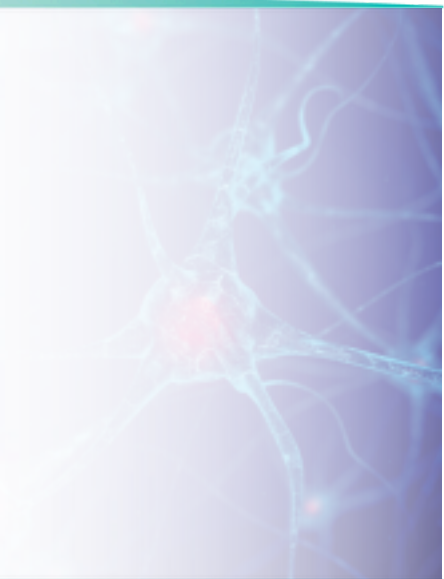
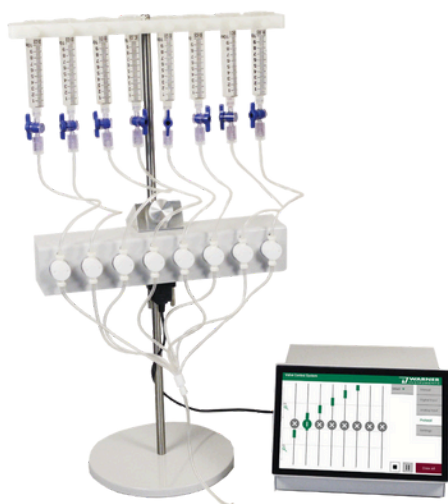




Electrophysiology & Live-cell Imaging

Chambers • Perfusion • Temperature Control

Patch Clamp Electrophysiology



Instruments for Electrophysiology & Live-Cell Imaging

Leveraging the combined expertise of three industry-leading brands (Warner Instruments, HEKA Elektronik, and Multi Channel Systems), Harvard Bioscience is proud to offer a wide range of versatile, integrated solutions designed to address the needs of electrophysiology & live cell imaging research.

We are happy to assist you in finding the right instruments for your application and to help in assembling the best products for a complete rig. For convenience, most of these products can be accessed at www.warneronline.com or www.heka.com.

Warner Instruments offers almost everything you may need for patch clamp on or around the microscope, and HEKA offers state of the art amplifiers and data acquisition well optimized for electrophysiological applications.

An Integrated Systems Approach

The Complete Rig

Our expert application scientists will consult with you to identify the best components needed to assemble a complete rig.



**Faraday Cage
and Table**



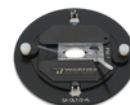
**Microscope
and Stage**



Amplifier and DAQ



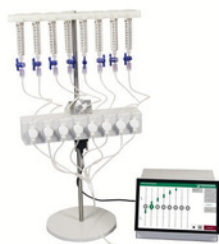
**Recording
Chambers and
Slice Anchors**



**Heated
Platforms**



Stage Adapters



Perfusion Systems



**Inline Solution
Heaters**



Temperature Controllers

Recording

HEKA EPC 10 USB 3.0 Amplifier and PATCHMASTER NEXT Software



The EPC 10 USB 3.0 integrates amplifier and data acquisition into one low-noise, USB 3.0-powered unit, delivering flexible, high-resolution recordings across a wide range of applications.

- **Software-controlled amplifier** with integrated data acquisition interface to automate experimental procedures
- **Compact, low-noise headstage** that's suitable for most applications and software setups
- **Multi-channel recording flexibility:** Available in Single, Double, and Quadro versions with synchronized headstages for parallel recordings. Two amplifiers can be linked to extend the number of recording channels
- **Improved data acquisition and hardware connectivity**, with 2 MHz sampling, extra analog/digital channels, and flexible external integration supports complex experimental designs.

The main technical features of the EPC 10 USB 3.0 making it a unique instrument include:

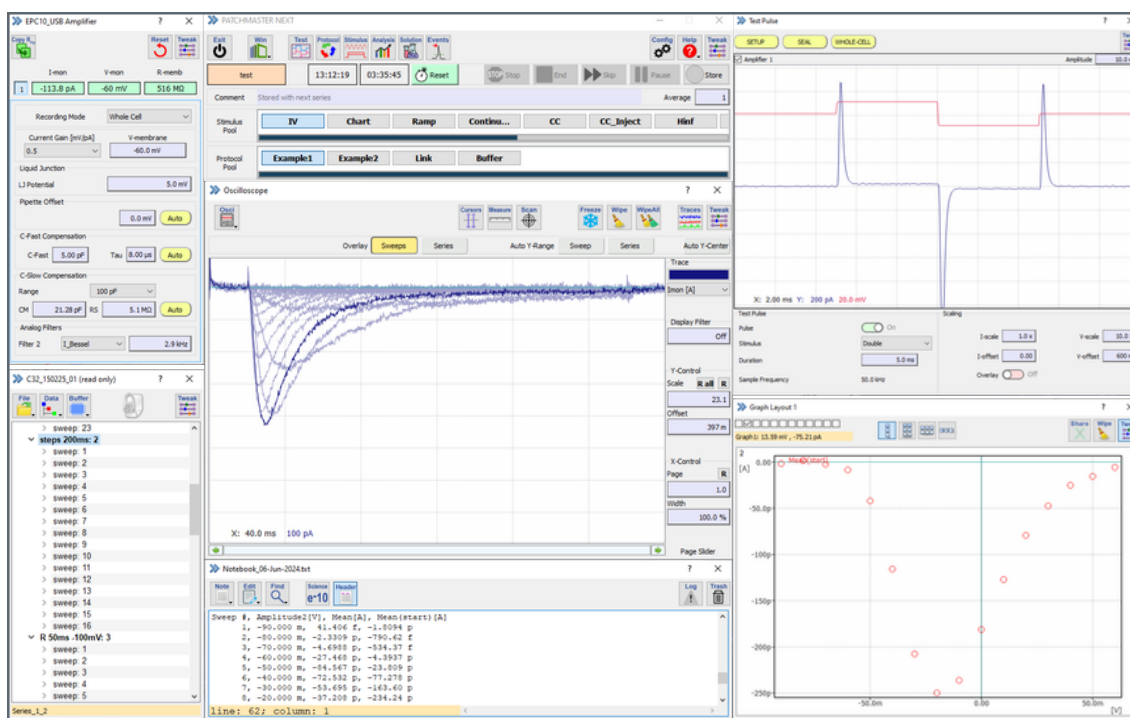
- **Integrated acquisition board** for low noise and easy setup
- **Fully computer controlled;** allows complete automation of experiments
- Optional small S-Probe headstage, only 49 x 17 x 14.5 mm, 25 g
- Optional bath sense for amperometry
- Versions with 1, 2, and 4 amplifiers and headstages
- **Two EPC 10 USB 3.0 amplifiers can be linked** to supply up to 8 headstages
- 3 feedback resistors per headstage
- On-site, user-performed calibration

EPC 10 USB 3.0: Wide Range of Recording Configurations

- Whole cell recordings (conventional and perforated)
- Single channel recordings
- Loose patch recordings
- Intracellular voltage recordings with high resistance electrodes

HEKA PATCHMASTER NEXT

The complete solution for amplifier control, data acquisition, and data analysis.



