



KFTechnology
LIFE SCIENCE TOOLS

Bioscience Tools

Systems & Accessories for

**Imaging & Recording in
Animal Physiology
& Cell Biology:
MicroIncubators for live samples
Single Cell & Tissue Perfusion
CO₂, O₂ & Temperature Control
Liquid Delivery & Fluidics**

2021

environment control & Solutions Application to

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ORDERING INFORMATION

KF Technology S.r.l.
Via A.Bocchi, 84 - 00125 Roma
Tel. +39 06 45434179
Fax +39 06 97253131
Cell. +39 339 5330322
www.kftechnology.it
info@kftechnology.it

Microscopic Samples

Miniature Incubators

Controlled Environment Systems for High Resolution Imaging



- Precise Temperature Control throughout the experiment
- No drift during Long Term Imaging
- Conditions similar to *in vivo*
- CO₂, Hypoxia (O₂), and humidity control
- High Temperature range up to 150°C
- 0.01°C Stability Objective Heaters for Immersion Optics

Closed Controlled Environments

Two basic types of closed incubators are available: 110x110mm TC-MIS models, that are mostly used with mechanical microscope stages, and 160x110mm models, that fit into motorized and type K mechanical stages (some larger motorized stages require mounting adapter-extensions, see tables below). TC-MIS incubators ship attached to a microscope stage adapter, which are available for almost any microscope (custom adapters are also made upon request). The tables below show adapter's catalog numbers for standard microscope models.

Microscope Adapters for TC-MIS incubators

Catalog No.	Description/Microscope Model
IMA-74-128x86	128x86mm Adapter, the size of standard multi-well plates, fits plate holders on mechanical microscope stages
IMA-74-110	110mm Adapter, the size of insert on Olympus microscopes
IMA-74-108	108mm Adapter, the size of insert on Nikon microscopes
IMA-74-108	108mm Adapter, the size of insert on Motic, Meiji microscopes
IMA-74-M	Type M Adapter, the size of type M insert on Zeiss and Leica microscopes

Incubators for motorized & type K stages



Adapters for motorized stages

Catalog No.	Stage Model
Not required	Ludl, Prior, ASI, Marhauser, Zeiss, and type K stages
TC-MI-THOR	Adapter for ThorLabs stages, 170x130mm
TC-MI-NIK	Adapter for Nikon motorized stages, 236x155mm
TC-MI-LUDL	Adapter for Ludl Bioprecision II stages, 172x116mm

Miniature Incubator TC-MI-20x46 This incubator was designed for long-term imaging and can be used with chambered coverglasses, coverslip holders CSC and UTIC, petri dishes or glass bottom dishes, both 50 and 35mm (in combination with 50mm reducing insert TC-PA50 and TC-PA-C, -N, -F, -W). Open aperture on the bottom is 20x46mm. For larger dishes and chambers or multiple samples, use TC-MWP incubator in combination with an appropriate insert. Incorporates luer-port for gas mixture (to control CO₂ or hypoxia), inside reservoir for water to control humidity, and heated cover to prevent condensation (the heated lid is purchased separately). Built-in multiple sealed ports for tubing and accessories, probes and sensors. Can be upgraded with an objective heater for immersion optics. An optional set of adjustable tubing holders MH-MIS allows you to position perfusion tubing for continuous media exchange. Requires a temperature controller. Fits all brands of motorized stages and type K stages with 160x110mm insert (radius on the corners). Optional adapters are available to fit ThorLabs (170x130mm cutout) and Nikon (236x 155mm cutout) and Ludl Bioprecision stages **Item#: TC-MI**

- **Outside dimensions:** fits 160x110mm cutout of motorized and type K stages. Brings the sample 7mm below the mounting surface (10mm from the top of 3mm mounting lip to the bottom of the incubator), can be elevated using included 3mm spacers
- **Clearance:** inside 34mm
- **Use with:** 50mm and 35mm dishes, chambers, chambered coverglasses and slides
- **Condensation free cover:** Uses a built-in temperature sensor to connect independently to the second channel of temperature controllers, 65x75mm low optical window
- **Gas port:** Luer-lock connector to a source of gas mixture (CO₂-O₂-MI controller).
- **Water reservoir:** Controls humidity. Can be replenished through outside ports.
- **Media exchange and perfusion:** Multiple sealed inflow/outflow ports, a set of optional adjustable tubing holders to position inflow and outflow tubing inside sample chambers.





Low-Profile Lid for Miniature Incubator TC-MIL Cover for Miniature Incubator for motorized stages, low profile. The decreased height allows to use condensers for DIC and phase contrast optics: 20mm from top cover to the sample plane. Note: not recommended for use with perfusion and media exchange tubing holders inside the incubator. Can be elevated 9.5mm using TC-I-E spacers. Multiple spacers can be attached to the lid, or to the base of the incubator. **Item#: TC-MIL**

Lid for MWP incubators, TC-MWPL Standard lid to use with TC-MWP incubators. Fits TC-MI incubators. Total height is 24mm for the lid only. Can be elevated 9.5mm using optional TC-I-E spacers. **Item#: TC-MWPL**



Miniature Incubators for Motorized microscope stages and type K stages from Zeiss

Catalog No.	Description
TC-MI-20x46	Miniature Incubator Motorized Stages, 20x46mm window on bottom, includes lid
TC-MWPL	Lid for Miniature Incubator Motorized Stages
TC-MI-THOR	Adapter for ThorLabs stages, 170x130mm
TC-MI-NIK	Adapter for Nikon motorized stages, 236x155mm
TC-I-E	Spacer to elevate the cover 9.5mm
MH-MIS	Set of miniature adjustable tubing and sensor holders, x3, includes 4-40 threaded posts
TC-PA-C	Petri Dish Adapter, for Corning and Mattek dishes
TC-PA-W	Petri Dish Adapter, for Willco dishes
TC-PA-F	Petri Dish Adapter, for Fluo dishes from WPI
TC-PA-G	Petri Dish Adapter, for Greiner Bio-One dishes, glass bottom
TC-PA50	50mm reducing adapter-ring for 35mm dishes (for use with TC-MI-30/45 and TC-MIS-30/45).



