

# SMALL ANIMAL ANESTHESIA



Components may not be as pictured.

## EZ-7000 Classic System

### Features

- **Integrated turnkey solution for small animal anesthesia**
- **Safe for surgical personnel, 90% below OSHA Isoflurane limit**
- **Designed by veterinarians**
- **Compact and portable**
- **Time efficient and cost effective**
- **Virtually stress-free for the animals**
- **Easy to setup and use, simplifying the training of new staff and reducing the threat of human error**
- **Speedy recovery time**

**EZ Anesthesia** is the system of choice for anesthetizing small animals, and it comes with a variety of choices. Animals to be anesthetized are placed in the acrylic induction chamber and the system delivers a precisely blended mixture of oxygen and isoflurane. An activated charcoal air filter canister at the top of the chamber releases safe, filtered air back into the room. A water-heated cage warmer or warming plate (**ATC2000**) is used to retain the animal body temperature while in the induction chamber. After the initial anesthetizing, the animal can be moved to the heated surgical water bed and positioned properly in the snugly fitted nosecone. A highly sensitive valve regulated by the animal's breathing works with the nosecone to ensure non-rebreathing efficiency, and allow safe anesthesia for up to several hours.

The breathing device also includes an air filter that releases safe, filtered air back into the room.

EZ Systems include all necessary hardware components and connections. Oxygen and liquid Isoflurane are not supplied. These are required to operate the system.

Each system comes with all necessary components and connections for immediate use, including::

- Oxygen regulator
- Vaporizer Unit
- One Induction Chamber (standard **EZ-178**)
- One Breathing Device (standard **EZ-103**)
- Case of charcoal filters

Other available options include:

- Heated Beds and Heating Pump
- Additional Breathing Devices

### EZ-FF9000 Fixed Flow System

The Fixed Flow System is our most advanced system and provides preset, fixed flow rates with no need for adjustment. The system offers five gas outlets, each with an individual ON/OFF switch. The system ensures consistent, precise gas flow when connected to any pressurized gas source higher than 7 psi.

- Induction Chamber output is fixed at 1 Lpm
- Four Breathing Circuit outputs are fixed at 0.5 Lpm

This unit features an oxygen flush button that purges the induction chamber with pure oxygen, thereby protecting personnel from exposure to anesthesia gas when opening the chamber. A handle on the vaporizer makes the unit easy to safely transport.

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#### EZ-FF9000 Fixed Flow System

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### EZ-7000 Classic System

The Classic System is the upgraded version of our original EZ-Anesthesia system. The new version has a reconfigured flow meter that is more user-friendly. The system offers five gas outlets that can supply a single induction chamber and four breather circuits simultaneously.

The upgraded system also features an oxygen flush button that purges the induction chamber with pure oxygen, thereby protecting personnel from exposure to anesthesia gas when opening the chamber. A handle on the vaporizer makes the unit easy to safely transport.

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#### EZ-7000 Classic System

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### EZ-B800 Basic System

The Basic System is designed for use with a single animal. It utilizes one output directly from the vaporizer into a Y-splitter which creates a dual feed that can be directed to the induction chamber or the breather circuit.

This unit incorporates an oxygen flush system that purges the induction chamber with pure oxygen, thereby eliminating personnel exposure to anesthesia gas when opening the chamber.

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#### EZ-B800 Basic System

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**Also see Animal Temperature Controller, page 40.**

### EZ-1130 Connection Kit

This kit is used for connecting additional components to the EZ-Anesthesia Systems. It includes 6 ft of clear PVC tubing with a quick-disconnect fitting.

**EZ-1130** Connection Kit

### EZ-830 Ventilator Connection Kit

This kit is used to connect the SAR-830 ventilators with EZ-Anesthesia Systems. It includes all required components, pre-assembled for simple connection between the ventilator and the anesthesia system.

**EZ-830** Ventilator Connection Kit



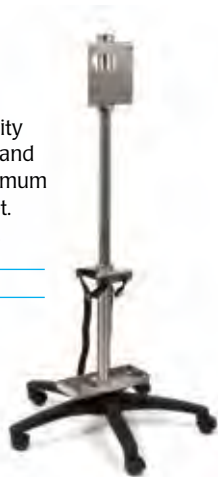
### Euthanex Lids

The Euthanex Lid system has become an industry standard. You no longer need to transfer animals. The lids are available in five sizes to accommodate virtually all plastic cage sizes designed for small lab animals. These heavy duty stainless steel lids have a stem fitting for connection to the quick-disconnect fitting on the hose from the gas source. A foam lid gasket ensures a good seal on the cage. Multiple lids may be used to treat several cages at once.

### Vaporizer Pole Mount

The **EZ-E28000** is a mounting option for the EZ-Anesthesia system, combining system portability with a small footprint. Constructed of Aluminum and Stainless Steel, it features a five leg base for maximum stability and an oxygen "E" tank mounting bracket. Anesthesia system must be purchased separately.

**E-28000** Vaporizer Pole Mount



### Rodent Isoflurane Facemask Kit

Mouse and rat facemasks, medical grade PVC tubing (12 feet), 1/4-inch adapters (2), 3/8-inch adapters (2).



- OC-SFM-KIT** Small Rodent Facemask Kit (one mask, tubing, adapters)
- OC-MFM-KIT** Medium Rodent Facemask Kit (one mask, tubing, adapters)
- OC-LFM-KIT** Large Rodent Facemask Kit (one mask, tubing, adapters)
- OC-XLFM-KIT** XLarge Rodent Facemask Kit (one mask, tubing, adapters)
- OC-MOUSE-KIT** Mouse Facemask Kit (sm & med masks, tubing, adapters)
- OC-RAT-KIT** Rat Facemask Kit (lg & xl masks, tubing, adapters)
- OC-ALLFM-KIT** Complete Rodent Facemask Kit (sm, med, lg & xl masks, tubing, adapters)

### Mobile Workstations

Two mobile workstations, constructed of heavy-duty stainless steel with locking casters, integrate all your EZ-Anesthesia components into one portable unit. Open side shelves accommodate 20 lb. cylinders, and convenient 2" port holes allow for easy rigging of gas and electrical lines. Below the work surface of each mobile workstation is an open shelf and a locking cabinet. It provides a 42"x24" work surface and holds up to four cylinders. EZ-E27000 has a 22"x21" work surface and holds up to two cylinders. These systems are easy to set up and provide maximum flexibility and mobility.

- EZ-E25000** Mobile Workstation, 42" x 24" Top
- EZ-E27000** Mobile Workstation, 22" x 21" Top



- EZ-104A** Versaflex Non-Rebreathing Unit
- EZ-103A** Microflex Non-Rebreathing Unit
- EZ-107A** Rat Stereotaxic Non-Rebreathing Unit
- EZ-109** Multi-Animal Non-Rebreathing Unit
- EZ-211** Mouse/Rat Thin-Line Heated Waterbed
- EZ-212** Mouse/Rat Standard Heated Waterbed

# Analgesia

## Electronic von Frey Anesthesiometer

- Plug up to three probes into a single unit
- LCD readout (Floating or last maximum/minimum)
- Rigid tips up to 800 gm
- "Supertips™" 15 up to 65 gm
- 1,000 gm probe available
- Independence from temperature
- Optional analog output cable for chart recorder
- Pipette tips can be customized to any specification
- Microprocessor electronics 0.1 gm plug-in probes



To assess mechanical allodynia, which is a painful response to a light touch or pressure from a stimulus that is not normally painful, the Electronic von Frey Anesthesiometer was developed. The Electronic von Frey meter uses one of 15 different flexible von Frey hairs called "SuperTips™" (or rigid tips up to 800 grams). Each hair, regardless of model chosen, is exactly 0.8 mm in diameter. This uniformity of design eliminates false readings and allows for comparison of test results. The Electronic von Frey can be used with chart recorders and analog/digital converters, and it never needs calibrated. This system includes either a 90, 800 or 1,000 gram probe. Mesh stands are available in a variety of sizes for large group studies.

<b>II-2390</b>	Electronic von Frey Anesthesiometer, rigid tips, 90 gram range
<b>II-2391</b>	Electronic von Frey Anesthesiometer, rigid tips, 800 gram range
<b>II-2392</b>	Electronic von Frey Anesthesiometer, rigid & 15 super tips, 90 gram range
<b>II-2393</b>	Electronic von Frey Anesthesiometer, rigid & 15 super tips, 800 gram range
<b>II-23931</b>	Electronic von Frey Anesthesiometer, custom rigid tips, 1000 gram range
<b>II-2394</b>	von Frey Probe, 90 gram range
<b>II-2395</b>	von Frey Probe, 800 gram range
<b>II-2396</b>	von Frey Probe, 1000 gram range
<b>II-2397</b>	MRI Probe Option (add to price of probe above)
<b>II-2400</b>	Analog Output Cable



### Trio

Get three test systems in one package with the Trio, featuring the Electronic von Frey, Plethysmometer and Randall Selitto Meters. Just like the Quattro package, the modular design allows these three test systems to communicate with the same electronic controller. The stand and sling for the Randall Selitto test are sold separately.