PATCHMASTER NEXT is a fully integrated solution for amplifier control, data acquisition, and real-time analysis, offering a modern, intuitive interface and complete automation of experimental workflows. It extends its functionality with FITMASTER NEXT for advanced trace processing, event detection, and fitting, while SmartLUX and DocuLUX synchronize fluorescence imaging and live-cell visualization with electrophysiological recordings. This seamless software ecosystem streamlines your workflow from acquisition to publication-quality results, making PATCHMASTER NEXT the most versatile and integrated patch clamp software platform available.

Software Ordering Information

Order #	Product
895245	PATCHMASTER NEXT
895372	FITMASTER NEXT (2 dongles)
895050	SmartLUX
895380	DocuLUX Camera System Color
895381	DocuLUX Camera System Monochrome
895246	PATCHMASTER NEXT Upgrade
895377	FITMASTER NEXT Upgrade (per dongle)

EPC 10 USB 3.0 Amplifier Ordering Information

Order #	Product
895331	EPC 10 USB 3.0 Single with Red Star Headstage
895332	EPC 10 USB 3.0 Double with Red Star Headstage
895333	EPC 10 USB 3.0 Quadro with Red Star Headstage
895382	EPC 10 USB 3.0 Single with S-Probe Headstage
895383	EPC 10 USB 3.0 Double with S-Probe Headstages
895384	EPC 10 USB 3.0 Quadro with S-Probe Headstages

Contact us for information about units without software included.

Acquisition Hardware and Software

HEKA EPC 10 USB 3.0 Amplifier and PATCHMASTER NEXT

The PATCHMASTER NEXT data acquisition system is recognized as a premier DAQ for electro- physiological applications. PATCHMASTER NEXT requires the HEKA LIH 816 USB 3.0 for operation.

While the HEKA EPC10 USB 3.0 amplifiers feature an integrated acquisition board, amplifiers from other manufacturers require an external acquisition system for recording and stimulation.

The LIH 816 USB 3.0 data acquisition board samples up to 2 MHz per channel and two LIH digitizers can be linked to increase the available number of recording channels.



LIH 816 USB 3.0

Order #	Product
895345	LIH 816 USB 3.0

HEKA Holders

HEKA’s pipette holders are made of extremely low-noise polycarbonate material and offers two major improvements that virtually eliminate pipette movement and air leakage by elongating the holder’s cap and the addition of a third O-ring.

The longer cap allows for the insertion of a small polycarbonate cylinder, keeping the first O-ring firmly in place, even after removal of the cap for cleaning purposes.

The second O-ring is nestled at the other end of the short cylinder featuring a precision mill cut that holds it in place.

The design provides the highest pipette stability, eliminates air leaks, and extends the life time of O-rings. Most importantly, this holder will increase the rate of successful recordings and increase productivity.

Order #	Product
895229	Pipette holder BNC Type 1.5mm
895150	Pipette holder SMA Type 1.5mm (for S-Probe)



Recording and Imaging Chambers

Good to know:

Warner Instruments is the industry standard when it comes to imaging and recording chambers. We offer a wide variety of specialty chambers accommodating many applications. We also provide stage adapters to match almost every microscope stage.

Several components are needed for the proper use of an imaging and recording chamber:

- Chamber and coverslip
- Platform
- Stage adapter

The image on the left illustrates how the components assemble to form a system.

The sample containing coverslip is sealed to the chamber bottom and chamber is placed into a platform. Warner has two platform styles available, with the magnetic design being simpler in design and more convenient to use.

The chamber/platform assembly is then placed into a stage adapter which allows all Warner products to be placed onto a microscope stage.

If using slice preparations, the slice is held in place using a slice anchor specifically designed for the chamber in use. Those slice anchors are press-fit into the respective chamber and are not weight dependent.

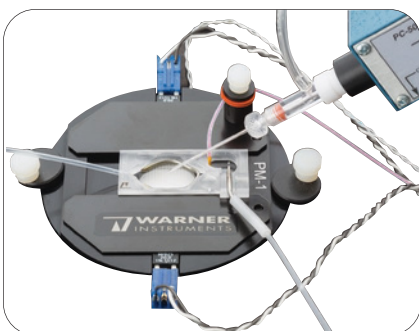
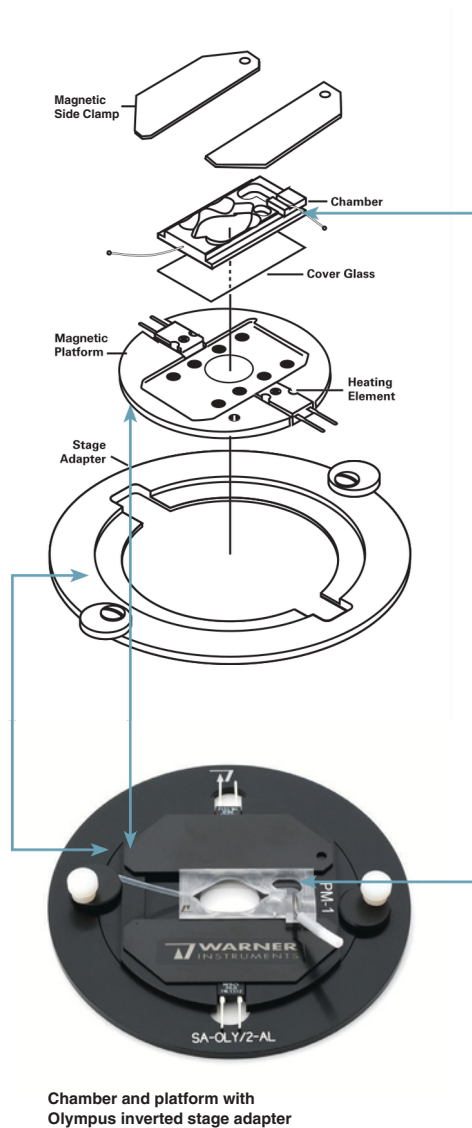
Open bath chambers allow direct access to the chamber bath by either recording electrodes or microscope objectives.