Adapter for ThorLabs stages TC-MI-THOR If attached to the bottom of incubators for motorized stages, allows you to fit the incubator inside 170x130mm cutout of ThorLabs stages. Includes two pieces for both sides. **Item#: TC-MI-THOR**

Adapter for Nikon motorized stages TC-MI-NIK If attached to the bottom of incubators for motorized stages, allows you to fit the incubator inside 236x155mm cutout of Nikon motorized stages. Includes two pieces for both sides. **Item#: TC-MI-NIK**



Incubator for multi-well plates, dishes and slides TC-MWP Designed for long-term live cell imaging and time-lapsed microscopy. It can be used with standard multi-well plates and optional inserts: TC-I-20x30, TC-I-30x50, and TC-I-SL for slides and micro-fluidics devices, TC-I-35/TC-I-60 for standard 35mm Petri and larger dishes (up to 60mm diameter), TC-I-3 - for slides and chambered coverglasses (x3), and TC-I-4 - for CSC coverslip holders and Petri dishes (x4). The inserts can be used with a set of adjustable tubing holders MTH and NH-MIS to position perfusion tubing for continuous media exchange. Incorporates luer-lock port for gas mixture (to control CO₂ or hypoxia), and heated cover (purchased separately) to prevent condensation. Built-in multiple ports for tubing and accessories, probes and sensors. Fits all brands of motorized stages and type K Zeiss/Leica stages. Some models of motorized stages might require optional adapter extensions to fit. Requires a temperature controller. The whole bottom is open for access with a microscope objective (for closed heated bottom incubator - consider another model TC-MWPHB). Can be upgraded with an objective heater for immersion optics. **Item#: TC-MWP**

- **Outside dimensions:** Fits 160x110mm cutout of motorized stages from Ludl, Prior, Marhauser, Zeiss and ASI; the bottom is recessed 10mm below the top surface (7mm below the mounting surface inside cutouts) of motorized stages, and can be elevated by included 3mm spacers
- **Optical window and clearance:** 112x72mm window on the bottom; 34mm from bottom to top surface; optional spacers allow to elevate the top surface 9.5mm - to provide more space inside the incubator
- **Use with:** Standard multi-well plates, 35-60mm dishes, and 1x3in. glass coverglasses/slides (requires replaceable inserts)
- **Condensation free cover:** Uses a built-in temperature sensor to connect independently to the second channel of temperature controllers, 81x121mm optical window
- **Gas port:** Luer-lock connector to a source of gas mixture: CO₂-O₂-MI controller
- **Media exchange and perfusion:** Multiple sealed inflow/outflow ports, an optional set of adjustable tubing holders to position inflow and outflow tubing inside sample chambers.



Lid for MWP incubators, low-profile TC-MWPL Low-profile lid to use with TC-MWP incubators. Total height is 24mm. Can be elevated 9.5mm using optional TC-I-E spacers. **Item#: TC-MWPL**



Magnetic insert, MA-128x86 This insert provides flexible working area for positioning accessories required for high resolution live sample imaging and recording: from media exchange and test solution delivery tubing, to sensors and electrodes. Specially treated stainless magnetic surface of the adapter provides ideal means to mount miniature adjustable magnetic holders. Shown on the picture are ZMM zero-dead volume manifold and MTH-S holder with stainless suction tubing. Incorporates adjustable clamps to fix all brands of 35mm Petri dishes and CSC chambers, glass bottom dishes (both 35 and 50mm), and heating elements. **Item#: MA-128x86**



Insert for standard slides, TC-I-20x30 Designed to hold standard 1x3in. slides. Provides wide access for fluidics tubing. Optical aperture is 20x30mm, 1mm thick lip to hold slides up to 76x26mm. Includes adjustable clumps and thumb screws. **Item#: TC-I-20x30**



Insert for custom devices, TC-I-30x50 Designed to hold custom devices up to 101x51mm. Provides wide access for custom accessories. Optical aperture is 50x30mm. Includes adjustable clumps and thumb screws. **Item#: TC-I-30x50**



Insert for slides and microfluidics devices, TC-I-SL Designed to position custom microfluidics devices and slides. Provides wide access for fluidics tubing - 80x70mm recessed area. Optical aperture is 72x24mm, 1mm thick lip to hold slides up to 76x28mm. Includes adjustable clumps and thumb screws. **Item#: TC-I-SL**



Insert for 50-60mm dishes, TC-I-60 Designed to position larger (up to 60mm diameter) dishes. Provides wide access for custom accessories and fluidics tubing. Optical aperture is 30mm. Includes adjustable clumps and thumb screws. **Item#: TC-I-60**



Insert for 35mm dishes, TC-I-35 Designed to position standard 35mm Petri dishes. Provides wide access for custom accessories and fluidics tubing. Optical aperture is 25mm. Includes adjustable clumps and thumb screws. **Item#: TC-I-35**



x4 Coverslip holders and Petri dishes insert for MWP incubators, TC-I-4 Allows to place four petri dishes or CSC chambers - coverslip holders inside MWP incubators. Might require reducing adapters for different brand dishes, TC-PA-C for example for Corning dishes. Can be used with MH-MIS holders to position perfusion tubing. **Item#: TC-I-4**



