

# surgical tools



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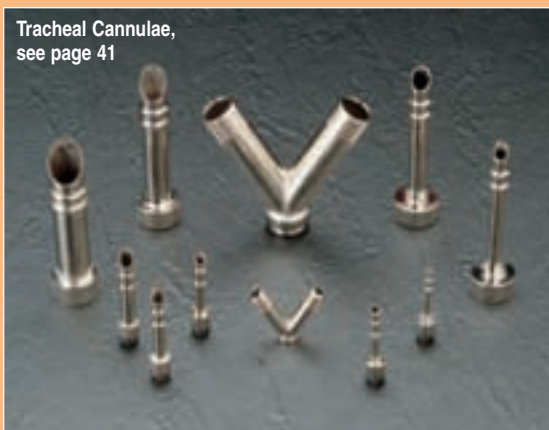
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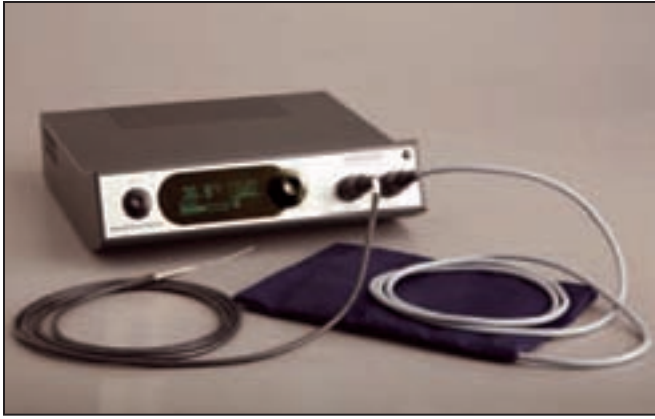
## NEW Homeothermic Monitoring Systems



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- **NEW user interface with:**
  - Large graphical display
  - Menu driven user interface
  - Rotary encoder and push buttons to make temperature selection clear and easy as well as providing easy access to the menus and settings
- Set temperature displayed continually on screen
- Two modes now available:
  - Homeothermic control or
  - Stand alone digital thermometer
- Audible & visual alarms user set for minimum and maximum points
- Animal body temperature control at its simplest-feedback loop maintains animal's temperature
- Versatile – offered in three sizes – for adult mice, rats, cats, dogs or similar sized animals
- Centigrade or Fahrenheit selection set by menu option
- Displays actual body temperature on Control Unit
- New digital circuitry provides wide linear temperature response between 0° and 99.9°C (32° to 211.8°F)

### NEW Large Display

The new system has a large vacuum fluorescent display so you can easily see the temperature selected.

### Simple and Easy

Place the animal on the blanket for procedures and recoveries. For more exacting body temperature wrap the animal tightly in the heating blanket, using tape if necessary. Insert the temperature-sensing probe rectally, and set the required temperature by means of the control on the front panel. Should the animal's core temperature fall, power is automatically increased to the blanket; conversely, power will automatically reduce if the animal's temperature rises. During this process the animal's temperature is continuously displayed on the front panel display.

This homeothermic blanket system consists of three parts: a probe, a control unit, and a blanket. An operating table version is also available.

The flexible probe is a precision thermistor encapsulated in a bead of epoxy resin at the top of a flexible hollow plastic tube. The 1.7 mm diameter probe is 100 mm (4 in) long and has a 2 m (6 ft) long cable with plug for attachment to the control unit. It is suitable for a wide range of laboratory animals from adult mice to large dogs.

The output of the temperature sensing probe is used by the control unit to proportionally control the DC supply to the blanket. This method of control alleviates the interference problems associated with that of non-proportional control, such as switching contacts, thus enabling the system to be used in conjunction with high-gain recording systems.

The control temperature is adjusted using the rotary encoder and can be set between 20° and 50°C (68° and 122°F). The control temperature is continually shown in the main display alongside the actual temperature.

The blanket consists of a highly flexible insulated heating element, which can be folded without risking internal damage. It is electrically floating, with respect to ground however, one end of the heating element can be grounded by a switch on the front panel of the control unit. The system operates satisfactorily whether or not the blanket is grounded. Special circuitry eliminates electrical noise thus permitting sensitive recordings.

Blankets are available in three sizes and each comes with a 2 m (6 ft) cable to attach to the control unit:

- Small Blanket: Measures 15 x 20 cm (6 x 8 in) and is suitable for rodents
- Medium Blanket: Measures 45 x 70 cm (18 x 27 in) and is suitable for rabbits and cats
- Large Blanket: Measures 60 x 90 cm (24 x 36 in) and is suitable for dogs

Each system is supplied complete with control unit, flexible temperature probe, blanket and plastic cover for the blanket. The operating table version is supplied with the Rodent Operating Table instead of a blanket. See page D8 for complete details on the table.

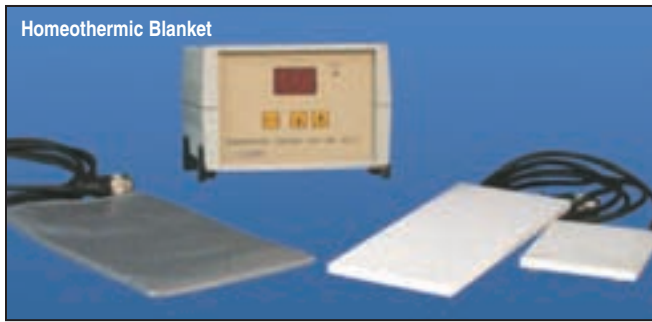
### Homeothermic Monitor Systems

Blanket Size	115 VAC, 60 Hz	230 VAC, 50 Hz
Rat Blanket	EC1 50-7220-F	EC1 50-7221-F
Cat Blanket	EC1 50-7222-F	EC1 50-7223-F
Dog Blanket	EC1 50-7224-F	EC1 50-7225-F

Order #	Product
EC1 50-7217	Flexible Probe Only, 1.7 mm OD
EC1 50-7214	Rat Blanket Only, 15 x 20 cm (6 x 8 in)
EC1 50-7215	Cat Blanket Only, 45 x 70 cm (18 x 27 in)
EC1 50-7216	Dog Blanket Only, 60 x 90 cm (24 x 36 in)
EC1 50-7178	Spare Plastic Cover for Rat Blanket
EC1 50-7194	Spare Plastic Cover for Cat Blanket
EC1 50-7210	Spare Plastic Cover for Dog Blanket
EC1 50-7212	Control Unit Only, 115 VAC
EC1 50-7213	Control Unit Only, 230 VAC

## Homeothermic System for Controlling Body Temperature in Small Animals

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### Key Features

- Interchangeable and precalibrated temperature probes
- Electrical noise avoided thanks to DC power supply
- Control unit raises/lets temperature drop in order to match preselected desired animal's body temperature
- Models available for a number of species (rat, mouse, rabbit)

### Parameters Measured

- Blanket temperature
- Animal rectal temperature

### Components Included

- Soft Blanket or Hard Pad
- HB101 Control Unit
- One temperature probe

### Options

- Wide Range of temperature probes

The Panlab/Harvard Apparatus S.L. homeothermic blanket allows a precise control of the body temperature in small laboratory animals (mouse, rat, hamster or rabbit). The complete system consists of a blanket or a pad, a control unit and a temperature probe.

Basically, the desired body temperature (32° to 45°C) is easily set by the front panel of the control unit. The body temperature is controlled by the linear temperature probe connected to the control unit. When the body temperature falls below the target, the control unit increases the temperature of the blanket.

The blankets can be hard (rigid pad), suitable for stereotaxic surgery as it fits perfectly into the stereotaxic frame or a soft blanket.

The heat of the blanket is maintained by the HB-101 or HB 121 Control Units, working with a DC power supply to minimize electrical noise interferences on surrounding electronic apparatus. The unit allows the user to adjust the animal body temperature between 32 to 45°C. The heat is maintained by a probe associated to the blanket or by a rectal thermistor probe. A switch allows selecting the probe which temperature will be used as reference by the control unit. Both blanket and animal body temperatures can be visualized simultaneously on two different displays on the HB121 control unit.

The control unit (HB101 or HB121) can be delivered with a RS-232 output & SeDaCom software, so the user can see the temperature data on his computer at selected time periods.

The homeothermic system uses calibrated thermistor probes which are interchangeable with no loss of accuracy.

### Specifications

Temperature Range	32-45 degrees Celsius
Resolution	0.1 degrees Celsius
Dimensions	
Mouse Soft Blanket	10 x 15 cm
Mouse Hard Pad	11.4 x 9 cm
Rat Soft Blanket	15 x 25 cm
Rat Hard Pad	10.5 x 23 cm
Rabbit Soft Blanket	40 x 70 cm
Temperature Probe Diameter:	
YS451 Probe	2 mm
YS402 Probe	3 mm
YS401 Probe	4.2 mm
Computer requirements	PC (Windows 95, 98, ME, NT, 2000 and XP)

Order #	Model	Product
EC1 76-0104	HB101M402	Mice Homeothermic Pad with YS402 Rectal Probe
EC1 76-0105	HB101M451	Mice Homeothermic Pad with YS451 Probe
EC1 76-0106	HB101SM402	Mice Homeothermic Blanket with YS402 Rectal Probe
EC1 76-0107	HB101SM451	Mice Homeothermic Blanket with YS451 Rectal Probe
EC1 76-0108	HB101S402	Rat Homeothermic Blanket with YS402 Rectal Probe
EC1 76-0109	HB101H402	Rat Homeothermic Pad with YS402 Rectal Probe
EC1 76-0110	HB101RB401	Rabbit Homeothermic Blanket with YS401 Probe

### Options

EC1 76-0111	RS	RS-232 Communications Port (SeDaCom Software included)
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### Citations

- Pedersen M et al. (2007) Cerebral blood flow autoregulation in early experimental S. pneumoniae meningitis. *J. Appl. Physiol.* 102: 72-78. (rat, Denmark)
- Rippe A et al. (2007) Disproportionally low clearance of macromolecules from the plasma to the peritoneal cavity in a mouse model of peritoneal dialysis. *Nephrol. Dial. Transplant.* 22(1):88-95. (HB 101/2, mouse, Sweden)
- Burgete M et al. (2006) Dietary phytoestrogens improve stroke outcome after transient focal cerebral ischemia in rats. *E. J. Neurosci.* 23 (3): 703-710. (transient focal cerebral ischemia, rat, Spain).
- Rosengren BI et al. (2006) Transvascular protein transport in mice lacking endothelial caveolae. *Am. J. Physiol. Heart Circ. Physiol.* 291: H1371-H1377. (HP 101/2, mouse, Sweden, Norway)
- Winkelmann ER et al. (2006) An ultrastructural analysis of cellular death in the CA1 field in the rat hippocampus after transient forebrain ischemia followed by 2, 4 and 10 days of reperfusion. *Anatomy and Embryology.* 211(5): 423-434. (transient cerebral ischemia, rat, Brazil)
- Gozalov A et al. (2005) Role of KATP channels in the regulation of rat dura and pia artery diameter. *Cephalalgia.* 25(4):249. (rat, Denmark)

## Operating Tables Size 1 for Mice, Size 5 for Rodents



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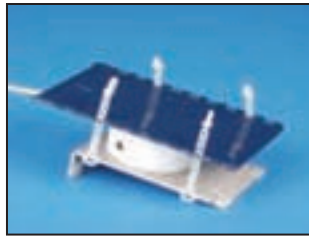
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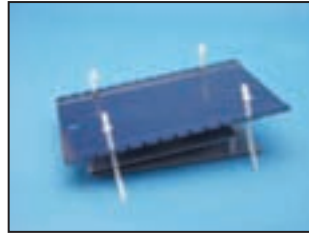
Size 1 with Tripod Stand with ball joint



Size 1 with Flat angled Stand



Size 5 with Tripod Stand with ball joint



Size 5 with Flat angled Stand

- For general surgical work on small animals mouse, rat, and guinea pig
- Eight different versions available for each size:
  - Non-heated with tripod or flat angled base
  - With heating, power supply and tripod or flat angled base
  - With heating controller and tripod or flat angled base
  - With heating, homeothermic temperature controller and tripod or flat angled base
- Includes paw holders
- Capable of receiving thorax retractors and mounting ball joint holders

Eight different configurations are available for each size of the operating table, size 1 for mice or size 5 for larger rodents. Each configuration is equipped with four paw clamps. Experimental requirements and user's preference dictate the preferred configuration. The core components for the size 1 consist of a 160 x 100 mm (6.3 x 3.9 in) and for the size 5 of a 300 x 195 mm (11.8 x 7.7 in) plastic coated aluminium plate. Both sides of the plate have multiple slots for fixing the paw clamps and optional thorax retractors. Numerous slots and dedicated paw holders allow both large and small animals to be held firmly in position for optimal surgical access. A block clamp with ball joint holder can be fixed onto the plate for holding various probes, electrodes, or cannulae. A 4 mm banana plug outlet is available when grounding of the table is required, e.g. for ECG recordings.

Two different models of the mounting base are available, the traditional Tripod stand mounted on a ball joint allowing the table to tilt in multiple directions or the new Flat Angled version with a lower profile consuming less working height.

The non-heated operating table models are recommended only for necropsy studies or short term anaesthetized animal experiments such as procedures calling for the removal of isolated organs or tissues. These models are not upgradeable to heated versions.

### Table Specifications

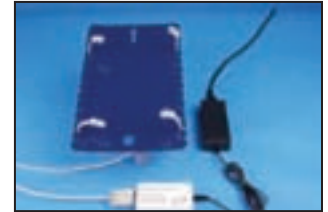
Table Plate	300 x 195 mm, (11.8 x 7.7 in), stainless steel, plastic coated
Height with Tripod	From 160 to 180 mm (6.3 - 7.1 in). Can be inclined in all directions
Height Flat Base	55 mm (2.2 in)
Heating Element	silk-screen printed embedded resistor
Heater Resistance	approximately 1.5 Ohm
Weight	3 kg (6.6 lb) with tripod base, 3 kg (6.6 lb) with flat base

Three different versions of the heated operating table are available depending on the level of temperature control required. The heated operating table models have a built-in embedded heating element and temperature probes to ensure the temperature of the table is maintained and for safety shutoff in association with the controllers.

### The Basic Fixed Temperature Heated Model with Adapter Box and Power Supply



Size 1 with Fixed Temperature



Size 5 with Fixed Temperature

The adapter consists of a separate box including the permanent control of the operating table temperature. It controls the table temperature via the temperature sensor built-in the operating table. The temperature of the operating table is fixed to 38°C (100.4 °F).

### Specifications (Heated with Power Supply)

Power Output	12 V DC / 60 VA
Mains Voltage	115 V/60 Hz - 230 VAC/50 Hz
Dimensions	Adapter box 105 x 55 x 30 mm (4.1 x 2.2 x 1.5 in)
Power Supply	140 x 60 x 30 mm (5.5 x 2.4 x 1.5 in)
Weight	0.6 kg

### The Advanced Fixed Temperature Heated Model with Heating Controller 872/1



Size 1 with Heating Controller



Size 5 with Heating Controller

In this version, there is no feedback control. The table is heated and maintained at stable temperature by controlling the amount of DC-energy to the heating element. On the controller the energy is adjustable in a range of 20-100% of the maximum energy. The controller also ensures the safety shutoff. These models are often used for quick surgical procedures.

## Operating Tables Size 1 for Mice, Size 5 for Rodents



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### The Advanced Fixed Temperature Heated Model with Heating Controller 872/1 (cont'd)

or acute animal studies (30 minutes or less) requiring the core temperature of the animal be maintained. To adjust the controller an electronic thermometer for measuring the animal body temperature is used.

#### Specifications (Heating Controller)

Power Output	DC 9 Volt, 40 VA adjustable in the range 20 - 100%
Mains Voltage	230 VAC/50 Hz Version, or 115 VAC/60 Hz Version
Dimensions	125 x 95 x 210 mm (4.9 x 3.8 x 8.3 in)
Weight	2 kg (4.4 lb)

### The Homeothermic Controlled Version



Size 1 with Homeothermic Controller



Size 5 with Homeothermic Controller

Should the animal's core temperature fall, power is automatically increased to the operating table; conversely, power will automatically reduce if the animal's temperature rises. During this process the animal's temperature is continuously displayed on a front panel LCD display.

This homeothermic controller consists of three parts: a probe, a control unit, and an adapter box. The flexible probe is a precision thermistor encapsulated in a bead of epoxy resin at the top of a flexible hollow plastic tube. The 1.75 mm diameter probe is 100 mm (4 in) long and has a 2 m (6 ft) long cable with plug for attachment to the control unit. It is suitable for a wide range of laboratory animals from adult mice to rat and guinea pigs

The rigid probe is a stainless steel shaft with a diameter of 1.6 mm. The shaft attaches to a 2 m (6 ft) cable with a plug that connects to the control unit. It is suitable for rats and guinea pigs. The output of the temperature sensing probe is used by the control unit to proportionally control the regulated, low-voltage DC supply to the operating table. This method of control alleviates the interference problems associated with that of non-proportional control, such as switching contacts, thus enabling

the system to be used in conjunction with highgain recording systems.

The control temperature is preset at 37°C (98.6°F) at the factory, but can be adjusted within the range of 35° to 40°C (95° to 104°F) by means of a control on the front panel. An LCD display on the control unit continuously displays the probe temperature. A horizontal LED bar graph indicates the level of power being delivered to the operating table. When core temperature is substantially below the desired temperature the bar graph will indicate maximum power being delivered.

The adapter consists of a separate box including the permanent control of the maximum temperature of the operating table. It acts as a safety circuit by limiting the maximum temperature of the operating table to 40°C. This circuit uses a second thermistor probe built-in the operating table.

The operating table is electrically floating, with respect to ground however, one end of the heating element can be grounded by a switch on the front panel of the control unit. The system operates satisfactorily whether or not the operating table is grounded. Special circuitry eliminates electrical noise thus permitting sensitive recordings.

#### Specifications (Homeothermic Control)

Power Output	Maximum 40 VA. Supplied continuously (not switched), the level is dependent on the temperature monitored
Ripple Output	Less than 10mV RMS
Temperature Accuracy	±1% of actual temperature (35°C to 40°C)
Temperature Range	35°C to 40°C monitored on the front panel LCD
Temperature Safety Limit	40°C
Analogue Output	50 mV at 35°C to 150 mV at 40°C (20 mv/°C)
Mains Voltage	230 VAC/50 Hz Version, or 115 VAC/60 Hz Version
Dimensions, W x H x D	274 x 320 x 94 mm (10.8 x 12.6 x 3.7 in)
Weight	3 kg (6.6 lb)

#### Order # Product

<b>EC1 50-7217</b>	Flexible Probe for All Systems, 2 mm OD
<b>EC1 73-2358</b>	Thorax Retractors with Ball Chain, 1 pair, for Size 5 Table ONLY
<b>EC1 73-2353</b>	Holder for Clamping Probes, Electrodes and Cannulae, for Size 5 Table ONLY
<b>EC1 73-3572</b>	Replacement Paw Holders, pkg. of 5, for Size 5 Table ONLY

See Accessories on next page.

