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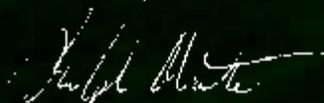
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# Cell Biology Research Catalog



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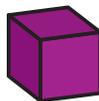
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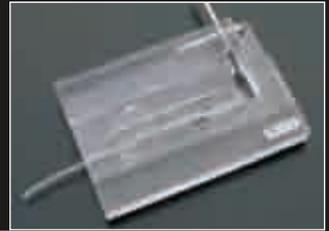
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JG-23 Ultra-quiet  
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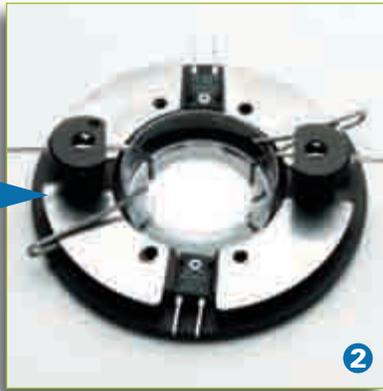
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## Chambers, Perfusion and Temperature Control for Live Cell Imaging

Chambers

an integrated systems approach



Imaging and Recording Chambers



Series 40 imaging and recording chambers  
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Stage Adapters  
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Inline solution heater and coolers  
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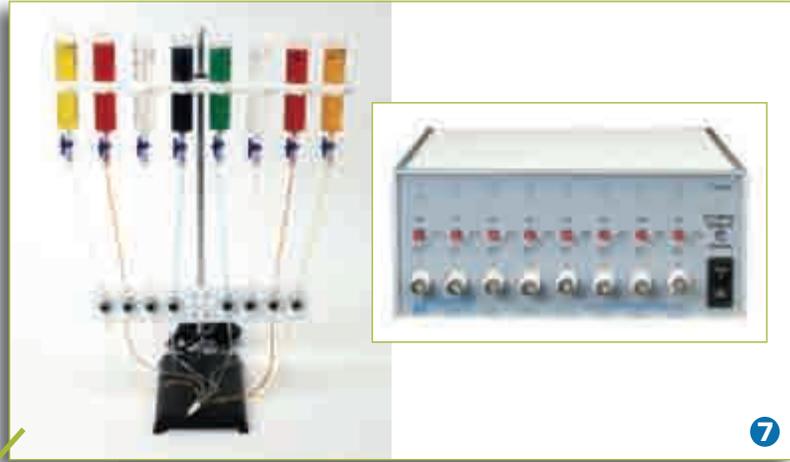
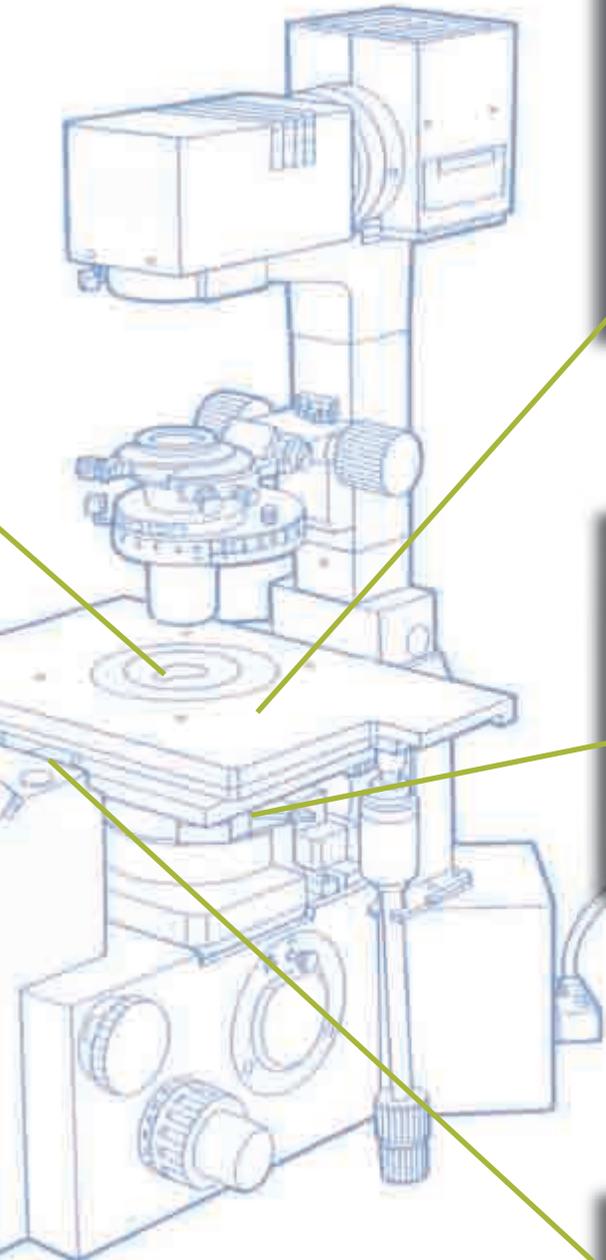
### Typical, complete package

for use with 35 mm culture dishes and Warner quick change chambers includes chamber, temperature control, Inline solution heater and stage adapter

Model	Product
1 RC-40LP	Quick Change Chamber 25 mm Low Profile
2 QE-1	Quick Exchange Heated Base
3 SA-NIK	Stage Adapter for 108 mm stage insert
4 SH-27B	Solution Heater
5 CC-28	Cable Assembly for Heater Platforms
6 TC-344B	Dual Channel Heater Controller
7 VC-8	Eight Channel Perfusion Valve Controller
8 OW Series	Objective Warmer
TC-124	Temperature Controller
9 Spill Sensor	Solution Leak Detector



# systems approach



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# micro-incubation

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Culture Dish Heater, see page 162



1" x 3" Slide Heated Platform, see page 169



QE-1 Heated Platform, see page 172



Brain/Tissue Slice Chamber System, see page 176

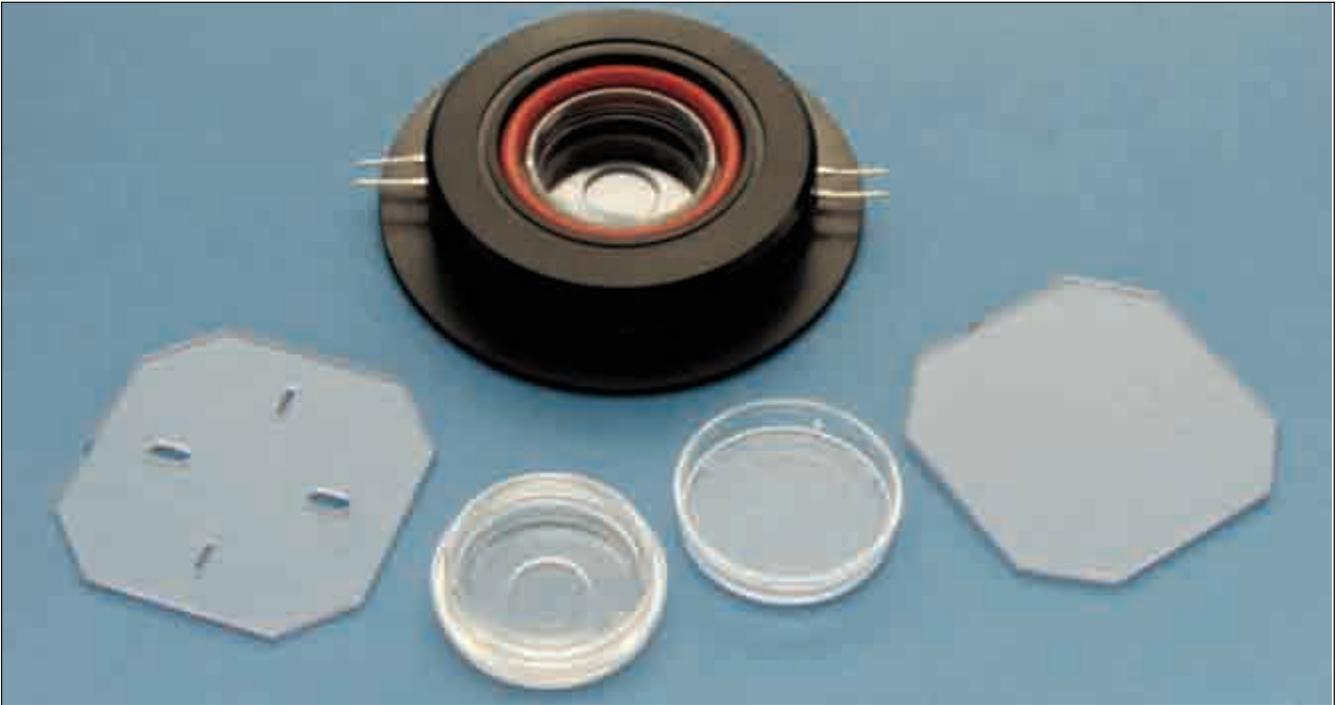


# micro-incubators

## DH-35

### Culture Dish Heater

Deep heating for 35 mm culture dishes



DH-35 Culture Dish Heater work with Corning 35 mm tissue culture dishes (Corning p/n 25000) and are designed for mounting on most microscopes. The holder is machined in two pieces. The top half is easily removed for replacement of dishes.