Closed bath chambers do not permit direct access to the bath but are very well suited for imaging studies. The basic composition of a Warner chamber includes:

- An imaging/recording zone
- A perfusion input
- A suction regulated output tube

Most Warner chambers incorporate a diamond-shaped fluidics reservoir yielding laminar flow throughout the bath.

Low profile open bath chambers allow excellent electrode access without interfering with the optical equipment used in slice work.



Open Bath Chambers

The RC-26, RC-26G, and RC-26GLP provide a large volume in a diamond shaped, open bath chamber capable of accommodating large specimens such as slice preparations. These chambers are also well optimized for assays using adherent cultured cells.

RC-26, RC-26G, and RC-26GLP



- Optimized for patch clamp studies
- Can be used for tissue slice samples or with cell cultured coverslips
- Large imaging area
- Supports both upright and inverted microscopes
- Slice anchors available
- Fits PM-1 or PH-1 Series 20 platforms

Order #	Product
64-0234	RC-26, 170 μ L volume
64-0235	RC-26G, 234 μ L volume
64-0236	RC-26GLP, Low profile, large bath recording chamber



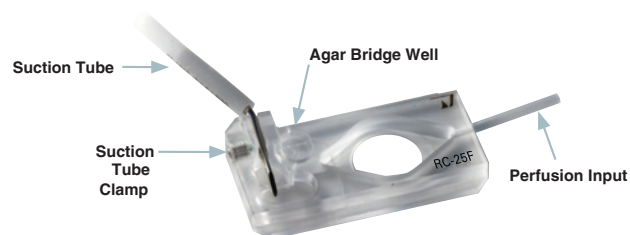
RC-27L

The RC-27L is designed with tissue slice studies in mind. The tissue slice rests on a slice support and is held in place by a slice anchor (also known as a harp). This design allows the tissue slice to be perfused from both above and below, which can increase the sample's viability. The slice support rests 0.5 mm above the coverslip floor and are included with the RC-27L.

- Designed for tissue slice studies
- Permits solution flow both above and below a tissue slice
- Provides good access for immersion optics and electrodes.
- Can be used with either upright or inverted microscopes
- Slice anchors available
- Requires a platform (PM-6D or PH-6D) and Series 20 stage adapter

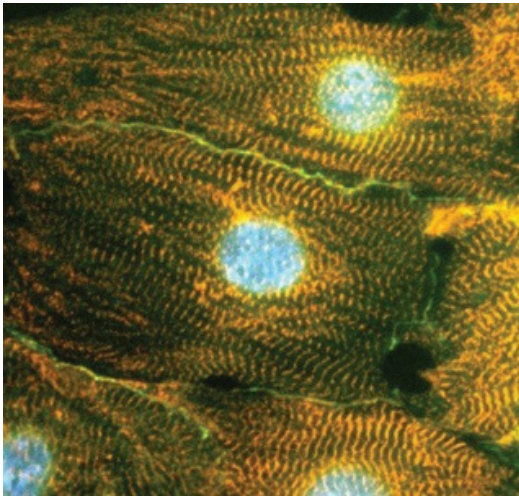
RC-25 and RC-25F

- Designed for physiological measurement of cell cultured coverslips
- Diamond-shaped bath for laminar solution flow
- Applications such as patch clamp, intracellular extracellular recordings and imaging
- Small bath volume facilitates fast solution exchange
- Uses 12mm (RC-25) or 15mm (RC-25F) round coverslips



Order #	Product
64-0232	RC-25, 90 μ L volume
64-0233	RC-25F, 133 μ L volume

Field Stimulation Chambers

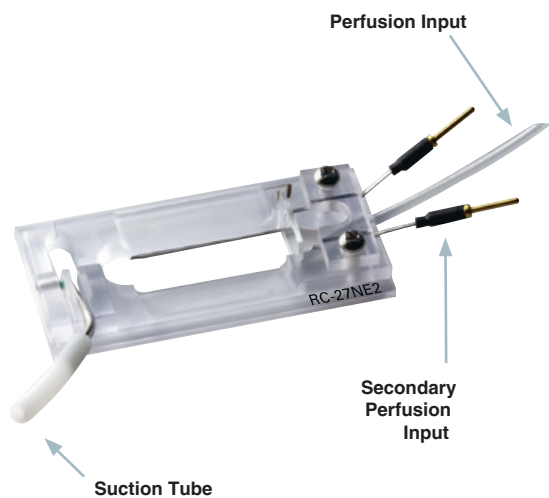


Warner Instruments provides a wide selection of field stimulation chambers.

All chambers are equipped with platinum electrodes that are attached to the sides of the bath. The cables are terminated with 1 mm pins.

- Narrow open bath design
- Rectangular shape
- Accommodates tissue and brain slice specimens
- For applications such as patch clamp and physiological measurements on cultured cells

RC-27NE2



The RC-27NE2 is a modified version of the RC-27 with a narrower bath and smaller volume.

- Narrow open bath design
- Rectangular shape
- Accommodates tissue and brain slice specimens
- For applications such as patch clamp and physiological measurements on cultured cells

Order #	Product
64-0240R2	RC-27NE2 narrow bath for field stimulation

RC-49MFSH

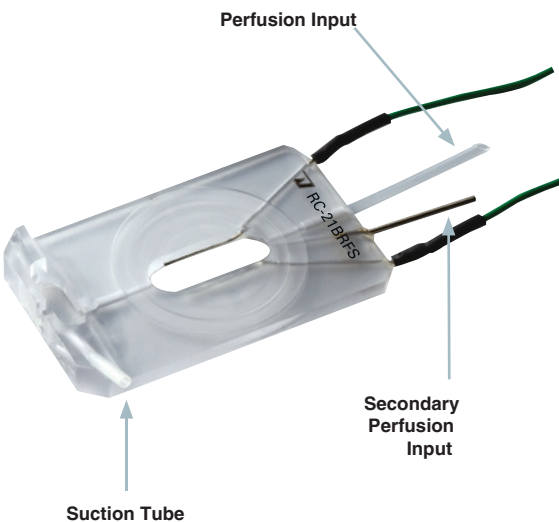


The RC-49MFSH is designed quick exchange of coverslips in field stimulation applications.