### Operating Table Size 1

Base	Non-Heated		Heated with Power Supply		Heating Controller		Homeothermic Controller	
	115V	230V	115V	230V	115V	230V	115V	230V
Tripod	EC1 73-3754	EC1 73-3754	EC1 73-3774	EC1 73-3774	EC1 73-3770	EC1 73-3771	EC1 73-3778	EC1 73-3779
Flat Angled	EC1 73-3768	EC1 73-3768	EC1 73-3775	EC1 73-3775	EC1 73-3772	EC1 73-3773	EC1 73-3780	EC1 73-3781

### Operating Table Size 5

Tripod	EC1 73-3529	EC1 73-3776	EC1 73-3584	EC1 73-3582	EC1 73-3782	EC1 73-3783
Flat Angled	EC1 73-3530	EC1 73-3777	EC1 73-3586	EC1 73-3585	EC1 73-3784	EC1 73-3785

## Mini-OP Tables



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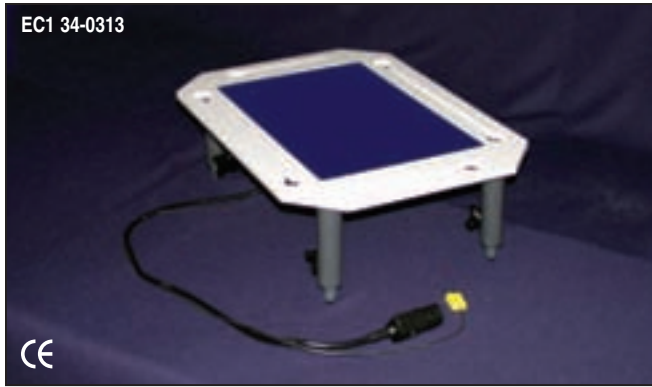
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### IMS Heated Mini-OP Table

Animals tend to lose body temperature while undergoing surgery and it is therefore advisable to provide supplementary heat. The Heated Mini-OP Table is ideal for more demanding types of small animal surgery.

The heated area measures 300 x 200 mm and is placed centrally. It has a stainless steel surface. The outer edge of the table is made from a heavy duty plastic, machined to accommodate sliding instrument stands and to provide anchorage for retractors and other equipment.

The overall dimension is 420 x 300 mm. The whole unit is adjustable in any plane to give ideal operating maneuverability. The adjustable supports allow any working height between 115 mm and 185 mm and allows the table to be inclined to present the most suitable presentation.

The table has a mains lead and thermostat lead which plug into a central mains control unit. The control unit is supplied with the table as a package.

Each table is supplied with the following equipment:

- **Mains Control Unit**
- **Table with heated area**
- **6 x Edge Clamps**
- **4 x Crocodile Clips**
- **2 x Uprights**
- **1 x Rod**
- **3 x Bossheads**
- **1 x Clamp (Suitable for Holding a Fluovac Size 1 Anesthesia Mask)**

Order #	Model	Product
EC1 34-0313	6.39.0	IMS Heated Mini-OP Table, 230 VAC



### IMS Mini-OP Table

Designed specifically for operative work in small animals, the IMS Mini-OP Table tilts in any direction to ensure the patient is always presented to the best advantage. A choice of two tops is available. One contains slots to accommodate uprights so that additional equipment can be used.

The table top stands 150 mm above the base and can be height adjusted for user comfort. It is manufactured

in lightweight, non-absorbent PVC, which retains heat and therefore helps to maintain body temperature. The metal base has non-slip feet.

Accessories supplied with the IMS Mini-OP Table:

- **Crocodile Clips 4 supplied. They are used to secure the animal during necropsy. 150 mm long ball chain and connector are included.**
- **Retractors 6 supplied. These stainless steel rods measure 50 mm in length. They can be bent into the desired shape. 150 mm chain and connector included.**
- **Edge Clamps 6 supplied. They can be clamped around the edge of the table to accommodate retractors and crocodile grips.**
- **Uprights 2 supplied. They fit into the table slots to provide a 5 mm diameter bar to which equipment can be attached.**
- **Bossheads 2 supplied. They are used with the uprights and are made from tough plastic with nylon screws.**
- **Rod 1 supplied. It is useful for positioning equipment precisely where it is needed. The edge clamps can be fitted to the rods to give greater flexibility of use. They are manufactured in stainless steel and measure 200 mm long and 5 mm in diameter.**

Order #	Model	Product
EC1 34-0294	6.30.0	IMS Mini-OP Table & Accessories



Order #	Model	Product
EC1 34-0314	6.39.1	Set of Retracting Instruments

## Operating Tables and Boards



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- Available as stand alone table or as complete homeothermic heated table
- Uniformly heated with temperature regulation

### Heated Rodent Operating Table

This heated rodent operating table is a sturdy piece of equipment that will stand up to daily use. The entire top portion of the table is

mounted on a heavy base by means of a sturdy ball and socket joint. The socket allows the table top to be swiveled and tilted into any convenient position and then locked securely in place.

The stand alone table has a warming chamber under the table top and contains a small, metal-sheathed 40 watt heater. An energy regulator controls the table top surface varying the heating cycle when necessary. The regulator is calibrated from "full" to "off" through ten marked points. Uniform heat distribution is maintained over the entire surface by an insulation barrier located between the woven resistance mat and stainless steel top.

The Homeothermic Rodent Operating Table includes a rectal thermometer-sensing probe and a sensitive control unit. The system continuously monitors the animal's core temperature during surgery and, through the controller, automatically adjusts the table temperature. For complete details on the probes and control unit, see page D2.

These operating tables are supplied with a cork mat that has a cutout in the center for holding the animal. Four stainless steel 6.5 mm (1/4 in) diameter rods and four tying cleats are supplied with the Table. Each 20.4 cm (8-1/16 in) rod is mounted on a simple slotted clamp with a locking screw. The table is mounted on a heavy base fitted with non-slip feet. The top measures 20 x 26 cm (8 x 10 in). It weighs 4.3 kg (9-1/2 lb).

Order #	Product
EC1 50-1205	Heated Rodent Operating Table, 115 VAC, 60 Hz
EC1 50-1213	Heated Rodent Operating Table, 230 VAC, 50 Hz
EC1 50-1221	Replacement Cork Mat
EC1 50-7226-F	Homeothermic Rodent Operating Table with Flexible Probe, 115 VAC, 60 Hz
EC1 50-7227-F	Homeothermic Rodent Operating Table with Flexible Probe, 230 VAC, 50 Hz
EC1 50-7152	Heated Table Only, for use with Homeothermic Control Units EC1 50-7129 and EC1 50-7137



- Captures anesthetic gases
- Removable stainless steel work surface
- Specifically designed anesthetic chamber
- Autoclavable

### Portable Down-Draft Small Animal Operating Table

This Down-Draft Table provides an effective way to decrease operator exposure to waste anesthetic gases during rodent procedures without altering the depth of anesthesia. Optional filters for anesthetics, formalin, organic vapors, hazardous and nuisance dusts help comply with laboratory standards and regulations. Captured air is sent either to the filter located within the unit via a blower fan or to an existing exhaust ventilation system.

The Down-Draft Table includes an anesthetic chamber specially designed for use with this table. Accessories include an anodized aluminum cart with optional drop down shelves, storage cabinet and light fixture. Order Potassium Permanganate Filters for formaldehyde use, Carbon Filters for anesthetics use, and Carbon/Potassium Permanganate 50/50 Filters for both formaldehyde and anesthetics applications.

#### Dimensions

Down Draft Table, H x W x D	45.7 x 61.0 x 76.2 cm (18 x 24 x 30 in)
Work Surface, W x D	76.2 x 43.2 cm (24 x 17 in)

Order #	Product
EC1 72-6201	Portable Down-Draft Table with Blower
EC1 72-6202	Portable Down-Draft Table with Vent
EC1 72-6203	Accessory Package (Folding Shelves, Cabinet and Light)
EC1 72-6204	Folding Shelves only
EC1 72-6205	Anodized Aluminum Cart
EC1 72-6206	Potassium Permanganate Filter, pkg. of 2
EC1 72-6207	Carbon Filter, pkg. of 2
EC1 72-6208	Carbon/Potassium Permanganate Filter 50/50, pkg. of 2
EC1 72-6209	HEPA Filter, pkg. of 1



### Frog Board

To prevent warping, this 9 x 14 cm (3-1/2 x 5-1/2 in) Frog Board is made of a thick piece of cork cemented to a heavy piece of

12.5 mm (1/2 in) thick white acrylic. A clamp and locking screw are mounted on the side with an opening to fit a standard 9.5 mm (3/8 in) diameter rod (not supplied), see the Clamps, Stands and Lattices Section.

Order #	Product
EC1 50-3565	Frog Board

## Operating Tables and Boards



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Heated Small Animal Operating Table

- This operating table is good for general surgical work on small animals

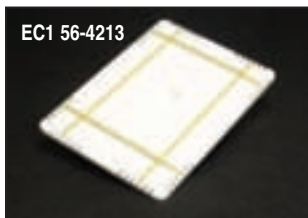
### Heated Small Animal Operating Table

The top is a flat, heavy gauge, biologically inert piece of stainless steel measuring 23 x 33 cm (9 x 13 in). A warming chamber located beneath this top contains a small metal sheathed 40 watt heater controlled by an energy regulator. An energy regulator controls the table top surface, varying the heating cycle when necessary. The regulator is calibrated from "full" to "off" through ten marked points. This allows adequate heating control for most operating procedures. Indicator lights are visible when the heater is on and when the regulator is switching.

Uniform heat distribution is maintained over the total surface by an insulation barrier located between the resistance mat and stainless steel top. Four stainless steel 6.5 mm (1/4 in) rods are supplied with the Table. Each 20.4 cm (8-1/16) rod is mounted on a simple slotted clamp with a locking screw. The slot of this clamp fits over the edge of the Table and allows the rod to be inserted anywhere along the edge of the Table or slid along the edge into position. Four tying cleats are also supplied which have a deep slot similar to the rod clamps to fit over the edge of the table and secure with a locking screw. The top of the cleat has a tapered slot that binds any tying strings securely in place. These cleats, like the rod, can be inserted at any point around the edge of the Table or can be slid along the edge into position. Folding legs under the Table allow the Table to be used in a tilted position.

#### Order # Product

EC1 50-1239	Heated Sm. Animal Operating Table, 115 VAC, 60 Hz
EC1 50-1247	Heated Sm. Animal Operating Table, 230 VAC, 50 Hz



EC1 56-4213

- Facilitates implantation of the small vascular access port in rodents, see pages B38 - B41.

Its non-porous working surface measures 20.3 x 29.2 cm (8 x 11-1/2 in) and has grooves running both its length and width for drainage or placement of the flushing line during surgery.

Four surgical rubber restraining straps can easily be adjusted to accommodate animals of various sizes by way of numerous hold-down slots located on the edges of the Board. A large central well facilitates ventral surface surgery once the port is implanted in the animal's dorsal surface.

This Rodent Operating Board is supplied with four adjustable length, surgical rubber restraining straps. The Board weighs 1.7 kg (3-3/4 lb).

#### Order # Product

EC1 56-4213	Rodent Operating Board
-------------	------------------------

### Rodent Operating Board

This innovative Operating Board for small animal surgical work is constructed of 1.89 cm (3/4 in) thick, high performance acrylic resin and natural minerals, making it stain resistant, steam sterilizable and extremely durable.



EC1 52-0452

EC1 52-0445

EC1 52-6942

- Provides excellent access to the entire length of the animal

### Plastic Operating Boards

These one-piece molded boards hold rodents and other small animals during surgery. They provide excellent access to the entire length of the animal. A quick-release system of restraint cords and locking cleats

quickly and easily attach the animal to the Board. The large Rodent Board has a raised center for easily positioning the animal. Fluids drain to the sides and a folding metal leg elevates one end of the board for special positioning.

The small Rodent Board has a built-in "V" design for easy positioning of the animal. Fluids drain to the center of the Board. The Rabbit Board has a "V" design for easy positioning of the animal. Suction cups on the feet hold the unit steady. A folding leg tilts the board to a 30° angle.

Each is supplied with four cleats, one mounted at each corner, and five restraining cords for quick tie-down of animals.

### Plastic Operating Boards

Order #	Board	Dimensions, L x W	Max. Weight Range	Length of Animal
EC1 59-6942	Rodent Large	40.6 x 13 cm (16 x 5-1/8 in)	Up to 500 g	35.6 cm (14 in)
EC1 52-0445	Rodent Small	27.9 x 11.4 cm (11 x 4-1/2 in)	Up to 125 g	20.3 cm (8 in)
EC1 52-0452	Rabbit	60 x 30 cm (24 x 12 in)	—	—



## Surgical Retractor Systems



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- Now you can perform solo surgery
- Ideal for use with Harvard Apparatus' small homeothermic blanket systems
- Easily accommodates animals in either prone or supine position

### Small Animal Surgery Tray

The small animal surgery tray is anatomically designed to accommodate small animals in either the prone or supine position. There are 10 slots on each of two adjustable retractor arms and 32 slots around the perimeter of the tray that accept elastic stay hooks. These ingenious devices retract the incision exactly where you need it and with exactly the right amount of tension. They do not obstruct the surgical site. See to the right for complete listing of elastic stays which are sold separately.

To maintain an animal's body temperature, this tray easily accommodates Harvard Apparatus' small homeothermic blanket, see page D2. It is an ideal choice when precise control of body temperature is required. The blanket and temperature probe cables easily fit through the cable port on the side of the tray. There is also a drain with collection well for fluids.

#### Specifications

Composition	Injection-molded using GE Noryl® resins
Inside Dimensions	30.1 x 15.5 x 4.0 cm (11.75 x 6 x 1.5 in)
Stay Slots	32 perimeter slots on tray and 10 slots on each of two retractor arms
Fluid Collection	1.5 ml collection well (drain plugged)
Drain Hole	Accepts 1/4 in ID Tygon® formulation S-50-HL or equivalent
Maximum Retraction	Up to 1.6 kg (3.5 lb) per Tension elastic stay
Packaging	Disassembled, non-sterile, elastic stays sold separately
Sterilization	Cold sterilize only

Order #	Product
EC1 72-2590	Small Animal Surgery Tray

- Self-retaining design permits surgery without an assistant
- Provides fully balanced exposure — no bulky attachments or instruments to obstruct surgical site
- Versatile design — adapts to the animal anatomy during the surgery and incision closure
- Autoclavable

### Small Animal Retractor System

A complete system consists of three components; the small animal surgery tray (EC1 72-2590), the plastic retractor ring (EC1 72-2591 or EC1 72-2592) and the elastic stays (see page D11). These parts must be ordered separately. Different areas of the ring may be raised or lowered using the thumbscrews along the edge of the ring to permit the ring to be adapted to the anatomy of the surgical site. Available in two sizes, the larger size has 6 thumbscrews while the smaller size has 4.

The elastic stays provide precise retraction with adjustable tension without obstructing the surgical site. The stays are placed along the perimeter of the ring at preset locations. The elastic stays must be purchased separately from the retractor ring. Four types of elastic stays are available. See next page for details.

#### Specifications

Retractor Ring:	
Composition	Injection-molded using GE Noryl® silicone and resins, does not contain latex
Small Ring, L x W	14.2 x 14.2 cm (5.6 x 5.6 in)
Large Ring, L x W	25.0 x 14.2 cm (9.8 x 5.6 in)
Stays:	
Composition	Silicone and stainless steel
Overall Length	16 cm (6.3 in)
Tubing OD	3.3 mm (0.13 in)
Maximum Tension	Up to 3.5 lb (1.6 kg)
Sterilization	Steam or cold sterilization

Order #	Product
EC1 72-2591	Retractor Ring, large
EC1 72-2592	Retractor Ring, small

## Surgical Retractor Systems (continued)



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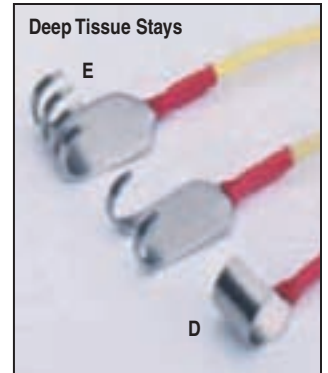
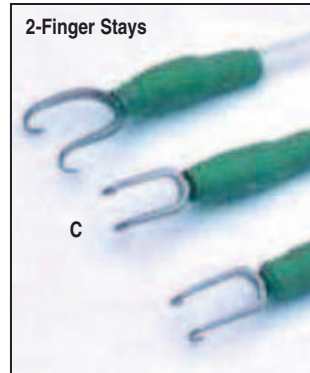
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### Elastic Stays

Single hook stays (A, B) are for general purpose use. A new single hook stay is available. See full details below. You may also select from 2-finger sharp stays (C) or deep tissue blade stays, both solid (D) or with either 2 or 4 blunt fingers (E). All of the blade stays have a hook radius of 12 mm (0.5 in). Select the appropriate stay based on your surgical needs.

The newest addition to the stay line is one made from solid silicone. This hook is molded out of solid silicone, and features a 5-mm stainless steel sharp hook. The entire body of the elastic stay is molded in one piece from solid silicone, with no hollow tail.

- Solid silicone-molded design provides easier re-sterilization by autoclave techniques
- Environment-friendly packaging
- Tinted a medium green color for easy recognition
- 6 hooks per package

The solid silicone-molded design provides easier re-sterilization by autoclave techniques. The design features no cracks, crevices, or cavities that might make it difficult to clean.

### Single Hook Stay, Non-Sterile Solid Silicone, pkg. of 6

Order #	Style	Hook Radius
EC1 72-2606	Single Hook	3 mm

### Single Hook Stays, Sterile, pkg. of 8

Order #	Style	Hook Radius
---------	-------	-------------

#### Sharp

EC1 72-2593	Medium	3.0 mm
-------------	--------	--------

#### Blunt

EC1 72-2595	Medium	5.0 mm
EC1 72-2596	Large	12 mm
EC1 72-2597	Large (Dual Tube)	12 mm

### 2-Finger Sharp Stays, Sterile, pkg. of 4

Order #	Finger Spread	Hook Radius
EC1 72-2598	5 mm	3 mm
EC1 72-2599	7 mm	3 mm
EC1 72-2600	10 mm	3 mm

### Deep Tissue Blade Stays, Sterile, pkg. of 4

Order #	Style	Blade Width
EC1 72-2601	Solid Blade	6.5 mm
EC1 72-2602	Solid Blade	13 mm
EC1 72-2603	2-Finger Blunt	14 mm
EC1 72-2604	4-Finger Blunt	20 mm

### Alligator Style Clip Stays, Sterile, pkg. of 4

EC1 72-2607
-------------

For Surgical Instruments, click here.

## Medium Size Animal Heated Operating Tables



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EC1 50-1361 Medium Animal Hydraulic Base Operating Table



EC1 50-1320 Medium Animal Frame Base Operating Table

- For use with animals weighing up to 40 kg (88 lb)
- Choice of hydraulic or frame base
- The heated operating table with hydraulic base is ideal for dissection, post-mortem and general surgical use
- The heated operating table with frame base provides maximum rigidity required for experiments in neurophysiology and myography; for details, see below

These Heated Operating Tables consist of a flat top containing a resistive heating element mounted on either an hydraulic pedestal or heavy frame base.