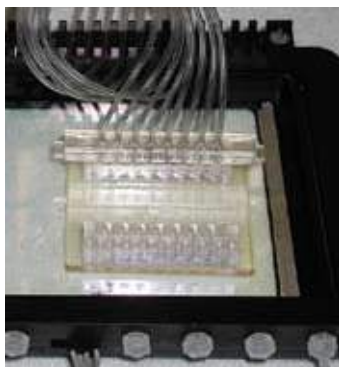
Slides insert for MWP incubators, TC-I-3 Allows to place three chambered coverglasses inside incubators. **Item#: TC-I-3**



Miniature Incubators for motorized stages

Catalog No.	Description
TC-MWP	Incubator for multi-well plates and inserts
TC-MWPHB	Incubator with 1mm glass heated bottom
TC-MWP-6	Incubator x6 30mm apertures in the bottom
TC-MIW	Incubator for micro-fluidics devices and chambers
TC-MWPL	Lid for miniature Incubators, Low Profile
TC-I-E	Spacer to elevate the cover 9.5mm
TC-MI-LUDL	Adapter for Ludl Bioprecision II stages,
TC-MI-THOR	Adapter for ThorLabs stages, 170x130mm
TC-MI-NIK	Adapter for Nikon motorized stages, 236x155mm
TC-I-35	Insert for 35mm dishes
TC-I-60	Insert for 50-60mm dishes
TC-I-20x30	Insert for slides, 20x30mm aperture
TC-I-SL	Insert slides and fluidics devices, 24x72 aperture
TC-I-30x50	Insert for custom devices, 30x50mm aperture
MA-128x86	Magnetic Insert
TC-I-4	Insert for x4 Petri dishes and CSC chambers.
TC-I-3	Insert for slides and coverglasses
TC-I-100	Set of metal inserts, to position adjustable holders, can be used with dishes and chambers up to 90mm diameter
MH-MIS	Set of miniature adjustable tubing and sensor holders, x3, includes 4-40 threaded posts
PS-KIT	A set of tubing, ferule-type and luer-lock fitting, and barbed connectors
TC-PA-C	Petri Dish Adapters, for Corning and Mattek dishes
TC-PA-W	Petri Dish Adapters, for Willco dishes
TC-PA-F	Petri Dish Adapter, for Fluo dishes from WPI
TC-PA-G	Petri Dish Adapter, for Greiner Bio-One dishes

Incubator with 1mm glass heated bottom TC-MWPHB For use with standard multi-well plates, and custom devices. Can be used for long-term imaging. Fits all brands of motorized stage. Incorporates heated bottom, luer-lock port for gas mixture (to control CO₂ or hypoxia), and heated cover lid (purchased separately), to prevent condensation. Built-in multiple ports for tubing and accessories, probes and sensors. The bottom is closed with 1mm glass (for open bottom incubator, to access with immersion objective - consider another model TC-MWP). Consider a modified incubator TC-MIW for easy positioning of tubing to deliver media and test solutions. **Item#: TC-MWPHB**



- **Outside dimensions:** Fits 160x110mm cutout of motorized stages; the bottom is recessed 10mm below the top surface (7mm below the mounting surface) of motorized stages, and can be elevated using included 3mm spacers;
- **Optical window and clearance:** 112x72mm; 33mm from sample to top surface; optional spacers allow to elevate the top surface 9.5mm - to provide more space inside the incubator
- **Condensation free cover:** Uses a built-in temperature sensor to connect independently to the second channel of temperature controllers, 81x121mm optical window
- **Gas port:** Luer-lock connector to a source of gas mixture (CO₂-O₂-MA controller)
- **Media exchange and perfusion:** multiple sealed inflow/outflow ports, an optional set of adjustable tubing holders to position inflow and outflow tubing inside sample chambers
- **Heated bottom:** 1mm glass
- **Stability:** 0.01°C



Incubator with heated bottom TC-MWP-6 The metal heated bottom of this incubator has round cutouts, so there is no obstruction on the way of optical path (x6 for 6-well plates, different number and pattern of cutouts can be made for different plates). Designed for long-term live cell imaging and time-lapsed microscopy. For use with standard multi-well plates. Fits all brands of motorized stages (see table below). Incorporates luer-lock port for gas mixture (to control CO₂ and hypoxia), and heated cover (purchased separately) to prevent condensation. Built-in multiple ports for tubing and accessories (probes and sensors). The bottom thickness is 2mm, the aperture diameter is 30mm (for 6-well plates). Recommended for long distance optics because wider microscope objectives might not fit inside the cutouts. **Item#: TC-MWP-6**

Miniature Incubator for custom micro-fluidics devices and chambers TC-MIW

For use with any custom chamber or plate. Can be used for long-term imaging. Incorporates heated bottom, luer-lock port for gas mixture (to control CO₂ or hypoxia), and heated cover lid (purchased separately), to prevent condensation. Built-in multiple ports for tubing and accessories, probes and sensors. The chambers and devices can be formed directly on the glass bottom. One removable side provides multiple openings for tubing. Fits all brands of motorized stage and Zeiss type K stages. Can be used with a set of adjustable tubing holders to position perfusion tubing for continuous media exchange, provided optional inserts are placed inside, and miniature holders MH-MIS are attached. The bottom is closed (for open bottom incubator, to access with immersion objective - consider another model TC-MWP). **Item#: TC-MIW**



Miniature Incubator for 90mm dishes TC-MI-100 For use with any dishes and chambers up to 90mm diameter. Standard multi-well 86x128mm plates will also fit inside. Incorporates



rates heated bottom, luer-lock port for gas mixture (to control CO₂ or hypoxia), and heated cover, to prevent condensation (the lid is purchased separately). Includes the insert for water to control humidity. The insert can be used to position adjustable holders for tubing, electrodes and accessories. Built-in multiple ports for tubing and accessories, probes and sensors. Fits all brands of motorized stage. Can be used with a set of adjustable tubing holders MH-MIS to position perfusion tubing for continuous media exchange. The bottom is closed (for open bottom incubator, to access with immersion objective - consider another model TC-MWP). Can be used for long-term imaging. **Item#: TC-MI-100**