- O-Ring seal permits quick exchange of coverslips
- Low profile design allows low entry angle electrodes
- Platinum field stimulation electrodes
- Uses popular 18 mm round coverslips
- Embedded heating elements

Order #	Product
64-1725	RC-49MFSH magnetic imaging/recording chamber with removable electrodes for field stimulation and heating elements

RC-21BRFS



The RC-21BRFS is a modified version of the RC-21.

- Closed bath design
- Small bath volume with slotted bath
- Requires 25mm round cover glasses for top and bottom of the chamber
- Volume of 263 μ l
- Gas tight design at chamber interface

Order #	Product
64-0226	RC-21BRFS for field stimulation

Chamber Platforms

PM and PH Series

Warner platforms function as base for the Series 20 chambers and provide easy clamping to make a secure seal between the chamber and coverslip.

Platforms are available in the classic PH Style and the improved magnetic PM Style.

Each chamber fits only a single platform version (eg, PH-1 or PM-1), but a single platform can accept several different chambers. Each chamber specifies which platform to which it is designed.

- Allows small entry angles ideal for patch recordings
- No tools needed for PM platform version
- Available for all Series 20 Chambers
- Magnetic stainless steel allows use of magnetic holders
- Compatible with all Series 20 stage adapters
- Platforms come with heating elements



Stage Adapters

All Warner Series 20 platforms have the same outer dimension, and a stage adapter is used to mount the platform onto a microscope stage.

The cutout of the microscope stage determines the corresponding adapter and Warner adapters support stage cutouts from all manufacturers as noted in the table provided on the following page.

Please visit our website to find a suitable adapter.



Stage Adapters

Stage Manufacturer	Adapter Dimensions	Series 20 Stage Adapters	Order #
Warner Hybrid Stage	11 cm diameter	SA-OLY/2-AL	64-2411
Multiwell Plate Cutout	12.8 x 8.6 cm	SA-20MW-AL	64-2416
Nikon	10.8 cm diameter	SA-NIK-AL	64-2410
	9 x 13 cm	SA-20TS/100	64-0340
	12.7 x 11 cm	SA-20UU-AL	64-2412
	23.6 x 15.5 cm	SA-20Ti-2 Fits newer Nikon Ti2 stages	64-3073
	12.7 x 8.5 cm	SA-20MW-AL-N Fits newer Nikon MW stages	64-2420
Olympus	12.7 x 11 cm	SA-20UU-AL	64-2412
	11.0 cm diameter	SA-OLY/2-AL	64-2411
Zeiss	10.97 x 15.98 cm	SA-20KZ-AL	64-2415
	16.5 x 10 cm	SA-20LZ-AL	64-2413
Leica	16.5 x 10 cm	SA-20LZ-AL	64-2413
Scientifica	11.0 cm diameter	SA-OLY/2-AL	64-2411
Prior & Ludl	16 x 11 cm	SA-20PL	64-0299
Burleigh Gibraltar	11.0 cm diameter (steel top stage only)	SA-OLY/2-AL	64-2411
Marzhauser	10.97 x 15.98 cm	SA-20KZ-AL	64-2415
HEKA EIProScan	10.97 x 15.98 cm	SA-20KZ-AL	64-2415

Quick Release Chambers

QR-40 Series

The QR-40 Series chambers are designed for research requiring the fast exchange of round cover slips. They use strong neodymium magnets to create the seal and hold. A soft rubber o-ring creates a watertight seal between the chamber top and the coverslip in use.

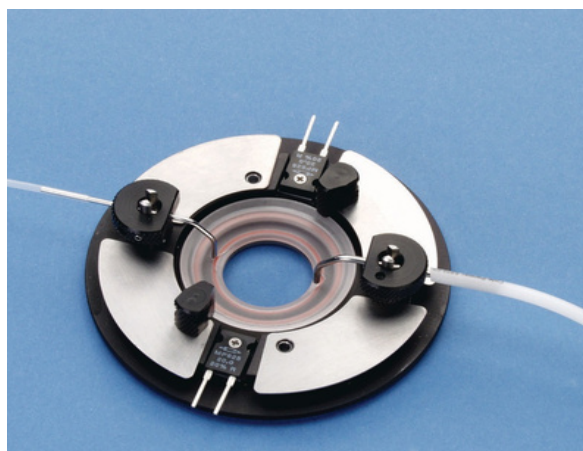
The QR-40 imaging chambers are compatible with the QE-1 quick exchange platform, as well as the DH-35iL and DH-40iL culture dish incubators.

- O-ring seal system enables quick coverslip exchange, ideal for rapid screening assays
- Closed bath design promoting smooth continuous solution exchange as well as stable imaging focus
- Anodized aluminum base guarantees effective heat transfer



Order #	Product
64-1943	QR-40LP for 25 mm coverslip, low profile
64-1944	QR-41LP for 18 mm coverslip, low profile
64-1945	QR-42LP for 15 mm coverslip, low profile
64-1946	QR-48LP for 12 mm coverslip, low profile
64-1947	QR-40HP for 25 mm coverslip, high profile
64-1949	QR-41SLP for 25 mm coverslip, slotted bath
64-1951	QR-47FSLP for 25 mm coverslip for field stimulation

QE-1 Platform



- Supports inverted and upright microscopes
- Resistive heating elements for temperature control
- Provides the base for our DH-35iL and DH-40iL stage top microincubators
- Removable perfusion and suction holders
- Adapter ring kit accommodates 35 mm format culture dishes from Willco Wells, Corning, Falcon, NUNC, and others

The QE-1 platform is designed to serve as a convenient holder for Warner's QR-40 Series chambers as well as most 35 mm culture dishes, with or without glass bottoms.