A resistive heating element underneath the stainless steel surface, measuring 31 x 51.5 cm (12 x 20 in), produces a heating area of 1,596.5 cm<sup>2</sup> with a maximum heating density of 0.156 watts/cm<sup>2</sup> (1 watt/in<sup>2</sup>). A power regulator adjusts the power to a maximum of 250 watts. At maximum power the table top will reach 4.4°C (40°F) above ambient without an animal.

### Hydraulic Base Operating Tables

- Turns in the horizontal plane through 360°
- Tilts from end-to-end through 45° in either direction
- Height adjustment from 89 to 110 cm (34-1/2 to 42-1/2 in)

All of these adjustments can be made while an operation is in progress. The table is raised by pumping a foot pedal and lowered by depressing it. Raising the foot pedal locks the table in position. This lock also controls rotation of the table. The pedestal base is 60 cm (24 in) OD.

The tilt is controlled by a locking clamp under the table. The tilting movement acts against a friction device so that the table can be tilted slowly under control. The table does not need to be bolted to the floor.

### Frame Base Operating Tables

The heavy welded steel frame is coated with tough nylon to prevent corrosion and provide for easy cleaning. A leveling screw on each foot accommodates uneven floors. The lower bracing of the frame supports a full-sized laminated Formica shelf (supplied). The operating table top is 103 cm (40-1/2 in) from the floor.

### Table Features

Four electrical outlets under one end of both tables provide a power source for equipment. A heavy 4 m (12 ft) long cord is provided. The two side rails are extended on the table, thus providing a holder for a removable 12.5 mm (1/2 in) diameter stainless steel rod to which an animal head holder can be securely fixed.

The table is supplied with four vertical rods, one cross rod, six tying cleats and two EC1 50-2518 Open Sided Connectors. The vertical 9.5 mm (3/8 in) diameter rods are mounted on a simple, deep slotted clamp with a locking screw. Two are 25.8 cm (10-1/8 in) long, the other two are 38.8 cm (15-1/4 in) long. The tying cleats also have a deep slot and locking screw. The slot fits over the edge of the Table and allows the rods and cleats to be inserted anywhere along the length of the Table.

A 12.5 mm (1/2 in) cross rod is supplied and can be mounted on the two vertical rods using the Open Sided Connectors provided. This cross rod is 53.3 cm (21 in) long and is used for positioning equipment directly over the animal.

The table with hydraulic base is also supplied with a 22.5 x 30 cm (9 x 12 in) stainless steel instrument tray mounted on a fixed rod by means of a clamp. This clamp provides height adjustment and also allows the tray to be swivelled away from or over the operating area. The tray is locked in position by a thumbscrew and is mounted in such a way that it remains level even while the table top is being tilted.

### Specifications

#### Dimensions:

Table Top	47 x 107 cm (18 x 42 in), single piece, stainless steel	
Heating Element	31 x 51.5 cm (12 x 20 in)	
Instrument Tray	(Table with Hydraulic Base Only) 22.5 x 30 cm (9 x 12 in)	
Heating Element Capacity	250 W	
Weight	43 kg (95 lb)	
Rods:	<b>Length</b>	<b>Diameter</b>
Cross Rod	53.3 cm (21 in)	12.5 mm (1/2 in)
Small Vertical Rods (2)	25.8 cm (10-1/8 in)	9.5 mm (3/8 in)
Large Vertical Rods (2)	38.8 cm (15-1/4 in)	9.5 mm (3/8 in)
Instrument Tray Vertical Rod	61 cm (24 in)	12.5 mm (1/2 in)

### Order # Product

EC1 50-1361	Medium Animal Heated Operating Table With Hydraulic Base, 115 VAC, 60 Hz
EC1 50-1387	Medium Animal Heated Operating Table With Hydraulic Base, 230 VAC, 50 Hz
EC1 50-1320	Medium Animal Heated Operating Table With Frame Base, 115 VAC, 60 Hz
EC1 50-1346	Medium Animal Heated Operating Table With Frame Base, 230 VAC, 50 Hz

*For Surgical Instruments and Sutures, click here.*

## Operating Table and Thoracic Positioners



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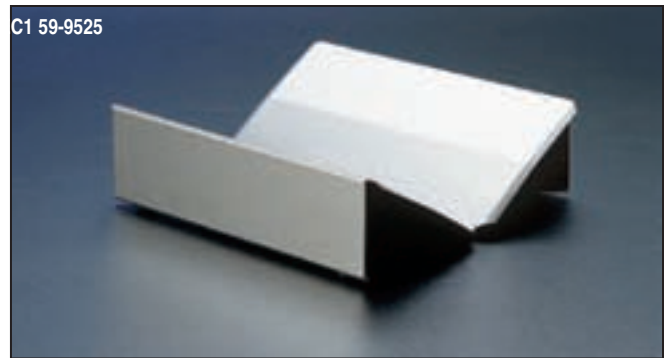
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### Stainless Steel Thoracic Positioner

This Thoracic Positioner will hold the animal in the desired operating position. Made of heavy gauge stainless steel for durability, this positioner has sure grip rubber feet to hold it in place on any flat-top surface or operating table. It measures, H x W x D, 8.25 x 30.5 x 26.7 cm (3-1/4 x 12 x 10-1/2 in) and weighs 2.25 kg (5 lb).

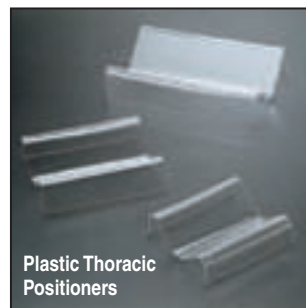
Order #	Product
EC1 59-9525	Stainless Steel Thoracic Positioner

### IMS Large Animal Operating Table

The electrically operated table can be lifted from 490mm up to a height of 970mm, enabling heavy animals to be accommodated. Operator lifting risk is kept to a minimum as it will lift a weight of 150 kg. The range of tops available enable the table to be used for other lifting purposes. The lifting mechanism is controlled by pressing the simple hand held raising & lowering buttons. All tops measure 1200 mm x 600 mm. The table base and top must be purchased separately. A new optional feature is the top tilting device that is now available.

*\*New heated version now available. Please inquire for details.*

Order #	Model	Product
EC1 34-0924	6.38.0	IMS Large Animal Operating Table– Base Only, finished white steel with black feet, 115V
EC1 34-0306	6.38.0	IMS Large Animal Operating Table – Base Only, finished white steel with black feet, 230V
EC1 34-0307	6.38.1	Table Top for EC1 34-0924 or EC1 34-0306 Table, Stainless Steel
EC1 34-0308	6.38.2	Table Top for EC1 34-0924 or EC1 34-0306 Table, Ridged Rubber with Aluminum Edge
EC1 34-0309	6.38.3	Table Top for EC1 34-0924 or EC1 34-0306 Table, Wood Finish
EC1 34-0310	6.38.4	Table Top for EC1 34-0924 or EC1 34-0306 Table, Laminate
EC1 34-0311	6.38.5	Castors for EC1 34-0924 or EC1 34-0306 Table. 4 Swivels, Braked
EC1 34-0312	6.38.6	Tilting Mechanism for Tops



- Durable, lightweight plastic
- Transparent to light and x-rays
- Easy-to-clean
- Low heat loss

### Plastic Thoracic Positioners

These Thoracic Positioners are designed to hold the animal in the desired operating position and are available in three sizes.

Since these positioners are constructed of plastic instead of stainless steel, the animal will lose less body heat during surgery.

Order #	For use with	Animal Weight	Dimensions, H x W x D
EC1 59-6435	Cats and Small Dogs	Up to 9 kg (20 lb)	5.7 x 20.3 x 17.8 cm (2-1/4 x 8 x 7 in)
EC1 59-6436	Medium Dogs	9 to 18 kg (20 to 40 lb)	7 x 25.4 x 20.5 cm (2-3/4 x 10 x 8 in)
EC1 59-6437	Large Dogs	18 to 27.2 kg (40 to 60 lb)	7.6 x 35.6 x 22.7 cm (3 x 14 x 9 in)

## Large Animal Operating Tables



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**EC1 59-6823**  
Non-Heated Flat-Top  
Operating Table with  
Single Tilting and  
Hydraulic-Lift Base



**EC1 59-6833**  
Heated V-Top Operating  
Table with Single Tilting  
and Pedestal Base

• These sturdy operating tables are for use with animals up to 136.2 kg (300 lb) and are available with any combination of the below features:

- V-top or flat-top
- Pedestal or hydraulic-lift base
- Tilting mechanism
- Heated or non-heated top

### V-Top

The v-top table is 147.5 x 48 cm (58 x 19 in). Each panel adjusts independently from horizontal to near vertical for exact positioning without a thoracic positioner.

A 76.2 mm (3 in) trough centered under the panels can be used to collect fluids. The table has a hook for a collecting pail which is offered as an accessory. Two tie-down attachments on each side of the table slide along the table edge and lock at any position.

### Flat-Top

The extra large 152.5 x 56 cm (60 x 22 in) flat top is die-formed from one piece of heavy-gauge stainless steel with rounded corners, resulting in no welding, seams or sharp edges. The table center is slightly elevated so that fluids drain to a shallow trough around table edges. The drain outlet on the end has a hook for a collecting pail which is offered as an accessory. Two sliding tie-down attachments on each side can be locked at any position along the edge of the table.

### Hydraulic-Lift Base

The lift mechanism of the hydraulic-lift base is completely foot-operated, both up and down, allowing quick and easy adjustment of the table top to a comfortable height and position. Pumping action on a rubber pedal smoothly lifts the table top. Pressing down on a release bar causes the table top to glide down to the lowest position.

The v-top table height may be adjusted from 79 to 104 cm (31 to 41 in). The flat-top table height may be adjusted from 75 to 100 cm (29-1/2 to 39-1/2 in). The heavy base provides real stability and includes leveling screws. The base cover is made of heavy-gauge, satin finish, type 304, non-corrosive stainless steel to provide a lifetime of service.

### Pedestal Base

This base provides a sturdy, stable support for the working surface, yet in no way interferes with your legs and feet as you move around the work surface. Four adjustable screws facilitate easy leveling. The working

height of the pedestal base with a v-top table is 94 cm (37 in); with a flat-top table, it is 89 cm (35 in). The pedestal base is covered with heavy gauge, non-corrosive stainless steel.

### Tilting Mechanism

These operating tables offer a one end tilt mechanism. All tables will revolve 360° and tilt lengthwise from horizontal to near vertical and lock at any angle.

### Heated Tops

The heated table tops aid in the prevention of heat loss during surgery and are available for both v-top and flat-top tables.

Heated coils located under the table provide even heat distribution. The temperature can be adjusted from 21° to 42°C (70° to 108°F) with the heating control box which easily mounts on a tie-down/restraint rod.

The total heating area measures 40.5 x 122 cm (16 x 48 in) on the v-top tables, 20 x 122 cm (8 x 48 in) for each panel, and measures 38 x 122 cm (15 x 48 in) on the flat-top tables. These tables are UL listed, CSA approved and CE marked.

### Large Animal Operating Table

Table Style	Hydraulic-Lift Base Single Tilting	Pedestal Base Single Tilting
<b>V-Top</b>		
Heated 115 VAC, 60 Hz	<b>EC1 59-6831</b>	<b>EC1 59-6833</b>
Heated 230 VAC, 50 Hz	<b>EC1 59-6835</b>	<b>EC1 59-6837</b>
Non-Heated	<b>EC1 59-6822</b>	<b>EC1 59-6824</b>
<b>Flat-Top</b>		
Heated 115 VAC, 60 Hz	<b>EC1 59-6832</b>	<b>EC1 59-6834</b>
Heated 230 VAC, 50 Hz	<b>EC1 59-6836</b>	<b>EC1 59-6838</b>
Non-Heated	<b>EC1 59-6823</b>	<b>EC1 59-6825</b>

### Order # Product

<b>EC1 59-6830</b>	Collecting Pail, 11.9 liter (12-1/2 qt) capacity; seamless, noncorrosive stainless steel construction; 25.4 cm (10 in) deep with a 20 cm (7-7/8 in) diameter base
<b>EC1 59-9524</b>	Base with Casters adds mobility to Hydraulic Lift and Pedestal Base Surgery Tables; two heavy-duty plated steel caster bars attach easily to existing leveling screws in the Table base; all four casters are equipped with locks

## NEW Harvard Apparatus Line of Surgical Instruments



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### Introducing Harvard Apparatus Brand Surgical Instruments

- Affordable
- German Made
- Certified Surgical Grade German Steel
- Special materials and finishes including Tungsten Carbide, Titanium, Diamond and UltraEdge

These Harvard Apparatus Surgical Tools are designed to give you maximum performance at affordable prices. The Harvard Apparatus brand surgical tools are forged and finished in German foundries from certified German surgical-grade steel in ISO 9001 facilities. This provides for extremely high-quality: high corrosion resistance keeps cutting surfaces sharp for a long time, flat surfaces hold tight without cutting, designed for long life operation. You can purchase them separately or in convenient money saving kits.

Harvard Apparatus offers a broad selection of surgical instruments and surgical equipment. For technical assistance please call Harvard Apparatus 508-893-8999 and speak to one of our technical support representatives. You can also visit our website for a more extensive presentation of products and to find a distributor near you...

[www.harvardapparatus.com](http://www.harvardapparatus.com)



### Tungsten Carbide - TC

Tungsten carbide is tough, only a diamond edge or laser beam will work it. Therefore, over an extended period time no or negligible wear can be detected.

- The TC edge on scissors gives a soft touch. Thus, less force is required in delicate procedures, reducing trauma to the tissue.
- The Needle Holders are indestructible and firmly hold the needle, while keeping the needle surface smooth. The needle nestles into concave/convex pyramids, regardless of needle positioning, so that the needle does not rotate during surgery.



### Titanium

Titanium (Material No. 7035, 7165) is approximately 50% lighter than steel to minimize tissue trauma during operations. Titanium instruments are also corrosion-proof, rugged and antimagnetic.



### Diamond

Diamond-coated tweezers grip as no other can! Each tweezer is made of stainless steel and coated with extremely fine diamond particles on the inside tips. This tweezer should be used for special applications where gripping is essential.



### UltraEdge

Our UltraEdge Scissors warrant your careful consideration. The highest quality steel goes into forging of an extremely durable razor edge on one blade and the opposite edge has a wave serration. The result is a solid smooth cut.

### German Steel, Forging and Finish

## NEW Harvard Apparatus Line of Surgical Instruments

### Minor and Major Surgical Kits

#### Research Surgical Kits

Harvard Apparatus offers enormous savings and convenience by packaging instruments together which are commonly used for various procedures. These kits are comprised of all German made instruments for extremely high quality and durability at a true value.



#### Minor Surgery Surgical Kit

This convenient surgical kit is an ideally suited for basic procedures and minor surgery.

**This money-saving kit consists of:**

- EC1 72-8350 Scalpel Handle No. 3
- EC1 72-8361 Scalpel Blades No. 10, Sterile
- EC1 72-8441 Eye Scissors, 11.5 cm, Curved, Special Cut
- EC1 72-8906 Blumenthal Bone Rongeurs, Curved, 15.5 cm
- EC1 72-8450 Universal Clothing Scissors
- EC1 72-8393 Operating Scissors, 14.5 cm Sharp/Blunt, Straight
- EC1 72-8676 Kuehne Cover Glass Forceps. 10 cm, Angled
- EC1 72-8696 Jeweller's Forceps No. 5, 11 cm, with Extra Delicate Points
- EC1 72-8912 Probe 14.5 cm Double Ended, 1 mm Diameter

Order #	Product
EC1 72-8940	Minor Surgery Surgical Kit

German Steel, Forging and Finish

#### Deluxe Major Surgical Kit

The savings, convenience and top German quality continue in this kit assembled for more extensive procedures and major laboratory animal surgeries.

**This money-saving kit consists of:**

- EC1 72-8350 Scalpel Handle, No. 3
- EC1 72-8361 Scalpel Blades No. 10, Sterile
- EC1 72-8362 Scalpel Blades No. 11, Sterile
- EC1 72-8508 Vannas Eye Scissors, Spring Action Model Tübingen, 8.5 cm, Straight
- EC1 72-8899 Olsen-Hegar Needle Holders with Scissors with Tungsten Carbide Inserts, 14.0 cm
- EC1 72-8440 Eye Scissors, 11.5 cm, Straight, Special Cut
- EC1 72-8696 Jeweller's Forceps, 11.0 cm, No. 5, with Extra Delicate Points
- EC1 72-8598 Graefe Iris Forceps, Serrated, 7.0 cm, Curved, Points 0.5 mm
- EC1 72-8394 UltraEdge Operating Scissors, 14.5 cm Sharp/Blunt, Straight
- EC1 72-8450 Universal Clothing Scissors
- EC1 72-8905 Friedman Bone Rongeurs, Delicate
- EC1 72-8547 Adson Tissue Forceps, 12.0 cm, 1x2 Teeth
- EC1 72-8919 Barraquer (Colibri) Eye Specula, Large
- EC1 72-8912 Probes, 14.5 cm, Double Ended, 1 mm, Diamond

Order #	Product
EC1 72-8941	Deluxe Major Surgical Kit

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## NEW Harvard Apparatus Line of Surgical Instruments

### Rat and Mouse Surgical Kits



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#### Rodent Surgical Kits

Harvard Apparatus offers enormous savings and convenience by packaging instruments together which are commonly used for various procedures. These kits are comprised of all German made instruments for extremely high quality and durability at a true value.



#### Rat Surgical Kit

Harvard Apparatus' Rat Surgical Kit is an ideal starting point for surgical procedures commonly performed on laboratory rats.

##### The Rat Surgical Kit consists of:

- EC1 72-8372** Disposable Scalpels with plastic handle No. 11, sterile box of 10

---

- EC1 72-8696** Jeweller's Forceps 11.0 cm No. 5, with Extra Delicate Points

---

- EC1 72-8503** Vannas Eye Scissors 8.5 cm Straight, Spring Action

---

- EC1 72-8604** Graefe Iris Forceps Serrated 10.0 cm Curved Points, 0.7 mm

---

- EC1 72-8440** Eye Scissors 11.5 cm Straight, Special Cut

---

- EC1 72-8919** Barraquer (Colibri) Eye Specula, Large

---

- EC1 72-8844** Olsen-Hegar Needle Holder with Scissors. 11.5 cm

---

- EC1 72-8912** Probes 14.5 cm Double Ended, 1 mm Diamond

##### Order #    Product

EC1 72-8942    Rat Surgical Kit

#### Mouse Surgical Kit

This convenient surgical kit is an ideally suited for basic procedures and minor surgery.