**II-2888** Trio 3-in-1 System

### Quattro

This special package offers four tests, including Electronic von Frey, Plethysmometer, Randall Selitto and the Grip Strength Meter. You get all four test modules and the electronic controller that is interchangeable with all four systems. The electronic controller has up to three inputs, so you can perform up to four unique tests with only one electronic system. If you prefer, you may build your system and you grow. Because of the modular design of these four systems, you need to order only one complete system. Then, the modules for the other three tests, which integrate into the system, can be purchased separately, as needed. The stand and sling for the Randall Selitto test are sold separately.

**II-2889** Quattro 4-in-1 System



## Plethysmometer (Paw Volume) Meter



- **No wetting solution needed**
- **One calibration/year**
- **Battery-operated or line powered controller**
- **One-year warranty**

Test the effectiveness of anti-inflammatory agents and agents to reduce edemic conditions with the Plethysmometer. Simply insert the rat or mouse paw into water. A sensor in the water notes a pressure change when the paw is immersed. Pressure is calibrated in 0.1 milliliters and displays on the battery-powered monitor. The acrylic stand offers full visibility of the subject throughout the testing.

**II-520MR** Paw Volume Meter for Mouse & Rat

## Randall Selitto Paw Pressure Meter

- **Hands free operation with footswitch**
- **Visible force limit indicator**
- **Portable electronic display**
- **Battery-operated or line powered controller**
- **3-oz. handheld probe with accuracy of 0.5%**
- **No calibration required**



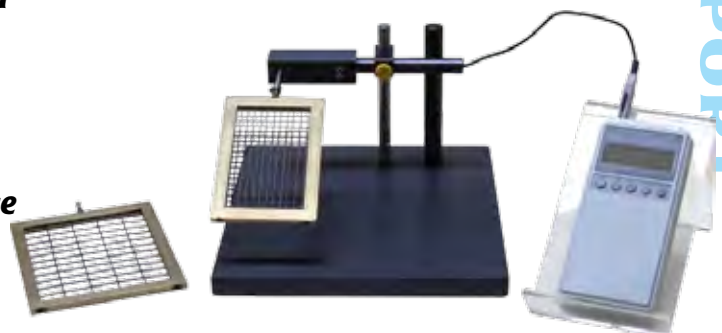
The Randall Selitto Paw Pressure Meter for analgesia testing is digitally controlled. Use the handheld instrument to apply force to an animal's extremity and get instantaneous, live readings. You can even view the last maximum force applied during the test. The new limit

indicator lets you select the maximum force limit, and then indicates with a warning light when the system reaches that limit. This unit comes with an acrylic stand to allow for easy viewing of the display. Stand and sling are sold separately.

**II-2500** Randall Selitto Paw Pressure Meter, 800 g pressure applicator

## Grip Strength Meter

- **Mouse and rat wire mesh grid plates included**
- **Maximum force range is 2,000 gm (10% over range allowed). Higher ranges are available by special order.**
- **1 gram increment readings**
- **Suction feet on the heavy, anodized base plate resist even large pulling forces**
- **Battery-operated or line powered controller**
- **One year warranty**



Measure muscle hyperalgesia in rats and mice with the Grip Strength Meter, which gauges the forelimb grip force using a digital force transducer. Simply hold the animal by the tail and gently dangle it over the wire mesh plate until the animal grasps the plate with its

forepaws. The force transducer, connected with the wire mesh plate, measures the strength of the animal at the time of the test. The battery-operated, electronic control device calculates the

average of three measurements, and it holds the last maximum force in a "peak and hold" type readout until you reset it.

**II-2200** Grip Strength Meter for Mouse & Rat

# Analgesia

## Incremental Hot Cold Plate Analgesia Meter

- **Heat or cool, from 0-70°C**
- **Ramping temperatures for threshold and latency results**
- **Rapid increase or decrease in temperature**
- **Precise programmable digital control**
- **Printout of data**
- **Temperature stability is 0.1°C**
- **Includes clear animal enclosure**
- **Plate size 4 x 8"**
- **Two-year warranty**



This safe, humane device for rats and mice is used for latency and threshold-based nociception, ramping temperatures for 0-70°C. Because this hot cold plate is incremental, it measures latencies of much more than just the strong narcotic agents, broadening dramatically the range of analgesia research with devices

of this type. Microprocessor-controlled, the Incremental Hot Cold Plate can heat or cool in increments of 0.1°C, at a rate of 1-10°C per minute. With uniform heating and cooling and upper/lower cut-off limits, this device is

predictable and safe. It can also function as a constant temperature plate with great stability (0.1°C). As soon as a reaction is observed from the chosen paw, the unit reverses to the standby temperature.

**II-PE34** Incremental Hot Cold Plate Analgesia Meter for Mouse & Rat

## Incapacitance Meter for Mouse & Rat

- **Precise programmable digital control**
- **Start, stop and reset test from controller's front panel**
- **180-270 gram holder included (other sizes available)**
- **Reaction detected automatically**
- **Manual override of all timer functions**
- **Alphanumeric readout**
- **5 to 999 seconds test period**
- **Alphanumeric readout**
- **All functions and parameters entered via key-pad**
- **Two-year warranty**



Test pain and inflammation in the hind limbs of mice, rats or birds with the Incapacitance Meter. It uses a technique called dual channel weight averaging, which tests both hind limbs. This gives you a clean, stress-free correlation of the paw pressure test. Conduct control and testing of the animal at the same time. Place the animal in the holder with its hind limbs resting on the two weight-averaging platform pads. The controller records the average weight (grams) over the test period as the animal shifts its weight from each pad

**II-600MR** Incapacitance Meter for Mouse & Rat

## Hot Plate Analgesia Meter

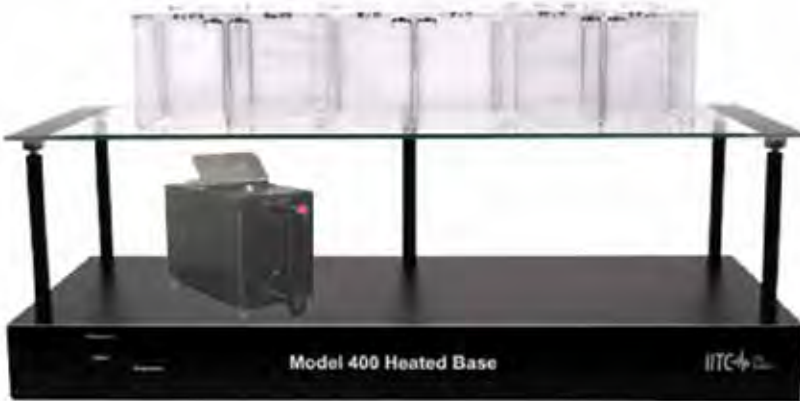
- **Includes both mouse and rat enclosure**
- **Temperature indicated in 0.1°C increments**
- **Holding accuracy is +/- 0.1°C**
- **Digitally controlled**
- **Two-year warranty**

Use the Hot Plate Analgesia meters for latency testing in rats and mice. Simply place the animals on a black anodized, aluminum plate (11 x 10.5 x 0.75", 275 x 263 x 15 mm) and set the plate's surface temperature to the desired setpoint (up to 75°C). The plate maintains a consistent temperature throughout the test.



**II-39** Hot Plate Analgesia Meter for Mouse & Rat

## Plantar Test Apparatus/Tail Flick Test Analgesia Meter



- **Includes three acrylic animal enclosures that each hold two rats or four mice**
- **Precise programmable digital control**
- **User-defined humane cutoff feature**
- **Adjustable beam intensity in 1% increments up to 250°C**
- **Reaction is detected automatically**

This unit, which is designed for testing narcotics and strong non-narcotic drugs, offers both Plantar (Hargreaves Method) and Tail Flick testing with a single unit. Either testing system is also available individually. In plantar mode, the visible light/heat source is directed at the paw or other desired body part, and in tail flick mode it is directed at the subjects' tails. Test up to 12 mice or 6 rats simultaneously. If desired, other animals like cats and rabbits may also be used. Tests are simple to setup. The focused, radiant heat/light source creates a 4 x 6 mm intense spot. Because the light is visible, you know when the test starts and ends. The equipment is silent (no whining or clicking sounds) to avoid

- **Alphanumeric readout**
- **Manual override of all timer functions**
- **All functions and parameters entered via key-pad**
- **Heated glass option**
- **Tail temperature monitor option (for use with the Tail Flick meter)**

triggering an automatic response in conditioned animals. You can set a humane cutoff timer that automatically shuts off the heat if no response is observed during the designated time frame.

When an animal is placed on cold glass, its reaction time may be slower. This unique system offers a heated glass option that prevents the glass enclosure from acting as a heat sink,

giving a more accurate reading. An optional tail temperature monitor can also be selected for use with the Tail Flick meter. This option actually preheats the tail before experimentation. Once the preset tail temperature is reached, the test and timer automatically begin. A glass stand is also available in two sizes for large group studies.