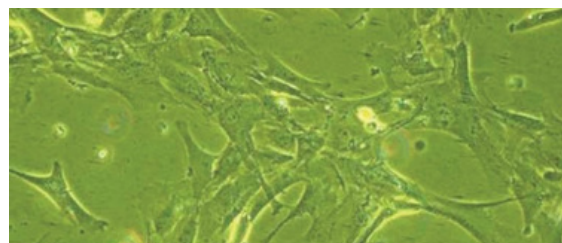
Order #	Product
64-0375	Quick change platform, heated base, for QR-40 series chambers

Microincubation System DH-35iL and DH-40iL

Warner Instruments also provides microincubation platforms such as DH-40iL and DH-35iL.

The DH-40iL is designed to support glass-bottomed 35 mm cell culture dishes and the QR/RC-40 family of open bath chambers. The DH-35iL supports glass-bottomed 35 mm cell culture dishes and the RC-30 Series of culture dish inserts.

- DH-platforms provide imaging, temperature, and gas environment control
- Compatible with dishes from Corning, Falcon, MatTek, Nunc, Willco Wells, and WPI
- (DH-40iL only in open configuration)
- Unique dish clamps provide easy cell access



Order #	Product
64-0349	DH-35iL culture dish incubation system supporting 35 mm quick exchange chambers
64-0388	DH-40iL Culture dish incubation system

Chamber Accessories

Coverslips, slice anchors, silicone grease

Warner Instruments provides a number of D265 borosilicate glass coverslips in multiple thicknesses and sizes for microscopy and imaging. Please visit our website to find the right coverslips for your application.

The slice anchors are designed for an easy-press fit into the chamber's bath area. This allows control of the cord line pressure that is applied to the tissue slice. Most anchors are made of a type 316 stainless steel with Lycra® threads and finished with a plastic coating.



Silicone Grease

An artist's acrylic brush is an effective tool for applying silicone lubricant to a glass coverslip and polycarbonate chamber.

By “painting” the grease onto the bottom surface of a polycarbonate chamber, it is easy to evenly spread lubricant and create a water-tight seal.

The silicone grease kit includes:

- Tube of Dow Corning® 111 Valve Lubricant & Sealant
- Two acrylic paint brushes (sized #2 and #4)
- Several pallets



Order #	Product
64-0378	Silicone grease kit, includes brushes and pallets
64-0275	Stopcock grease



Overview:

Temperature Control

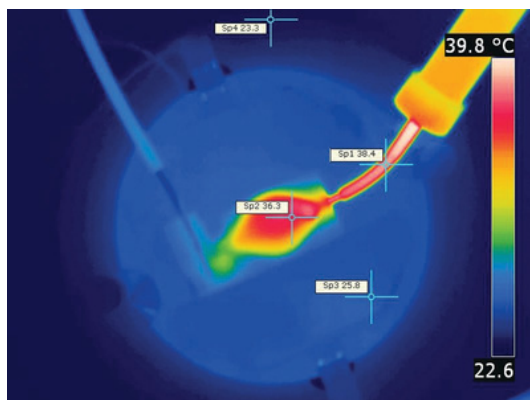
Researchers have long understood the importance of temperature regulation in the study of cellular function.

Warner temperature control apparatus have been designed with the demanding noise and precision requirements of electrophysiological applications in mind.

Transmission of thermal energy can happen through the microscope objective, the perfusion solution, the chamber platform, and any other physical elements of the working environment.

We provide temperature control of two parts: platforms and solution.

Heated platforms transmit heat to the chambers via the sides only, therefore heat applied through a platform only will have a gradient from the sides to the middle of the bath. Heating the perfusing solution is extremely effective if the flow rate is sufficient. Obviously, combining the two approaches will capture the best of both.



Single Channel TC-324C Resistive Temperature Controller

Temperature Control

Heat only temperature controllers

The Warner TC-324C and TC-344C temperature controllers have been designed with the demanding noise and precision requirements of electrophysiological applications in mind and feature:

- Slow ramped DC power for quiet operation
- Temperature control from ambient to +65 °C
- Manually controlled DC output choices
- Three feedback loop speeds
- Independent bath temperature monitoring
- External input for computer control
- Open thermistor fault protection
- Low noise toroidal transformer power supply

These PID controllers are compatible with all Warner non-Peltier based thermal control products, are easy to use, and sport rock solid construction for years of reliable use.



Single and Dual Channel (TC-324C and TC-344C)
Heat only Temperature Controllers

Order #	Product	Properties	Suggested Applications
64-2400	TC-324C	Single channel temperature controller	<ul style="list-style-type: none">• Syringe heater• Stage insert heater• In-line solution heater, culture dish incubation system
64-2401	TC-344C	Dual temperature controller	

In-Line Solution Heaters

The simplest and most direct approach for the application of heat to a sample is to preheat the perfusion solution immediately prior to its delivery to the chamber.

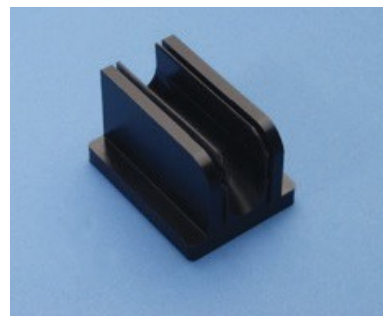


Order #	Product	Max Flow Rate	Inputs	Outputs	Heating/Cooling
64-0103	SF-28 In-Line solution heater	2 ml/min	1	1	H
64-0102	SH-27B In-Line solution heater	5 ml/min	1	1	H

In-Line Solution Heater Holders

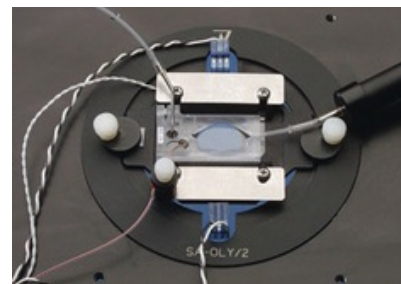
We provide the following in-line-solution heater holders:

Order #	Product
64-1555	SHH-1 Holder for SH-27B and SF-28 inline solution heaters



Platform Heating

Platform heating is the second most efficient method for warming a heating and recording chamber. All Warner platforms come supplied with resistive heat elements, and the platform is connected to the TC-324C/TC-344C temperature controller via a CC-28 cable. The CC-28 also provides feedback thermistors for regulating the controller and informing the user of the precise bath conditions.



Order #	Model No.	Product
64-0106	CC-28	Cable assembly for heater controls to platform
64-0107	TA-29	Cable with bead thermistor
64-0108	TA-30	Cable with glass thermistor
64-0109	CC-35	Cable assembly for heater controllers, unterminated with tinned leads at platform end



Bipolar Temperature Control

Heating & Cooling

These systems are designed to work with our bipolar temperature controller (CL-100) to provide both heating and cooling via our SC-20 inline solution heater/cooler.