##### This convenient money saving kit consists of:

- EC1 72-8372** Disposable Scalpels with Plastic Handle No. 11, Sterile, Box of 10

---

- EC1 72-8696** Jeweller's Forceps No. 5, 11.0 cm with Extra Delicate Points

---

- EC1 72-8503** Vannas Eye Scissors, 8.5 cm Straight Spring Action

---

- EC1 72-8604** Graefe Iris Forceps Serrated, 10.0 cm, Curved Points 0.7 mm

---

- EC1 72-8426** Eye Scissors 10.5 cm, Straight

---

- EC1 72-8918** Barraquer (Colibri) Eye Specula, Small

---

- EC1 72-8826** Derf Needle Holders, 12.0 cm

---

- EC1 72-8912** Probe, 14.5 cm Double Ended, 1 mm Diameter

##### Order #    Product

EC1 72-8943    Mouse Surgical Kit

German Steel, Forging and Finish



## NEW Harvard Apparatus Line of Surgical Instruments

### Harvard Apparatus Scalpels and Handles



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#### Order # Product

EC1 72-8350 Scalpel Handle, No. 3

EC1 72-8354 Scalpel Handle, No. 7

EC1 72-8356 Scalpel Handle, No. 4



#### Order # Product

EC1 72-8361 Scalpel Blades, Fig. 10, Sterile, pkg. of 100

EC1 72-8363 Scalpel Blades, Fig. 11, Sterile, pkg. of 100

EC1 72-8365 Scalpel Blades, Fig. 12, Sterile, pkg. of 100

EC1 72-8367 Scalpel Blades, Fig. 13, Sterile, pkg. of 100

EC1 72-8369 Scalpel Blades, Fig.15, Sterile, pkg. of 100



#### Order # Product

EC1 72-8370 Disposable Scalpels with Plastic Handle Fig. 10, Sterile, Box of 10

EC1 72-8372 Disposable Scalpels with Plastic Handle Fig. 11, Sterile, Box of 10

EC1 72-8373 Disposable Scalpels with Plastic Handle Fig. 12, Sterile, Box of 10

EC1 72-8374 Disposable Scalpels with Plastic Handle Fig. 13, Sterile, Box of 10

EC1 72-8375 Disposable Scalpels with Plastic Handle Fig. 15, Sterile, Box of 10

German Steel, Forging and Finish

# scalpels & blades



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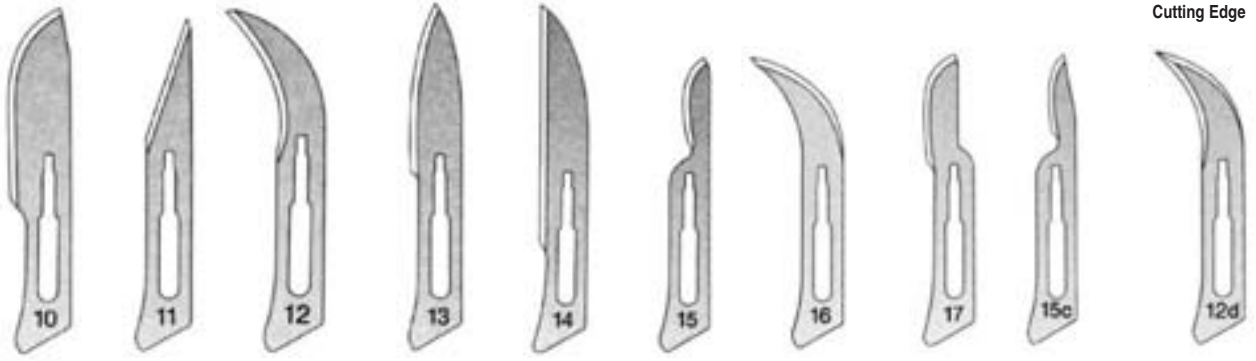
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## Blades for Disposable No. 7, No. 7K and No. 3



Double Sided Cutting Edge

### These Scalpel Handles and Blades are offered two ways:

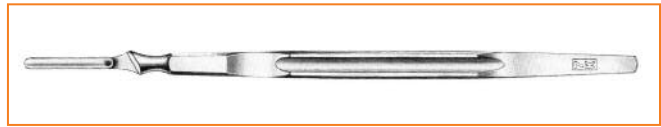
- As reusable Handles and separate non-sterile and sterile Blades  
Blades supplied in boxes of 100  
Each Blade in individually wrapped
- As a disposable plastic Handle and Blade  
Supplied on boxes of 10  
Sterilized with maximum of 2.5 MEGARAD Gamma-Irradiation  
Plastic handles do not have burrs and are accurately worked



Order #	Product
EC1 810-295-10	Disposable Scalpel Blade with Handle, 13 cm (5 1/8 in), pkg. 10



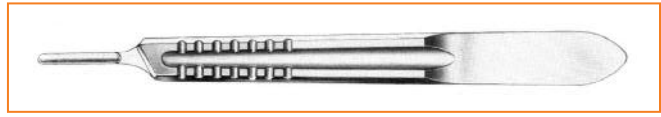
Order #	Product
EC1 52-3522	No. 7K Solid 16 cm (6 1/8 in)



Order #	Product
EC1 810-137-71	No. 7K Solid 12.5 cm (5 in)



Order #	Product
EC1 52-3514	Standard No. 3 Solid 10 cm (4 in)



Order #	Product
EC1 810-130-04	No. 3 Solid 12.5 cm (5 in)

Order #	Product
<b>NON-STERILE for use with Handles 7, 7K and No. 3</b>	
EC1 810-150-10	Scalpel Blade, #10, Non-Sterile, pkg. of 100
EC1 810-150-11	Scalpel Blade, #11, Non-Sterile, pkg. of 100
EC1 810-150-12	Scalpel Blade, #12, Non-Sterile, pkg. of 100
EC1 810-150-13	Scalpel Blade, #13, Non-Sterile, pkg. of 100
EC1 810-150-15	Scalpel Blade, #15, Non-Sterile, pkg. of 100
EC1 810-150-16	Scalpel Blade, #16, Non-Sterile, pkg. of 100
EC1 810-150-17	Scalpel Blade, #17, Non-Sterile, pkg. of 100
EC1 810-151-15	Scalpel Blade, #15c, Non-Sterile, pkg. of 100
EC1 810-151-12	Scalpel Blade, #12d, Non-Sterile, pkg. of 100
<b>STERILE for use with Handles 7, 7K and No. 3</b>	
EC1 72-6145	Scalpel Blade, #10, Sterile, pkg. of 100
EC1 72-6146	Scalpel Blade, #11, Sterile, pkg. of 100
EC1 72-6147	Scalpel Blade, #12, Sterile, pkg. of 100
EC1 72-6148	Scalpel Blade, #14, Sterile, pkg. of 100
EC1 72-6149	Scalpel Blade, #15, Sterile, pkg. of 100
EC1 72-6150	Scalpel Blade, #15c, Sterile, pkg. of 100
EC1 72-6151	Scalpel Blade, #12d, Sterile, pkg. of 100
<b>DISPOSABLE Scalpel</b>	
EC1 810-295-10	Disposable Scalpel with #10 Blade, pkg. of 10
EC1 810-295-11	Disposable Scalpel with #11 Blade, pkg. of 10
EC1 810-295-12	Disposable Scalpel with #12 Blade, pkg. of 10
EC1 810-295-13	Disposable Scalpel with #13 Blade, pkg. of 10
EC1 810-295-15	Disposable Scalpel with #15 Blade, pkg. of 10

# scalpels & blades



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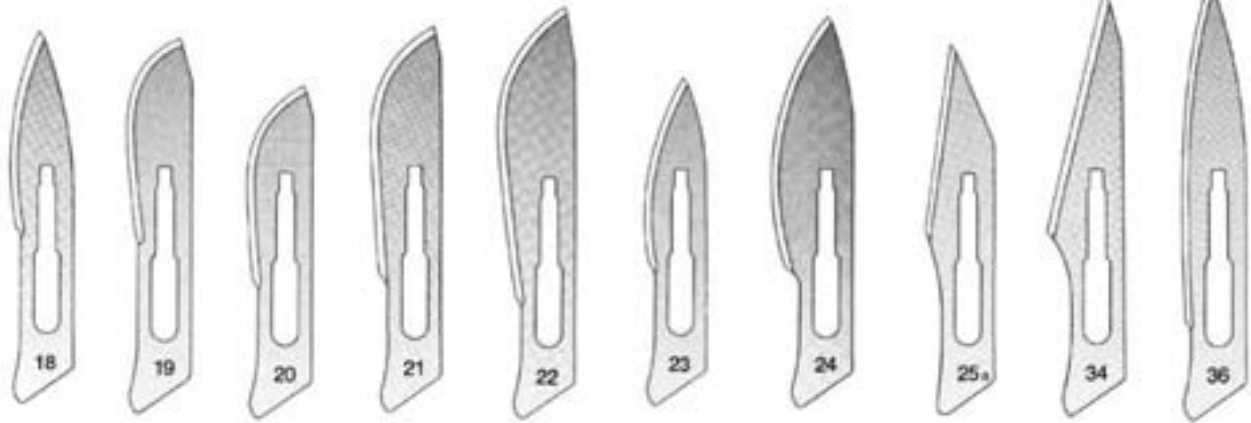
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## Blades for Disposable No. 4 and Plastic Handles Only



Order #	Product
<b>NON-STERILE Scalpel Blades for use with Handles 4 and Plastic</b>	
EC1 810-150-18	Scalpel Blade, #18, Non-Sterile, pkg. of 100
EC1 810-150-19	Scalpel Blade, #19, Non-Sterile, pkg. of 100
EC1 810-150-20	Scalpel Blade, #20, Non-Sterile, pkg. of 100
EC1 810-150-21	Scalpel Blade, #21, Non-Sterile, pkg. of 100
EC1 810-150-22	Scalpel Blade, #22, Non-Sterile, pkg. of 100
EC1 810-150-23	Scalpel Blade, #23, Non-Sterile, pkg. of 100
EC1 810-150-24	Scalpel Blade, #24, Non-Sterile, pkg. of 100
EC1 810-150-34	Scalpel Blade, #34, Non-Sterile, pkg. of 100
EC1 810-150-36	Scalpel Blade, #36, Non-Sterile, pkg. of 100
<b>STERILE Scalpel Blades for use with Handles 4 and Plastic</b>	
EC1 72-6152	Scalpel Blade, #18, Sterile, pkg. of 100
EC1 72-6153	Scalpel Blade, #19, Sterile, pkg. of 100
EC1 72-6154	Scalpel Blade, #20, Sterile, pkg. of 100
EC1 72-6155	Scalpel Blade, #21, Sterile, pkg. of 100
EC1 72-6156	Scalpel Blade, #22, Sterile, pkg. of 100
EC1 72-6157	Scalpel Blade, #23, Sterile, pkg. of 100
EC1 72-6158	Scalpel Blade, #24, Sterile, pkg. of 100
EC1 72-6160	Scalpel Blade, #25a, Sterile, pkg. of 100
EC1 810-155-34	Scalpel Blade, #34, Sterile, pkg. of 100
EC1 72-6159	Scalpel Blade, #36, Sterile, pkg. of 100
<b>DISPOSABLE Scalpel</b>	
EC1 810-285-18	Scalpel Blade, #18, Disposable, pkg. of 10
EC1 810-285-19	Scalpel Blade, #19, Disposable, pkg. of 10
EC1 810-285-20	Scalpel Blade, #20, Disposable, pkg. of 10
EC1 810-285-21	Scalpel Blade, #21, Disposable, pkg. of 10
EC1 810-285-22	Scalpel Blade, #22, Disposable, pkg. of 10
EC1 810-285-23	Scalpel Blade, #23, Disposable, pkg. of 10
EC1 810-285-24	Scalpel Blade, #24, Disposable, pkg. of 10



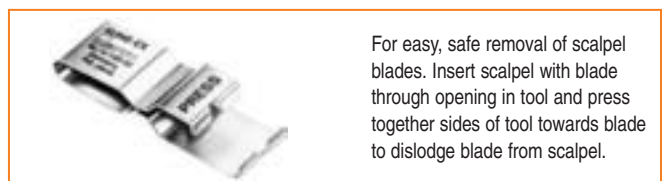
Order #	Product
EC1 810-285-23	Disposable, pkg. 10 13 cm (5 1/8 in)



Order #	Product
EC1 52-3530	Standard No. 4 Solid, pkg. 1 12 cm (4 3/4 in)



Order #	Product
EC1 810-112-04	Plastic, pkg. 1 13.5 cm (5 1/4 in)



Order #	Product
EC1 810-199-00	Scalpel Blade Remover, pkg. 1

# microdissecting



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## Mini-Blade®, pkg. 24

Use with Chuck Handles, (see below)



Order #	Product
EC1 56-5465	Mini Blade, Extra Delicate, 24 per box

## Round Knurled Chuck Handles, pkg. 1

Works with Mini-Blade EC1 56-5465 (see above)



Order #	Product
EC1 56-5671	Chuck Handle, 0.5 cm D 7.5 cm (3 in) L
EC1 56-5655	Chuck Handle, 0.5 cm D 10 cm (4 in) L
EC1 56-5630	Chuck Handle, 0.5 cm D 13 cm (5 1/8 in) L

## Micro-Unitomes, 6 per box

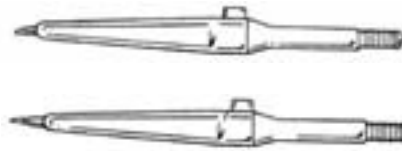


Razor thin, finely-pointed blades embedded in color-coded plastic tips with attached handle

Order #	Product
EC1 56-5665	Micro-Unitomes 15° 1.5 mm Depth Orange
EC1 56-5673	Micro-Unitomes 15° 3 mm Depth Blue
EC1 56-5657	Micro-Unitomes 15° 5 mm Depth Green
EC1 56-5624	Micro-Unitomes 45° 3 mm Depth Tan

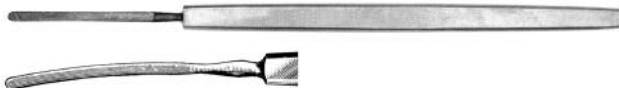
## Micro-Sharp®, 6 per box

Razor thin, finely-pointed blades embedded in color-coded plastic tips.



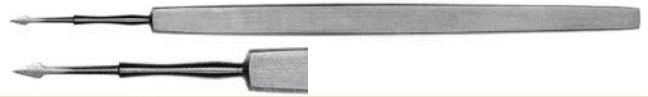
Order #	Product
EC1 56-5754	Micro-Sharp® 15° 3 mm Depth Blue
EC1 56-5762	Micro-Sharp® 15° 5 mm Depth Green

## Wecker Micro Dissecting Spatula, pkg. 1



Order #	Product
EC1 52-2664	Wecker Micro Dissecting Spatula 12.5 cm (5 in)

## Bowman Knife - spear point, pkg. 1



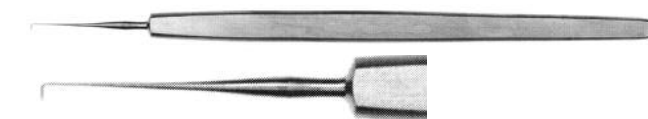
Order #	Product
EC1 52-2730	12 cm (4 3/4 in) Blade Length 3 mm

## Frazier Dura-Hook, pkg. 1



Order #	Product
EC1 52-2706	Frazier Dura-Hook Sharp 12.5 cm (5 in)
EC1 52-2714	Frazier Dura-Hook Blunt 12.5 cm (5 in)

## Nugent Micro Dissecting Hook Angular Sharp, pkg. 1



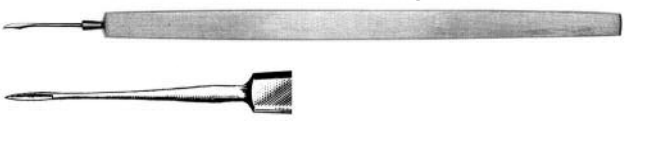
Order #	Product
EC1 52-2722	12.5 cm (5 in)

## Micro Dissecting Knife, pkg. 1



Order #	Product
EC1 60-3979	Blade # 1 1.5 x 25 mm
EC1 60-3980	Blade # 2 1.7 x 27 mm

## Micro Dissecting Knife 11.4 cm (4 1/2 in), pkg. 1



Order #	Product
EC1 60-3977	Micro Dissecting Knife Blade # 2, 6 mm
EC1 60-3978	Micro Dissecting Knife Blade # 3, 7 mm
EC1 60-3975	Micro Dissecting Knife Blade # 0, 3 mm
EC1 60-3976	Micro Dissecting Knife Blade # 1, 5 mm

# microsurgery knives



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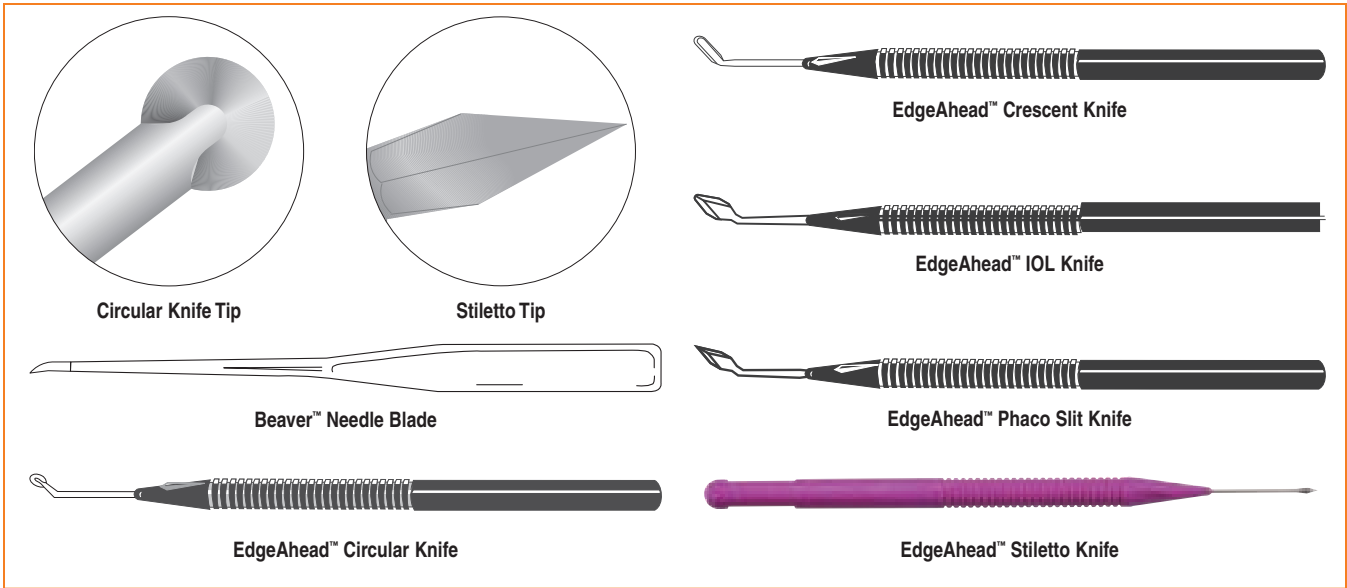
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- Small size is ideal for small animal surgery
- Ultra sharp for precise surgical procedures
- Variety of styles and sizes
- Sterile

These Knives for Microsurgery are ideal for surgery on small animals. Originally designed for ophthalmological procedures, these knives have consistently sharp edges for precise incision without tissue distortion. Each Knife has a matte finish designed to reduce microscope glare. Each

blade is laser-etched to clearly identify knife size or width. Knife handles are designed for a secure comfortable grip and have a ridge to indicate the position of the cutting edge.