Miniature Incubators for mechanical microscope stages



Miniature Incubators for Slides, coverslips and Petri Dishes TC-MIS

Designed for long-term live cell imaging and time-lapsed microscopy. Can be used with Petri dishes, chambered coverglasses, coverslip holders and glass bottom dishes, both 35 and 50mm. Incorporates luer-lock ports for gas mixture (to control CO₂ or hypoxia), inside reservoir for water to control humidity, and heated cover (purchased separately), to prevent condensation. Built-in multiple ports for tubing and accessories (probes and sensors). Requires a temperature controller. Incorporates STAGE sensor for stable temperature control, and can be used with optional BATH probe to monitor inside temperature. Fits any microscope (specify microscope model when ordering, ships installed on the microscope adapter; some (Zeiss for example) microscopes need a recessed down insert - type K - and a different incubator with 160x110mm foot print). Can be upgraded with a heated lid with openings to access cells with micro-injection tools to perform cell manipulation.



Can be upgraded with an objective heater for immersion optics. For use with long-distance objectives, select TC-MIS-65x75-HB incubator with closed 1mm heated glass bottom, which allows you to use both slides, Petri dishes and custom devices. Can be used with multi-channel solution switch and perfusion systems. An optional set of adjustable tubing holders MH-MIS allows you to position inflow and outflow tubing for continuous media exchange. All incubators require a lid purchased separately.

Universal **Incubator with 22x46mm bottom aperture, TC-MIS-20x46**. Can be used with 50mm dishes and chambers, slides/coverglasses, and, in combination with 50mm reducing insert TC-PA50 (plus TC-PA-C, -N, -F, -W), with 35 dishes and coverslip holders CSC/UTIC.





Incubator with 35mm bottom aperture for use with petri dishes and coverslip holder CSC and UTIC, TC-MIS-35. Has the whole bottom open for easy access with immersion optics.



Incubator with 15mm bottom aperture for use with petri dishes, TC-MIS-15. Provides better heat distribution from the bottom due to reduced 15mm aperture. Might require reducing insert TC-PA-C/F/N/W for different brands of petri dishes.



Incubator with 11mm bottom window for use with petri dishes, TC-MIS-11. Provides better heat distribution from the bottom due to reduced 11mm aperture. Might require reducing insert TC-PA-C/F/N/W for different brands of petri dishes.

Incubator with 45mm bottom window for use with 50mm petri dishes and chambers, TC-MIS-45. If used with 50mm reducing insert TC-PA50, can be also used with 35mm dishes and coverslip holders CSC and UTIC.

Incubator with 30mm bottom window for use with 50mm petri dishes and chambers, TC-MIS-30. Provides better heat distribution from the bottom due to reduced 30mm aperture. If used with 50mm reducing insert TC-PA50, can be also used with 35mm dishes and coverslip holders CSC and UTIC.



Incubator with 65x75mm bottom window and 1mm heated closed bottom for use with slides, and petri dishes, TC-MIS-80x70-HB. For use with long-distance objectives only. Has the whole bottom closed with 1mm glass to provide 80x70mm surface with uniform heating.

- **Outside dimensions:** 110x110 mm, 34mm clearance from sample plane to the top cover (25mm clearance for low-profile configuration)
- **Optical aperture (on the bottom):**
TC-MIS-20x46: 20 x 46 mm,
TC-MIS-65x75-HB: 65 x 75 mm,
TC-MIS-45: 45mm,
TC-MIS-35: 35mm,
TC-MIS-30: 30mm,
TC-MIS-15: 15mm,
TC-MIS-11: 11mm
- **Use with:** 50mm (TC-MIS-40 and TC-MIS-30) , 35mm petri dishes and glass bottom dishes, 1x3in. coverglasses/slides, and chambers for replaceable coverslips CSC/UTIC
- **Condensation free cover:** Uses a built-in temperature sensor to connect independently to the second channel of temperature controllers, 70x70 mm optical window
- **CO2 port:** Luer connector to a source of gas mixture: CO2-O2-MI or PC-MI controller; CO2-MI controller requires CO2-UP modification;
- **Water reservoir:** Controls humidity. Can be replenished through outside ports.
- **Media exchange and perfusion:** multiple sealed inflow ports, a set of adjustable tubing holders to position inflow and outflow tubing inside sample chambers
- **Heated bottom (TC-MIS-65x75-HB) : 1mm glass**



Low-Profile configurations (/L) are only 25mm high and can be used with microscope condensers that require low vertical clearance to obtain bright-field images with Phase-contrast and DIC optics. Incorporates four ports for CO₂ input and to replenish water to control humidity inside. Although this configuration provides two ports that can be used for tubing, it is not recommended for perfusion applications due to limited space inside.

Closed Controlled Environment Chambers

Catalog No.	Description
TC-MIS-20x46	Miniature Incubator for Slides and Petri Dishes, 20x46mm aperture
TC-MIS-20x46-L	Miniature Incubator for Slides and Petri Dishes, 20x46mm aperture, low profile
TC-MIS-45	Miniature Incubator for 50mm Petri Dishes, 45mm aperture
TC-MIS-45-L	Miniature Incubator for 50mm Petri Dishes, 45mm aperture, low profile
TC-MIS-30	Miniature Incubator for 50mm Petri Dishes, 30mm aperture
TC-MIS-30-L	Miniature Incubator for 50mm Petri Dishes, 30mm aperture, low profile
TC-MIS-35	Miniature Incubator for 35mm Petri Dishes and coverslip holders CSC and UTIC, 35mm aperture
TC-MIS-35-L	Miniature Incubator for 35mm Petri Dishes and coverslip holders CSC and UTIC, 35mm aperture, low profile
TC-MIS-15	Miniature Incubator for 35mm Petri Dishes, 15mm aperture
TC-MIS-15-L	Miniature Incubator for 35mm Petri Dishes, 15mm aperture, low profile
TC-MIS-11	Miniature Incubator for 35mm Petri Dishes, 11mm window
TC-MIS-11-L	Miniature Incubator for 35mm Petri Dishes, 11mm window, low profile
TC-MIS-65x75-HB	Incubator with 75x65mm bottom window and 1mm heated closed bottom for use with custom chambers
TC-MIS-65x75-HB-L	Incubator with 75x65mm bottom window and 1mm heated closed bottom for use with custom chambers, low profile
TC-MIS-LID	Lid for Miniature Incubator TC-MIS
MH-MIS	Set of miniature adjustable tubing and sensor holders, x3, includes 4-40 threaded posts
IMA-74	Microscope Adapter for Miniature Incubators