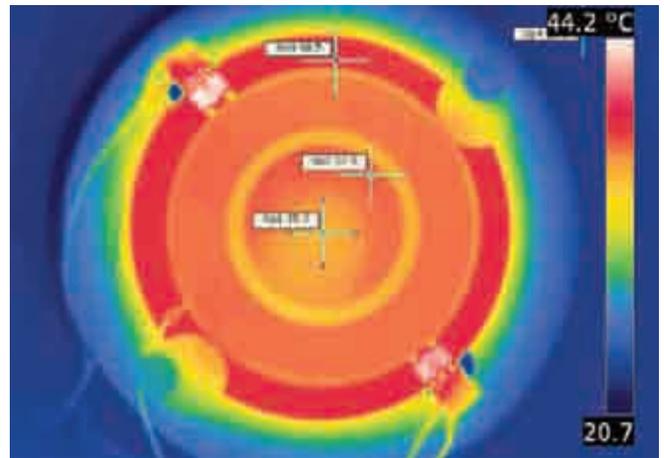
Dishes can be placed in the holder with or without dish covers. The holder is supplied with two additional holder covers, one of which has openings to allow for perfusion or insertion of probes or electrodes.

The base of the DH-35 has a 19 mm diameter aperture. Stage adapters are available for many microscopes, see pages 64 to 69. The DH-35 is used with the CC-28 Cable Assembly.

Corning P/h 2500 W4 65-0054 LU-PD Sleeve of plastic 35 mm dishes, pkg of 20, see page 175.

#### Specifications

Height	14.7 mm
Base $\phi$	79.3 mm
Well	4 mm depth
Base Height	6.3 mm overall



Thermograph DH-35 with a Corning 35 mm Petri dish.

Order #	Model	Product
W4 64-0110	DH-35	Culture Dish Heater, 35 mm
W4 64-0106	CC-28	Cable Assembly for Heater Platforms
W4 64-0350	AR-1	Adapter Ring for Willco Dish

#### Popular Stage Adapter Microscopes

W4 64-0291	SA-NIK	Nikon Diaphot, TE200 & TE300
W4 64-0295	SA-OLY/2	Olympus IMT-2, IX & BX50WI
W4 64-0296	SA-20LZ	Zeiss Axiovert, Leica DMIRB & DMIL

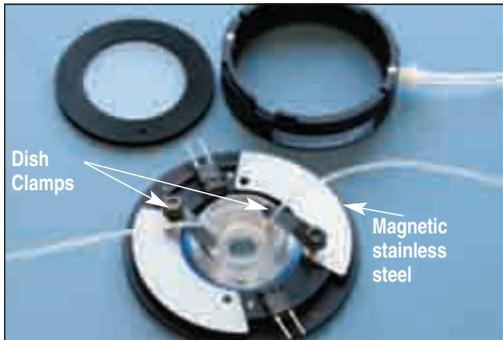
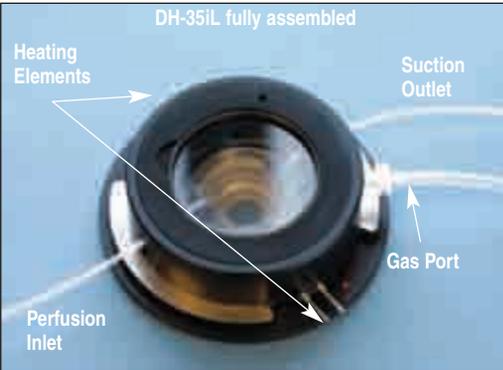
For other microscopes, please consult our technical support department.

# micro-incubators

## DH-35iL

### Micro-incubation System for 35mm Cell Culture Dishes

**Complete environment on the microscope - New light weight for use in Z stages 105 grams**



- Designed for glass bottom 35 mm dishes
- Permits imaging, temperature and gas environment control
- Compatible with Corning, Falcon, MatTek, Nunc, Willco Wells and WPI Dishes
- Unique dish clamps permit easy cell access
- Compatible with Warner's RC-37 Cell Culture Dish Perfusion Chamber Inserts

The introduction of glass bottomed 35 mm culture dishes extended their use into areas such as confocal microscopy, fluorescence microscopy, and high resolution image analysis. The DH-35iL Culture Dish Incubator is a system designed for imaging live cells in an open culture dish (for easy access) or in a closed dish (for gas atmosphere control).

DH-35iL Incubators work well with 35 mm culture dishes from all suppliers. Adapter rings are supplied to ensure a close fit for the supported dish. Dishes can be placed in the holder with or without dish covers.

The holder is machined in three pieces. The midsection and top are easily removed for dish replacement and enables the positioning of electrodes at low angles. Resistive heating of the DH-35iL is provided via the optional Warner TC-324B/TC-344B Temperature Controllers and a CC-28 cable. Clamps are provided to ensure good contact between the dish and the heated surface and to prevent unwanted movement. The removable midsection is magnetically secured and has several ports to allow multi-channel perfusion, atmospheric maintenance, and aspiration of the dish.

The base of the holder has a 25 mm aperture and the removable cover features a 36 mm glass aperture.\* Included with the system are an MP-2 Perfusion Manifold and a set of 6 culture dish adapter rings.

When combined with the Warner RC-37 Cell Culture Perfusion Chamber Insert, a complete micro-environmental system is achieved, and this system is compatible with Warner's SH-27B and SF-28 In-line Solution Heaters.

Series 20 Stage adapters are available for all major microscopes. Custom or modified stage adapters are also available; call our technical support department for details. See pages 64 to 69 for Stage Adapters.

\* Distance between bottom and top cover glass is 18.3 mm.

Order #	Model	Product
W4 64-0349	DH-35iL	Culture Dish Incubation System, Includes Set of 6 Adapter Rings

#### Accessories and Replacement Parts

W4 64-0351	AR-4	Retaining Clips, Magnetic Holders MAG-1 and MAG-3, Wire Probe Support, Lift Tool, PE-160/10 CFlex Tubing
W4 64-0100	TC-324B	Heater Controller, Single Channel
W4 64-0101	TC-344B	Heater Controller, Dual Channel
W4 64-0106	CC-28	Cable Assembly for Heater Platforms
W4 64-0102	SH-27B	In-line Solution Heater
W4 64-0103	SF-28	In-line Solution Heater
W4 64-1543	HSC-1	Heated Top Coverslip
W4 64-1544	HSC-RPL	Replacement ITO Coverslip

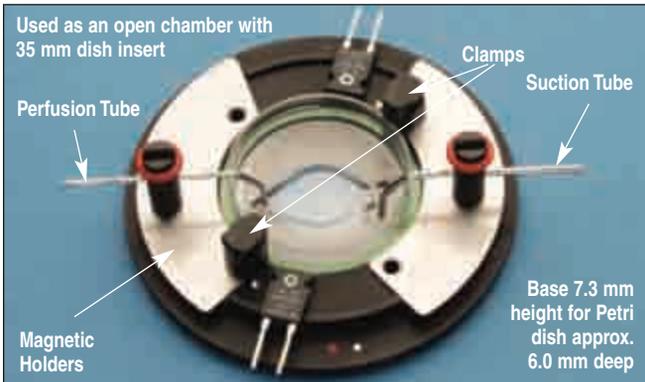
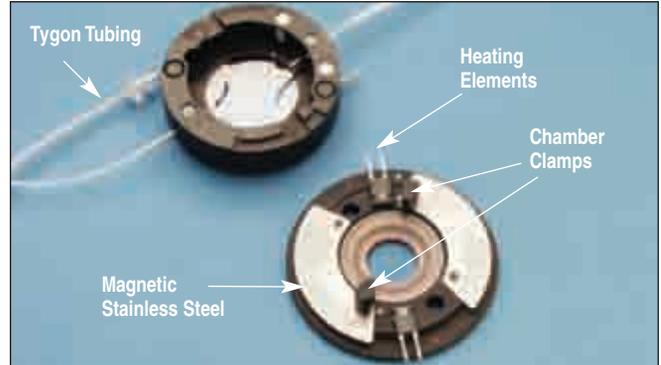
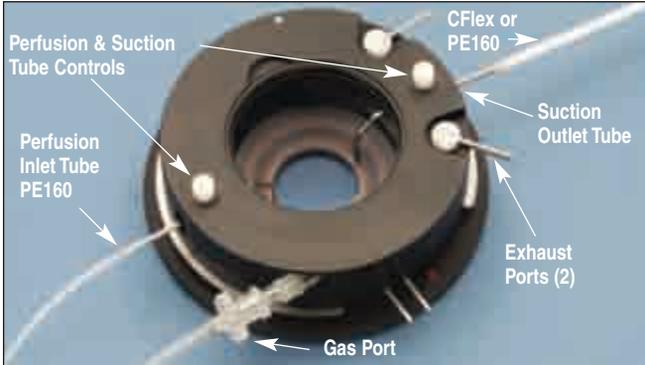
# micro-incubators

## DH-40i

### Micro-Incubation System

*Complete environment on the microscope*

*Permits imaging with perfusion, temperature and gas control*



- Designed for RC-40 Quick Change Imaging Chambers and 35 mm culture dishes
- Adapters for Willco Wells, Corning, Nunc, WPI, MatTek and Falcon dishes
- Heated top coverslip (optional) eliminates condensation when used as a closed chamber
- Accommodates upright and inverted microscopes

The DH-40i Micro-Incubator is a system designed for imaging live cells at the required temperature and atmospheric conditions. This versatile chamber is designed for high resolution image analysis, fluorescence microscopy and time-lapse imaging studies.