Crescent knives have a 260° cutting edge for even incision. The AC Stiletto (Blumenthal) Knife is designed for stab incision with smooth, easy insertion. The Stiletto/MVR knife has a tapered tip to create a fluid tight incision for self-sealing wounds and for use in inserting cannulae. All knives are sterile and wrapped individually in a protective carrier that allows for aseptic transfer. All Knives are packaged 5 per box.

Order #	Product	Edge Length	Blade Feature
EC1 72-6530	Beaver™ Needle Blades	1.5 mm	–
EC1 72-6531	Beaver™ Needle Blades	3.0 mm	–
EC1 72-6532	Beaver™ Needle Blades	5.0 mm	–
EC1 72-6534	EdgeAhead™ Circular Knives	2.25 mm	60°, 3 mm from tip
EC1 72-6535	EdgeAhead™ Circular Knives	2.25 mm	60°, 6 mm from tip
EC1 72-6537	EdgeAhead™ Crescent Knives	1.75 mm	60° Bevel Up
EC1 72-6539	EdgeAhead™ Crescent Knives	2.25 mm	60° Bevel Down
EC1 72-6542	EdgeAhead™ IOL Knives	3.5 mm	40° Bevel Up
EC1 72-6544	EdgeAhead™ IOL Knives	4.1 mm	40° Bevel Up
EC1 72-6546	EdgeAhead™ IOL Knives	4.8 mm	40° Angle
EC1 72-6552	EdgeAhead™ Phaco Slit Knives	2.65 mm	40° Bevel Up
EC1 72-6554	EdgeAhead™ Phaco Slit Knives	2.8 mm	40° Bevel Up
EC1 72-6556	EdgeAhead™ Phaco Slit Knives	3.0 mm	40° Bevel Up
EC1 72-6560	EdgeAhead™ Phaco Slit Knives	3.5 mm	40° Bevel Up
EC1 72-6561	EdgeAhead™ Stiletto/MVR Knives	0.6 mm (23 G)	0.75 mm Width
EC1 72-6562	EdgeAhead™ Stiletto/MVR Knives	0.9 mm (20 G)	1.15 mm Width
EC1 72-6563	EdgeAhead™ Stiletto/MVR Knives	1.1 mm (19 G)	1.28 mm Width
EC1 72-6564	EdgeAhead™ Stiletto/MVR Knives	0.6 mm (23 G)	45° Angle
EC1 72-6566	EdgeAhead™ AC Stiletto Knife (Blumenthal)	0.9 mm	45° Bevel Up

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### Harvard Apparatus Scissors



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Order #	Product
EC1 72-8379	Operating Scissors, 10.5 cm, Blunt/Blunt, Straight
EC1 72-8380	Operating Scissors, 11.5 cm, Blunt/Blunt, Straight
EC1 72-8383	UltraEdge Operating Scissors, 14.5 cm, Blunt/Blunt, Straight
EC1 72-8384	Operating Scissors, 15.5 cm, Blunt/Blunt, Straight
EC1 72-8390	Operating Scissors, 10.5 cm, Sharp/Blunt, Straight
EC1 72-8392	Operating Scissors, 13.0 cm, Sharp/Blunt, Straight
EC1 72-8393	Operating Scissors, 14.5 cm, Sharp/Blunt, Straight
EC1 72-8394	UltraEdge Operating Scissors, 14.5 cm, Sharp/Blunt, Straight
EC1 72-8395	Operating Scissors, 15.5 cm, Sharp/Blunt, Straight
EC1 72-8400	Operating Scissors, 10.5 cm, Sharp/Sharp, Straight
EC1 72-8402	Operating Scissors, 13.0 cm, Sharp/Sharp, Straight
EC1 72-8403	Operating Scissors, 14.5 cm, Sharp/Sharp, Straight
EC1 72-8405	Operating Scissors, 16.5 cm, Sharp/Sharp, Straight
EC1 72-8409	Operating Scissors, 14.5 cm, Blunt/Blunt, Curved
EC1 72-8411	Operating Scissors, 16.5 cm, Blunt/Blunt, Curved
EC1 72-8415	Operating Scissors, 14.5 cm, Sharp/Blunt, Curved
EC1 72-8417	Operating Scissors, 16.5 cm, Sharp/Blunt, Curved
EC1 72-8422	Operating Scissors, 14.5 cm, Sharp/Sharp, Curved
EC1 72-8424	Operating Scissors, 16.5 cm, Sharp/Sharp, Curved

Order #	Product
EC1 72-8453	TC Operating Scissors, 14.5 cm, Blunt/Blunt, Straight with TC-Inserts
EC1 72-8456	TC Operating Scissors, 14.5 cm, Sharp/Sharp, Straight with TC-Inserts

Order #	Product
EC1 72-8426	Eye Scissors, 10.5 cm, Straight
EC1 72-8428	Eye Scissors, 11.5 cm, Straight
EC1 72-8430	Eye Scissors, 12.0 cm, Straight
EC1 72-8432	Eye Scissors, 10.5 cm, Curved
EC1 72-8434	Eye Scissors, 11.5 cm, Curved
EC1 72-8436	Eye Scissors, 12.0 cm, Curved
EC1 72-8437	Eye Scissors, 11.5 cm, Laterally Angled
EC1 72-8438	Eye Scissors, 11.5 cm, Delicate, Straight*
EC1 72-8440	Eye Scissors, 11.5 cm, Straight, Special Cut
EC1 72-8441	Eye Scissors, 11.5 cm, Curved, Special Cut

\* Our Special Cut Scissors are especially durable and delicate, signified by a black handle.



Order #	Product
EC1 72-8442	Bonn Ultrafine Eye Scissors, 8.5 cm, Straight
EC1 72-8443	Bonn Ultrafine Eye Scissors, 8.5 cm, Curved

German Steel, Forging and Finish

## NEW Harvard Apparatus Line of Surgical Instruments

### Harvard Apparatus Scissors (continued)



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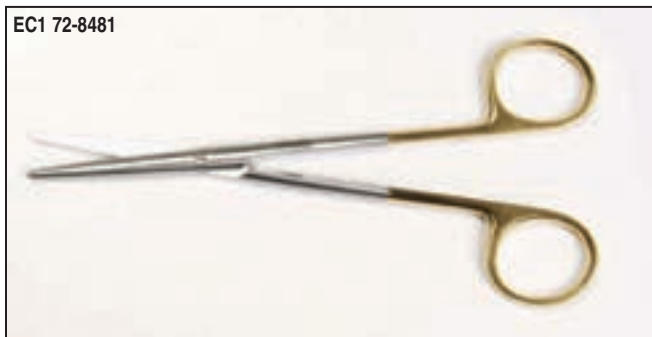
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Order #	Product
<b>EC1 72-8461</b>	TC Mayo Operating Scissors, 14.0 cm, Straight with TC-Inserts
<b>EC1 72-8463</b>	TC Mayo Operating Scissors, 17.0 cm, Straight, with TC-Inserts
<b>EC1 72-8466</b>	TC Mayo Operating Scissors, 14.0 cm, Curved with TC-Inserts
<b>EC1 72-8468</b>	TC Mayo Operating Scissors, 17.0 cm, Curved with TC-Inserts
<b>EC1 72-8480</b>	TC Eye Scissors, 11.5 cm, Straight, TC-Inserts



Order #	Product
<b>EC1 72-8481</b>	TC Metzenbaum-Delicate, Dissecting Scissors, 14.5 cm, Straight, TC-Inserts*

\* TC signifies tungsten carbide for increased delicacy that lasts.



Order #	Product
<b>EC1 72-8448</b>	Lister Bandage Scissors, 15.5 cm



Order #	Product
<b>EC1 72-8450</b>	Universal Clothing Scissors, 14.0 cm, Black
<b>EC1 72-8451</b>	Universal Clothing Scissors, 18.0 cm, Black

**Tungsten Carbide**

**UltraEdge**

see page E2 for details

German Steel, Forging and Finish

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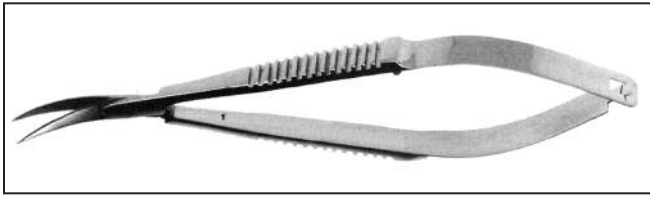
### Harvard Apparatus Spring Scissors



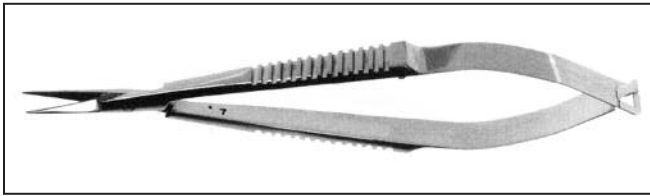
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Order #	Product
EC1 72-8493	Castroviejo Eye Scissors, 10.0 cm, Spring Action, Sharp/Sharp, Curved
EC1 72-8494	Castroviejo Eye Scissors, 10.0 cm, Spring Action, Blunt/Blunt, Curved



Order #	Product
EC1 72-8496	Castroviejo-Mini Eye Scissors Spring Action, 11.0 cm, Left
EC1 72-8497	Castroviejo-Mini Eye Scissors Spring Action, 11.0 cm, Right



Order #	Product
EC1 72-8483	Vannas Eye Scissors, 8.0 cm, Straight, Spring Action, 3 mm Cutting Edge
EC1 72-8484	Vannas Eye Scissors, 8.0 cm, Curved, Spring Action, 3 mm Cutting Edge
EC1 72-8485	Vannas Eye Scissors, 8.0 cm, Sideways Angled, Spring Action, 3 mm Cutting Edge
EC1 72-8503	Vannas Eye Scissors, 8.5 cm, Straight, Spring Action
EC1 72-8504	Vannas Eye Scissors, 8.5 cm, Curved, Spring Action
EC1 72-8505	Vannas Eye Scissors, 8.5 cm, Angular, Spring Action
EC1 72-8506	Vannas Eye Scissors, 8.5 cm, Angled Up, Spring Action
EC1 72-8507	Vannas Eye Scissors, 12.0 cm, Angled Down, Spring Action

German Steel, Forging and Finish



Order #	Product
EC1 72-8508	Vannas Eye Scissors, Spring Action Model Tübingen*, 8.5 cm, Straight
EC1 72-8509	Vannas Eye Scissors, Spring Action Model Tübingen*, 8.5 cm, Curved
EC1 72-8510	Vannas Eye Scissors, Spring Action Model Tübingen*, 8.5 cm, Angular
EC1 72-8511	Vannas Eye Scissors, Spring Action Model Tübingen*, 8.5 cm, Angled Up

\* The Tübingen model has a longer blade than the standard Vanna scissors.

Order #	Product
EC1 72-8512	Barraquer Eye Scissors, Spring Action, Length of Blade 5.0 mm



Order #	Product
EC1 72-8514	Troutman Eye Scissors, Spring Action, 10.0 cm, Left
EC1 72-8515	Troutman Eye Scissors, Spring Action, 10.0 cm, Right

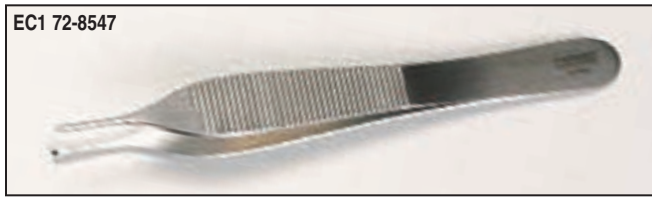




## NEW Harvard Apparatus Line of Surgical Instruments

### Harvard Apparatus Tweezers and Forceps

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Order #	Product
EC1 72-8547	Adson Tissue Forceps, 12.0 cm, 1 x 2 Teeth
EC1 72-8548	Adson Tissue Forceps, 12.0 cm, 1 x 2 Teeth, Light Weight



Order #	Product
EC1 72-8555	Micro-Adson Tissue Forceps, 12.0 cm, 1 x 2 Teeth, 0.8 mm, No Finish
EC1 72-8556	Micro-Adson Tissue Forceps, 12.0 cm, 1 x 2 Teeth, Extra Delicate, 0.5 mm
EC1 72-8557	Micro-Adson Tissue Forceps, 12.0 cm, 1 x 2 Teeth, Angled
EC1 72-8558	Micro-Adson Tissue Forceps, 15.0 cm, 1 x 2 Teeth, Extra Delicate
EC1 72-8575	Micro-Adson-Biemer Ultrafine Tissue Forceps, 12 cm, 1 x 2 Teeth, Super Delicate*

\* Extremely fine for the most subtle procedures.



Order #	Product
EC1 72-8573	Adson Tissue Forceps, 12.0 cm, 1 x 2 Teeth with Suture Platform, 2 Stop-Pins, 0.8 mm
EC1 72-8577	Adson Tissue Forceps, 12.0 cm, 2 x 3 Teeth, Light Weight



Order #	Product
EC1 72-8590	Graefe Iris Forceps, Serrated, 10.0 cm, Straight, Points 0.7 mm
EC1 72-8591	Graefe Iris Forceps, Serrated, 10.0 cm, Straight, Points 1.0 mm
EC1 72-8593	Graefe Iris Forceps, Non-Magnetic*, 10 cm, Serrated, Straight, Points 1.0 mm

\*These Non-Magnetic Forceps are made of German Stainless Steel #1.4301

Order #	Product
EC1 72-8595	Iris Forceps, Serrated, 11.5 cm, Straight, 1.0 mm



Order #	Product
EC1 72-8598	Graefe Iris Forceps, Serrated, 7.0 cm, Curved, Points 0.5 mm
EC1 72-8599	Graefe Iris Forceps, Serrated, 7.0 cm, Curved, Points 0.7 mm
EC1 72-8600	Graefe Iris Forceps, Serrated, 7.0 cm, Curved, Points 1.0 mm
EC1 72-8601	Graefe Iris Forceps, 10 cm, Curved 0.3 mm
EC1 72-8602	Graefe Iris Forceps, 10 cm, Curved 0.5 mm
EC1 72-8603	Graefe Iris Forceps, Serrated, 10.0 cm, Slightly Curved, Points 0.6 mm with Stop-Pin
EC1 72-8604	Graefe Iris Forceps, Serrated, 10.0 cm, Curved, Points, 0.7 mm
EC1 72-8605	Graefe Iris Forceps, Serrated, 10.0 cm, Curved, Points 1.0 mm
EC1 72-8611	Graefe Iris Forceps, Serrated, 7.0 cm, Strongly Curved, Points 0.5 mm
EC1 72-8612	Graefe Iris Forceps, Serrated, 7.0 cm, Strongly Curved, Points 0.7 mm
EC1 72-8614	Graefe Iris Forceps, Serrated, 10.0 cm, Strongly Curved, Points 0.3 mm
EC1 72-8615	Graefe Iris Forceps, Serrated, 10.0 cm, Strongly Curved, Points 0.5 mm

German Steel, Forging and Finish

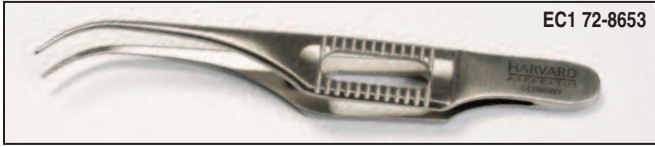
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### Harvard Apparatus Forceps and Tweezers (continued)

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Order #	Product
EC1 72-8649	Bishop-Harmon Iris Forceps Serrated, 8.5 cm, Straight
EC1 72-8650	Bishop-Harmon Iris Forceps, 8.5 cm, 1 x 2 Teeth



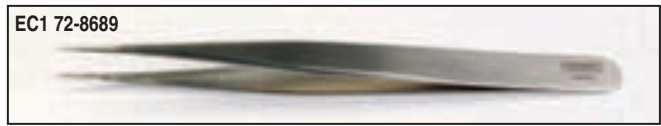
Order #	Product
EC1 72-8653	Gill Iris Forceps, 7.5 cm, Serrated, Curved
EC1 72-8654	Gill Iris Forceps, 7.5 cm, 1 x 2 Teeth, Curved



Order #	Product
EC1 72-8658	Nevyas Capsulorhexis Forceps, Very Delicate Grasping Tips and Extremely Thin 11 mm, Long Shanks

Order #	Product
EC1 72-8660	Troutman Suture Forceps, 7.5 cm, 1 x 2 Teeth, Double Angled

Order #	Product
EC1 72-8662	Castroviejo Suture Forceps, 10.0 cm, 1 x 2 Teeth, Straight, Points 0.12 mm
EC1 72-8663	Castroviejo Suture Forceps, 10.0 cm, 1 x 2 Teeth, Straight, Points 0.3 mm
EC1 72-8664	Castroviejo Suture Forceps, 10.0 cm, 1 x 2 Teeth, Straight, Points 0.5 mm
EC1 72-8665	Castroviejo Suture Forceps, 10.0 cm, 1 x 2 Teeth, Straight, Points 1.0 mm
EC1 72-8669	Castroviejo Suture Forceps, 10.0 cm, 1 x 2 Teeth, Angled, Points 0.3 mm
EC1 72-8670	Castroviejo Suture Forceps, 10.0 cm, 1 x 2 Teeth, Angled, Points 0.5 mm
EC1 72-8671	Castroviejo Suture Forceps, 10.0 cm, 1 x 2 Teeth, Angled, Points 1.0 mm



Order #	Product
EC1 72-8689	Jeweller's Forceps, 12.0 cm, No. 1 with Extra Delicate Points
EC1 72-8690	Jeweller's Forceps, 12.0 cm, No. 2 with Extra Delicate Points
EC1 72-8691	Jeweller's Forceps, 12.0 cm, No. 3 with Extra Delicate Points
EC1 72-8692	Jeweller's Forceps, 11 cm, No. 4 with Extra Delicate Points, 10.5 cm
EC1 72-8693	Jeweller's Forceps, 11.0 cm, No. 4 with Extra Delicate Points, Straight, Light Spot Weld
EC1 72-8694	Jeweller's Forceps, 11.0 cm, No. 4 with Extra Delicate Points, Lightweight 3 Holes, Straight, Light Spot Weld
EC1 72-8696	Jeweller's Forceps, 11.0 cm, No. 5 with Extra Delicate Points
EC1 72-8698	Jeweller's Forceps, 11.0 cm, No. 5 with Extra Delicate Points, Non-Magnetic*
EC1 72-8699	Jeweller's Forceps, 11.5 cm, No. 6 with Extra Delicate Points
EC1 72-8700	Jeweller's Forceps, 11.5 cm, No. 7 with Extra Delicate Points
EC1 72-8701	Jeweller's Forceps, 11.5 cm, No. 7 with Extra Delicate Points, Lightweight, 3 Holes, Curved, Light Spot Weld
EC1 72-8714	Jeweller's Forceps, 11.5 cm, No. 7 Extra Delicate Tips, 1 x 2 Teeth Curved

