electrodes/pipettes has evolved into a practical method of testing their effects on cells or cellular systems. The versatile **NeuroPhore BH-2 System** is designed to facilitate controlled ejection of fluids from multi-barrel micropipettes. Extracellular ejections of minute volumes can be delivered using up to five pumps in serial or parallel. The ejection schedule for each pump can be independently programmed for sequential or simultaneous output. Ejection cycles can be internally timed, triggered manually, or synchronised to external events.

This flexible system allows the use of **Iontophoretic Pump Modules**, **Pneumatic Pump Modules** or a combination of both. By interchanging the IP-2 Iontophoretic Pump Module with a PPM-2 Pneumatic Pump Module, the overall system capability can be expanded for simultaneous pressure and iontophoretic injection of drugs from a multibarrel pipette.

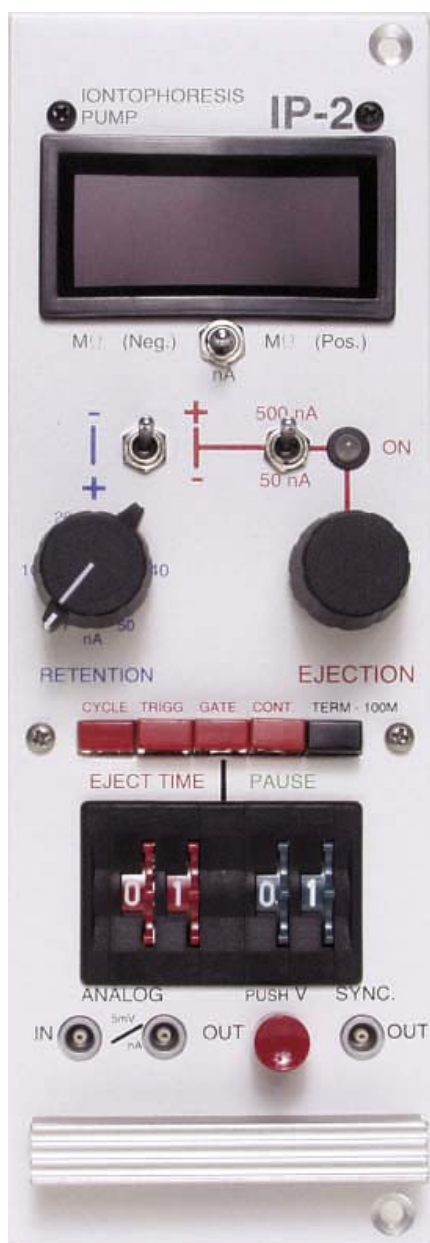
The **NeuroPhore BH-2 System** was developed under the guidance of active researchers with extensive experience in iontophoretic techniques. These researchers needed a system to provide precise stimulation and quantitative control for ejection of drugs in their pharmacological studies of drug evoked responses. What emerged was the reliable, accurate, easy to use **NeuroPhore BH-2 System** that is capable of accommodating high impedance multi-barreled micro-electrode pipettes.

BH-2 Mainframe Chassis (includes BM-2 Balance Module & MS-2 Power Supply)

The BH-2 is prewired to accept one balance and control module and up to five iontophoretic/pneumatic pump modules. The BM-2 Balance Module provides automatic current neutralisation as well as independent control of its current pump settings (from 0 - 500nA). The Balance Module includes digital system timing, clock, provisions for electrical and manual cycle start/stop, a single cycle/recycle switch and trigger/gate input terminals to initiate externally controlled eject pumping action of each module. Analogue input for balance or drive with override capability. Analogue output for monitoring of unbalance currents.

IP-2 Iontophoretic Module

Each IP-2 module includes controls for precise settings of current magnitude and polarity (retention 0 - 50 nA, ejection 0 - 500 nA). The actual current and polarity being delivered is continuously displayed digitally and can be externally monitored at the analog output terminal.



Ejection Timing & Mode Switch

The mode switch provides 5 push buttons which control the operations of cycle, trigger, gate, continuous and termination:

Cycle Mode - An incoming trigger or the cycle start push button will initiate the current ejection pumping action. In this mode the module is automatically triggered after the Pause time of the preceding module has been completed. Both Eject and Pause times can be preset between 10ms and 990ms with a 10ms resolution or 1 - 99s with a 1s resolution.

Trigger Mode - When the trigger switch is engaged, the preset eject time interval (ejection and pause) will be initiated by an incoming trigger pulse via the respective trigger/gate inputs on the front panel of the BM-2 Balance Module.

Gate Mode - In this mode, the eject current is delivered in response to a gating pulse applied at the respective trigger/gate inputs mentioned above.

Continuous Mode - The ejection current is continuously maintained.

Termination Mode - The output is diverted from the preparation to a dummy load (100Mohm). This mode is particularly useful when setting up the desired current to be delivered as well as testing for possible instability in the preparation pipette.

Analogue Input

This input allows an external voltage to control the ejection amplitude at a ratio of 5mV/nA. This signal is added to that generated by the panel control settings.

Analogue Output

This output provides a buffered voltage which is proportional in magnitude and polarity to the actual current passed from the current pump into the pipette. Ideal for monitoring the experiment on a chart recorder.

Sync Output Terminal

This output provides a TTL pulse which coincides with the eject time and can be used to trigger external devices such as a computer, event counter, etc.

PPM-2 Pneumatic Pump Module

The pneumatic pump module has been designed specifically for pressure ejection of drugs in pharmacological studies. Output pressure can be controlled between 0 and 30 psi and output timing can be precisely controlled with a minimum pulse width of 30ms up to 99s. The operational modes are similar to those possible with the IP-2 module described above.

DP-1 Dummy Module

A fully functional BH-2 system must have a module fitted to each bay in the BH-2 chassis. If you only require three drug ejection channels, it is important that the other 2 bays are fitted with DP-1 Dummy Modules.

Micropipettes & Accessories

Digitimer can supply a range of accessories including multibarrelled pipettes and various cables and hoses.

MS-7PB - Micropipette 7 barrel - 1.5mm o.d. Borosilicate glass (pre-pulled blank, 20 per box).

MS-7MT - Micropipette 7 barrel - 1.5mm o.d. Borosilicate glass (fully pulled, approx 20µm tip, 10 per box).

SC-01 - Tygon flexible hose micropipette interface coupling for pneumatic (PPM-2) use.

SC-02 - Tygon flexible hose micropipette interface coupling for iontophoretic (IP-2)/pneumatic (PPM-2) use.

OH-01 - Output hose (9ft) including SC-01 coupling.

OC-01-NEW - Output cable (9ft) with 7 pin Lemo connector.

NL952 - Cable (2m) with Lemo connector at one end and tinned leads at the other end for use as Sync output or analogue output/input cable.

References

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