<b>II-336T</b>	Combination Plantar/Tail Flick Meter, non-heated glass and tail temperature for mouse and rat
<b>II-336TG</b>	Combination Plantar/Tail Flick Meter, tail temperature and heated glass for mouse and rat
<b>II-390</b>	Plantar Test Analgesia Meter, non-heated glass for mouse and rat
<b>II-390G</b>	Plantar Test Analgesia Meter, heated glass for mouse and rat



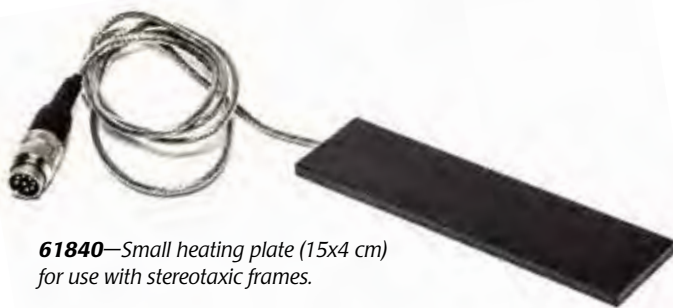
# Animal Temperature Controller

**ATC2000** is a low noise heating system for maintaining animal body temperature during experimental procedures. The DC heater is extremely quiet in terms of electromagnetic radiation. This is essential in electrophysiological recordings which are very sensitive to electromagnetic interference.

The controller uses proportional, integral, and derivative (PID) technology in adjusting the DC voltage output. Compared with switched on/off type controllers, PID controllers provide a much more precise and stable control of temperature. The PID approach is also more immune to the variation of the experimental conditions such as change in animal size and unexpected disturbances.

The controller has three temperature sensing inputs.

- The resistive temperature device (RTD) Probe input can be used to monitor an RTD rectal probe to control the animal temperature or to monitor ambient temperature, induction chamber temperature or any other temperature.
- When using a thermocouple probe, the thermocouple (TC) probe input can be used just like the RTD input. (A T type thermocouple must be used.)



**61840**—Small heating plate (15x4 cm) for use with stereotaxic frames.



## ● Low Noise DC Heater

## ● Adaptive mode—auto adjust PID regardless of animal size

## ● PID control for maximum temperature stability

## ● Three temperature inputs—RTD, TC, plate

## ● Automatic shutdown if the plate reaches 45°C

- The heater plate also has an internal temperature sensor. The ATC2000 monitors this sensor to prevent the localized hot spots under animal.

The controller has three operational modes:

- Normal mode uses the configured sensor (RTD or TC) or the plate sensor to drive the control loop.
- Adaptive mode uses the temperature of the heated plate and the temperature of the subject to control. This approach is less prone to overshoot, but somewhat slower the normal mode, depending on the sampling rate used.

- Shutdown is a fail safe mode used if the plate temperature ever exceeds 45°C.

The ATC2000 is tuned at the factory. However, the PID parameters may also be set manually. The temperature resolution of the controller is 0.1°C. The rectal temperature probe has a 6-ft ultra-flexible, shielded cable and an RTD sensor. The metal heating plates (available separately) have built-in temperature sensors. Compatible with stereotaxic systems, the rigid, flat surface fits under the U-frame. Plates are washable with water and detergent.

### ATC2000 SPECIFICATIONS

TEMPERATURE RANGE	..... up to 45°C
RESOLUTION	..... 0.1°C
ACCURACY	..... ± 0.3°C
RAT SENSOR	..... RTD, OD 2.0mm tube with 3.5mm ball head (Optional mouse sensor is available)
MAXIMUM DC OUTPUT	..... 10V, 3A
POWER	..... Universal AC Adapter 90–264V Input, 12V@4.5A maximum output
DIMENSIONS	..... 8.9 x 20.8 x 27.6 cm (3.5 x 8.2 x 10.8 in.)
WEIGHT	..... 5 kg (11 lb)

**ATC2000** Animal Temperature Controller

#### REQUIRED ACCESSORIES (select one sensor and one plate)

<b>61800</b>	Heating Plate with built-in RTD sensor, 15 x 25 cm
<b>61830</b>	Heating Plate with built-in RTD sensor, 15 x 10 cm
<b>61840</b>	Heating Plate with built-in RTD sensor for stereotaxic frame, 15x4 cm \$

#### REPLACEMENTS

<b>61824</b>	RTD Rectal Temp Probe, 1.25 mm shaft diam., 2.5mm ball tip
<b>RET-2</b>	TC Rat Rectal Temp Probe, 1 mm shaft diam., 3.2mm ball tip
<b>RET-3</b>	TC Mouse Rectal Temp Probe, 1 mm shaft diam., 1.6mm ball tip
<b>503573</b>	Silicone Pad for ATC2000 (10 x 15 cm)

#### NEEDLE MICROPROBES (see page 51 for details)

<b>MT-29/1</b>	29 ga 1 cm Needle Microprobe, 5-ft cable
<b>MT-23/3</b>	23 ga 3 cm Needle Microprobe, 5-ft cable
<b>MT-D</b>	Needle Microprobe, 5-ft cable

#### FLEXIBLE IMPLANTABLE PROBES (see page 51 for details)

<b>IT-18</b>	0.025-inch diam Flexible Implantable Probe, 3-ft cable
<b>IT-23</b>	0.009-inch diam Flexible Implantable Probe, 3-ft cable
<b>IT-1E</b>	0.025-inch diam Flexible Implantable Probe, 3-ft cable

<b>300443</b>	RTD Extension Cable, 3 m
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# Ventilators



## CW-MRI-1

The **CW-MRI-1** ventilator is a small animal ventilator designed for use in MRI and other highly magnetic field environments, though its use is not limited to those environments. It offers manual or remote operation of pneumatic, non-metallic valves. The CW-MRI-1 operates on the flow-time principle, dispensing a known airflow into the lungs for a set inspiratory time to generate desired tidal volumes. Three controls—respiratory rate, inspiratory time and flow rate—allow for accuracy and extraordinary flexibility over a wide range of volumes, breaths-per-minute and inspiration/expiration (I/E) ratios. The unit can be expanded to ventilate larger animals. A source of compressed air or helium is required for operating the pneumatic valves.



### Features

- **Non-metallic, pneumatic valves**
- **Wide tidal volume and rate range**
- **Safe with oxygen and anesthesia**
- **Internal air pump**
- **Direct readout of volume and rate**

**CW-MRI-1** Ventilator

## CW-SAR1000

The **CW-SAR1000** Small Animal Ventilator is a versatile and easy-to-use ventilator for mice, rats, and other small animals. Volume mode delivers a fixed tidal volume on each breath, and pressure mode causes inflation to stop at a preset airway pressure. In either mode, lung inflation is maintained at the end of inspiration until the percent inspiration (%Insp) time has elapsed. This end inspiratory pause (IEP) improves gas exchange and the overall efficiency of ventilation. In volume mode, the ventilator operates on the proven flow-time principle, where a known airflow is delivered for a set time, thus delivering a fixed volume. In pressure mode, airflow is simply adjusted to give a suitable inspiration time. Actual tidal volume is computed and displayed on the LCD display, as well as minute ventilation (MV) and other respiratory parameters. A built-in air pump allows completely self-contained operation. This pump draws in room air, oxygen, or anesthetic gasses through a rear-panel port.



### Features

- **Pressure or volume-cycled operation**
- **Wide tidal volume and rate range**
- **User-friendly set-up and operation.**
- **Direct display of Tidal Volume & all parameters**
- **Remote control via USB port**
- **Safe with oxygen and anesthesia**
- **Multi-animal set-ups**

**CW-SAR1000** Ventilator

### VENTILATOR SPECIFICATIONS

	<b>CW-MRI-1</b>	<b>CW-SAR1000</b>
RESPIRATORY RATE RANGE	5-150 breaths/min	5-200 breaths/min
TIDAL VOLUME RANGE	0.1-30 mL	0.2-35 mL (using internal valves. External valve assemblies available for larger animals provide up to 350 mL volumes.)
INSPIRATION/EXPIRATION RANGE	20-80%	
INTERNAL AIR PUMP CAPACITY	4 LPM	
INSPIRATORY FLOW RANGE	50-1000 mL/min	10-1000 mL/min
PRESSURE CONTROL RANGE		0-50.0 cmH <sub>2</sub> O
POWER	120/240V (switchable), 100VA	120/240VAC, selectable
DIMENSIONS	9x5.5x9 in. (23x14x23cm)	9x4x9 in. (23x10x23 cm)

## microCAPSTAR CO<sub>2</sub> Analyzer



**microCAPSTAR** extends CO<sub>2</sub> monitoring to the realm of small animals. The advanced features, reliability and ease of operation make it the perfect companion to the CW-SAR-830/AP small animal ventilator. Featuring low sample requirements, rapid response time and long-term stability, this CO<sub>2</sub> analyzer provides accurate end-tidal or continuous measurement of expired CO<sub>2</sub>. The LCD screen displays CO<sub>2</sub> concentration (instantaneous ET-CO<sub>2</sub> in either percent or mmHg), respiratory rate measurements and trend plot of the end-tidal values. An adjustable ET-CO<sub>2</sub> alarm warns when end-tidal values fall out of the user-adjustable preset range. Built-in diagnostics warn of plugged sample tubing or other fault conditions.