\*These Non-Magnetic Forceps are made of German Stainless Steel #1.4301

German Steel, Forging and Finish

## NEW Harvard Apparatus Line of Surgical Instruments

### Harvard Apparatus Forceps and Tweezers (continued)



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Order #	Product
EC1 72-8676	Kuehne, Cover Glass Forceps, 10 cm, Angled



Order #	Product
EC1 72-8678	Jeweller's Forceps, 12.0 cm, No. 1
EC1 72-8679	Jeweller's Forceps, 12.0 cm, No. 1, Non-Magnetic*
EC1 72-8680	Jeweller's Forceps, 12.0 cm, No. 2
EC1 72-8681	Jeweller's Forceps, 12.0 cm, No. 3
EC1 72-8682	Jeweller's Forceps, 11.0 cm, No. 4
EC1 72-8683	Jeweller's Forceps, 11.0 cm, No. 4, Non-Magnetic*
EC1 72-8684	Jeweller's Forceps, 11.0 cm, No. 5
EC1 72-8685	Jeweller's Forceps, 11.5 cm, No. 7
EC1 72-8686	Jeweller's Forceps, 12 cm, No. 1, Angled
EC1 72-8687	Jeweller's Forceps, 11.0 cm, No. 3c
EC1 72-8688	Jeweller's Forceps, 11.0 cm, No. 5, Angled

\*These Non-Magnetic Forceps are made of German Stainless Steel #1.4301



Order #	Product
EC1 72-8715	Micro Tweezer, 9.5 cm, 1 x 2 Teeth, 0.2 mm with Suture Platform
EC1 72-8717	Micro Tweezer, 15.0 cm with Ring 1.0 x 0.5 mm with Stop-Pin, diamond coated
EC1 72-8718	Titanium Micro Tweezer, 15.0 cm with Ring 1.0 x 0.5 mm with Stop-Pin, diamond coated Titanium*
EC1 72-8719	Titanium Micro Tweezer, 15.0 cm with Ring 1.0 x 0.5 mm with Stop-Pin Titanium*
EC1 72-8720	Micro Tweezer, 15.0 cm with Ring 2.0 x 1.0 mm with Stop-Pin
EC1 72-8721	Diamond Micro Tweezer, 15.0 cm with Ring 2.0 x 1.0 mm with Stop-Pin, diamond coated
EC1 72-8722	Titanium Coat Micro Tweezer, 15.0 cm with Ring 2.0 x 1.0 mm with Stop-Pin, diamond coated Titanium*
EC1 72-8725	Diamond Micro Tweezer, 18.0 cm with Ring 1.0 x 0.5 mm with Stop-Pin, diamond coated
EC1 72-8726	Titanium Coat Micro Tweezer, 18.0 cm with Ring 1.0 x 0.5 mm with Stop-Pin, diamond coated Titanium*

\*These tweezers are titanium coated with diamond coated tips.



Order #	Product
EC1 72-8760	Titanium Dressing Forceps, 14.5 cm, Straight, Serrated
EC1 72-8761	Titanium Dressing Forceps, 18.0 cm, Straight
EC1 72-8762	Titanium Dressing Forceps, 24.0 cm, Straight
EC1 72-8763	Titanium Dressing Forceps, 18.0 cm, Straight, Small
EC1 72-8764	Titanium Dressing Forceps, 18.0 cm, Straight, Small, Smooth



Order #	Product
EC1 72-8768	Titanium Micro Forceps, 15.0 cm with Suture Platform, Straight, 6 x 0.4 mm
EC1 72-8769	Titanium Micro Forceps, 18.0 cm with Suture Platform, Straight, 6 x 0.4 mm
EC1 72-8770	Titanium Micro Forceps, 15.0 cm with Suture Platform, Curved, 6 x 0.4 mm
EC1 72-8771	Titanium Micro Forceps, 18.0 cm with Suture Platform, Curved, 6 x 0.4 mm

**Titanium**  
MRI Compatible

**Diamond**

see page E2 for details

German Steel, Forging and Finish

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### Harvard Apparatus Tweezers



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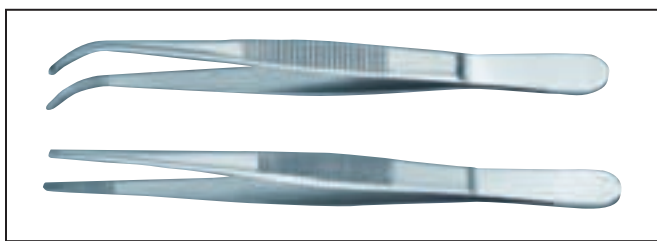
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Order #	Product
EC1 72-8782	Titanium De Bakey Atraumatic Vascular Forceps, 15.0 cm, Width of Jaw 1.0 mm
EC1 72-8783	Titanium De Bakey Atraumatic Vascular Forceps, 20.0 cm, Width of Jaw 1.0 mm
EC1 72-8784	Titanium De Bakey Atraumatic Vascular Forceps, 24.0 cm, Width of Jaw 1.0 mm
EC1 72-8785	Titanium De Bakey Atraumatic Tissue Forceps, 15.0 cm, Width of Jaw 1.5 mm
EC1 72-8786	Titanium De Bakey Atraumatic Tissue Forceps, 20.0 cm, Width of Jaw, 1.5 mm
EC1 72-8787	Titanium De Bakey Atraumatic Tissue Forceps, 24.0 cm, Width of Jaw 1.5 mm
EC1 72-8788	Titanium De Bakey Atraumatic Tissue Forceps, 15.0 cm, Width of Jaw 1.8 mm
EC1 72-8789	Titanium De Bakey Atraumatic Tissue Forceps, 20.0 cm, Width of Jaw 1.8 mm
EC1 72-8790	Titanium De Bakey Atraumatic Tissue Forceps, 24.0 cm, Width of Jaw 1.8 mm
EC1 72-8791	Titanium De Bakey Atraumatic Tissue Forceps, 15.0 cm, Width of Jaws 2.0 mm
EC1 72-8792	Titanium De Bakey Atraumatic Tissue Forceps, 20.0 cm, Width of Jaws 2.0 mm

Order #	Product
EC1 72-8773	Titanium Gillies Tissue Forceps, 15.0 cm, 1 x 2 Teeth

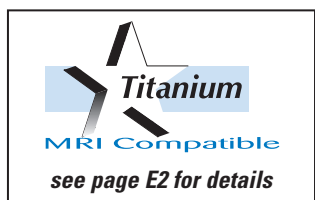


Order #	Product
EC1 72-8945	Dressing Forceps, 11.5 cm, Curved
EC1 72-8946	Dressing Forceps, 13.0 cm, Curved
EC1 72-8947	Dressing Forceps, 14.5 cm, Curved
EC1 72-8948	Dressing Forceps, 15.0 cm, Curved
EC1 72-8951	Dressing Forceps, 9.0 cm, Curved
EC1 72-8952	Dressing Forceps, 10.5 cm, Curved
EC1 72-8949	Dressing Forceps, 13.0 cm, Straight, Slender
EC1 72-8950	Dressing Forceps, 14.5 cm, Straight, Slender

German Steel, Forging and Finish



Order #	Product
EC1 72-8953	HARTMANN, Hemostatic Forceps, 9.5 cm, Straight Smooth
EC1 72-8954	HARTMANN, Hemostatic Forceps, 12 cm, Straight Smooth
EC1 72-8955	HARTMANN, Hemostatic Forceps, 9.5 cm, Curved Smooth
EC1 72-8956	HARTMANN, Hemostatic Forceps, 10 cm, Curved Smooth
EC1 72-8957	HARTMANN, Hemostatic Forceps, 10.0 cm, Straight
EC1 72-8958	HARTMANN, Hemostatic Forceps, 10.0 cm, Straight, Extra Fine
EC1 72-8959	HARTMANN, Hemostatic Forceps, 10.0 cm, Straight, Smooth
EC1 72-8960	HARTMANN, Hemostatic Forceps, 10.0 cm, Curved
EC1 72-8961	HARTMANN, Hemostatic Forceps, 10.0 cm, Curved, Extra Fine
EC1 72-8962	HARTMANN, Hemostatic Forceps, 10.0 cm, Curved, Smooth



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### Harvard Apparatus Hemostatic Forceps



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Order #	Product
EC1 72-8963	MICRO-MOSQUITO, Hemostatic Forceps, 12.0 cm, Right Angled
EC1 72-8964	MICRO-MOSQUITO, Hemostatic Forceps, 10.0 cm, Straight
EC1 72-8965	MICRO-MOSQUITO, Hemostatic Forceps, 12.0 cm, Straight
EC1 72-8966	MICRO-MOSQUITO, Hemostatic Forceps, 10.0 cm, Curved
EC1 72-8967	MICRO-MOSQUITO, Hemostatic Forceps, 12.0 cm, Curved
EC1 72-8968	MICRO-MOSQUITO, Hemostatic Forceps, 10.0 cm, Straight, 1x2 teeth
EC1 72-8969	MICRO-MOSQUITO, Hemostatic Forceps, 12.0 cm, Straight, 1x2 teeth
EC1 72-8970	MICRO-MOSQUITO, Hemostatic Forceps, 10.0 cm, Curved, 1x2 teeth
EC1 72-8971	MICRO-MOSQUITO, Hemostatic Forceps, 12.0 cm, Curved, 1x2 teeth

Order #	Product
EC1 72-8972	HALSTEAD-MOSQUITO, Hemostatic Forceps, 11.5 cm, Straight, Smooth
EC1 72-8973	HALSTEAD-MOSQUITO, Hemostatic Forceps, 12.5 cm, Straight
EC1 72-8974	HALSTEAD-MOSQUITO, Hemostatic Forceps, 12.5 cm, Straight, X-Fine
EC1 72-8975	HALSTEAD-MOSQUITO, Hemostatic Forceps, 12.5 cm, Straight, Smooth
EC1 72-8976	HALSTEAD-MOSQUITO, Hemostatic Forceps, 14.0 cm, Straight
EC1 72-8977	HALSTEAD-MOSQUITO, Hemostatic Forceps, 11.5 cm, Curved, Smooth
EC1 72-8978	HALSTEAD-MOSQUITO, Hemostatic Forceps, 12.5 cm, Curved
EC1 72-8979	HALSTEAD-MOSQUITO, Hemostatic Forceps, 12.5 cm, Curved, X-fine
EC1 72-8980	HALSTEAD-MOSQUITO, Hemostatic Forceps, 12.5 cm, Curved, Smooth
EC1 72-8981	HALSTEAD-MOSQUITO, Hemostatic Forceps, 14.0 cm, Curved
EC1 72-8982	HALSTEAD-MOSQUITO, Hemostatic Forceps, 12.5 cm, Straight, 1x2 Teeth
EC1 72-8983	HALSTEAD-MOSQUITO, Hemostatic Forceps, 14.0 cm, Straight, 1x2 Teeth
EC1 72-8984	HALSTEAD-MOSQUITO, Hemostatic Forceps, 12.5 cm, Curved, 1x2 Teeth
EC1 72-8985	HALSTEAD-MOSQUITO, Hemostatic Forceps, 14.0 cm, Curved, 1x2 Teeth

## NEW Harvard Apparatus Line of Surgical Instruments

### Harvard Apparatus Needle Holders



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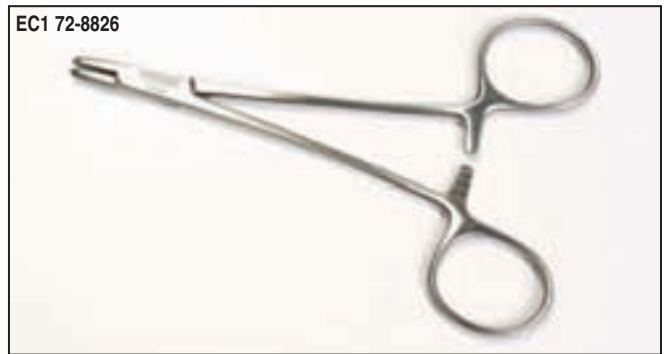
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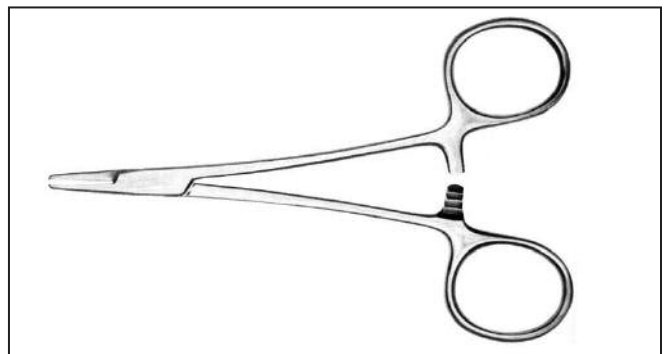
Order #	Product
<b>EC1 72-8884</b>	TC Derf Needle Holders with Tungsten Carbide Inserts, 12.0 cm, Extra Delicate Jaw
<b>EC1 72-8885</b>	TC Derf Needle Holders with Tungsten Carbide Inserts, 12.0 cm, Extra Delicate Jaw



Order #	Product
<b>EC1 72-8826</b>	Derf Needle Holders, 12.0 cm



Order #	Product
<b>EC1 72-8897</b>	TC De Bakey Needle Holders with Tungsten Carbide Inserts, 16.0 cm



Order #	Product
<b>EC1 72-8828</b>	Webster Needle Holders, 13.0 cm, Smooth Jaw



Order #	Product
<b>EC1 72-8902</b>	TC Gillies Mini Needle Holders with Scissors with Tungsten Carbide Inserts, 13 cm
<b>EC1 72-8903</b>	TC Gillies Needle Holders with Scissors with Tungsten Carbide Inserts, 16.0 cm



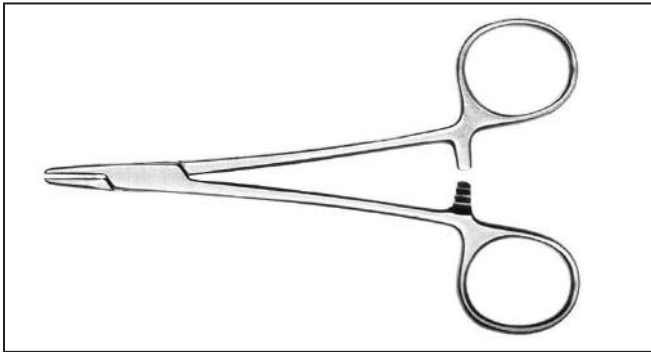
Order #	Product
<b>EC1 72-8830</b>	Crile-Wood Needle Holders, 15.0 cm with Groove
<b>EC1 72-8831</b>	Crile-Wood Needle Holders, 18.0 cm with Groove
<b>EC1 72-8832</b>	Crile-Wood Needle Holders, 20.0 cm with Groove

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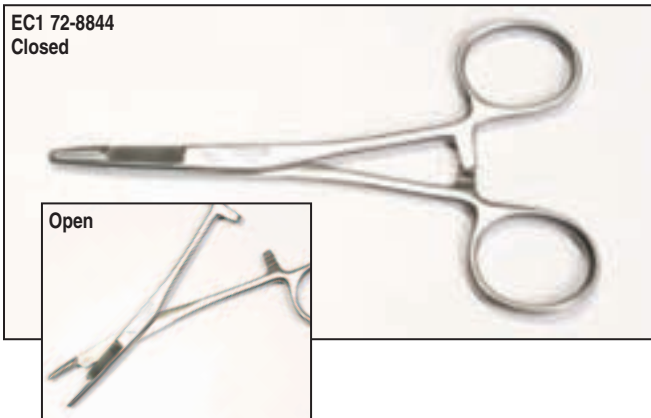
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### Harvard Apparatus Needle Holders (continued)

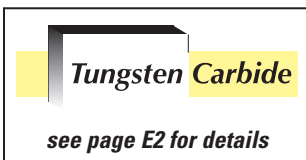
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Order #	Product
EC1 72-8834	Mayo-Hegar Needle Holders, 14.0 cm, Straight
EC1 72-8835	Mayo-Hegar Needle Holders, 16.0 cm, Straight
EC1 72-8836	Mayo-Hegar Needle Holders, 18.0 cm, Straight



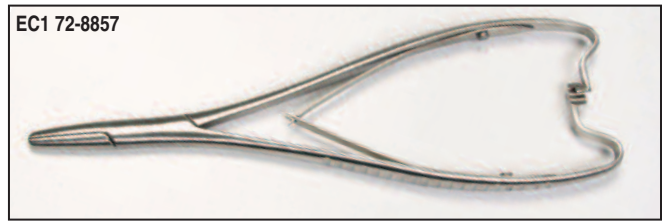
Order #	Product
EC1 72-8844	Olsen-Hegar Needle Holders with Scissors, 11.5 cm
EC1 72-8845	Olsen-Hegar Needle Holders Extra Delicate with Scissor, 11.5 cm, 1.5 mm at the Serrated Tip
EC1 72-8846	Olsen-Hegar Needle Holders with Scissors, 14.0 cm
EC1 72-8847	Olsen-Hegar Needle Holders with Scissors, 16.0 cm
EC1 72-8848	Olsen-Hegar Needle Holders with Scissors, 18.0 cm
EC1 72-8898	TC Olsen-Hegar Needle Holders with Scissors with Tungsten Carbide Inserts, 12 cm
EC1 72-8899	TC Olsen-Hegar Needle Holders with Scissors with Tungsten Carbide Inserts, 14.0 cm
EC1 72-8900	TC Olsen-Hegar Needle Holders with Scissors with Tungsten Carbide Inserts, 16.0 cm



German Steel, Forging and Finish



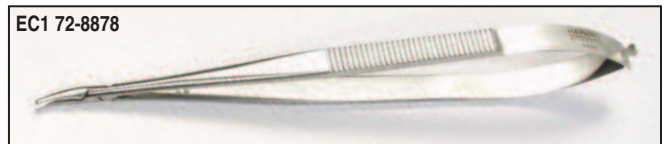
Order #	Product
EC1 72-8850	Crile Needle Holders, 15.0 cm



Order #	Product
EC1 72-8851	Mathieu Needle Holders, 14.0 cm without Groove
EC1 72-8854	Mathieu Needle Holders, 14.0 cm with Groove
EC1 72-8857	Mathieu Needle Holders, 17.0 cm without Groove with Inside Ratchet
EC1 72-8858	Mathieu Needle Holders, 20.0 cm without Groove with Inside Ratchet



Order #	Product
EC1 72-8865	Micro Needle Holders, 18.0 cm, Straight Rotary Handle
EC1 72-8866	Micro Needle Holders, 18.0 cm, Curved with Rotary Handle