DH-40i incubators work with Warner RC-40 Quick Change Imaging Chambers and 35 mm culture dishes. The removable top section of the incubator is magnetically held in place and has several sealed ports to allow perfusion, aspiration, and gas atmosphere maintenance. Perfusion and suction tubes can be easily adjusted without disturbing the cell environment. When used as an open bath chamber, magnetic holders are supplied to allow entry of perfusion and suction tubes into Series 40 chambers and 35 mm dishes. Clamps are provided to insure good contact between the chamber and the heated surface, and to prevent movement. Adapter rings are supplied to insure a close fit for 35 mm culture dishes.

The base of the holder has a 25 mm diameter aperture and the removable top section features a 40 mm glass aperture.\* An optional heated top coverslip eliminates condensation when used as a closed chamber.

Resistive heating of the DH-40i is provided by means of our TC-324B/TC-344B Temperature Controllers and a CC-28 cable. Heating of perfusate is achieved by our SH-27B or SF-28 In-line Solution Heaters.

The DH-40i chamber includes a set of 6 adapter rings, suction and perfusion tubes, magnetic holders, clamps for RC-40 series chambers and 35 mm dishes, PE-160 tubing (10 ft.), 1/16" ID Tygon tubing (25 ft.), and 5 replacement 40 mm coverslips. See page 175 for replacement parts, weighs 238.7 grams without ring and dish.

Series 20 Stage adapters are available for all major microscopes, see pages 64 to 69. Custom or modified stage adapters are also available, call our technical support department for details.

Order #	Model	Product
W4 64-0388	DH-40i	Culture Dish Incubation System
<b>Accessories and Replacement Parts</b>		
W4 64-0351	AR-4	Replacement Adapter Ring Kit set of 6
W4 64-0100	TC-324B	Heater Controller, Single Channel
W4 64-0101	TC-344B	Heater Controller, Dual Channel
W4 64-0106	CC-28	Cable Assembly for Heater Platforms
W4 64-0102	SH-27B	In-line Solution Heater
W4 64-0103	SF-28	In-line Solution Heater
W4 64-1543	HSC-1	Heated Top Coverslip
W4 64-1544	HSC-RPL	Replacement ITO Coverslips

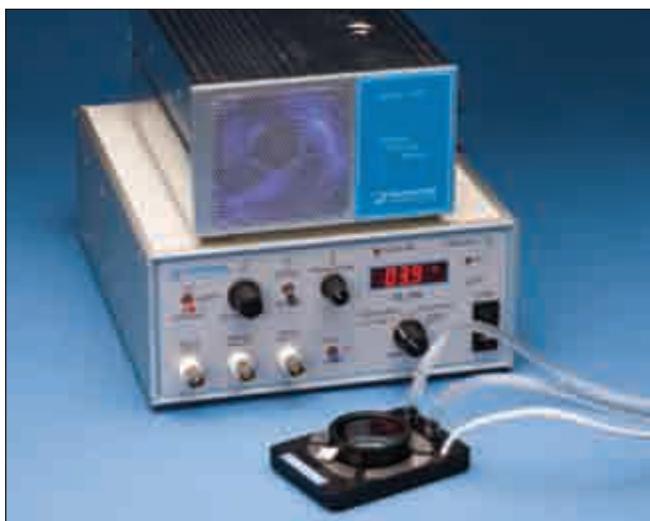
\* Distance between bottom and top cover glass is 18.3 mm.

## Model TB-3 CCD

### Thermal Insert for Prior Nano Z Stage

# micro-incubators

Precise temperature control from 5° to 50° C in a compact design



- Designed for use with Prior Scientific NZ200CE NanoScanZ Piezo Z stage
- Optimized for 35 mm culture dishes and Warner RC-40 quick change imaging chambers
- Adapters for all major brand 35 mm dishes
- Temperature control from 5° to 50°C
- Magnetic stainless steel allows use of magnetic holders
- Additional stage adapters available

The Warner TB-3 CCD Thermal Insert is a versatile platform for cell culture and tissue work on the NanoScanZ stage from Prior Scientific. It is designed to work with Warner RC-40 quick change imaging chambers and all 35 mm cell culture dishes. Precise temperature control of the media is possible when used with our low noise CL-100 temperature controller and heat exchanger (TCM-1, Thermal Cooling Module).

An integral water jacket is used to remove excess heat from the internal Peltier device. Running water either from a tap or from Warner's TCM-1 may be used.

Magnetic clamps hold cell culture dishes and quick change imaging chambers securely in place. Magnetic stainless steel along the perimeter of the platform allows for the use of included magnetic suction and perfusion tube holders.

*The TC-3 CCD is supplied with a 35 mm adapter ring kit, set of six, three sets of magnetic clamps for holding Petri dishes, one humidifying cover, one TA-29 bead thermistor, one MAG-3 magnetic holder for wires, one perfusion tube with magnetic holder, one suction tube with magnetic holder, four M-2 x 10 mm mounting screws for the Prior stage, 10 feet of PE-160 tubing, 20 feet of 1/8" ID x 1/4" OD soft tubing, 50 feet of 1/16" Tygon tubing, an allen wrench, and a lift tool.*

While designed to fit the NanoScanZ stage, adapters are available for other major microscope stages.

#### Specifications

Temperature Range	5° to 50°C
Accuracy	±0.1°C
Feedback Thermistor	Built in Unical 10kΩ at 25°C
Controller	CL-100 Bipolar Controller
Physical Dimensions:	
Aperture Size (D x L)	25.4 mm
Thermal Insert Size(D x L x H)	64.0 x 92.2 x 10.5 mm
Weight	105 g
Cable Length	2.4 m
Connector Type	15 pin Male "D"
Water Jacket Ports	1/8" Barb Fittings
Warranty	One Year

Order #	Model	Product
W4 64-1636	TB-3 CCD	Thermal Insert for 35 mm Dishes

#### Accessories / Replacement Parts

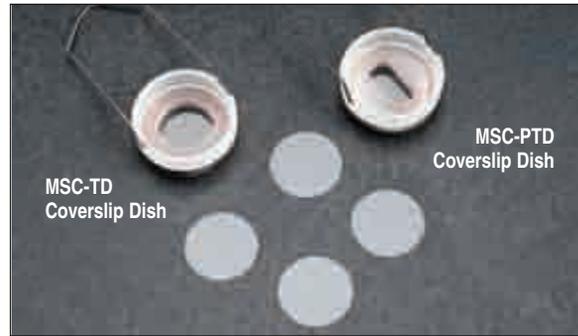
W4 64-0352	CL-100	Bipolar Temperature Controller
W4 64-1922	LCS-1	Liquid Cooling Sytem
W4 64-0107	TA-29	Cable with Bead Thermistor
W4 64-1404	PT-QE1	Perfusion Tube
W4 64-1553	MAG-6	Mini Magnetic Clamp for 18 gauge tube
W4 64-1403	ST-QE1	Suction Tube
W4 64-1554	MAG-7	Mini Magnetic Clamp for 16 gauge tube
W4 64-0297NZ	SA-20KZnano	Stage Adapter for the (K) stage
W4 64-0296NZ	SA-20LZnano	Stage Adapter for the Zeiss
W4 64-0291NZ	SA-NIKnano	Stage Adapter for the Nikon 108 Dia.
W4 64-0295NZ	SA-OLY/2nano	Stage Adapter for the Olympus 110 Dia.

# micro-incubators

## PDMI-2

### Open Perfusion Micro-Incubator

*Complete environment on the microscope*



- Heats and cools from  $\sim 5^\circ$  below ambient to  $50^\circ\text{C}$
- Maintains pH,  $\text{O}_2$  and temperature using Peltier technology
- Flexible chamber option

The PDMI-2 operates equally well under static or perfused conditions. When operated with perfusion, the Micro-Incubator's unique design places flexible tubes carrying inflowing perfusate in contact with a temperature regulated Peltier driven plate, thus heating or cooling the incoming fluid to a command temperature. This eliminates the need for auxiliary preheating or cooling. The Peltier plate heats or cools the cell carrying central chamber uniformly when no perfusate is flowing.

#### Flexible Temperature Range

The operating temperature range of the PDMI-2 Open Perfusion Micro-Incubator is nominally  $\sim 5^\circ$  below ambient to  $50^\circ\text{C}$  when used with the TC-202A Temperature Controller; see page 113. Lower temperatures can be achieved (approximately  $10^\circ\text{C}$  below ambient) by using an optional cool water-carrying coil which attaches to the perimeter of the PDMI-2. Temperatures stabilize quickly throughout the operating range and temperature uniformity across the chamber is excellent.