### Features

- **Use with Ventilated or unassisted animals**
- **End-tidal peak or continuous CO<sub>2</sub> readings**
- **Low sample flow requirements, rapid response time**
- **Simple one-gas calibration**

### CW-MICROCAPSTAR SPECIFICATIONS

MEASUREMENT RANGE	0-9.9% (0-76mmHg) CO <sub>2</sub>
RESPONSE TIME	75mS at 70mL/min through cell 150mS at 50mL/min sampling
MAXIMUM SAMPLE CELL PRESSURE	+5PSi <sub>g</sub>
SIGNAL OUTPUTS	BNC
POWER	120VAC/220VAC switchable, 25VA
DIMENSIONS	19x5.25x16", 49x13x41cm
WEIGHT	10lb. (4.5kg)

**CW-MICROCAPSTAR** CO<sub>2</sub> Analyzer



# Blood Pressure Measurement for Rats and Mice

*Unique environmental control system and single tail cuff allows tail movement, minimizing stress in the animal subjects*



- **Test up to 200 animals at a time**
- **Sensor is MRI compatible**
- **Quick and accurate blood pressure measurement at temperatures as low as 32°C**

This revolutionary design brings non-invasive blood pressure testing to a new level — a true turn-key system for accurate, consistent blood pressure measurement on mice, rats or any other laboratory animal test subject.

It is a compact, simple yet versatile system that can test from one to 200 animals at a time with independent control of each channel. Simple daisy-chaining allows expansion of up to 200 independently controlled systems.

All components are built into one small unit — controls, inflation of tail cuff, warming environment with whisper-quiet fans — providing an ideal system for teaching facilities and for the pharmaceutical industry when high throughput is a must.

Single animal systems are controlled from the touch screen, which allows keying in all necessary test setups. Touch screen control allows ease of operation, supplying automatic evaluation of test results — systolic, diastolic, mean and heart rate.

- **Highly sensitive photoelectric sensor for blood pressure detection**
- **Monitor, record, store or export real time systolic, diastolic, mean and heart rate**

Data is collected, stored, displayed and can be transferred to the supplied memory stick. The USB interface allows for software control of multichannel systems. For single animal systems, built-in software lets you view and export data. Reports are in an Excel-style format and may be easily exported.

No computer is required. However, the analog output may be interfaced with your own data acquisition software.

System is easily cleaned. Removable trays are included with each system.

In addition to the standard one-year warranty on the system, tail cuff sensors have a lifetime warranty..

**Includes all accessories necessary to run system.**

**II-MRBP-M** Mouse Blood Pressure System

**II-MRBP-R** Rat Blood Pressure System

**Call for pricing on multiple channels.**

# Blood Pressure Monitor and Transducer



- **Monitors animal arterial or venous blood pressure**
- **Displays systolic, diastolic or average blood pressure**

**BP1** accepts WPI's BLPR blood pressure transducer (below) as well as other blood pressure transducers.

An audio monitor provides a signal with variable pitch and amplitude, allowing you to hear changes in blood pressure. Digital LCD display provides average or peak signal values from 0 to 1999 mV. With an optional pressure gauge (not provided — see **PM015D**, page 183), the user may calibrate the display to read mm Hg. Recorder output connector allows direct connection to a pen recorder, oscilloscope or computer via a data acquisition system.

**BLPR2** can be used for the direct arterial and venous pressure measurement in animal blood vessels. Supplied sterile, BLPR2 is accurate, linear and stable with temperature. May be sterilized cold with Cidex or a similar bactericide.

BLPR2 is equipped with a twelve-foot cable and connector compatible with WPI's four-channel signal conditioning unit, **TBM4M** Transbridge, and the single-channel **BP1** blood pressure monitor. Cable has moisture-resistant locking connector. A continuous, uniform lumen eliminates



- **0.4mm O.D., 0.2mm I.D. tubing**
- **Autoclavable**
- **Biocompatible Perfluorocarbon tubing material**

**Micro Cannula**  
**KZ1101**

See description on page 120.

places for bubbles to form and lodge. The clear fluid path is easy to inspect. Easy to mount — slotted transducer body accepts Velcro strap.

To facilitate setup and operation, a four-way stopcock that allows easy filling, flushing, and zeroing of the transducer is included. Typically, the stopcock is located between the transducer and the animal catheter where it can be used to quickly zero, flush, or de-bubble the transducer.

**SYS-BP1** Pressure Monitor (transducer & cable not included)

**Specify line voltage**

## ACCESSORIES

<b>BLPR2</b>	NEW Blood Pressure Transducer & Cable
<b>BPCABLE2</b>	NEW Cable (12 ft) with DIN connector for BLPR2
<b>503067</b>	BLPR2 Transducer without cable
<b>13024</b>	Single Rack Mount Kit
<b>13025</b>	Dual Rack Mount Kit
<b>3491</b>	Extension Cable, 5 ft
<b>500184</b>	BNC-to-BNC Cable, 10 ft
<b>14036-15</b>	4-Way Luer Stopcock, Blue Tint (package of 15)
<b>KZ1101</b>	Micro Cannula, 3 inch

**Note: BLPR2 is intended for animal research only and may not be used for human blood pressure measurement.**

## BP1 SPECIFICATIONS

AMPLIFICATION	x1, x10, x100, variable (x5 to x1000)
OUTPUT VOLTAGE SWING	± 5 volts
MAXIMUM OUTPUT CURRENT	2 mA
INPUT IMPEDANCE, EACH INPUT	100 kΩ    0.01 μF
TRANSDUCER APPLIED VOLTS	10 V nominal, varies with load. 25 mA, maximum
POWER	95-135 V or 220-240 V, 50/60 Hz
DIMENSIONS	8.5x5.12x10 in. (21.6x13x25.44 cm)
SHIPPING WEIGHT	11 lb (5 kg)

## BLPR2 SPECIFICATIONS

WORKING PRESSURE	-50 to + 300 mm Hg
OVERPRESSURE	-400 to +4000 mm Hg
EXCITATION VOLTAGE	1-10 VDC or RMS to 5 kHz
SENSITIVITY	5 μV/V/mm Hg
DYNAMIC RESPONSE	100 Hz
EIGHT HOUR DRIFT	1 mm Hg after 5 minute warm-up
MAXIMUM ERROR	Total combined effects of Sensitivity, Linearity, Hysteresis (at 25°C and 5 μV/V/mm Hg) do not exceed ±2% or 1 mm Hg, whichever is greater.
SHIPPING WEIGHT	1 lb

# Precision Stereotaxic Instruments for Small Animals

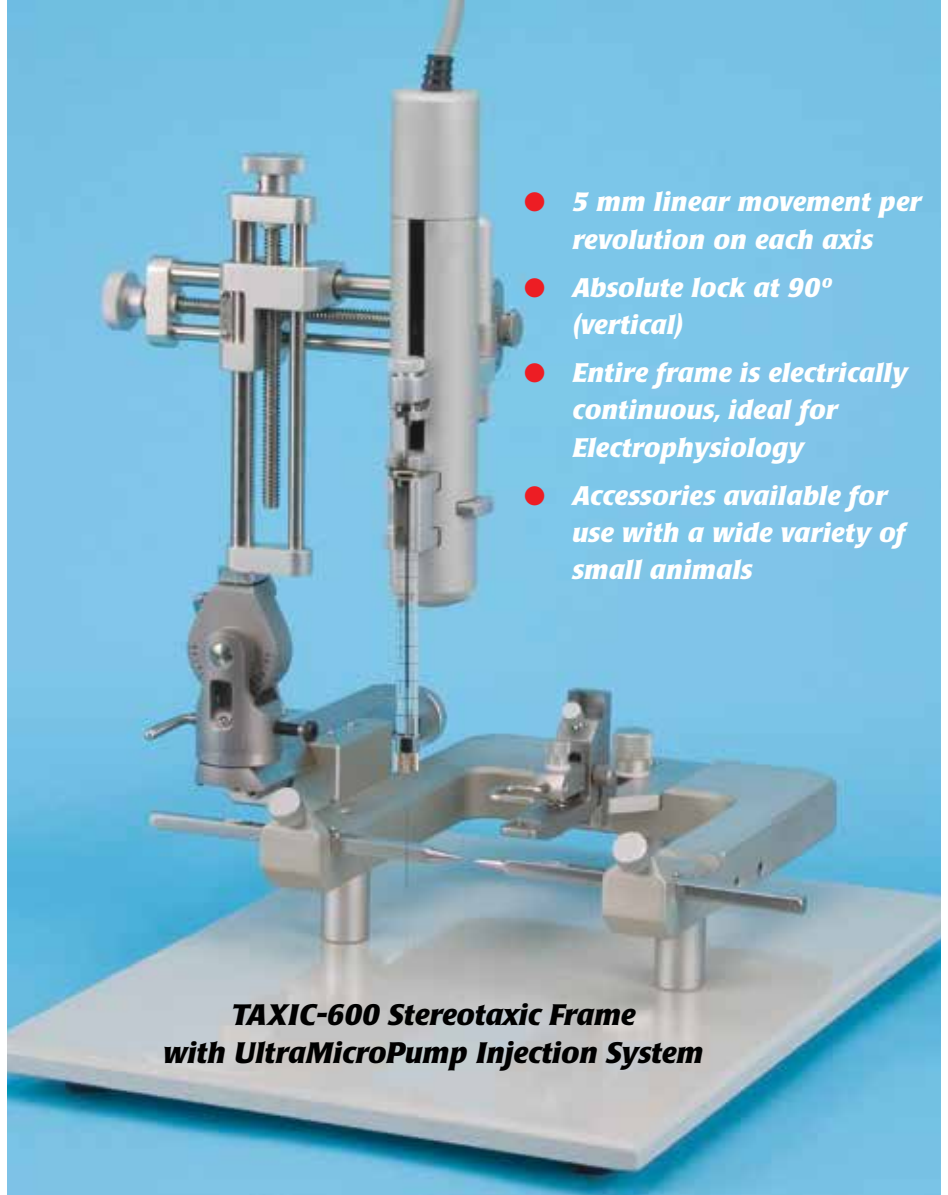
WPI's Precision Stereotaxic Instrument is built around the time-proven U-frame design concept, providing stability, and adaptability to most species. Precision alignment ensures accurate placement of electrodes, micropipettes, and other devices. It is ideal for researchers in need of a versatile, reliable instrument for stereotaxic procedures with small animals

## Versatility of positioning

The manipulator arm controls medio-lateral and vertical positioning via lead screws with 80 mm of travel. This allows the fastest positioning possible, consistent with lining up the scales easily at a given coordinate. The antero-posterior movement is controlled via a dovetail slide movement, with 80 mm of travel possible in each direction. A universal joint allows the investigator to change the angle of the probe up to 90° in either the antero-posterior or medio-lateral planes. The locking mechanism will hold any angle position without drift or creep. It also provides an absolute lock at 90° vertical.