Order #	Product
EC1 72-8872	Castroviejo Needle Holders, 14.0 cm, Straight without Catch
EC1 72-8876	Castroviejo Needle Holders, 14.0 cm, Curved with Catch
EC1 72-8878	Castroviejo-Micro Needle Holders, 18 cm, Curved without Catch with Flat Handle
EC1 72-8879	Castroviejo Needle Holders, 13.0 cm, 8 mm, without Catch

## NEW Harvard Apparatus Line of Surgical Instruments

### Harvard Apparatus Probes and Bone Rongeurs



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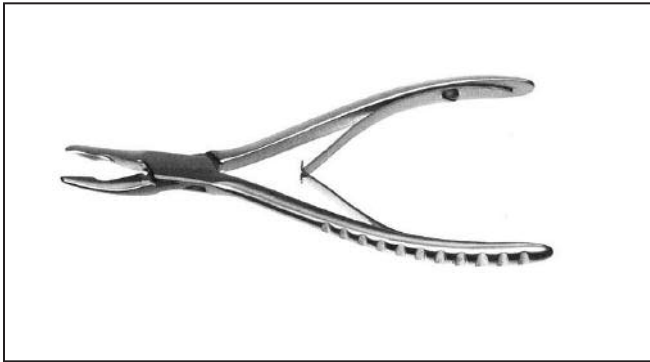
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Order #	Product
EC1 72-8908	Liston Bone Cutting Forceps, Straight, 14.0 cm
EC1 72-8909	Liston Bone Cutting Forceps, Straight, 17.0 cm
EC1 72-8910	Liston Bone Cutting Forceps, Straight, 19.0 cm



Order #	Product
EC1 72-8906	Blumenthal Bone Rongeurs, Curved, 15.5 cm
EC1 72-8907	Blumenthal Bone Rongeurs, 45° Angled, 15.5 cm

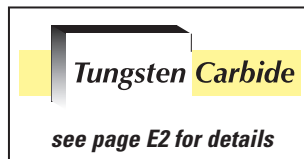


Order #	Product
EC1 72-8904	Friedman Bone Rongeurs, Curved, 14.0 cm
EC1 72-8905	Friedman Bone Rongeurs, Delicate, 14.5 cm



Order #	Product
EC1 72-8911	Probes, 13 cm, Double Ended, 1.0 mm Diameter
EC1 72-8912	Probes, 14.5 cm, Double Ended, 1 mm Diameter
EC1 72-8913	Probes, 16 cm, Double Ended, 1.0 mm Diameter
EC1 72-8914	Probes, 18 cm, Double Ended, 1.0 mm Diameter
EC1 72-8915	Probes, 14.5 cm, 2.0 mm Diameter with Eye
EC1 72-8916	Probes, 16.0 cm, 2.0 mm Diameter with Eye
EC1 72-8917	Probes, 18.0 cm, 2.0 mm Diameter with Eye

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## NEW Harvard Apparatus Line of Surgical Instruments

### Harvard Apparatus Clamps and Retractors



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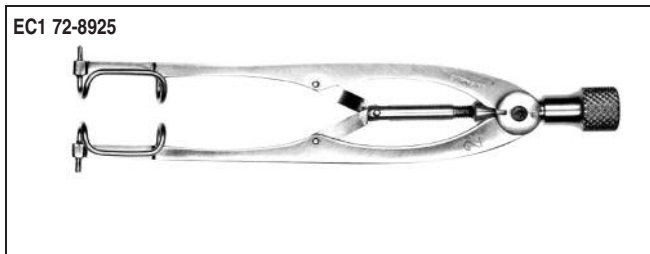
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#### Retractors



Order #	Product
EC1 72-8918	Barraquer(Colibri) Eye Specula, Small
EC1 72-8919	Barraquer(Colibri) Eye Specula, Large

Order #	Product
EC1 72-8920	Graefe Eye Specula, 6.0 cm



Order #	Product
EC1 72-8925	Castroviejo Eye Specula, 8.0 cm



Order #	Product
EC1 72-8926	Desmarres, Lid Retractors, 12 mm
EC1 72-8927	Desmarres, Lid Retractors, 14 mm
EC1 72-8928	Desmarres, Lid Retractors, 16 mm
EC1 72-8929	Desmarres, Lid Retractors, 18 mm

#### Clips & Bulldog Clamps



Order #	Product
EC1 72-8815	Dieffenbach, Vessel Clips, 35 mm, Straight



Order #	Product
EC1 72-8816	Vessel Clips, Length of Jaw 4 mm, Width of Jaw 0.75 mm, Locking Pressure 125 g



Order #	Product
EC1 72-8817	Diethrich, Mini Bulldog Clamp, 50 mm, Jaws 8 mm, Pressure 50 g, Straight

German Steel, Forging and Finish

## Aneurysm & Vascular Micro Clips



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- Ideal for temporary clamping of small animal vessels
- Stainless steel

### Micro Aneurysm Clips

These micro aneurysm clips provide an easy and secure way to stop blood flow while performing procedures on vessels. Using one of the applying forceps listed below, simply grasp the clip to open the jaw, slide it over the vessel and release. To remove, just perform the procedure in reverse. It's that simple. They do not compromise the vessel integrity. Package of 1.

Order #	Product
EC1 61-0186	Micro Aneurysm Clip, Straight, 60 gm Pressure, 0.8 mm width, 5 mm long
EC1 61-0187	Micro Aneurysm Clip, Straight, 85 gm Pressure, 0.75 mm width, 6 mm long
EC1 61-0188	Micro Aneurysm Clip, Slight Curve, 85 gm Pressure, 1 mm Width, 6 mm Long
EC1 61-0189	Micro Aneurysm Clip, Strong Curve, 85 gm Pressure, 1 mm Width, 6 mm Long Micro Aneurysm Clip, 45° Angle, 85 gm Pressure, 1 mm Width, 6 mm Long
EC1 61-0191	Applying Forcep for Micro Aneurysm Clips, 14 cm (5.5 in) Long
EC1 61-0192	Applying Forcep for Micro Aneurysm Clips with Lock, 14.6 cm (5.75 in) Long

- For temporary occlusion of flow through a vessel
- Stainless steel

### Micro Vascular Clips

These stainless steel clips are available in three sizes. They are easy to apply using EC1 61-0198 forcep listed below. Package of 1.

Order #	Product
EC1 61-0195	Micro Vascular Clip for 1 mm Diameter Vessels, Occlusion Pressure 10 to 15 g
EC1 61-0196	Micro Vascular Clip for 1 to 2 mm Diameter Vessels, Occlusion Pressure 15 to 20 g
EC1 61-0197	Micro Vascular Clip for 2 to 3 mm Diameter Vessels, Occlusion Pressure 20 to 30 g
EC1 61-0198	Applying Forcep for Vascular Clips, 12.1 cm (4.75 in) Long

## KTR-5 Ventilator



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- Different Versions available
- From mouse to rabbit
- Avoids the danger of excessively extending and damaging the lung
- Variable Ins/Exp ratio
- "Plateau" function to maintain the end-inspiratory pressure
- Sigh function

The KTR-5 is available in different version. It is used for ventilating the most frequently used animals in the laboratory, from mouse to rabbit. It employs Microprocessor control. This permits flexible adaptation of the ventilation parameters to the most diverse experimental conditions. The functional sequence is signaled by suitably marked signal LED's. The ventilation sequence can also be influenced by external signals.

Unlike a STARLING piston pump, use of the KTR-5 avoids the danger of excessively extending and damaging the lung of the ventilated animal through incorrect setting of the stroke volume. The electronic control of the KTR-5 also permits free selection of the ventilation timing over a wide range in order to adapt it to the requirements of your experiment.

The KTR-5 operates on the principle of intermittent positive pressure ventilation. A continuously adjustable air (gas) stream is passed by solenoid valves either to the animal or to an overflow outlet. The effective pressure in the ventilation cannula is measured and indicated. By suitable settings on the unit it is possible to utilize the measuring circuit to terminate the inspiration process when a given adjustable ventilation pressure has been reached (EIP LIMIT: 0–29 cmH<sub>2</sub>O). This effectively protects the animal against excessive pressure rise in the lung.

Through the "Plateau" function, the end-inspiratory pressure can be maintained constant over an adjustable period of time (% of cycle). This function permits direct control of the inspired air retention. Measurements can also be performed in the inspired condition.

The air flow to the ventilated animal is adjusted by means of a built-in needle valve. The set air flow is indicated on a float flow meter (Rota meter). A sigh (or a number of sighs) can be induced at any time by key stroke.

The connection to the tracheal cannula is made through a specially formed Y-shaped ventilation cannula. It carries the following tubing on its ends: 4 mm ID for rats and 1.5 mm ID for mice.

The ventilation air required is normally supplied by a built-in pump. There is also a provision for introducing ventilation gas from outside (max. pressure: 0.5 bar, 7.5 psi). A special version has the internal pump replaced by a precision pressure regulator; in this case the supply has to be provided by an external pressure source (pressure range: 2 - 8 bar, 29 - 116 psi).

The ventilation cannula is linked to the KTR-5 ventilator by a Y-shaped connector and suitable tubing. Different type of cannulae and Y-connections are available depending on the application and on the species.

### Specifications

Respiration Rate	1 - 200 bpm (breaths per minute)
Inspiration Duration	10 - 79% of ventilation cycle
Duration of Plateau	1 - 50% (of total cycle time)

#### EIP Limit:

Rat	0.1 - 50 cm H <sub>2</sub> O
Mouse	0.1 - 20 cm H <sub>2</sub> O
Leak Alarm	0 - 10 cmH <sub>2</sub> O

#### Maximum Sigh Pressure:

Rat	0.1 - 50 cmH <sub>2</sub> O
Mouse	0.1 - 20 cmH <sub>2</sub> O
Sigh Number	1 - 10

Adjustable Continuous Air Flow	5000 ml/min maximum (with internal compressor)*
Minute Volume Range	Up to 2500 ml/min (50% INSPIR, depending on compliance)*
Displays	LC-display, 3 lines of 12 characters; 7 LED's for function control

#### Electrical outputs:

Recorder Output	For measured ventilation pressure: 0.1 V/cm H <sub>2</sub> O
Trigger Output (TTL)	For synchronizing external equipment

Other functions	Alarm function, visual and audible, on pressure fall, alarm limit adjustable on "LEAK ALARM" control; indication of functional sequence by signal LED's; remote control
-----------------	---

Air/Gas Connections	Outlet for expiration air/gas (EXHAUST EXPIR), immersion tube for PEEP adjustment is connected to this outlet, also used for gas sampling to analyze the expired gas
---------------------	--

Outlet for excess air or gas	(EXHAUST OVERFLOW) connection for Halothane Vaporizer (FROM, TO HALOTHANE VAPORIZER) inlet for external supply (2 bar max.)
------------------------------	---

Air/gas supply	Internal compressor 5 l/min maximum, external supply from tank or central supply using pressure reducer and particle filter. Maximum pressure 2 bar
----------------	---

### Specifications (continued)

#### Ambient Conditions:

Operating temperature	15 to 35°C
Storage temperature	-10 to 50°C
Humidity	20 - 80%, no condensation
Supply	115/230 V, 50 - 60 Hz, 75 VA
Dimensions (W x H x D)	37 x 15 x 26 cm (37 x 5.9 x 10.2 in)
Weight	6.5 kg (14.3 lbs)

\* Note: Rota meter can easily be exchanged for better adaptation to the species (flow meter in the range for 1 l/min to 20 l/min are available). As a special version the ventilator can be equipped with two different flow meters to match a large range of species

## KTR-5 Ventilator (continued)



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### Specifications (continued)

#### Ambient Conditions:

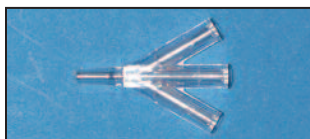
Operating temperature	15 to 35°C
Storage temperature	-10 to 50°C
Humidity	20 - 80%, no condensation
Supply	115/230 V, 50 - 60 Hz, 75 VA
Dimensions (W x H x D)	37 x 15 x 26 cm (37 x 5.9 x 10.2 in)
Weight	6.5 kg (14.3 lbs)

\* Note: Rota meter can easily be exchanged for better adaptation to the species (flow meter in the range for 1 l/min to 20 l/min are available). As a special version the ventilator can be equipped with two different flow meters to match a large range of species

### Important:

Cannulae must be ordered separately according to the species. For tracheotomy or intubation, use a cannulae with a Y-Piece. For more details, [click here](#).

KTR-5 Versions	With Built-In Pump for Internal Air Supply		Without Pump, with Built-In Precision Pressure Regulator for External Air Supply	
	230 VAC	115 VAC	230 VAC	115 VAC
Rodent up to Rabbit Version with 1 Flow Meter	EC1 73-3597	EC1 73-3645	EC1 73-3641	EC1 73-3646
Option for Second Flow Meter	EC1 73-3691	EC1 73-3691	EC1 73-3691	EC1 73-3691
Mouse Version with 1 Flow Meter	EC1 73-3640	EC1 73-3647	EC1 73-3642	EC1 73-3648
Mouse up to Rabbit Version with 2 Flow Meters	EC1 73-3629	EC1 73-3649	EC1 73-3643	EC1 73-3650
Remote Control	EC1 73-3709	EC1 73-3709	EC1 73-3709	EC1 73-3709



Special Y-Piece with central port, cannulae with Luer must be used. See page F16.

### Order # Product

**EC1 73-2943** Adapter for Cannulae with Luer Connection and Pressure Measurement Port for KTR-5 Ventilator, pkg. of 5

### Replacement Parts

**EC1 73-0027** Small Y Adapters, each with 2x silicone tubing 1.5 mm ID, 3 mm OD, 14 cm long, pkg. of 10

**EC1 73-0032** 5 Medium Y adapters, each with 2x silicone tubing 6 mm ID, 9 mm OD, 80 cm long, pkg. of 5

## HSE-HA Multiple-Channel Ventilator for Rodents

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EC1 73-0046



EC1 73-0048



Set up for 4 Animals

- Ventilate up to eight rodents at the same time
- Adjust tidal volume individually
- Very small dead space volume
- For applications where multiple rodents must be ventilated simultaneously (e.g. multiple blood pressure measurement)
- For Einthoven bronchospasmolysis test on multiple animals

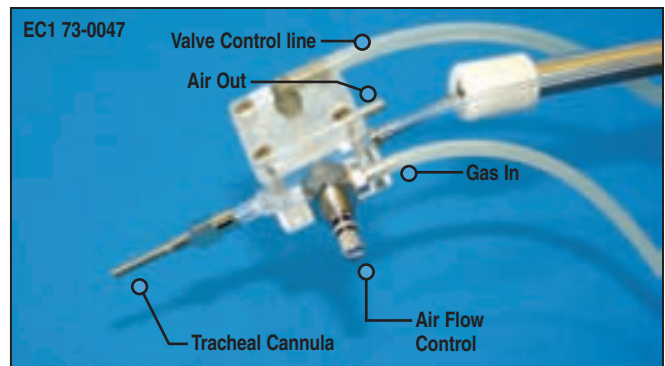
The HSE-HA Multiple-Channel Ventilator is a modular system for ventilation of one to eight large rodents. The respiratory rate is adjustable from 30 to 100 breaths per minute. It is based on the PLUGSYS system, see Section I for a complete description of the PLUGSYS system. The primary component is the Ventilator Sequencer Module (VSM) which plugs into a PLUGSYS mainframe case and is used to set the respiratory rate, inspiratory:expiratory (I:E) ratio and the maximum inspiratory pressure (i.e. safety pressure) for all animals. The safety pressure is set by the researcher and is used to prevent over inflation of the animal's lungs. The VSM requires a compressed air supply and, using both electronic and pneumatic controls, directs the air flow to the VSM ventilation head.

One to eight ventilation heads EC1 73-0047 can be connected to the VSM. If more than one ventilation head is used, a connecting block EC1 73-0048 is required. A directional valve within the ventilation head is controlled by the VSM to regulate the inspiratory and expiratory cycle. The VSM ventilation head includes all necessary tubing.

An optional MPX pressure transducer, EC1 73-0064, can be connected to the ventilation head. This pressure transducer attached to a TAM-A Transducer Amplifier, EC1 73-0065, can be used to record tracheal/airway pressures. This setup is described more thoroughly in the Einthoven Anti-asthmatics system, see our website. All components must be purchased separately.

### HSE-HA Ventilation Sequencer Module (VSM)

The HSE-HA Ventilation Sequencer Module (VSM) consists of an electronic and a pneumatic section and requires a compressed air supply. The VSM module with the ventilation head operates on the principle of 'intermittent constant flow ventilation'. A continuously adjustable air flow is passed by a main valve either to the animal (during inspiration) or to an overflow outlet



(during expiration). The design of the main valve provides an adjustable, pressure controlled, protection against excessive pressure rise in the animal's lung. The main valve is controlled electronically according to the selected respiration rate (RATE) and the selected inspiratory cycle (INSP. CYCLE %). The safety pressure which is the maximum admitted inspiratory pressure can be adjusted on the VSM module. The timing and the safety pressure are the same for all the ventilation heads, the constant air flow during inspiration can be adjusted individually on each ventilation head.

### Specifications

Compressed Air Supply:	
Minimum	4 bar (58 lbs)
Maximum	8 bar (116 lbs)
Respiratory Rate	30, 40, 50, 60, 70, 80, 90, 100 breaths/min
Inspiratory Time	10, 20, 30, 40, 50, 60, 70, 80 % of total cycle duration
Control of Ventilation Heads:	
Ventilation Pressure	150 mmHg
Control Pressure	Adjustable 0 to 50 cmH <sub>2</sub> O, safety pressure set at 'Max. Insp. Pressure'

### Ventilator Sequencer Module (VSM)

Indication	LED lights up during inspiration
Trigger Output	BNC socket on front panel (TTL open collector; inspiration = low level; expiration = high level); trigger signal also available on PLUGSYS bus system
Power Supply	5 V 0.4 A and 24 V 0.18 A through connector from PLUGSYS bus system
Dimensions, H x W x D	1128.7 x 101.6 x 220 mm (5.1 x 4 x 8.7 in)
PLUGSYS Width	5 slot units
Connector	DIN 41612, 96-pin VG

### Order # Product

EC1 73-0045	PLUGSYS Basic System Case
EC1 73-1523	PLUGSYS Minicase <sup>1</sup>
EC1 73-1537	PLUGSYS Minicase Case Extension Option <sup>1</sup>
EC1 73-1538	PLUGSYS Minicase 24 V Option <sup>1</sup>
EC1 73-0046	Ventilator Sequencer Module (VSM) <sup>4</sup>
EC1 73-0048	Connecting Block for up to 8 Ventilation Heads
EC1 73-0047	Ventilation Head Kit <sup>2</sup>
EC1 73-0500	Stand with Triangular Plate
EC1 73-0566	Perspex X-Block <sup>3</sup>
EC1 73-0064	MPX Pressure Transducer <sup>4</sup>
EC1 73-0065	TAM-A Amplifier Module <sup>4</sup>

<sup>1</sup> Alternative case if pressure monitoring not used.  
<sup>2</sup> Kit includes ventilation head, stand and block clamp.  
<sup>3</sup> One required for each MPX transducer.  
<sup>4</sup> For more information on VSM, MPX Transducer or TAM-A, see Section I.