#### Optimal and Flexible Perfusion

Two temperature controlled perfusion lines deliver perfusates through the Micro-Incubator into the chamber at a nominal rate of 3 ml per minute each. Fluid level is maintained by placing an aspirator (model LU-ASP) in the chamber. Fluid height is easily adjusted via a simple screw mechanism; a cleverly designed suction port eliminates fluid flutter making aspiration quiet; a magnetic base secures the aspirator to the Micro-Incubator at a user selectable convenient location.

#### Excellent pH Control

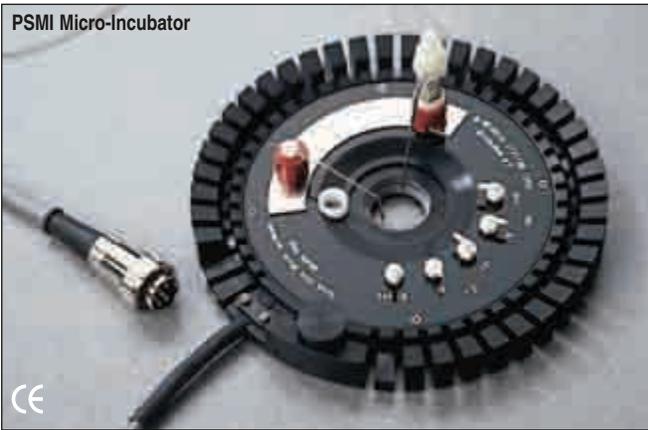
The PDMI-2 also provides gas flow over the top of the chamber for pH control and improved temperature uniformity. The open design provides excellent mechanical and optical access to the media.

#### Specifications

Chamber Options	Corning 35 mm Petri dishes, LU-CSD, MSC-TD or MSC-PTD, LU-CSD Special
Recommended Gas Flow	0.5 to 2.0 L/min
Temperature Range	$\sim 5^\circ$ to $10^\circ\text{C}$ below ambient to $50^\circ\text{C}$
Temperature Stability	$\pm 0.2^\circ\text{C}$ with TC-202A, at $37^\circ\text{C}$ with 1 ml/min perfusion
Temperature Gradient Across Chamber	$2^\circ\text{C}$ with 1.5 ml media volume, 1 ml/min perfusion
Built-In Temperature Sensor	Thermistor, 100 k $\Omega$ at $25^\circ\text{C}$
Peltier Device Current Rating	6 A maximum
Media Perfusion Rates	Up to 3.0 ml/min
Overall Dimensions	17 x 152 mm (0.67 x 6.0 in), H x D
Weight	0.5 kg (17.9 oz)
Microscope Stage Mounting	Call for options
Chambers:	
Cover Slips	25 mm D thickness #1 or 2
Overall Dimensions	LU-CSD/MSC-TD: 19 mm D round optical window MSC-PTD: 9.5 x 19 mm (WxL) slotted optical window
Weight	17 g (0.6 oz)
Dish Materials	Teflon <sup>®</sup> and stainless steel

Order #	Model	Product
W4 65-0043	PDMI-2	Open Perfusion Micro-Incubator, comes with LU-PD and LU-ASP (Stage Adapter not included, see page 175)
W4 65-0058		Copper Cooling Tube for PDMI-2
<b>Micro-incubator Chambers</b>		
W4 65-0049	LU-CSD-S	Leiden Multi Well Cover Slip Dish; Special 35 mm D Teflon Dish with two (2) kidney-shaped inner optical window wells, approx. 15 x 8 mm (L x W) (max.) and one (1) 31.50 mm D surrounding well
W4 65-0050	MSC-PTDS	Teflon Glass Cover Slip Dish; 35 mm D, 9.5 x 19 mm (W x L) rectangular optical window, rounded at each end; low volume (less than 1 ml), fast fluid transfer and maximum mixing
W4 65-0051	MSC-TD	Teflon Glass Cover Slip Dish; 35 mm D with Removable Handle, 19 mm D optical window, 31.50 mm D working area, 1 ml approx. fluid volume

*Complete micro-environment for patch clamp on the microscope*



**Specifications**

Chamber Type	PS-CSD Cover Slip Dish
Temperature Stability	±0.2°C with TC-202A, at 37°C with 1 ml/min perfusion
Temperature Gradient	Across chamber: 2°C with 1.5 ml media volume, 1 ml/min
Temperature Range	5-10°C below ambient to 50°C
Built In Temp. Sensor	Thermistor type: 100 kΩ at 25°C
Peltier Device	Current rating: 6 A max
Media Perfusion Rates	Up to 3.0 ml/min
Dimensions, H x Dia	17 x 152 mm (0.67 x 6.0 in), overall
Weight	0.5 kg (17.9 oz)

- Small entry angles ideal for patch slice recordings
- Shallow fluid level minimizes pipette capacitance
- Heats and cools from ~5° below ambient to 50°C
- Peltier heat pump maintains cell conditions for hours

The Patch Slice Micro-Incubator System provides a complete solution to the challenge of electrophysiological study of synaptic connections at physiological temperatures. Low noise whole cell patch recording, with or without water immersion of the microscope objective in the recording medium, are possible with the PSMI.

This Micro-Incubator is a shallow, annular assembly which surrounds the central slice holding dish. Room temperature perfusant is delivered to the incubator which in turn delivers it to the dish at a precisely controlled temperature you select. The perfusant is removed (via user supplied suction) by an included, height adjustable aspirator (LU-ASP). Two independent perfusant channels flow through the PSMI into the chamber via replaceable plastic tubing (of low volumes <100 µl) to allow rapid switching of media via an upstream valve for pharmacological studies. A separate inlet provides temperature controlled gas delivery across the dish.

The TC-202A provides temperature control (~5° below ambient to 50°C) using the Micro-Incubator warming/cooling plate as the control point. Lower temperatures (approximately 10°C below ambient) may be obtained by using an optional cooling tube. The cover slip dish (PS-CSD) consists of two 22 mm diameter cover slips held in a circular frame. The slice sits on the top cover slip with the immersion objective reaching the fluid surface. The bottom cover slip prevents condensation for optimal illumination and viewing. To enable placement of the patch electrode, entry angles as small as 15° can be achieved for slice access.

Order #	Model	Product
<b>W4 65-0044</b>	PSMI	Patch Slice Micro-Incubator with PS-CSD
<b>W4 65-0109</b>		Copper Cooling Tube for PSMI
<b>W4 65-0053</b>	PS-CSD	Patch Slice Cover Slip Dish for PSMI
<b>W4 65-0052</b>	MI-M	Mini Magnets for Top Surface of Micro-Incubators (LU-CB-1, PDMI-2 or PSMI), set of 4

Micro-Incubation

micro-incubators

# micro-incubators

## Model TB-3 CS

### Thermal Insert for Prior Nano Z Stage

Temperature control from 5° to 50° C in a compact design

Heating and Cooling using Peltier Technology



Complete system with CL-100 Temperature Controller and TCM-1 Thermal Cooling Module

- Designed for use with Prior Scientific NZ200CE NanoScanZ Piezo Z stage
- Optimized for rectangular chambered slides and chambered coverglass
- Can accept up to 1 x 3" slides
- Temperature control from 5° to 50°C
- Magnetic stainless steel allows use of magnetic holders
- Additional stage adapters available

### Thermal Insert for Prior Nano Z Stage

The Warner TB-3 CS Thermal Insert is a versatile platform for cell/tissue culture work on the NanoScanZ stage from Prior Scientific. It is designed to accommodate rectangular chambered slides and coverglass from several manufactures. Slides up to 1x3" can be used.

Precise temperature control of the media is possible when used with our low noise CL-100 temperature controller and heat exchanger (TCM-1, Thermal Cooling Module).

An integral water jacket is used to remove excess heat from the internal Peltier device. Running water either from a tap or from Warner's TCM-1 may be used.

Magnetic clamps hold slides and chambered coverglasses securely in place. Magnetic stainless steel along the perimeter of the platform allow the use of magnetic tools.

*The TC-3CS is supplied with two "L" shaped chambered slide holding brackets, two chambered slide hold-down clamps, one TA-29 bead thermistor, one MAG-3 magnetic holder for wires, four M-2 x 10 mm mounting screws for the Prior stage, 20 feet of 1/8" ID x 1/4" OD soft tubing, an allen wrench, and lift tool.*

Optional magnetic holders for perfusion and suction tubes allow perfusion in the wells. Stage adapters are available for several major microscopes in addition to the NanoScanZ stage.