The use of Peltier-driven, bipolar temperature controlled apparatus require a heat exchanger in order to function properly. We have the LCS-1 Liquid Cooling System for this purpose.



LCS-1 Liquid Cooling Device

Order #	Product	Suggested Applications
64-0352	CL-100 Bipolar single channel temperature controller	<ul style="list-style-type: none"> In-line solution heater/cooler Stage insert heater/cooler
64-0353	SC-20 In-Line heater/cooler	5 ml/min 2 Inputs, 1 output
64-1922	LCS-1 Liquid Cooling Device Required accessory for systems using CL-100	<ul style="list-style-type: none"> Used to temperature manage the water jacket Electrically and mechanically quiet



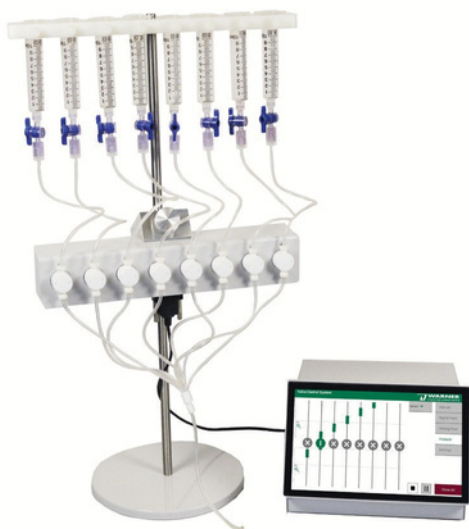
SC-20 In-Line heater/cooler

Perfusion Systems

Perfusion is required to keep the specimen alive and can also be used for heating or cooling. Most of the perfusion systems available consist of a set of syringes filled with solution and a valve controller that opens and closes the valves of each syringe. Syringe tubing consolidates in a manifold which is connected to the chamber.

To avoid overflow of the solution, suction must be applied. This is usually done with a vacuum system. Alternatively, a peristaltic pump can be used for delivering solution as well as for suction.

Touch and PC Software controlled Valve Control Systems



The VCS systems are configured to control up to 8 Pinch-, PTFE-, or Mini-valves. Each valve is individually accessed by a manual touch display, the included PC software, an external analog signal, or an external digital signal (TTL).

- Digital or analog switching for Patch Clamp applications
- UI programmable valve protocols
- Save and load protocols on hard drive
- Download protocols to valve controller for permanent storage
- Run and monitor protocols

VCS Perfusion Systems are comprised of the following:

- Valve control unit with 7" touch display
- Valves
- Valve bracket, including an 8 ft long cable to be connected to valve controlled
- MP series manifold (Pinch and PTFE), ML series (Mini)
- 60cc (10cc for mini-valves) reservoirs (syringes)
- Reservoir holder
- Ring lab stand
- Stopcocks for each reservoir
- Tubing connector

Order #	Product	Channels	Valves	Specialty
64-3084	VCS-6-PINCH	6	pinch	-
64-3085	VCS-6-PTFE	6	PTFE	-
64-3086	VCS-6-Mini	6	mini	-
64-3087	VCS-6-Mini-LT	6	mini	large tubing
64-3080	VCS-8-PINCH	8	pinch	-
64-3081	VCS-8-PTFE	8	PTFE	-
64-3082	VCS-8-Mini	8	mini	-
64-3083	VCS-8-Mini	8	min	large tubing

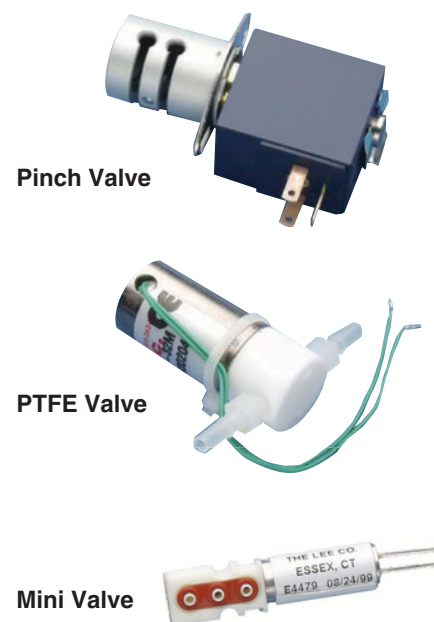
Pinch, PTFE & Miniature Valves

The controllers support three different valves: Pinch, PTFE and Miniature Valves.

Pinch Valves are the simplest valves to maintain as the solution never gets in touch with the valve and tubing can easily be changed. Valves are dual acting (3-way) with both normally open and closed sides. Y connectors at the valve input permit solution flow to waste with the valves off.

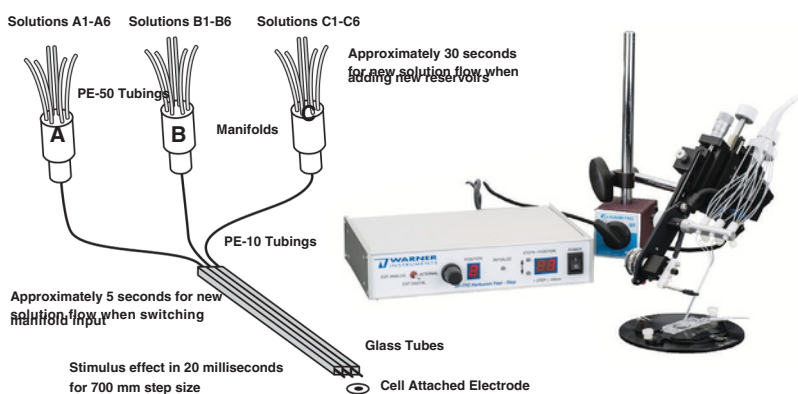
PTFE Valves are available for applications where resistance to chemicals is a concern. The valves are 2-way, either on or off.

Miniature Valves are designed for slow flow perfusion systems where smaller diameter tubing is used. The valves mount directly to a compact Delrin manifold. The 3-way valves allow for solutions to flow to waste if desired. These are ideally suited for use with the SF-77C Fast-Step Perfusion Stepper Systems.