Above: **502600** Precision Stereotaxic Frame.  
At right: **502603** Dual Manipulator Stereotaxic Frame.



**TAXIC-600 Stereotaxic Frame with UltraMicroPump Injection System**

- 5 mm linear movement per revolution on each axis
- Absolute lock at 90° (vertical)
- Entire frame is electrically continuous, ideal for Electrophysiology
- Accessories available for use with a wide variety of small animals



## Easily read scales

All scales are oriented to be read easily from the open end of the "U". This is the position from which most scientists prefer to work. The numerals on the scales are clear and easy to read. Precise alignment with facing vernier scales gives accurate resolution to 0.1 mm.

## Convenient for electrophysiology

The entire Stereotaxic frame including the dovetails, manipulator arms and base are electrically continuous. Grounding of the entire frame including the base plate can be accomplished by connecting the provided grounding stud to earth. This is ideal for electrophysiological studies where the animal and surrounding structures need to be grounded to reduce electrical noise.

<b>502600</b>	Precision Stereotaxic Frame with 18° Ear Bars
<b>502650</b>	Precision Stereotaxic Frame with 45° Ear Bars
<b>502603</b>	Dual Manipulator Stereotaxic Frame with 18° Ear Bars
<b>502653</b>	Dual Manipulator Stereotaxic Frame with 45° Ear Bars
<b>TAXIC-600</b>	Stereotaxic Frame with 18° Ear Bars plus UMP3-1 System
<b>TAXIC-650</b>	Stereotaxic Frame with 45° Ear Bars plus UMP3-1 System
<b>TAXIC-603</b>	Dual Manipulator Stereotaxic Frame with 18° Ear Bars plus UMP3-1 System
<b>TAXIC-653</b>	Dual Manipulator Stereotaxic Frame with 45° Ear Bars plus UMP3-1 System

# Precision Stereotaxic Instruments for Mice and Neonatal Rats



**502610**  
Stereotaxic Frame for Mouse, Portable, Single Manipulator



**502612**  
Stereotaxic Frame for Rat, Portable, Single Manipulator, 18° Ear Bars



**502614**  
Stereotaxic Frame for Rat, Rail-mounted, Single Manipulator, 18° Ear Bars



**502257**  
MRI Rat Adaptor



**502258**  
Neonatal Rat Gas Anesthesia Head Holder



**502261**  
Rat Gas Anesthesia Head Holder

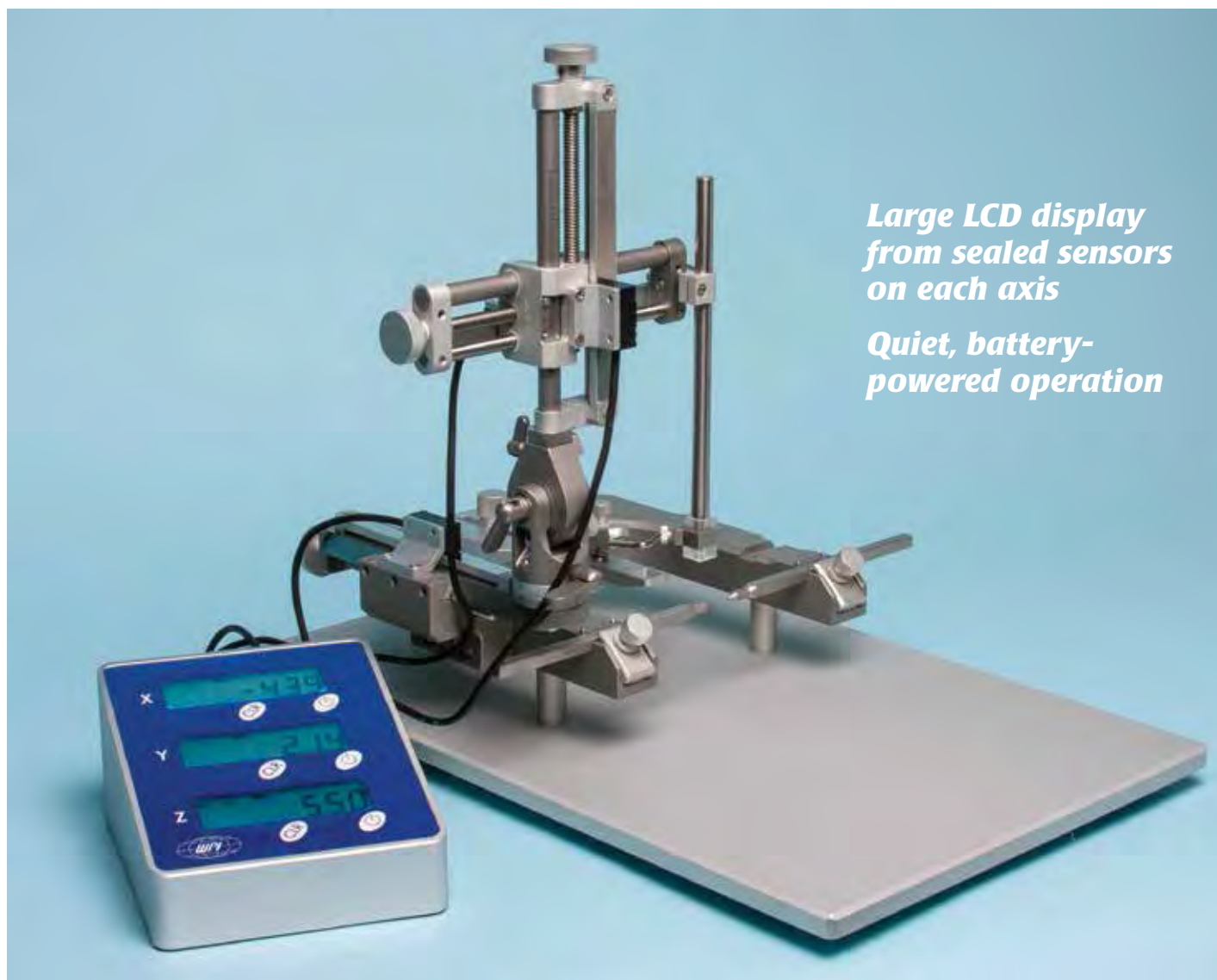


**502262**  
Mouse Gas Anesthesia Head Holder



**502616**  
MRI Stereotaxic Instrument for Dogs and Monkeys

<b>502257</b>	MRI Rat Adaptor
<b>502258</b>	Neonatal Rat Gas Anesthesia Head Holder
<b>502259</b>	Rat Spinal Adaptor
<b>502261</b>	Rat Gas Anesthesia Head Holder
<b>502262</b>	Mouse Gas Anesthesia Head Holder
<b>502610</b>	Stereotaxic Frame, Single Manipulator, for Mouse
<b>502612</b>	Stereotaxic Frame, Single Manipulator, for Rat, 18° Ear Bars
<b>502614</b>	Stereotaxic Frame, Single Manipulator, Rail Mounted, for Rat, 18° Ear Bars
<b>502616</b>	MRI Stereotaxic Frame, for Dogs and Monkeys



*Large LCD display  
from sealed sensors  
on each axis*

*Quiet, battery-  
powered operation*

## Digital Stereotaxic Frame with LCD Display

This new Digital Stereotaxic Frame features sealed electronic sensors and an easy-to-read LCD display with 10-micron resolution in all three axes. A zeroing function aids in targeting specific coordinates. The battery-powered display is electronically quiet, making it useful in electrophysiology experiments as well as keeping the workbench tidy.