### Specifications

Temperature Range	5° to 50°C
Accuracy	±0.1°C
Feedback Thermistor	Built in Unical 10kΩ at 25°C
Controller	CL-100 Bipolar Controller
Physical Dimensions:	
Aperture Size (D x L)	21.5 x 52.3 mm
Thermal Insert Size (D x L x H)	64.0 x 92.2 x 10.5 mm
Weight	105 g
Cable Length	2.4 m
Connector Type	15 pin Male "D"
Water Jacket Ports	1/8" Barb Fittings
Warranty	One Year

Order #	Model	Product
W4 64-1632	TB-3 CS	Thermal Insert

### Accessories/Replacement Parts

W4 64-0352	CL-100	Bipolar Temperature Controller
W4 64-1922	LCS-1	Liquid Cooling Sytem
W4 64-0107	TA-29	Cable with Bead Thermistor
W4 64-1404	PT-QE1	Perfusion Tube
W4 64-1553	MAG-6	Mini Magnetic Clamp for 18 Gauge Tube
W4 64-1403	ST-QE1	Suction Tube
W4 64-1554	MAG-7	Mini Magnetic Clamp for 16 Gauge Tube
W4 64-0297NZ	SA-20KZnano	Stage Adapter for the (K) Stage
W4 64-0296NZ	SA-20LZnano	Stage Adapter for the Zeiss
W4 64-0291NZ	SA-NIKnano	Stage Adapter for the Nikon 108 Dia.
W4 64-0295NZ	SA-OLY/2nano	Stage Adapter for the Olympus 110 Dia.

# CSH-1

# micro-incubators

## Heated Platform for Chambered Slides and 1" x 3" Slides

*A specially designed, heated chamber for 1x3 inch slides*



- Open design for easy cell access
- Ideal for use with chambered coverglass
- Magnetic stainless steel platforms allow use of magnetic holders
- Stage Adapters permit mounting on all major microscopes

### Rectangular Slide Heated Platform

The Warner CHS-1 heated platform is a versatile base for many popular disposable glass slides and chambered coverglasses.

The platform is at home on both upright and inverted microscopes and includes resistive heating elements. Magnetic stainless steel along the perimeter of the CHS-1 permits the use of Warner's MAG-3 magnetic clamps. The base has a 21.5 x 52.3 mm viewing aperture.

The MAG-3 clamps are equipped with an adjustable arm that can be used to bring perfusion and aspiration lines into the chamber.

Control of CSH-1 resistive heating is provided via our TC-324B/TC-344B Temperature Controllers and a CC-28 cable. Heating of perfusate is achieved using our SH-27B or SF-28 In-line Solution Heaters.

Stage adapters are available, see page 64 for all major microscopes. The CSH-1 uses the Series 30 stage adapters. Custom or modified stage adapters are also available. Call our Technical Support Department for details.

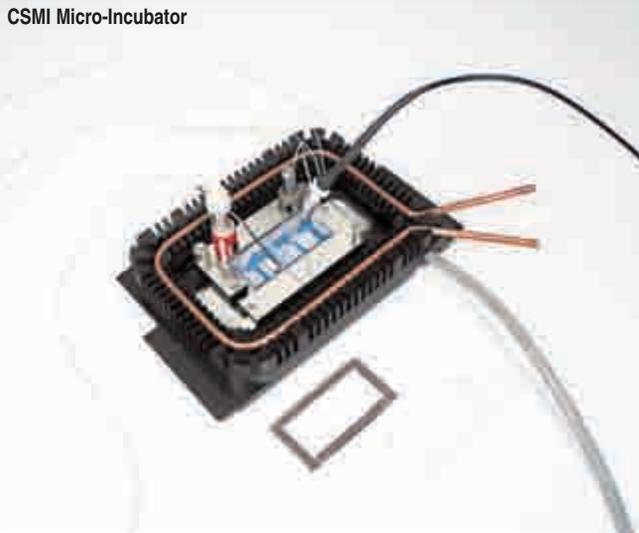
*Each chamber includes 2 special version MAG-3 magnetic clamps with adjustable wire arms.*

Order #	Model	Product
W4 64-1592	CSH-1	Heated base for chamber slides
W4 64-0100	TC-324B	Single Channel Heater Controller
W4 64-0101	TC-344B	Dual Channel Heater Controller
W4 64-0106	CC-28	Cable Assembly for Heater Platforms
W4 64-0102	SH-27B	In-line Solution Heater
W4 64-0103	SF-28	In-line Solution Heater
W4 64-0360	MAG-3	Magnetic Clamp

Micro-Incubation

micro-incubators

*A versatile microscope-stage incubator for cell/tissue culture work on chambered glass slides*



- Ideal for use with rectangular chambered slides and chambered coverglass
- Controls pH, temperature, perfusion and gas atmosphere
- Uses Peltier heat pump; heats and cools from ~5° below ambient to 50°C
- Accommodates up to 4 perfusion lines
- Unique aspirator for perfusate removal

The CSMI is a versatile microscope stage-incubator for cell/tissue culture work. It is designed to accommodate disposable rectangular Chamber Slides™ and Chambered Coverglass from the Nunc Lab-Tek® series, and the Falcon® Culture slide series from Beckton Dickinson.

The CSMI, in combination with a matching low noise TC-202A temperature controller, facilitates long term maintenance of tissue or cell cultures on a microscope stage. This allows optical monitoring of dyes, micro-injection, electrical recording, and micro-manipulation for many hours or even days.

The CSMI not only facilitates the precise regulation and manipulation of bath temperature, but also supports multi-channel perfusion (up to 4 lines), gas atmosphere maintenance, and CO<sub>2</sub> superfusion for pH control.

The CSMI is based on a successful design of the Medical Systems PDMI-2 Micro-Incubator for 35 mm Petri dishes. The CSMI utilizes Peltier technology to regulate temperature over a wide range of temperatures, both above and below ambient levels. Lower temperatures (approximately 10°C below ambient) may be obtained by using an optional cooling tube.

The CSMI fits on the stage of inverted microscopes from major microscope manufacturers including Zeiss, Nikon, Olympus and Leica. Harvard Apparatus offers custom-made rectangular adapters for these microscopes.

**Specifications**

Temperature Range	~5° to 10°C below ambient to 50°C
Disposable Chambers Accommodated	<ul style="list-style-type: none"> <li>• Nalge Nunc chambered slides &amp; cover slips</li> <li>• Becton Dickinson Falcon chambered slides</li> </ul>
Microscopes Accommodated	<ul style="list-style-type: none"> <li>• Zeiss Axiovert with attachable mechanical stage</li> <li>• Leica DAS Microscope DMIL and DMIRB/E with attached mechanical stage</li> <li>• Nikon Diaphot</li> <li>• Olympus IX50/70 or IMT-2 fixed stage</li> </ul>
Peltier TED Current Rating	6 A DC max
Built In Plate Thermistor	100 kΩ at 25°C
Perfusion Inlet Lines	26 AWG Teflon capillary up to 4 lines can be installed simultaneously
Perfusion Rate	3 ml/min nominal total
Perfusate Outlet	LU-ASP aspirator
Gas Port	1/16 in. barb
Gas Superfusion Rate	0.5 to 2.0 L/min
Weight	17.9 oz (0.5 kg)
Overall Dimensions	6.5 x 4 x 1 in (16.5 x 10.2 x 2.5 cm)

Order #	Model	Product
W4 65-0101	CSMI	Chambered Slide Micro-Incubator
W4 65-0102	CSMI	Chambered Slide Micro-Incubator Special Design Version for 3 Plate Mechanical Stages
W4 65-0045	TC-202A	Bipolar Temperature Controller
W4 65-0103	–	Copper Cooling Tube for CSMI
W4 65-0052	MI-M	Mini Magnets for Top Surface of Micro-Incubators (LU-CB-1, PDMI-2 or PSMI), set of 4