Liquid delivery and tubing fitting inside Miniature Incubators

Precision Miniature Dosing Pump, CFPS-1U, 8 µl/min to 7.3 ml/min

This unit provides precise linear flow rate control in selectable ranges from 340 nl/min to 22 ml/min. The range is defined by tubing I.D. and the drive configuration. Precision design and miniature size minimize pulsations to provide smooth perfusion. Designed for stable solution delivery, perfusion, infusion or substance application during microscope imaging, recording, calcium and other ions measurement, and biochemical assays. The miniature size allows to mount the pump next to the sample to minimize the connecting tubing length. High flow rate units can be used for suction to prevent solution overflow during perfusion. Can be used with coverslip chambers, lab-on-chips and miniature incubators, and small organs and animals perfusion setups.



The pump can be controlled manually, using wireless remote, analog input, digital input, and by software through RS232 port. The unit can be programmed using built-in timers to provide precise dosing at certain period. Can be used to apply multiple solutions, if linked to automated perfusion systems, which can be programmed to deliver sequences of different solutions. All metal body design eliminates electrical noise. Multiple units can be controlled by the same remote control, up to sixteen units.

Includes a 100-240VAC power supply. Includes X-block to mount on a standard 0.5" post. Comes with a set of tubing for different flow ranges: 0.015" I.D. - 8-170 µl/min; 0.020" I.D. - 20-340 µl/min; 0.031" I.D. - 50-920 µl/min; 0.062" I.D. - 170-3400 µl/min; 0.093" I.D. - 370-7300 µl/min. **Item#: CFPS-1U**

- **Flow control:** manual dial, RS232 port, analog signal (0 - +10V), reverse direction
- **Remote control:** wireless ON/OFF and to start programmed sequences
- **Timers:** 1sec resolution; both delivery time and period can be programmed;
- **Programmable Volume:** Can be programmed to deliver volumes, up to 999.9ml
- **Continuous Delivery:** Can be programmed to deliver liquid continuously in a loop with set volume/time and period
- **Dimensions:** 4W x 3.5H x 3.5D in.
- **Power:** external 110/230VAC power supply
- **Mounting:** 0.5in. rod x-block
- **Fitting:** barbed luer-locks, or optional CFPS-FIT kit
- **Peristaltic Tubing:** 0.015in. I.D.; 0.020in. I.D.; 0.031in I.D.; 0.062in. I.D.; 0.093in. I.D.

Precision Miniature Dosing Pump, 340 nanol - 275 µl/min

Comes with a set of tubing for different flow ranges. Includes a power supply. Power rating: 0.30W.

Item#: CFPS-1U10K

Precision Miniature Dosing Pump, 30µl/min to 22 ml/min

Comes with a set of tubing for different flow ranges. Includes a DC power supply. Power rating: 1.4W.

This high flow rate unit can be used for solution suction/aspiration from open perfusion chambers. **Item#: CFPS-1U66**

Precision Miniature Dosing Pump, 4µl/min to 3.3 ml/min

Comes with a set of tubing for different flow ranges. Includes a power supply. Power rating: 0.30W.

Item#: CFPS-1U9



4-Channel Programmable Dosing System, CFPS-2

- **Flow control:** manual dial, analog signal (-5 - +5V), software control through RS232/USB port, reverse direction
- **Remote control:** wireless channel switch ON/OFF and to start programmed sequences
- **Timers:** 1sec accuracy, up to more than 24hours for each channel
- **Programmable Volume:** Can be programmed to deliver volumes, up to 999.9ml
- **Programmable Sequences:** Can be programmed to activate channels in sequences with programmable delays
- **Continuous Delivery:** Can be programmed to deliver liquid continuously with set volume/ time and period
- **Dimensions:** 4x2.5x1.85 in.
- **Power:** 110/230VAC
- **Mounting:** 0.5in. 1 ft. rod and x-block
- **Fitting:** barbed luer-locks
- **Peristaltic Tubing:** 0.015in. I.D.; double 0.015in. I.D.; 0.020in. I.D.; 0.031in. I.D.; 0.062in. I.D.; 0.093in. I.D.

This is a 2-channel perfusion system for precise control of solution flow rate from 8 $\mu\text{l}/\text{min}$ to 7.3 ml/min (or choose upgrades below for different flow rates up to 22ml/min). Includes a 4-channel programmable controller, which allows upgrade to a 4-channel system. Precision design and miniature size minimize pulsations to provide smooth perfusion. Designed for stable solution flow or substance application during imaging, recording, calcium and other ions measurement, biochemical assays or small organs and animals perfusion.

Digital interface and analog inputs allow you to calibrate each channel independently and to apply one or multiple substances by switching channels manually or through data acquisition and imaging software. The controller can be programmed using timers for each channel, or to dispense preset volumes. It also allows to program continuous sequence of solution applications, which can be used to replenish liquid media during long-term experiments. You can accurately mix different solutions or generate dose-response curves using only two solutions: buffer and concentrated test compound.