### Features

- Adaptors available for use with rats, mice, birds, cats, geckos, guinea pigs and other species
- 80 mm of vertical, lateral and anterior-posterior travel
- 180° rotation and lock at any vertical angle

- 360° rotation and lock at any level angle
- Syringe pump, microcamera and drill can be attached directly
- Dual-lead screws provide stable and accurate movement
- Maintains accuracy and flexibility under different temperatures
- Zeroing function for targeting specific coordinates
- 10µm precision of manipulator in all directions
- Desktop display is separate from sensors, making it easy to read
- Battery-powered sensors, without electronic noise, are suitable for electrophysiology experiment
- Extended base plate 400mmX255mm suitable for various animals
- Vertical lock and fixing knob are separated to ensure accurate position at any angle
- The precisely-designed rotary knob and U frame allow sufficient space for the anterior-posterior operation
- Laser engraved scales and darkened rod make numerals easy to read
- Curved design of nose clamp fixes the head of the animals more securely

<b>502300</b>	Digital Stereotaxic Frame with 18° Ear Bars
<b>502350</b>	Digital Stereotaxic Frame with 45° Ear Bars
<b>502303</b>	Dual Manipulator Digital Stereotaxic Frame with 18° Ear Bars
<b>502353</b>	Dual Manipulator Digital Stereotaxic Frame with 45° Ear Bars

**Also available  
with UMP3-1  
UltraMicroPump —  
special pricing!**

# Parallel Rail Stereotaxic Instrument for Large Animals



<b>502227</b>	Stereotaxic Frame System with one manipulator for Cat and Monkey
<b>502228</b>	Stereotaxic Frame System with two manipulators for Cat and Monkey
<b>502229</b>	Stereotaxic Frame System with three manipulators for Cat and Monkey
<b>502230</b>	Stereotaxic Frame System with four manipulators for Cat and Monkey
<b>502231</b>	Stereotaxic Frame System with one manipulator for Dog
<b>502232</b>	Stereotaxic Frame System with two manipulators for Dog
<b>502233</b>	Stereotaxic Frame System with three manipulators for Dog
<b>502234</b>	Stereotaxic Frame System with four manipulators for Dog

For more options and accessories, visit the website — [www.wpiinc.com](http://www.wpiinc.com)

WPI's Parallel Rail Stereotaxic Frame systems are heavy-duty research instruments for large laboratory animals such as cats, monkeys, and dogs. The solid large frame and superior rigidity ensure the precise alignment of animals for Stereotaxic surgery, injection, and recording. The system can adopt up to four manipulators with 100-micron resolution on each axis. Each manipulator can smoothly moved to and locked at any location on both parallel rails in an arrange of 20 cm.

Parallel Rail Stereotaxic Frame system for large animals include the Parallel Rail Frame, base plate, manipulator(s), Cat/Monkey or Dog adaptor, and swivel mount.

## Research Catheters

### INTRATHECAL CATHETERS

<b>504106</b>	CR3212 Cth Rsr 32G 12 w/ Stylet
<b>504107</b>	CR3218 Cth Rsr 32G 18CM
<b>504108</b>	CS1 32G Intrathecal Cth Sys ST
<b>504109</b>	CS2 32G Intrathecal Cth Sys

### INTRATHECAL CATHETERS FOR USE WITH OSMOTIC PUMPS

<b>504110</b>	32G Cth 10cm w/50cm Extension
<b>504111</b>	32G Intrathecal Cth w/PE50
<b>504112</b>	32G Intrathecal Cth w/Extension
<b>504113</b>	32G Cth CE w/3 Side Ports
<b>504114</b>	32G Intrathecal Cth w/Bead
<b>504115</b>	32G Intrathecal Cth w/Dacron Mesh & Stylet
<b>504116</b>	32G Intrathecal Cth w/Bead 185mm

### VASCULAR & ARTERIAL CATHETERS FOR RATS

<b>504117</b>	Jugular Vein Catheter 163mm (6 Pack)
<b>504118</b>	Femoral Artery Catheter 255mm (6 Pack)
<b>504119</b>	Femoral Vein Catheter 190mm (6 Pack)
<b>504120</b>	Bile Duct Catheter 298mm (6 Pack)
<b>504121</b>	Carotid Artery Catheter 165mm (6 Pack)

### VASCULAR & ARTERIAL CATHETERS FOR MICE

<b>504143</b>	Mouse 32G Carotid Artery Catheter
<b>504144</b>	Mouse 32G Femoral Artery Catheter
<b>504145</b>	Mouse 32G Jugular Vein Catheter
<b>504146</b>	Mouse Catheter

### TAIL VEIN CATHETERS

<b>504147</b>	Tail Vein Cth for Mouse 29G Cannula
<b>504148</b>	Tail Vein Cth for Rat 23G Cannula
<b>504149</b>	Angio Catheter for a Mouse
<b>504150</b>	DSA Catheter
<b>504151</b>	Rat Y Connector

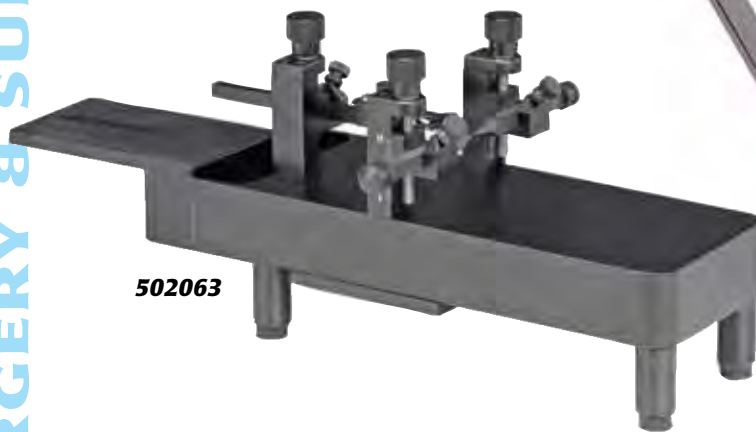
*Do you need a custom design? Tubing diameters, material, beads, shapes and lengths of existing products can be modified as necessary. Call us with your requirements.*

# Stereotaxic Accessories

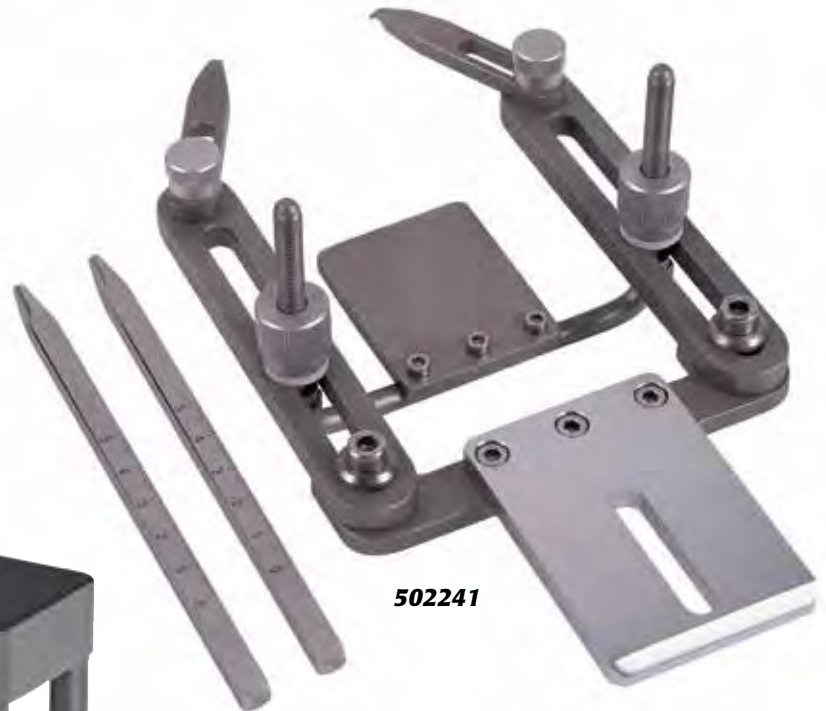
## ADAPTORS

<b>502063</b>	Mouse and Neonatal Rat Adaptor
<b>502213</b>	Platform, Gas Anesthesia, with mouse Mask ( <i>use with 502063</i> )
<b>502062</b>	Mouse Adaptor
<b>502204</b>	Rat Adaptor with a pair of ear bars, 18°
<b>502226</b>	Cat/Monkey Adaptor for 502600 series
<b>502238</b>	Spinal Adaptor for Rat
<b>502060</b>	Guinea Pig Adaptor for 502600 series
<b>502241</b>	Dog/Monkey Adaptor for Parallel Rail Stereotaxic instruments, with a pair of ear bars, 18°

The WPI Mouse and Neonatal Rat Adaptor (**502063**) employs light, Delrin® adjustable ear bars with tapered points on one end and thumbscrew on the other to facilitate surgery on mice and rat pups. Adjustable ear bars may be independently adjusted in height to level the skull. Laser engraved scales show the vertical positions of the ear bars. A tooth bar and nose clamp secures the nose. A well in the thick aluminum body may be filled with dry ice and alcohol for hypothermic anesthesia of neonatal animals. The adaptor clamps securely on the right side of the "U" frame of the stereotaxic instrument. When gas anesthesia is needed, a gas mask assembly (**502213**) may be mounted on the adaptor.