# micro-incubators

## Accessories

for PDMI-2, PSMI, CSMI and Leiden Chambers



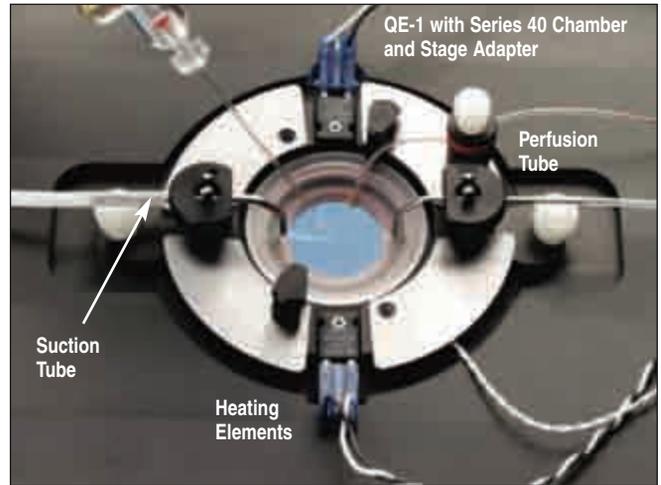
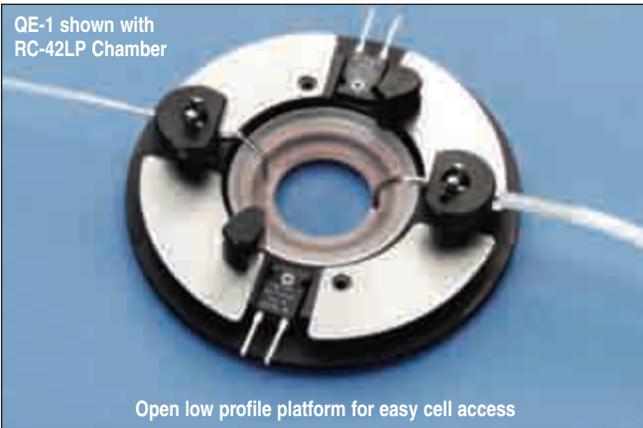
Order #	Model	Product
<b>Alignment Rings and Fixing Platforms</b>		
W4 65-0093	PDMI-ARL	Alignment Ring for Leica Microscope, 88 x 1.8 mm (OD x Thickness)
W4 65-0059	PDMI-ARN	PDMI-2/PSMI Alignment Ring for Nikon Diaphot (Old or 300/200) TMD Stage, 4.242 x .071 in (D x Thickness)
W4 65-0060	PDMI-ARO	PDMI-2/PSMI Alignment Ring for Olympus IX50/70 or IMT-2 Fixed Stage, 4.320 x .071 in (D x Thickness)
W4 65-0061	PDMI-ARZ	PDMI-2/PSMI Alignment Ring for Zeiss Axiovert Gliding or Rotary Stages, 4.046 x .071 in (D x Thickness)
W4 65-0062	PDMI-FPL	PDMI-2/PSMI Fixing Platform for Leica DAS Mikroskop DMIL and DMIRB/E w/Attachable Mechanical Stage
W4 65-0063	PDMI-FPZ	PDMI-2/PSMI Fixing Platform for Zeiss Axiovert with Attachable Mechanical Stage, M-Type Stage
W4 65-0058	PDMI-TUBE	PDMI-2 Copper Cooling Tube Coil (Shaped to Conform to Fin Channel) with Open Ends
W4 65-0064	LU-FPL	LU-CB-1 Fixing Platform for Leica DAS Mikroskop DMIL and DMIRB/E with Attachable Mechanical Stage
W4 65-0065	LU-FPZ	LU-CB-1 Fixing Platform for Zeiss Axiovert with Attachable Mechanical Stage, M-Type Stage
<b>Miscellaneous</b>		
W4 65-0047	LU-ASP	Leiden Aspirator, Cover Slip Dish Fluid Level Setting Device, 38 mm H
W4 65-0052	MI-M	Mini Magnets for Top Surface of Micro-Incubators (LU-CB-1, PDMI-2 or PSMI), set of 4
W4 65-0053	PS-CSD	Patch Slice Cover Slip Dish for PSMI
W4 65-0054	LU-PD	Sleeve of Plastic 35 mm Petri Dishes, pkg. of 20
W4 65-0055	BSC-TH	Magnetic Thermistor Holder for LU-CB-1
<b>Thermistors</b>		
W4 65-0057	BSC-T3	Bath Thermistor for Use with PDMI-2, PSMI, LU-CB1, and TC-202A
W4 65-0056	BSC-T3A	Bath Thermistor for Use with LU-CPC-CEH and TC-202A
W4 65-0098	BSC-T2	Replacement-Bath Thermistor for Obsolete TC-102
W4 65-0016	BSC-T2A	Replacement-Bath Thermistor for Use with LU-CPC-CEH and TC-102
<b>Micro-Incubator Replacement Parts</b>		
W4 65-0066	D-ORING-1	Cover Slip Dish O-Rings Replacement for LU-CSD or MSC-TD, 1 Small (approx. 23.80 mm OD) and 1 Large (approx. 29.80 mm OD), set of 2
W4 65-0067	D-ORING-2	Cover Slip Dish O-Rings, Replacement for MSC-PTD, 1 Small (approx. 20.80 mm OD) and 1 Large (approx. 29.80 mm OD), set of 2
W4 64-0705	CS-25R	Cover Glass 25 mm round thickness #1, pkg. of 100
W4 65-0069	CS-GLASS-2	Glass Cover Slips (#2) for LU-CSD or MSC-PTD, 0.18 to 0.25 x 25 mm (Thickness x D), pkg. of 100
W4 65-0070	MI-T	Perfusion/Aspiration Teflon Tubing Replacements for PDMI-2/PSMI, 2 ft L x 26 AWG, pkg. of 8
W4 65-0071	LU-CPC-P	Silicone Rubber Plugs for LU-CPC or LU-CPC-CEH, set of 4
W4 65-0072	TC-CA	Replacement Output Cable to Connect TC-102 Temperature Controller to LU-CB-1 or LU-CPC-CEH

# micro-incubators

## QE-1

Quick Exchange Heated Platform with Perfusion for 35 mm dish format

*Ideal for imaging and electrophysiology applications*



- Open design for easy cell access
- Removable perfusion and suction tube holders
- Designed for 35 mm dishes and Series 40 chambers
- Quick exchange of chamber or 35 mm dish
- Magnetic stainless steel allows for the use of magnetic holders

The QE-1 Quick Exchange Platform is a versatile base for the RC-40 Series chambers, as well as many popular 35 mm glass bottom dishes. The platform is at home on both upright and inverted microscopes and includes resistive heating elements. The base has a 25 mm diameter aperture. Magnetic stainless steel along the perimeter of the QE-1 permits the use of Warner's MC-1 Magnetic Clamp Kit, which includes a variety of holding tools.

Removable perfusion and suction tubes allow perfusion in any of the RC-40 Imaging Chambers or 35 mm dishes. Suction and perfusion tubes also feature set-screw locks for the horizontal location, and adjustable presets on the vertical for setting the bath height. These adjustments permit easy and exact positioning/repositioning of the suction and perfusion tubes. A redesigned suction tube eliminates tidal action and fluid flutter, making aspiration very quiet.

Resistive heating of the QE-1 is provided by means of our TC-324B/TC-344B Temperature Controllers and a CC-28 Cable. Heating of perfusate is achieved using our SH-27B or SF-28 In-line Solution Heaters.

Adapter rings are supplied for Corning, Falcon, Nunc, WPI, MatTek and Willco 35 mm dishes to ensure a close fit within the QE-1.

Series 20 stage adapters are available for all major microscopes. Custom or modified stage adapters are also available; call our Technical Support Department for details or see pages 64 to 69.

*The QE-1 includes 10 ft. of PE-160 polyethylene tubing and adapter rings for a variety of 35 mm culture dishes.*

Order #	Model	Product
W4 64-0375	QE-1	Quick Exchange Heated Base with Perfusion and Adapter Ring Kit
<b>Accessories and Replacement Parts</b>		
W4 64-1404	PT-QE1	Perfusion Tube for QE-1
W4 64-1403	ST-QE1	Tube Suction Micro-Slit Design for QE-1
W4 64-0103	SF-28	Slow Flow Solution Heater
W4 64-0351	AR-4	Replacement Adapter Ring Kit for 35 mm Dishes
W4 64-0100	TC-324B	Single Channel Heater Controller
W4 64-0101	TC-344B	Dual Channel Heater Controller
W4 64-0106	CC-28	Cable Assembly for Heater Platforms
W4 64-0102	SH-27B	Solution Heater
W4 64-0357	MCK-1	Magnetic Clamp Kit

\* QE-1 weight without stage adapter 134 g.

## QE-1HC

# culture dish platforms

Quick Exchange Heated / Cooled Platform for 35 mm Petri Dishes

Temperature control from 5° to 50° C for the Leica Galvo Z stages



- Designed for use with 35 mm Petri dishes and Series 40 quick change imaging chambers
- Open design for easy cell access
- Dish adapters for all major brand 35 mm dishes
- Temperature control from 5° to 50°C
- Magnetic suction and perfusion tube holders
- Magnetic dish clamps
- Available stage adapters for all microscopes

The Warner QE-1HC is designed to work with Warner RC-40 quick change imaging chambers and all 35 mm cell culture dishes. Precise temperature control of the media is possible when combined with our low noise CL-100 temperature controller and TCM-1 Thermal Cooling Module (heat exchanger). An integral water jacket is used to remove excess heat from the internal Peltier device.

Magnetic clamps hold cell culture dishes and quick change imaging chambers securely in place. Magnetic stainless steel along the perimeter of the platform allows for the use of included magnetic suction and perfusion tube holders (included).

Fits Series 20 stage adapters. All major microscope stages are accommodated. Custom or modified stage adapters are also available; call our Technical Support Department for details or see visit our website.