Each channel can be controlled through wireless remote, manually, by analog signal, TTL or through RS232 connection for fully automated setups controlled through third party software packages (optional USB adapters are also available).

The system can be upgraded to operate up to 4 channels in parallel. Can be connected to solution switching miniature systems for changing and mixing solutions in sequence. The optional luer-lock manifolds will combine multiple solutions into a single output. The size of the 2-channel system is 4x2.5x1.85 in (separate from the controller). Multiple systems can be attached to each other to form a multi-channel system. Includes 1 ft. mounting rod and X-block to attach a standard 0.5in. posts. Comes with a set of tubing for different flow ranges: 0.015" I.D. - 8-170 $\mu\text{l}/\text{min}$; 0.020" I.D. - 20-340 $\mu\text{l}/\text{min}$; 0.031" I.D. - 50-920 $\mu\text{l}/\text{min}$; 0.062" I.D. - 170-3400 $\mu\text{l}/\text{min}$; 0.093" I.D. - 370-7300 $\mu\text{l}/\text{min}$; dual 0.015" I.D. x2 8-170 $\mu\text{l}/\text{min}$ (for different ranges select upgrades below). Click on image to enlarge. **Item#: CFPS-2**

Flow Rates, ml/min

Tube ID	CFPS-2/1U	Upgrade		
		10K	900	66
.015"	0.008-0.17	0.34-6.7 µl/min	0.004-0.08	0.03-0.6
.020"	0.017-0.34	0.59-12 µl/min	0.007-0.14	0.05-1.0
.031"	0.046-0.92	1.6-34 µl/min	0.020-0.40	0.15-3.0
.062"	0.17-3.4	6.7-145 µl/min	0.08-1.7	0.5-10
.093"	0.37-7.3	13.5-275 µl/min	0.16-3.3	1.1-22

Flow Control

Catalog No.	Description
CFPS-1U	Flow Control Unit, 8µl/min to 7.3ml/min
CFPS-1U10K	Flow Control Unit, 0.34-275 µl/min
CFPS-1U66	Flow Control Unit, 30µl/min to 22 ml/min
CFPS-1U9	Flow Control Unit, 4µl/min to 3.3 ml/min
CFPS-2	Programmable 2-Channel Controlled Flow Perfusion System
CFPS-UC2	Programmable 4-Channel Flow Controller
CFPS-2U	Additional 2-Channel Upgrade
CFPS-10K	Upgrade for flow rates 0.34-275 µl/min
CFPS-900	Upgrade for flow rates 4-3300 µl/min
CFPS-66	Upgrade for flow rates 30-22000 µl/min
USB-RS232	USB Adapter
CFPS-FIT	Fitting Kit
CFPS-MB	Mounting Brackets Kit
CFPS-ST-15	Tubing set, 0.015", x5
CFPS-ST-20	Tubing set, 0.020", x5
CFPS-ST-31	Tubing set, 0.031", x5
CFPS-ST-162	Tubing set, 0.062", x5
CFPS-ST-93	Tubing set, 0.093", x5
CFPS-ST-15	Dual Tubing set, 0.015", x5
CFPS-S	Replacement protective tape



Perfusion fitting kit, PS-KIT For use with CFPS and/or PC-16 liquid delivery systems. This kit has everything you need to connect different systems together and to provide liquid delivery inside sample chambers. Compatible with 1/16in. I.D. soft tubing. Included x8 luer-locks and x8 ferrule-type fitting allow to connect to different size tubing. **Item#: PS-KIT**

Includes: A set of tubing with luer-lock fitting and stainless steel needle attached, x8. Can be used with adjustable holders MH-MIS to provide inflow and outflow to chambers and dishes placed inside incubator. The holders are attached to optional inserts TC-I-60, TC-I-SL, TC-I-4/3 or TC-I-100. Tubing fits through openings on sides of the incubator. The stainless needle attached to one end of the tubing can be bent to fit inside chambers and dishes. For use with perfusion or continuous media exchange systems.

Perfusion tubing with PTFE splicing and luer-lock ports, x2. Tygon tubing with thin splicing in the middle to fit through ports of TC-MIS incubators, to provide inflow and outflow through flow cells. Can be used with any luers.

Barbed elbow connectors, set x8. Fit 1/16in I.D. soft tubing and can be inserted into microfluidics devices.

Perfusion tubing and luer-lock ports fitting, set x8. Tygon tubing (50 feet), a set of threaded luer-lock fitting (x8) for use with TC-MWP, TC-MIW, and TC-MWPHB incubators, and a set of luer fitting (x8) to connect PETRI-FLOW top for example, enough to provide inflow and outflow for four dishes. Can be used with any female luer inputs in any chamber. The female luers are threaded in the incubator wall to provide an easy connect perfusion port.

Thin perfusion tubing to fit through incubator ports, x8. For use inside TC-MIS incubators. Includes tubing to fit into reduces inflow and outflow ports, which are connected to stainless steel needles to extend to the bottom of a petri dish. Tubing has a luer-lock fitting attached, and can be put through side ports of the incubator.