## Volume Controlled Ventilators



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Intermediate Animal Volume Controlled Ventilator Model 665

- For animals from 1 to 30 kg (2.2 to 66 lb) in body weight

### Intermediate Animal Volume Controlled Ventilator Model 665

This Ventilator is supplied with two interchangeable brass piston and cylinder assemblies. The piston travels to the end of the cylinder regardless of volume setting thus minimizing dead air space.

The smaller piston and cylinder assembly adjusts from 4 to 25 ml per stroke. The larger assembly adjusts from 17 to 100 ml per stroke. The rate is adjustable from 10 to 100 strokes/minute. The volume and rate are adjustable while the pump is running. Air/gas valving is by the four port system.

#### Specifications

Tidal Volume	Adjustable from 4 to 100 ml/stroke while the Ventilator is running
Respiratory Rate	Adjustable from 10 to 100 breaths/min while the Ventilator is running
Phase Control	Percentage of inspiration can be adjusted from 35 to 65% of respiratory cycle while ventilator is running
Port Size:	
ID	6.4 mm (1/4 in)
OD	7.9 mm (5/16 in)
Dimensions, H x W x D	35 x 20 x 45 cm (14 x 8 x 18 in)
Weight	18 kg (37 lb)

#### Order # Product

<b>EC1 55-0798</b>	Intermediate Animal Volume Controlled Ventilator, Model 665, 115 VAC, 60 Hz
<b>EC1 55-0806</b>	Intermediate Animal Volume Controlled Ventilator, Model 665A, 230 VAC, 50 Hz
<b>EC1 55-2810</b>	Overhaul Kit for Intermediate Animal Ventilator; Contains O-rings, Valve Springs, Lubricants, etc. to Overhaul Ventilator*

\*Overhaul Kit does not include cylinder



- Stroke volumes of 0 to 2.5, 0 to 10 and 0 to 30 ml
- LED digital readout of rate and volume
- Extremely quiet operation
- Electromagnetically quiet (meets EMC-CIS-B regulation)
- Rate and stroke adjustable during ventilation

### Starling's Miniature 'Ideal' Ventilator

The Harvard Apparatus Starling 'Ideal' ventilator features negligible dead space, low noise, low wear and high reliability. The rate is indicated on a LED display. Both the rate and stroke can be changed while the ventilator is running. The fine pitch of the stroke control allows the stroke to be accurately set and the actual stroke is clearly displayed on a static pointer scale, not on the side of the piston, or moving scale.

Three different sizes are available: 0.25 to 2.5 ml, 1.0 to 10 ml and 3.0 to 30 ml. All air drawn into the pump is expelled on each stroke. The negligible dead space feature ensures that the piston reaches the end of the cylinder at the top of every stroke.

The speed of the motor is continuously monitored and regulated to maintain a constant stroke rate. The precision-machined valve assembly has four ports which provide maximum air channeling flexibility. The input may be room air or non-explosive gas mixtures. The exhaust air can be partially or completely recycled, or collected for analysis.

The Harvard Apparatus Starling 'Ideal' ventilator is designed to generate minimal electro-radiated noise and meet the stringent EMC CIS-B regulations for radiated noise, as well as other current CE directives.

#### Specifications

Tidal Volume	0.25 to 2.5 , 1.0 to 10 or 3.0 to 30 ml, continuously variable
Respiratory Rate	10 to 200 breaths/min
Display	Digital readout of rate and volume
Port Size	OD 6.3 mm (1/4 in) ID 4.8 mm (3/16 in)
Certifications	Meets all EMC and CE requirements
Power	115 V, 60 Hz or 220 V, 50 Hz
Dimensions, H x W x D	20 x 29 x 31 cm (7.9 x 11.4 x 12.2 in)
Weight	10.6 kg (23.4 lb)

### Starling's Miniature 'Ideal' Ventilator

Volume	Voltage 115 VAC, 60 Hz	Voltage 220 VAC, 50 Hz
0 to 2.5 ml	<b>EC1 40-1000</b>	<b>EC1 40-1001</b>
0 to 10 ml	<b>EC1 40-1002</b>	<b>EC1 40-1003</b>
0 to 30 ml	<b>EC1 40-1004</b>	<b>EC1 40-1005</b>

## Large Animal Ventilators and Anesthesia Kits



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Large Animal Controlled Ventilator

- For animals from 1.5 to 50 kg (3.3 to 110 lb) in weight
- Volume adjustable from 30 to 750 cc/stroke
- Variable Inspiratory: Expiratory Ratio

### Large Animal Volume Controlled Ventilator

This is the workhorse of the Harvard Apparatus Volume Controlled Ventilators. There are literally thousands of these Ventilators in use in leading research laboratories throughout the world. Their design has been essentially unchanged over the years. There are dozens of examples of these Ventilators giving continuous service for more than thirty years with proper care and maintenance.

Note that the volume adjustment is made on the piston shaft, and that therefore accurate volume adjustment cannot be made while the ventilator is running. However, the rate and the I:E % can be varied while the ventilator is running.

Air/gas valving is by the four port system with separate ports for gas inlet, gas outlet (to animal), gas return (from animal), and ventilator exhaust.

The gas inlet can be used to supply air or any non-flammable gas supply. Like the other Harvard Apparatus mechanical ventilators, attachment of the ventilator exhaust to a column of water can be used to produce a positive and expiratory pressure (PEEP).

### Specifications

Volume	Adjustable from 30 to 750 cc/stroke. Note that the volume adjustment is made on the crank, and therefore accurate volume adjustments cannot be made while the ventilator is running
Rate	Adjustable from 7 to 50 strokes/min while the ventilator is running
Phase	Adjustable from 25 to 50% of a single stroke cycle continuously variable while the pump is in operation
Port Size:	
ID	12.7 mm (0.50 in)
OD	14.4 mm (0.56 in)
Dimensions, H x W x D	30 x 50 x 22.5 cm (12 x 20 x 9 in)
Weight	21 kg (45 lb)

### Order # Product

<b>EC1 55-0715</b>	Large Animal Volume Controlled Ventilator, Model 613, 115 VAC, 60 Hz
<b>EC1 55-0723</b>	Large Animal Volume Controlled Ventilator, Model 613A, 230 VAC, 50 Hz
<b>EC1 55-0731</b>	Overhaul Kit for Harvard Apparatus Large Animal Ventilator; Contains O-rings, Valve Springs, Lubricants, etc. to Overhaul Ventilator*

\*Overhaul Kit does not include cylinder



Anesthesia Connection Kits

- Necessary for connection of your rodent or small animal ventilator to anesthesia equipment
- 2 sets available to work with:
  - Inspira Advanced Safety Ventilator, [click here.](#)
  - Model 683 Small Animal Ventilator, [click here.](#)
  - Model 687 Mouse Ventilator, [click here.](#)
  - MicroVent Prenatal Mouse Ventilator, [click here.](#)
  - MiniVent Mouse Ventilator, [click here.](#)

### Anesthesia Connection Kits

This apparatus is intended to be used for connecting an anesthesia system to an animal ventilator in physiological and pharmacological research laboratories. Each kit contains the necessary connectors and tubing to properly connect the ventilator to the anesthesia system.

- **Direct connection of anesthesia to ventilator for delivery to animal via intubation or tracheotomy (see tracheal/intubation cannulas)**
- **Removes pressurized gas to waste port – the introduction of pressurized gas into a ventilator will damage the system and over-inflate the animal's lungs. The connection kits depressurize the incoming gas to atmospheric pressure for safe delivery.**

Two kits are available, one for the Inspira Advanced Safety Ventilator and Rodent Ventilator Model 683, and another for the MiniVent, MicroVent and Model 687 Ventilator for mouse ventilation.

*NOTE: Waste gas will contain anesthetic gas and MUST be connected to an evacuation system.*

### Items Required

In addition to the connecting kit and the essential consumables (e.g. Oxygen, compressed air, N<sub>2</sub>O, anesthetic agent) it is necessary to provide the following items and equipment to operate a complete anesthetic system:

- **Anesthesia Machine – Table Top, Vaporstick, or equivalent**
- **Anesthetic Vaporizer – Series 100**
- **Animal Ventilator – Inspira and Model 683 or MiniVent (based on the species you are working with)**
- **Evacuation System – Active Evacuation system, F/Air Canister, Fluovac System or Fume hood**

### Order # Product

<b>EC1 73-3076</b>	Anesthesia Connection Kit for Inspira and the 683 Ventilators
<b>EC1 73-3077</b>	Anesthesia Connection Kit for MiniVent, MicroVent and Model 687 Ventilator

# nebulizers & cannulae



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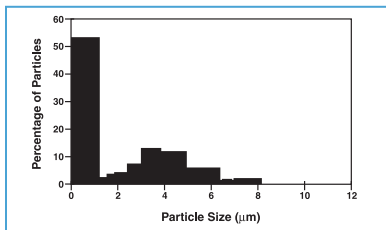
EC1 73-3433

- Low particle sizes (100% of the particles are below 10  $\mu\text{m}$ )
- No solution warming required
- Recommended for nebulizing drugs sensitive to ultrasonics
- Aerosol is automatically transported by compressed air

## Aerosol Nebulizer

This Aerosol Nebulizer is used to delivery nebulized substances to an animal or chamber. It requires an operating pressure of approximately 1.5 bar (22 psi) from a compressed air source. All of the particles generated by the Nebulizer are 10  $\mu\text{m}$  or less in size with 60% of the particles being 2.5  $\mu\text{m}$  or less. The data presented below in the bar graph and table list particle sizes obtained when 5 ml of a 0.9% saline solution was nebulized with a gas inlet pressure of 1.5 bar.

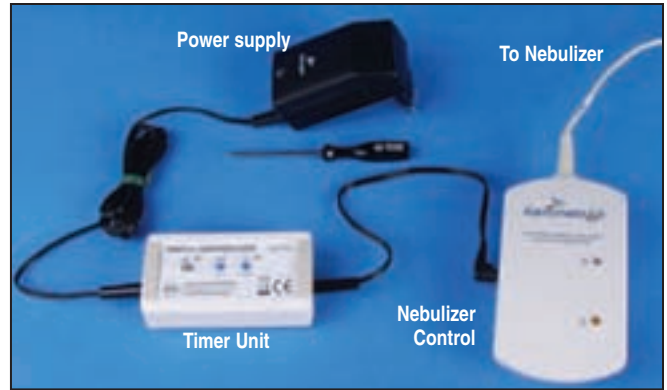
A special connecting block is required to attach the Nebulizer to the HA-HSE single/double chamber plethysmograph or mouse plethysmograph. The Nebulizer can be also used with the MiniVent or MicroVent using the Multi-Gas Inlet Adapter EC1 73-2919, see page F9. Lastly, the Nebulizer can also be used with a chamber/box. This version EC1 73-3433 includes the Nebulizer, stand, tubing, exhaust tubing and EC1 73-3300 Tubing Connection Kit.



Size Micron	Below	Band in Micron	% in Band
10.5	100	13.6 to 10.5	0
8.19	99.7	10.5 to 8.19	0.2
6.37	98	8.19 to 6.37	1.7
4.97	92.2	6.37 to 4.97	5.8
3.88	80.9	4.97 to 3.88	11.3
3.04	68.3	3.88 to 3.04	12.6
2.40	61.5	3.04 to 2.40	6.8
1.90	57.7	2.40 to 1.90	3.8
1.52	54.5	1.90 to 1.52	3.2
1.22	52	1.52 to 1.22	2.5
		1.22 to 0	52.0

Order #	Product
EC1 73-1963	Aerosol Nebulizer
EC1 73-3433	Aerosol Nebulizer with Multi-Gas Adapter Kit for Chamber/Box Use*
EC1 73-2919	Multi-Gas Inlet Adapter for MiniVent and MicroVent, see page F9
EC1 73-3300	Tubing Connection Kit for Aerosol Nebulizer

\*Note: To use this kit with a Ventilator, the EC1 73-3076 Connection Kit is required.



- Nebulizer does not alter formulation's molecular integrity
- High quality aerosol, precise particle size 2.5 to 4  $\mu\text{m}$
- Low flow rate approx. 0.1 ml/min
- Low residual volume < 0.2 ml
- Nebulized substance does not contaminate the inspiration path of the ventilator

## Ultrasonic Aerosol Nebulizer System

This Ultrasonic Aerosol Nebulizer is used to deliver nebulized substances to the respiratory path of small animals. It is used in combination with a ventilator. The nebulizer is placed between the ventilator and intubation cannula. The nebulized substance is transported by the ventilator to the animal lungs.

This Nebulizer is suitable for use with rats, guinea pigs or rabbits. The low dead volume adapter keeps the dead volume (system compliance) to 1.5 ml.

This system has a maximum temperature of approximately 30°C after 15 minutes in use. Compared to other nebulizers, the delivered compound is not heated and therefore its molecular integrity is not compromised. Additionally, this nebulizer comes with a timing unit which pulses the nebulizer which substantially reduces the amount of condensation.

This Ultrasonic Nebulizer System is comprised of 3 components: the nebulizer with filler cap, the control and timing unit with power supply, and the low dead volume adapter. All of these components are required for the system to function properly.

Order #	Product
EC1 73-3948	Ultrasonic Aerosol Nebulizer System

### Replacement Components

EC1 73-3732	Ultrasonic Nebulizer with Filler Cap
EC1 73-3733	Ultrasonic Nebulizer Control Unit with Power Supply and Timer
EC1 73-3734	Low Dead Volume Adapter for Nebulizer



# Tracheal and Intubation Cannulae



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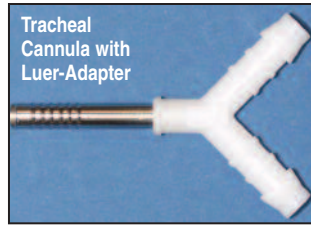
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Tracheal Cannula with Y-Adapter



Tracheal Cannula Only



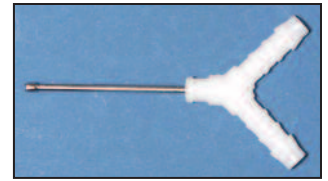
Tracheal Cannula with Luer-Adapter



Intubation Cannula Only



Intubation Cannula with Luer Adapter



Intubation Cannula with Y-Adapter

## Tracheal Cannulae

The tracheal cannula is used in a tracheotomy for general ventilation or respiratory mechanics studies. The outside diameter of the cannula must ensure a tight fit to the inside diameter of the animal's trachea. The cannulae are available in 3 versions:

- **Cannula only, for your own assembly**
- **With Y-adapter for connecting to a ventilator, the outside diameter of the Y-adapter matches to most of the ports diameter of the ventilators.**
- **With Luer-adapter for connecting to ventilation head of the multivent, see page F12.**

## Tracheotomy Cannulae (Stainless Steel)

OD (mm)	Length <sup>§</sup> (mm)	Animal	Cannula only	with Y-adapter	with Luer-adapter
1.0	15	mouse	EC1 73-0029	EC1 73-2731*	EC1 73-2835
1.2	15	mouse	EC1 73-2825	EC1 73-2830*	EC1 73-2836
1.3	15	mouse	EC1 73-0028	EC1 73-2730*	EC1 73-2837
1.5	20	small rat	EC1 73-2826	EC1 73-2831 <sup>#</sup>	EC1 73-2729
1.8	20	small rat	EC1 73-2827	EC1 73-2832 <sup>#</sup>	EC1 73-2728
2.0	25	small rat	EC1 73-2828	EC1 73-2833 <sup>#</sup>	EC1 73-2727
2.3	25	rat/guinea pig	EC1 73-2829	EC1 73-2834 <sup>#</sup>	EC1 73-2726
2.5	25	rat/guinea pig	EC1 73-0033	EC1 73-2732 <sup>#</sup>	EC1 73-2725
3.0	25	rat/guinea pig	EC1 73-0034	EC1 73-2733 <sup>#</sup>	EC1 73-2724
3.5	30	rat/guinea pig	EC1 73-0035	EC1 73-2734 <sup>#</sup>	EC1 73-2723
4.0	35	rabbit	EC1 73-0036	EC1 73-2735 <sup>~</sup>	-
5.0	35	rabbit	EC1 73-0037	EC1 73-2736 <sup>~</sup>	-
6.0	40	rabbit	EC1 73-3319	EC1 73-2891 <sup>~</sup>	-

\* Y-adapter for MiniVent and MicroVent OD 3.0 mm

<sup>#</sup> Medium Y-adapter OD 7.5 mm

<sup>~</sup> Large Y-adapter OD 10.0 mm

<sup>§</sup> Length listed is total cannula length. If cannula is used with Luer Adapter, the length is 4 mm less than listed. If the cannula is used with a Medium Y-adapter, the length is 3 mm less than listed. If the cannula is used with a Large Y-adapter, the length is 6 mm less than listed.

## Intubation Cannulae

The intubation cannula is used in chronic studies where the animal will be intubated. The outside diameter of the cannula must ensure a tight fit to the animal's trachea. These cannulae are also available in the 3 versions.

## Intubation Cannulae (Stainless Steel)

OD (mm)	Length <sup>§</sup> (mm)	Animal	Cannula only	with Y-adapter	with Luer-adapter
1.0	28	mouse	EC1 73-0030	EC1 73-2737*	EC1 73-2848
1.1	28	mouse	EC1 73-2838	EC1 73-2843*	EC1 73-2849
1.2	30	mouse	EC1 73-2839	EC1 73-2844*	EC1 73-2850
1.5	35	small rat	EC1 73-2840	EC1 73-2845 <sup>#</sup>	EC1 73-2851
1.8	35	small rat	EC1 73-2841	EC1 73-2846 <sup>#</sup>	EC1 73-2852
2.0	45	small rat	EC1 73-0038	EC1 73-2738 <sup>#</sup>	EC1 73-2853
2.3	45	rat/guinea pig	EC1 73-2842	EC1 73-2847 <sup>#</sup>	EC1 73-2854
2.5	50	rat/guinea pig	EC1 73-0039	EC1 73-2739 <sup>#</sup>	EC1 73-2855
3.0	55	rat/guinea pig	EC1 73-0040	EC1 73-2740 <sup>#</sup>	EC1 73-2856
3.5	60	rat/guinea pig	EC1 73-0041	EC1 73-2741 <sup>~</sup>	EC1 73-3112
4.5	70	rabbit	EC1 73-0042	EC1 73-2742 <sup>~</sup>	-

\* Y-adapter for MiniVent and MicroVent OD 3.0 mm

<sup>#</sup> Medium Y-adapter OD 7.5 mm

<sup>~</sup> Large Y-adapter OD 10.0 mm

<sup>§</sup> Length listed is total cannula length. If cannula is used with Luer Adapter, the length is 4 mm less than listed. If the cannula is used with a Medium Y-adapter, the length is 3 mm less than listed. If the cannula is used with a Large Y-adapter, the length is 6 mm less than listed.

For other Tracheal Cannulae, click here.