Fast-Step Perfusion Systems

Combining a Warner Mini-perfusion Valve Control System and the SF-77C Fast-Step Perfusion system results in a unique system that enables a user to rapidly select between several perfusion reservoirs, saving time and effort.



- Millisecond solution changes between tubes
- Solution change within individual ports within 5 seconds
- New solutions can be added into any port with a waiting time of no more than 30 seconds
- The cell is never required to pass through an intervening solution to get from control to test solution

64-3109	VCS-77CSP	Complete VCS-6 Fast-Step Perfusion System, right handed micromanipulator
64-3110	VCS-77CSPL	Complete VCS-6 Fast-Step Perfusion System, left handed micromanipulator
64-3111	VCS-77CSP8	Complete VCS-8 Fast-Step Perfusion System, right handed micromanipulator
64-3112	VCS-77CSP8L	Complete VCS-8 Fast-Step Perfusion System, left handed micromanipulator

Perfusion Accessories for Ephys Applications

Peristaltic Pump PPS2

If only one incoming and suction solution is required, the PPS2 is the perfect device.

- 2 channels (1 in/1 out or 2 in or 2 out)
- Control of instrument via touchscreen
- SW control (requires USB connection to Windows-PC)
- Control using TTL and analog voltage provided by e.g. acquisition board
- Flow rate 0.1 up to 30 ml/min in 0.1ml/min steps
- Link both channels by percentage, e.g. suction is 105% of incoming solution
- Bubble detector for suction control



If the incoming solution does not need to get changed, the PPS2 replaces a perfusion system and vacuum system for suction.

Order #	Product
89-0688	Peristaltic Pump, 2 channels

Dedicated Workstation Vacuum DWV

The DWV provides suction to prevent solution overflow in the chambers using a perfusion system.

- Completely self-contained liquid waste system
- High quality low-noise vacuum pump, 40 dB(A) maximum
- Dual flask design for improved vacuum stability

Order #	Product
64-1940	Dedicated Workstation Vacuum



Farraday Cages and Tables

The CleanBench™ combines the latest improvements to TMC's table tops with their gimbal piston air vibration isolation system. CleanBench offers more stability, better ergonomics, guided thread lead-ins, and a more compact design. TMC's vibration isolation lab tables are ideal for a wide variety of applications including AFM, confocal microscopy, IVF, patch clamp, interferometry, and metrology.

The CleanBench Advantage

A **unique tabletop design** combines the best features of TMC's CleanTop® steel honeycomb with an ultra-stiff, damped, layered platform.

Greater stability, especially for small size tables. The low-profile, high-density tops lower the overall floating center-of-mass ensuring inherent stability, even for relatively top-heavy payloads.

Guided thread lead-ins to align screws with tapped holes. The "bevel" shape eases engagement of the first thread. Ergonomically optimized for the seated user by minimizing the thickness of the table top.

- Gimbal piston isolators
- Greater stability
- Guided thread lead-ins
- Thin-Wall Rolling Diaphragms
- Aluminum Height Control Valves
- Internal Piston Travel Restrain
- Tiebar Gussets
- Rugged Built-in Leveling Feet
- Choice of tabletops



Order #	Model
60-4742	CleanBench, smooth stainless steel top, 30x36
60-4743	CleanBench, smooth stainless steel top, 30x48
60-4744	CleanBench, threaded (1/4-20 on 1" centers, US) stainless steel top, 30x36
60-4746	CleanBench, threaded (1/4-20 on 1" centers, US) stainless steel top, 30x48
60-4738	CleanBench, threaded (1/4-20 on 1" centers, US) stainless steel top, 36x48
60-4745	CleanBench, threaded (M6 on 25 mm centers) stainless steel top, 30x36
60-4747	CleanBench, threaded (M6 on 25 mm centers) stainless steel top, 30x48
60-4741	CleanBench, threaded (M6 on 25 mm centers) stainless steel top, 36x48
60-4799	Faraday Cage, fits 30x36 in tables
60-4800	Faraday Cage, fits 30x48 in tables
60-4801	Faraday Cage, fits 36x48 in tables
60-4766	BenchTop Faraday Cage, 30x36 in
60-4767	BenchTop Faraday Cage, 30x48 in
60-4768	BenchTop Faraday Cage, 36x48 in

Micromanipulators

Micromanipulators are required to position the micropipette for recording or injection relative to the specimen. Warner Instruments provides micromanipulators from Sensapex, Sutter, and Luigs & Neumann.

Micromanipulators from each of these manufacturers are of high precision and have been designed specifically for the electrophysiology workplace. As such, they are all well optimized for both microinjection and patch clamp studies.

Please visit our website or contact sales for more information on the features and benefits for each specific manufacturer.