Perfusion cover for 35mm petri dishes This cover, if placed on a standard Petri dish, forms a flow cell. Incorporates barbed ports for inflow and outflow 1/16in I.D. tubing - extending down to the bottom of the dish. The high optical quality glass window on top is 12mm diameter. Can be used in combination with PDI insert to provide laminar flow. Can be used to replenish media around your samples during imaging. Can be sterilized with ethanol solution or autoclaved (100°C max). **item#: FLOW-PETRI**



Petri Dish Insert PDI and Self-Adhesive Gaskets The insert converts a regular petri dish into a perfusion chamber. The biocompatible gasket form airtight and leak-proof contact with the bottom surface of the dish, even if the dish is filled with media or has an uneven surface. Simply press the insert to the bottom of the dish for a few seconds to form a perfusion system right in your dish. The low 3 mm profile allows you to use recording electrodes, upright microscopes with water immersion objectives as well. It has small working volume: conical opening with 11 mm I.D. on the bottom and 19 mm on the top. The chamber has two separate openings for solution inflow and outflow to prevent bubbles from entering the working compartment. The laminar profile facilitates perfusion and provides faster solution exchange. Can be used with 50mm glass bottom dishes for easy access with water immersion objectives. **Item#: PDI**

- **Outside diameter:** 35mm
- **Height:** 3mm
- **Working volume:** 11mm diameter, approx. 100 microl

FLOW-PETRI and Petri Dish Inserts

Catalog No.	Description
PDI	Low Profile Chamber-Insert for Petri Dishes
FLOW-PETRI	Perfusion cover for 35mm petri dishes
PS-KIT	Perfusion fitting kit



Petri Dish adapters for incubators and heating stages

Catalog No.	Description
TC-PA-C	Petri Dish Adapters, for Corning petri dishes
TC-PA-W	Petri Dish Adapters, for Willco dishes
TC-PA-F	Petri Dish Adapters, for FluoroDishes
TC-PA-G	Petri Dish Adapter, for Greiner Bio-One dishes, glass bottom
TC-PA50	50mm reducing adapter-ring for 35mm dishes.



Miniature Incubators Lid for micro-injection and cell manipulation

Can be used with petri dishes, chambered coverglasses, coverslip holders and glass bottom dishes, both 35 and 50mm. Allows you to insert micro-injection tools through openings in the glass window, which remains heated by a temperature controller during cell manipulation. Requires a temperature controller. Fits any microscope. Can be used for long-term imaging. Can be used with multi-channel solution switch and perfusion systems. The openings can be closed after manipulation. **Item# TC-MIS-INJECT**

Incubator Lid for micro-injection and cell manipulations

Catalog No.	Description
TC-MIS-INJECT	Incubator lid for micro-injection and cell manipulation

Cooling Incubators

Cooling & Heating microscope incubator for petri dishes and coverslip chambers, BTC-S /-35



- **Dimensions:** 120x120x23mm
- **Optical aperture:** 22mm diameter/ 35mm for BTC-S-35 stage
- **Objective working distance, minimum:** 0mm (for inverted microscopes)
- **Temperature stability:** 0.1°C, built-in sensor
- **Sink:** optional water cooling for very low temperatures, requires BTC-W unit
- **Microscope adapter:** Fits to 74mm cutout of standard microscope adapters IMA-74

Can be used with: Standard 35mm disposable Petri dishes (Petri dish adapters TC-PA might be required), or glass bottom dishes (TC-PA-W,-C,-G,-F adapter is required); and replaceable coverslip chambers CSC. Built-in temperature sensor for stable operation. Can be used with high optical quality glass cover with ports for gas input, to control CO₂ or hypoxia. Built-in lines to cool sink during deep cooling. Consider a different cooling stage for rectangular slides below. Requires a temperature controller. Requires a microscope adapter (specify microscope model). **Item#: BTC-S**



Low-Profile Cooling & Heating plate, BTC-L

- **Dimensions:** 120x160mm, 80x40mm cooling/heating area
- **Optical aperture:** 10mm diameter
- **Objective working distance, minimum:** 0mm (for upright microscopes)/ 3mm (for inverted microscopes)
- **Temperature stability:** 0.1°C, built-in sensor
- **Heat Sink:** optional water cooling for low temperatures, requires BTC-W unit
- **Microscope adapter:** Fits to 74mm cutout of standard microscope adapters IMA-74

Can be used with: standard 35mm disposable Petri dishes, glass bottom dishes, and disposable slides and coverglasses. Can cool the sample down to -2°C (or heat up to 150°C). The cooling area is 40x80mm with 10mm aperture in the middle. The low profile of the stage allows easy access to your samples. Provided clamps will fix the sample in place. Can be placed on upright microscopes. Can be mounted on a microscope stage (specify dimensions of microscope stage cutout, 108mm diameter for Nikon for example). Requires sink cooling and a temperature controller. **Item#: BTC-L**

Cooling & Heating microscope incubator for slides, BTC-SL



- **Dimensions:** 120x120x23mm
- **Optical aperture:** 20x46mm
- **Objective working distance, minimum:** 0mm (for inverted microscopes)
- **Temperature stability:** 0.1°C, built-in sensor
- **Sink:** optional water cooling for very low temperatures, requires BTC-W unit
- **Microscope adapter:** Fits to 74mm cutout of standard microscope adapters IMA-74

Can be used with: Standard 1 in. (25mm) wide disposable slides and chambered coverglasses. Built-in temperature sensor for stable operation. Can be used with high optical quality glass cover with ports for gas input, to control CO₂ or hypoxia. Built-in lines to cool sink during deep cooling. Consider a different cooling stage for petri dishes and coverslips above. Requires a temperature controller. Requires a microscope adapter (specify microscope model). **Item#: BTC-SL**



Slides and Chambered Coverglasses Cooling & Heating for motorized stages, BTC-SLM

- **Dimensions:** 110x160x18mm, 26x79mm cooling/heating area
- **Optical aperture:** 20x46mm
- **Objective working distance, minimum:** 0mm (for inverted microscopes)
- **Temperature stability:** 0.1°C, built-in sensor
- **Sink:** optional water cooling for very low temperatures, requires BTC-W unit
- **Microscope adapter:** Fits to 74mm cutout of standard microscope adapters IMA-74

Can be used with: custom devices, disposable slides and coverglasses. Can cool the sample down to -5°C (or heat up to 150°C). Fits 160x110mm cutout of motorized stages, and type K Zeiss stages. The cooling area is an inside cutout 26x79mm (to fit standard slides), with 20x40mm aperture in the middle. The inside cutout is 17mm deep, with 1mm lip to hold the sample. Requires sink cooling and a temperature controller. **Item#: BTC-SLM**