**502063**



**502241**



**502213**



**502054**

**502053**



**502062**



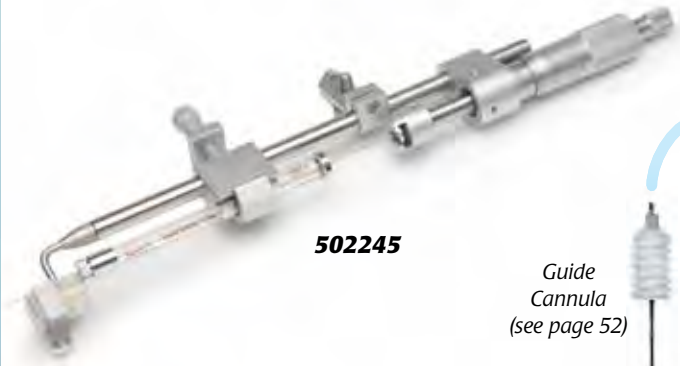
**502204**

ANIMAL SURGERY & SUPPORT



**502237**

OmniDrill35 not included — see page 29.



**502245**

Guide Cannula (see page 52)



**502256**

**502070**

**502068**

**502244**

**PROBE HOLDERS**

- 502210** Probe Holder with corner clamp, 0.3-1.5mm opening
- 502067** Probe Holder with side clamp, 0.3-3.5mm opening
- 502070** Cannula Holder, metal tip, opens to 3.4mm (see cannulas, page 52)
- 502256** Cannula Holder, plastic tip, opens to 3.4mm (see cannulas, page 52)
- 502068** Large Probe Holder, 6.5-13mm opening
- 502237** Extra Large Holder for OmniDrill35 Microdrill
- 502236** Microdialysis Probe Holder, 1.5mm hole
- 502244** Micrometer Adjustable Electrode Holder, 10µ resolution, 25mm travel, 0.3-1.5mm opening
- 502245** Manual Microsyringe Injection Holder, 10µ resolution, 25mm travel



**502235**

**502056**

**502225**

**502242**

**EAR BARS**

- 502055** Ear Bars, Rat, 18°, (pair)
- 502056** Ear Bars, Rat, 45°, (pair)
- 502224** Ear Bars, Cat, 18°, (pair)
- 502225** Ear Bars, Cat, 45°, (pair)
- 502235** Ear Bars, Mouse, 60°. Non-rupture, (pair)
- 502242** Ear Bars, Rat, Hollow. 1.5mm hole for auditory stimulation



**502259**—Spinal Adaptor for Rat

**OTHER ACCESSORIES**

- 502053** Mask, Gas Anesthesia, Mouse
- 502054** Mask, Gas Anesthesia, Rat
- 502201** V-Clamp, 10/32 screw
- 504608** V-Clamp screw
- 502213** Platform, Gas Anesthesia, with mouse Mask (use with 502063)
- 502243** Adjustable Stage Platform for 502600 series, 2cm high
- 503598** Micro-Drill, 35K rpm, 110/220VAC, w/ a set of bits
- 503599** Micro-Drill, 35K rpm, 240VAC, w/ a set of bits
- 61840** Heating Plate for 502063, 4X15cm, 5mm thick (use with ATC2000)



# Microprobe Thermometers



**BAT-12**

Stand sold separately

- **Super Accuracy** ● **Fast Response**
- **Analog output signal** ● **Multiple inputs**
- **Differential Temperature Measurement**



**BAT-10**

A Microprobe Thermometer is the instrument of choice for biological and laboratory temperature measurements. These thermometers are very versatile, providing fast response, high accuracy and stability with digital display and analog signal for connection to a computer or recorder. With the wide selection of probes, the instruments can be used in almost any application.

**BAT-12** This thermometer has a sealed construction making it water, dust and fume resistant. The BAT-12 has a single microprobe input and a single range with the same high accuracy as the BAT-10. Comes complete with carrying case.

The thermometers can be used with any "Type T" thermocouple. Select a temperature microprobe on the following page for your specific application.

**BAT-10** This is the most versatile thermometer available. The instrument has a wide temperature range and fast response with most microprobes. The BAT-10 accuracy

is NIST traceable and in each of the two temperature ranges, the accuracy is the same as the resolution. There are three microprobe inputs, 1 and 2 can be selected as separate inputs while 2 and 3 will read the differential temperature measurement between the two. The instrument has automatic warnings for low battery or faulty probes on the digital display. The linearized analog output (LOP) signal allows ease of connection to a data acquisition system or recorder.

**BAT-10R/LOP** Multiple Input Type T Thermocouple Thermometer, rechargeable NiCad batteries and 110 VAC adapter (microprobes ordered separately)

**BAT-10R/LOP220** Multiple Input Type T Thermocouple Thermometer, rechargeable NiCad batteries and 220 VAC adapter (microprobes ordered separately)

**BAT-12R** Single Input Type T Thermocouple Thermometer, rechargeable NiCad batteries and 110 VAC adapter (microprobes ordered separately)

**BAT-12R-220** Single Input Type T Thermocouple Thermometer, rechargeable NiCad batteries and 220 VAC adapter (microprobes ordered separately)

## OPTIONAL ACCESSORIES

**EXT-6** Probe Extension Lead, 180 cm long

**SBT-5** Thermocouple Switch Box, 5 probe inputs on back with numbered push button switches on the front. Connects 5 microprobes to one BAT-12R

**501608** Tripod Stand for BAT-12

## MICROPROBE THERMOMETER SPECIFICATIONS

	<b>BAT-10</b>	<b>BAT-12</b>
TEMPERATURE RANGE & RESOLUTION	-200°C to +400°C, 1°C resolution -100°C to +199.9°C, 0.1°C resolution	-100°C to +199.9°C, 0.1°C resolution
DIFFERENTIAL TEMP. RANGE	-19.99°C to +19.99°C Linearization centered at 40°C 0.01°C resolution	N/A
ACCURACY		
1° Range	1°C ± 1 least significant digit	0.1°C ± 1 digit between 0-50°C
0.1° Range	0.1°C ± 1 least significant digit	0.1% ± 1 digit over full range
Diff. Range	0.01°C ± 1 least significant digit	
REPEATABILITY	± 1 least significant digit	
CALIBRATION CONFORMITY	Conforms to NIST tables	Follows NIST thermocouple tables within 1 digit
DISPLAY	3½ Digit LCD	3½ Digit LCD
INPUT SOCKET	Miniature, quick disconnect, copper-constantan	Miniature, quick disconnect, copper-constantan
ANALOG OUTPUT	Non-linearized set at 1.6 V, corresponding to temperature of 401°C	≈ 10 mV per degree C
POWER SUPPLY / BATTERIES	BAT-10: 4 alkaline "C" cells (life: 1000 hr) BAT-10R: 4 Ni-Cad "C" cells (rechargeable unit)	BAT-12: 9V cell BAT-12R: 9V Ni-Cad with charger
SENSORS	Three Type T thermocouple inputs	One Type T thermocouple input
AMBIENT OPERATING RANGE	15-45°C	Auto-compensated to 0.1°C from 0°C to 50°C
DIMENSIONS	21.6 x 22.9 x 8.9 cm (8.5 x 9 x 3.5 in.)	12.7 x 6.4 x 15.2 cm (5 x 2.5 x 6 in.)
WEIGHT	1.6 kg (3.5 lb), including carrying case	1 kg (2 lb), including carrying case

# Temperature Probes

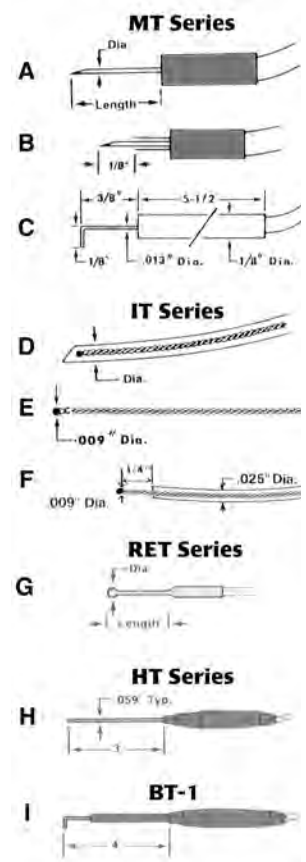
- Flexible Teflon microprobes are used for implantation in tissue, in spectrophotometer cuvettes, rectally in neonatal mice, in water baths, PCR thermal cyclers, etc.
- Animal rectal temperatures during surgical procedures and pyrogen testing.
- Skin temperature measurement during exercise physiology studies.

When precise temperature measurements are required, WPI can provide you with a very accurate monitor and thermocouple microprobes. WPI monitors have both resolution and accuracy of 0.1°C in the 0-50°C range and are traceable to NIST standards, whereas, other competitive electronic thermometers have

an accuracy that is usually to 0.5°C or worse. Furthermore, all our type T clinical probes are guaranteed accurate to 0.1°C, due to our stringent wire standards. These are five times more accurate than competitive probes made with regular "Special Limits" wire.