*The QE-1HC is supplied with a 35 mm adapter ring kit, set of six, three sets of magnetic clamps for holding Petri dishes, one humidifying cover, one TA-29 bead thermistor, one MAG-3 magnetic holder for wires, one perfusion tube with magnetic holder, one suction tube with magnetic holder, 10 feet of PE-160 tubing, 20 feet of 1/8" ID x 1/4" OD soft tubing, 50 feet of 1/16" Tygon tubing, and a lift tool.*

### Specifications

Temperature Range	5° to 50°C
Accuracy	±0.1°C
Feedback Thermistor	Built in Unical 10kΩ at 25°C
Controller	CL-100 Bipolar Controller
Physical Dimensions:	
Aperture Size (D x L)	25.4 mm
Thermal Insert Size (D x L x H)	64.0 x 92.2 x 10.5 mm
Weight	105 g
Cable Length	2.4 m
Connector Type	15 pin Male "D"
Water Jacket Ports	1/8" Barb Fittings
Warranty	One Year

### Order # Model Product

<b>W4 64-1659</b>	QE-1HC	Quick Exchange Stage Incubator
<b>W4 64-0352</b>	CL-100	Bipolar Temperature Controller
<b>W4 64-1922</b>	LCS-1	Liquid Cooling System

### Accessories/Replacement Parts

<b>W4 64-0297</b>	SA-20KZ	Stage Adapter for the (K) sSage
<b>W4 64-0296</b>	SA-20LZ	Stage Adapter for the Zeiss
<b>W4 64-0291</b>	SA-NIK	Stage Adapter for the Nikon 108 Dia.
<b>W4 64-0295</b>	SA-OLY/2	Stage Adapter for the Olympus 110 Dia.
<b>W4 64-0107</b>	TA-29	Cable with Bead Thermistor
<b>W4 64-1404</b>	PT-QE1	Perfusion Tube
<b>W4 64-1553</b>	MAG-6	Mini Magnetic Clamp for 18 Gauge Tube
<b>W4 64-1403</b>	ST-QE1	Suction Tube
<b>W4 64-1554</b>	MAG-7	Mini Magnetic Clamp for 16 Gauge Tube

# QE-2 culture dish platforms

Quick Exchange Heated Platform with Perfusion for 50 mm dish format

*The QE-1 in a 50 mm culture dish format*



- Designed for 50 and 60 mm culture dishes
- Removable perfusion and suction tube holders
- Open design for easy cell access
- Adapters for Willco Wells, Corning, Nunc, and Falcon dishes
- Magnetic stainless steel perimeter allows use of magnetic holders

The Warner QE-2 Quick Exchange Platform is a versatile base for many popular 50 and 60 mm glass bottom and plastic dishes. The platform is at home on both upright and inverted microscopes and includes resistive heating elements. The base has a 36 mm diameter aperture. Magnetic stainless steel along the perimeter of the QE-2 facilitates use of Warner's MC-1 Magnetic Clamp Kit, which includes a variety of holding tools.

Suction and perfusion tube holders are slotted and allow easy adjustment of the vertical position for setting the bath height. A specially designed suction tube eliminates tidal action and fluid flutter, making aspiration very quiet and even. Drop in one of Warner's RC-61 Series of 50 mm disposable chamber inserts and turn your dish into a low cost perfusion chamber.

Resistive heating of the QE-2 is provided by means of our TC-324B/TC-344B temperature controllers and a CC-28 cable. Heating of perfusate is achieved using our SH-27B or SF-28 In-line Solution Heaters.

Adapter rings for Corning, Falcon, Nunc and Willco 50 mm dishes are supplied. The following tissue culture dishes are supported: Corning (p/n 25060, 60 x 15 mm), Falcon (p/n 351006, 50 x 9 mm), Nunc (p/n 150326, 60 x 15 mm), and Willco (D5030 and D5040).

Stage adapters are available for all major microscopes. The QE-2 uses the Series 30 stage adapters, see page 64. Custom or modified stage adapters are also available. Call our Technical Support Department for details.

Order #	Model	Product
W4 64-1542	QE-2	Quick Exchange Heated Base with Perfusion and Adapter Ring Kit
<b>Accessories and Replacement Parts</b>		
W4 64-1403	ST-QE1	Tube Suction Micro-Slit Design for QE-1
W4 64-0100	TC-324B	Single Channel Heater Controller
W4 64-0101	TC-344B	Dual Channel Heater Controller
W4 64-0106	CC-28	Cable Assembly for Heater Platforms
W4 64-0102	SH-27B	Solution Heater
W4 64-0357	MCK-1	Magnetic Clamp Kit
W4 64-0760	D5040P	Glass Bottom Willco 50 mm Dishes, pack of 20

## Adapter Rings, Coverslips and Culture Dishes

### Accessories and Replacement Parts for Warner Micro-incubation Chambers



Order #	Model	Product
W4 64-0350	AR-1	Adapter Ring for DH-35 and Willco Dish
W4 64-1455	AR-2	Adapter Ring for AttoFluor® cell chamber in DH-35i/QE-1
W4 64-0351	AR-4	Adapter Ring Kit, set of 6, for Willco, Corning, Nunc, WPI, MatTek and Falcon Dishes
W4 64-1507	RPC-2	Replacement Clamps for DH-35i/DH-40i/QE-1
W4 64-1500	CS-40R	Cover Glass, 40 mm round, #1.0 thickness, 60 pc.

### Heated Top Coverslip for DH-35i and DH-40i Chambers



Developed for use in our DH-35i and DH-40i Micro-incubation chambers, this heated coverslip assembly replaces the 40 mm coverslip normally supplied with these chambers. Once installed, the HCS-1 eliminates condensation which occurs when these chambers are used in the closed mode.

The heated coverslip derives its power from the heated base of the DH-35i or DH-40i chamber and does not require an additional temperature controller.

Order #	Model	Product
W4 64-1543	HCS-1	Heated Top Coverslip
W4 64-1544	HCS-RPL	Replacement ITO Coverslip

### Glass Bottom Cell Culture Dishes (35 and 50 mm), #1.5 Thickness (0.17 mm)



- Highest quality construction, sterilized
- #1.5 Cover glass for microscope imaging
- Glass fully covers bottom
- Compatible with all Warner Dish Heaters

Glass Bottom Cell Culture Dishes

High quality polystyrene dishes with No. 1.5 cover glass bottoms are available in 35 mm and 50 mm diameters, available both in pouch packs (20/pouch) and individual blister packs (120/case). All dishes are sterilized before packaging.

50 mm dishes are 7 mm in height.

Order #	Model	Product
<b>Pouch-Pack Dishes, 20 sterilized dishes/pouch</b>		
W4 64-0757	D3512P	35 x 9.9 mm, 12 mm Well Diameter
W4 64-0758	D3522P	35 x 9.9 mm, 22 mm Well Diameter
W4 64-0759	D5030P	50 x 7.2 mm, 30 mm Well Diameter
W4 64-0760	D5040P	50 x 7.2 mm, 40 mm Well Diameter
<b>Blister-Pack Dishes, individual packaged sterile dishes, case of 120</b>		
W4 64-0762	D3522B	35 x 9.9 mm, 22 mm Well Diameter
W4 64-0763	D5030B	50 x 7.2 mm, 30 mm Well Diameter

*Note: 35 mm dishes supplied with triple vented lids for optimum ventilation. 50 mm dishes have low side walls to facilitate microinjection.*

## Brain/Tissue Slice Chamber System

Sensitive recordings without electrical interference

*Submerged or interfacial chambers for the in vitro study of tissue slices*



- Maintains brain slices for 10 hours or more on the bench-top
- Modular design accommodates submersible or interface chambers
- Over 20 years of use in leading labs

submerged slices. Each top allows rapid solution replacement, and both provide excellent access to slices for electrophysiological recording or other observations.

### Designed by Experts

Over twenty years ago, Drs. Haas and Zbicz, two leading electrophysiologists, designed these chambers for use in their own research.

### No Electrical Interference

Low noise temperature controllers (TC-324B, TC-344B, TC-202A) ensure even the most sensitive electrophysiologic recordings (such as single channel patch clamping) can be made from slices without electrical interference.

### Convenient

Temperature regulated perfusion lines are built in for rapid changeover of superfusing fluids without the need for an external temperature regulated perfusate supply tank.

### Components

All components must be purchased individually. See ordering information on the following pages.

This unique and versatile Brain/Tissue Slice Chamber System offers the investigator two in vitro methods of studying a thin tissue slice bathed by perfusates of interest.

The BSC-HT (Haas Top) is an interface-type chamber in which one surface of the slice is wet by a perfusing solution while the other surface is kept moist by a humidified gas mixture. The BSC-ZT (Zbicz Top) is a submersion-type chamber in which solution flow is transverse to fully



### BSC-BU Base Unit

The function of the Base Unit is to warm the superfusing solution. The BSC-BU consists of a double walled cylinder which is filled with distilled water and encloses a nichrome

heating element. The cavity also contains two separate sets of PVC tubing which can transport one or two superfusing solutions to the slice chamber. The base unit holds an aerator to humidify vapor when the Haas Top is employed.

The BSC-BU is mounted on legs which suspend the heating cylinder. This prevents the thermal expansion of the heating cylinder from moving the top unit and slice during temperature changes. The BSC-BU is specifically designed to accept both the BSC-HT and the BSC-ZT top units, providing economy and versatility. Includes connecting cable six pin DIN to Banana.

### Specifications

Dimensions, L x W x H	114.6 x 139.4 x 111.1 mm (4.5 x 5.4 x 4.3 in)
Weight	618 g (1 lb 5.8 oz)

Order #	Model	Product
W4 65-0073	BSC-BU	Base Unit
W4 65-0088	BSC-ACC-KIT	Base Unit, Haas & Zbicz Tops Accessory Kit (Replacement Screws, Fittings and Mesh)



### BSC-PC Prechamber

The BSC-PC chamber allows several (10 to 12) brain slices to be stored in vitro for several hours while maintaining excellent viability. A mixture of 95:5% O<sub>2</sub>:CO<sub>2</sub> is bubbled through physiological saline. This initiates a circular flow, and oxygen enriched saline

continuously permeates the slices. Slices remain viable for hours while awaiting transfer to an examining chamber. Gas flow pressure should not exceed 5 p.s.i. 1 insert included with prechamber.