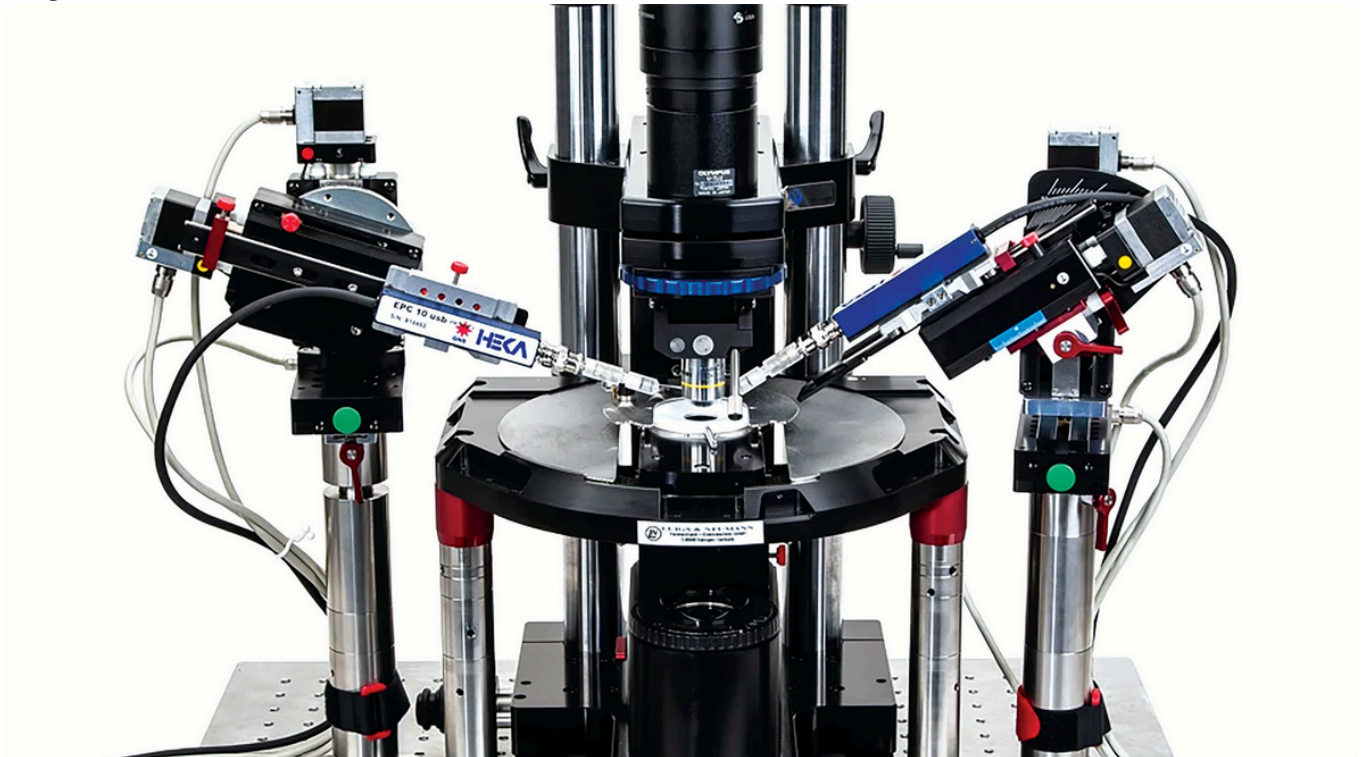


Sutter



Sensapex

Luigs & Neumann



Accessories for Ephys Applications

Hybrid Stage

We offer a hybrid stage for patch clamp studies and other expaverted or upright microscopes with US or metric threads.

It supports the most common microscopes. This part list is not comprehensive, please visit our website for a full list of options.

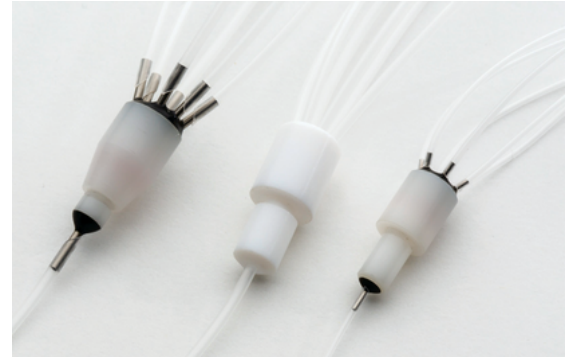


Order #	Model
Stage with XY translator for Inverted Microscope	
64-2365	Fits Nikon Eclipse T inverted, US thread
64-2374	Fits Leica DMI8 inverted, metric thread
64-2368	Fits Zeiss Axiovert inverted, US thread
64-2376	Fits Zeiss Axiovert inverted, metric thread

Order #	Model
Stage with XY translator for Upright Microscope	
64-2369	Fits Nikon E600 FN1 upright, US thread
64-2379	Fits Olympus BX-51WI upright, metric thread
64-2372	Fits Zeiss Axioscop 2FS upright, US thread
Accessories	
64-2384	Stainless steel insert for stage
69-4098	Wheel input device for hybrid stage, requires 69-5001
69-4097	Controller for hybrid stage

Manifolds

Manifold inputs converge to the common output with minimum dead space. They are designed for use with PE-160, PE-50, and PE-10 polyethylene tubing, but they can also be used with other tubings with similar dimensions.



Vacuum and Flow Regulator

The FR-50/FR-55S is a convenient tool to adjust both solution flow rates and vacuum pressure in a variety of applications. The solution flow is adjustable from zero to a maximum of 10 mL/min (measured with a solution head of 30 cm). The units have calibrated adjustment rings to permit returning to a predetermined setting.



Order #	Model
64-0220	FR-50, flow valve
64-0221	FR-50S, flow valve with on/off-switch

Miscellaneous Perfusion Accessories

Ergonomically optimized for the seated user by minimizing the thickness of the tabletop.

- Syringes, syringe holder
- Tubing
- Valve control parts
- Perfusion pressure kits
- Manifold holder

Please visit our website for a full selection of our accessories.



Microforge-Grinding Center (MFG-5)

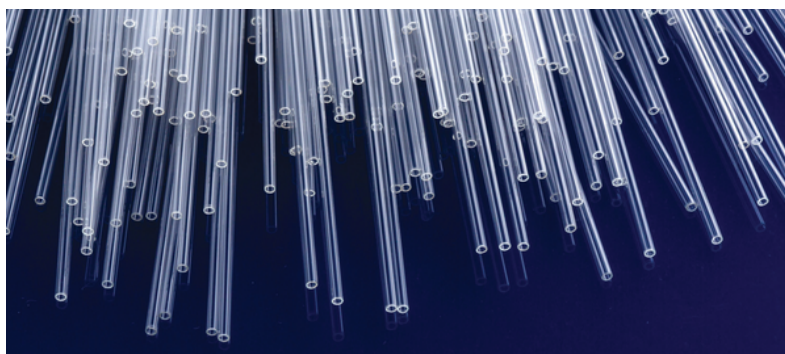
- Glass micropipette polishing, shaping, tipping, bending, beveling, and grinding — all in one compact platform
- Rapid and easy switching between microforge and microgrinder by turning the tool manipulator
- Precise, convenient movement controls for heater/grinder, pipette locations and optical focus

Order #	Model
64-1612	Microforge Grinding Center, 110/120 VAC
64-1617	Microforge Grinding Center, 220/240 VAC



Capillary Glass

- Warner Instruments provides a wide range of capillary glass.
- Length 75–150mm
- With and without filament
- Clark borosilicate, aluminosilicate and premium borosilicate glass
- Thin wall and standard



Programmable Pipette Puller PMP-102

The PMP-102 is a horizontal puller that pulls two identical pipettes.

- 25 programmable sequences
- Programmable multi-pulling steps
- Pneumatic adjustable pulling force
- 22 pre-programmed sequences for commonly used pipette tips



Order #	Model
69-0151	PMP-102 programmable puller, 110-120 VAC, 60 Hz
69-0151E	PMP-102 programmable puller, 220-240 VAC, 50/60 Hz



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