Probe Type	Size	Style	Time Constant	Isolated	Max. Temp.	Lead Length	Description
<b>NEEDLE MICROPROBES</b>							
Fast-response needle probes for instant readings in tissue, semisolids, liquids, very small specimens, powders and materials. Needle tip is sealed to ensure only stainless steel contacts specimen.							
MT-29/1	29 ga / 1 cm	A	0.125 sec	No	200°C	5 ft	29 gauge approximately 0.013-in
MT-29/2	29 ga / 2 cm	A	0.125 sec	No	200°C	5 ft	-
MT-29/3	29 ga / 3 cm	A	0.125 sec	No	200°C	5 ft	-
MT-29/5	29 ga / 5 cm	A	0.125 sec	No	200°C	5 ft	-
MT-26/2	26 ga / 2 cm	A	0.1 sec	No	200°C	5 ft	26 gauge approximately 0.018-in
MT-26/4	26 ga / 4 cm	A	0.1 sec	No	200°C	5 ft	-
MT-26/6	26 ga / 6 cm	A	0.1 sec	No	200°C	5 ft	-
MT-23/3	23 ga / 3 cm	A	0.15 sec	No	200°C	5 ft	23 gauge approximately 0.125-in
MT-23/5	23 ga / 5 cm	A	0.15 sec	No	200°C	5 ft	-
MT-23/8	23 ga / 8 cm	A	0.15 sec	No	200°C	5 ft	-
MT-4	29 ga / 1 cm	A	0.025 sec	No	200°C	5 ft	Similar to MT-29/1 but has a blunt tip. Good for instant skin and surface temperatures, liquids
MT-D	-	C	0.025 sec	No	200°C	5 ft	Fast response surface probe (stainless steel for locating inflammation, arteries, etc. Also for dental use.
<b>FLEXIBLE IMPLANTABLE PROBES</b>							
Designed for high accuracy on extremely small specimens such as insects, seeds, etc. Maximum insertion depth 1/8". Totally sheathed in chemical resistant Teflon.							
<b>Sensor Lead Diameter</b>							
IT-14	0.050" dia	D	0.3 sec	Yes	150°C	3 ft	-
IT-18	0.025" dia	D	0.1 sec	Yes	150°C	3 ft	-
IT-18EXLONG	0.025" dia.	D	-	Yes	150°C	5 ft	-
IT-21	0.016" dia	D	0.08 sec	Yes	150°C	1 ft	-
IT-23	0.009" dia	E	0.005 sec	Yes	150°C	3 ft	For ultra fast measurements and for use on micro-size specimens. Tissue implantable with 239a. Needle (supplied). Rather fragile. Teflon coated.
IT-1E	0.025" dia	F	0.005 sec	Yes	150°C	3 ft	As IT-18 sensor except bead exposed. Combines ultra-fast response of IT-23 with sheath strength of IT-18.
<b>RECTAL PROBES</b>							
RET-2	-	G	0.8 sec	No	125°C	5 ft	Rectal probe for rats typically for fast intermittent measurements. Smooth ball tip (0.125-in. dia.) with 1" long (0.59-in. dia) stainless steel shaft.
RET-3	-	G	0.5 sec	No	125°C	5 ft	Rectal probe for mice similar to RET-2 except tip diam. 0.063-in. and shaft 3/4-in. long (0.028-in. diam.)
<b>GENERAL PURPOSE</b>							
HT-1	-	H	0.5 sec	No	400°C	5 ft	"Workhorse" probe for liquids, gases, semi-solids. Plastic handle with straight stainless steel shaft. Not good for surface temperatures.
HT-2	-	H	0.5 sec	No	400°C	5 ft	Like HT-1 except shaft length is 9-in.
BT-1	-	I	0.15 sec	No	240°C	5 ft	Plastic handle with welded stainless steel, immersible shaft used for surface temperatures of solids, liquids, gases and semisolids. Tip is 0.02-in. diam., at right angle to probe to facilitate surface measurement.



These probes may also be used with WPI's new **ATC2000** Animal Temperature Controller. See page 38

# Neuroscience Cannulas

## For in vivo investigation of rodents



Cannula assembly: fixing screw, internal cannula with attached tubing, and guide cannula.



Internal cannula secured with fixing screw.

**Exceptional Quality**  
**Best Prices**  
**Rapid Order Response**

This cannula system for neuroscience study and pre-clinical research includes an entire range of cannula options. The three primary components include the Guide Cannula, the Internal Cannula and the Dummy Cannula (cap)

- WPI cannulas are beveled inside and out and then polished to remove any burrs and ensure that the inside diameter is perfectly cylindrical. This limits undesired trauma to tissue and ensures smooth operation.
- WPI offers exceptional quality at the best prices.
- Quantities of each item are kept in stock so you can order as needed.

### Guide Cannulas

Gauge	OD	ID
22	0.64	0.46
24	0.56	0.40
26	0.48	0.32



The Guide Cannula is a surgical grade, stainless steel tube that is implanted into a rodent's skull and cemented into place using dental cement and screws. It guides the Internal Cannula to the specific injection site.

### Internal Cannula

Gauge	OD	ID
22	0.41	0.26
24	0.36	0.21
26	0.30	0.16



The Internal Cannula is inserted into the Guide Cannula to sample or inject fluid.

### Dummy Cannula

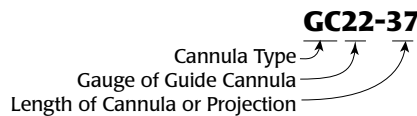
The Dummy Cannula has a stainless steel wire core, and it is placed in the Guide Cannula when the Internal Cannula is removed. It seals the opening and prevents tissue from entering the bottom of the Guide Cannula. The Dummy Cannula is threaded to securely tighten it so that the animal will not unscrew it while grooming.

### Ordering

Order the Guide Cannulas based on the gauge and length from the base and the Internal or Dummy Cannulas based on the length of the Guide Cannula and the projection from the Guide Cannula tip.

### Understanding Part Numbers

#### Cannula Type



GC—Guide Cannula

INC—Internal Cannula

DUMC—Dummy Cannula

Gauge—Choose the gauge of the Guide Cannula that will be used, even if you are specifying an

Internal or Dummy Cannula. Choices include 22, 24 and 26 gauge.

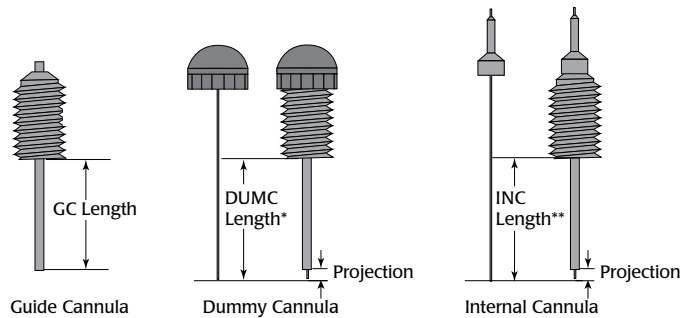
**Length**—Guide Cannulas can be ordered in a range of lengths from 3.4–8.5mm. Length can be specified to 0.1mm, with a tolerance of  $\pm 0.07$ mm. For example, a **GC24-60** is a 24ga. cannula that is 6.0mm long.

For other cannulas, the length is determined by the desired projection length and the guide cannula length. The projection can extend beyond the tip of the Guide Cannula up to 1.0mm.

$$DUMC \text{ Length} = GC \text{ Length} + \text{Projection}$$

$$INC \text{ Length} = GC \text{ Length} + \text{Projection}$$

For example, for a Dummy Cannula flush with the end of a 26ga Guide Cannula that is 6.0mm long, order a **DUMC26-60**. For an internal cannula that projects 0.5mm beyond the 6.0mm Guide Cannula (6.5mm), order an **INC26-65**.



\* DUMC Length = GC Length + Projection. If the cap is screwed on too tightly, the projection will be longer than expected.  
\*\* INC Length = GC Length + Projection. Internal cannula mounts flush and does not screw into place.

### Cannulas

	Qty 1-9	Qty 10-19	Qty 20-49	Qty 50-99	Qty 100+
<b>GC22-X</b>	Guide Cannula, 22 Gauge, X.0mm				
<b>INC22-X</b>	Internal Cannula, 22 Gauge, X.0mm				
<b>DUMC22-X</b>	Dummy Cap Cannula, 22 Gauge, X.0mm				
<b>GC24-X</b>	Guide Cannula, 24 Gauge, X.0mm				
<b>INC24-X</b>	Internal Cannula, 24 Gauge, X.0mm				
<b>GC26-X</b>	Guide Cannula, 26 Gauge, X.0mm				
<b>INC26-X</b>	Internal Cannula, 26 Gauge, X.0mm				
<b>DUMC26-X</b>	Dummy Cap Cannula, 26 Gauge, X.0mm				

### Flexible PE Tubing

	Qty 1-9	Qty 10-19	Qty 20-49	Qty 50-99	Qty 100+
<b>504278</b>	0.25mm ID, 0.5mm OD, 1m long				
<b>504279</b>	0.42mm ID, 0.85mm OD, 1m long				
<b>504280</b>	0.6 mm ID, 1.1mm OD, 1m long				

Flexible PE tubing are recommended to connect to Internal Cannula (INC) only, NOT Guide Cannula (GC) or Dummy Cap (DUMC).

504278 matches INC26-XX      504279 matches INC24-XX      504280 matches INC22-XX

### Misc. Accessories

	Qty 1-9	Qty 10-19	Qty 20-49	Qty 50-99	Qty 100+
<b>504281</b>	Fixing Screw for connection of INC & GC				
<b>504282</b>	Instant Cyanoacrylate Adhesive, 3g				
<b>504283</b>	Instant Cyanoacrylate Adhesive, 20g				