### Specifications

Dimensions, L x W x H	112.6 x 48.9 x 95.4 mm (4.4 x 1.9 x 3.7 in)		
Weight	362 g (12.8 oz)		
Internal Dimensions	OD	ID	L
	1.5 in	1.25 in	1.13 in
	38.1 mm	31.75 mm	28.7 mm

Order #	Model	Product
W4 65-0076	BSC-PC	Prechamber (for holding slices)
W4 65-0608		Insert for BSC-PC Prechamber

## Brain/Tissue Slice Chamber System (continued)



### BSC-HT Haas Top

The BSC-HT Haas Top is an interface-type chamber utilizing semi-submersion principles. It provides for rapid exchange of superfusing fluids and excellent stability for intracellular recording. Slices rest on a nylon mesh below which a thin sheet of the perfusate

of interest flows. The bottom side of the slice is wet by capillary action as solution saturates the mesh. Slices are oxygenated by a warmed, humidified mixture of 95% O<sub>2</sub>/5% CO<sub>2</sub> which flows across the top surface of the slice. The BSC-HT has been designed such that, if desired, one can study the effects of two drugs simultaneously. One drug flows down the left portion of the chamber and the second down the right.

Laboratory results confirm a good performance history for the semi-submersion top design:

#### Advantages

- Maintains a stable intracellular membrane potential of more than -60 mV.
- Facilitates action potentials with overshoots close to 100 mV in amplitude, duration of less than 2 msec at 32°C, when used with hippocampal pyramidal and granular cells.
- Maintenance of the membrane resting potential is possible for more than 1 hour, undisturbed by changes in perfusion fluids.
- Preparation slices remain viable for up to 12 hours.
- Flow rates of 1 ml/min will completely exchange the chamber fluid in less than 1 minute.

#### Specifications

BSC-HT:	
Dimensions, L x W x H	111.1 x 85.4 x 23.8 mm (4.3 x 3.3 x 0.9 in)
Weight	130 g (4.6 oz)
BSC-ZT:	
Dimensions, L x W x H	98.5 x 101.6 x 28.1 mm (3.8 x 4.0 x 1.1 in)
Weight	124 g (4.4 oz)

Order #	Model	Product
W4 65-0075	BSC-HT	Haas Top including 2 slice holds
W4 65-0074	BSC-ZT	Zbicz Top including nylon mesh



### BSC-ZT Zbicz Top

The BSC-ZT Zbicz Top is a submersion type chamber in which tissue slices are supported on a stiff nylon mesh. The perfusate flows transversely across both cut surfaces. The steady flow of warmed media across the cut surfaces of the slice is sufficient to

keep many tissues alive and responsive for 10 hours or more. The fluid level is set to 1 mm above the mesh by a dam at the end of the chamber. The chamber is 6 mm wide and the trough is 24 mm long; this provides adequate room for slices and instrumentation, yet minimizes the well volume to optimize drug exchange times. Fluid overflowing the dam is drained to waste via vacuum.

#### Advantages

- Slices remain viable for 10 hours or more.
- The slices are mechanically stable. They are placed on a special ribbed nylon mesh and may be held in place by 3 to 4 stimulating electrodes or a plastic insert. This stability is attributed to the stiff nylon mesh which does not rise or sag with changes in fluid flow, therefore, moderate changes in the transverse laminar flow can be well tolerated during intracellular and extracellular recordings. These features allow for switching of solutions with minimal risk of tissue movement and loss of neurons while recording.
- The low volume of the chamber cavity and the relatively fast flow rate allows rapid exchange of solution (1 to 2 minutes) which facilitates drug application studies.
- Slices remain moist and viable because they are wetted on both sides and do not dry out due to surrounding air currents.
- The mesh surface holding the slice is semipermanent and can be cleaned easily. The BSC-ZT comes with extra mesh which can be easily installed when necessary.
- Because the fluid depth is shallow (400 to 600 microns), the electrode capacitance remains low; an important consideration in single microelectrode voltage and patch clamping.
- Bubble formation is minimal. Bubbles, which form in the heating unit, escape by the path formed at the entrance of the trough. Movement of the slice will not result should bubbles inadvertently form under the mesh. The flow of solution over the slice's top surface will maintain tissue viability.
- The solution temperature at the slice can be precisely regulated due to the close proximity of an optional thermistor to the slice.
- Slices can be transilluminated.

## Brain/Tissue Slice Chamber System (continued)



### Choice of Temperature Controllers

The BSC-BU Base unit is offered in two versions, the original unit for use with the model TC-202A, and a new version, the BSC-BUW, designed to work with Warner's TC-324B and TC-344B temperature controllers.

Order #	Model	Product
W4 64-0100	TC-324B	Temperature Controller, Single Channel
W4 64-0101	TC-344B	Temperature Controller, Dual Channel
W4 65-0045	TC-202A	Biopolar Temperature Controller



### Ordering Information

All components are ordered individually. Most researchers order the BSC-BU Base unit with either the Haas or Zbicz top, depending on individual research. The pre-chamber is an effective accessory for slice preservation, but is not necessary for system operation. We recommend ordering the BSC-ACC-Kit since it contains valuable replacement parts such as screws, fittings, and mesh.

#### References:

- Zbicz, K.L. & Weight, F.F. "Transient Voltage and Calcium Dependent Current..." J. Neurophys 53,1038-1058 (1985).
- Haas, H.L. et al "A Simple Perfusion Chamber for the Study of Nervous Tissue Slices in Vitro" J. Neurosci Meth 1, 323-325 (1979).

Order #	Model	Product
W4 65-0073	BSC-BU	Base Unit Including Tubing, Heating Element and Electrical Terminals
W4 64-1525	BSC-BUW	Base Unit Slice Heater for Warner Temperature Controllers includes W4 64-1591 Cable
W4 65-0074	BSC-ZT	Zbicz Top Including Nylon Mesh
W4 65-0075	BSC-HT	Haas Top Including 2 Slice Holders
W4 65-0076	BSC-PC	Prechamber for Holding Slices

### Accessories and replacement parts

W4 65-0098	BSC-T2	Replacement T2 Thermistor for TC-102
W4 65-0057	BSC-T3	Thermistor (Bath) for Use with Brain Slice Chamber
W4 65-0078	BSC-AIR	Aeration Element Replacement, set of 2
W4 65-0079	BSC-ORING	Base Unit (BSC-BU) Replacement Gasket Set
W4 65-0080	BSC-HE	Base Unit Heating Element Replacement
W4 64-1697	-	Replacement Heating Element for BSC-BUW
W4 65-0081	BSC-TUBE	Base Unit (BSC-BU) Tubing Set Replacement, Tygon .031 x .093 (ID x OD)
W4 65-0082	BSC-G10	Haas Top (BSC-HT) Tissue Insert Replacement, set of 2
W4 65-0083	BSC-HTC	Haas Top (BSC-HT) Plastic Cover Replacement
W4 65-0084	BSC-HT-AG	Haas Top (BSC-HT) Ground Wire Replacement
W4 65-0086	BSC-ZTC	Zbicz Top (BSC-ZT) Plastic Insert Replacement
W4 65-0087	BSC-PC-VAL	Prechamber (BSC-PC) Valve Replacement
W4 65-0088	BSC-ACC-KIT	Base Unit, Haas & Zbicz Tops Accessory Kit (Replacement Screws, Fittings and Mesh)
W4 65-0091	BSC-CABLE	BSC-BU/TC-102 Replacement Power Cable
W4 65-0090	BSC-MESH	Haas Top (BSC-HT) Zbicz Top (BSC-ZT) Replacement Mesh 300 µm grid, 5 x 5 in, pkg. of 4
W4 65-0104	-	Output Cable, 6-Pin to Banana for TC-202A or BSC-BU
W4 65-0100	-	Output Cable, 6-Pin to 1 mm for BS4 TC-202A, BS4 LU-CB1 and BS4 LU-CPC-CEH
W4 64-1591	-	Output Cable, 8-Pin to Banana for temperature controller to BSC-BUW base, includes thermistor (Warner Temperature Controllers) Comes with BSC-BUW

# contact information

## Sales Subsidiaries & Authorized Distributors

### Subsidiaries

#### CANADA



**Harvard Apparatus Canada**  
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#### FRANCE



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website **www.harvardapparatus.fr**

#### GERMANY



**Hugo Sachs Elektronik  
Harvard Apparatus, GmbH**  
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e-mail **info@hugo-sachs.de**  
website **www.hugo-sachs.de**

#### SPAIN



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C/Energia, 112  
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fax **34.934.750.699**  
e-mail **info@panlab.com**  
website **www.panlab.com**

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website **www.harvardapparatus.co.uk**

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