Low Profile Cooling & Heating stage for Slides and Chambered Coverglasses, BTC-SL-128x86

- **Dimensions:** 128x86mm, 29x79mm cooling/heating area
- **Optical aperture:** 20x46mm
- **Objective working distance, minimum:** 0mm (for inverted and upright microscopes)
- **Temperature stability:** 0.1°C, built-in sensor
- **Sink:** optional water cooling for very low temperatures, requires BTC-W unit
- **Microscope adapter:** Fits to 128x86mm holders for standard multi-well plates

This low profile heating/cooling stage designed to fit inside 128x86mm holders for standard multi-well plates. Can be used with: custom devices, disposable slides and coverglasses. Positioned on both sides threaded #4-40 holes can be used to mount optional IMA-MH tubing and probes holders. Can cool the sample down to 0°C (in combination with BTC-W heat exchange unit) or heat up to 150°C. The cooling area is an inside cutout 29x79x1mm (to fit standard slides), with 20x40mm aperture in the middle. Requires a temperature controller. **Item#: BTC-SL-128x86**



Cover-incubator for Cooling & Heating microscope stage for petri dishes and coverslip chambers, BTC-SI

- **Dimensions:** 63mm diameter
- **Optical window:** 44mm double glass window
- **Thickness:** 3mm
- **Ports:** x2 barbed gas ports

If placed on top of BTC-100 stage, will form a closed system to control gas composition inside. Incorporates two high optical quality glass covers and ports for gas input, to control CO₂ or hypoxia. **Item#: BTC-SI**

Cover-incubator for Cooling & Heating microscope stages for slides, BTC-SLI



- **Dimensions:** 38x88mm
- **Optical window:** 22x57mm double glass window
- **Thickness:** 3mm
- **Ports:** x2 barbed gas ports

Can be used with BTC-SL stages for standard 1 in. (25mm) wide disposable slides and chambered coverglasses. Incorporates two high optical quality glass covers and ports for gas input, to control CO₂ or hypoxia. **Item#: BTC-SLI**

Cooling & Heating Microscope Objective, BTC-O



- **Dimensions:** custom cooling/heating area (22.5x10mm for example)
- **Optical aperture:** custom
- **Objective working distance, minimum:**
- **Thickness:** 0mm (for upright microscopes)/ 0mm (for inverted microscopes)
- **Stability:** 0.1°C, built-in sensor
- **Heat Sink:** optional water cooling for low

Can be used with any microscope objective (or any cylindrical object). Can cool the objective down to -6°C (or heat up to 150°C). The cooling area should be specified when ordering, for example 22.5mm diameter and 10mm wide for x40 Zeiss objective (technical drawings are required). Built-in clamp will fix the objective in place. Can be placed on upright and inverted microscopes. Requires sink cooling and a temperature controller **Item#: BTC-O**

Cooling Incubators

Catalog No.	Description
BTC-S	Heating & Cooling microscope stage for 35mm petri dishes, 22mm diameter clearance on the bottom
BTC-S-35	Heating & Cooling microscope stage for coverslip chambers CSC, 35mm diameter clearance on the bottom
BTC-SL	Heating & Cooling microscope incubator for slides
BTC-L	Heating & Cooling plate for slides and dishes, low profile
BTC-SLM	Heating & Cooling stage for slides, 160x110mm
BTC-SL-128x86	Low Profile Heating & Cooling stage for slides, 128x86mm
BTC-O-22.5x10mm	Heating & Cooling attachment for Microscope objective, 22.5x10x40mm
BTC-O-34x10mm	Heating & Cooling attachment for Microscope objective, 34x10x40mm
TC-PA-C	Reducing adapter-ring, for Corning type dishes
TC-PA-W	Reducing adapter-ring, for Willco dishes
TC-PA-F	Petri Dish Adapter, for Fluo dishes from WPI
TC-PA-G	Petri Dish Adapter, for Greiner Bio-One dishes, glass bottom
IMA-74	Microscope adapter
BTC-SI	Cover-incubator for Cooling & Heating microscope stage for petri dishes and coverslip chambers
BTC-SLI	Cover-incubator for Cooling & Heating microscope stages for slides



Microscope Adapters for Miniature Incubators TC-MIS, and cooling stages BTC-S & BTC-SL

This is a microscope stage adapter to provide exact fit and center miniature incubators and cooling stages on mechanical microscopes. Fits both TC-MIS incubators and cooling stages. Adapters for all brands of microscopes and isolation tables/platforms are available. Motorized stages usually require different models TC-MI or BTC-SLM for example. Choose the size appropriate for your microscope. **Item#: IMA-74**

- **Inside opening:** 74mm cooling stages
- **Use with:** TC-MIS; BTC-S and BTC-SL

Microscope Adapters with 74mm cutout

Catalog No.	Description
IMA-74-110	Microscope Adapter for Olympus microscopes, Applied Precision stages, Burleigh Gibraltar stages, Narishige stages 110mm
IMA-74-108	Microscope Adapter for Nikon microscopes, SISKIYOU stages, Burleigh Gibraltar stages 108mm
IMA-74-LM	Microscope Adapter for Leica microscopes and Zeiss type M stages
IMA-74-150x150	Microscope Adapter for Leica 150x150mm stages
IMA-74-90	Microscope Adapter for stereo microscopes, 90mm
IMA-74-128x86	Microscope Adapter, 128x86mm

Incubator-Covers for coverslips, petri dishes and slides

Incubator-cover for 35mm coverslip holders CSC and petri dishes, TC-I



- **Outside diameter:** 45 mm
- **Height:** 25 mm
- **Top Optical window:** 28mm
- **CO2 control:** x2 barbed ports

Can be used for imaging of samples on coverslips and in Petri dishes. Fits on top of heating elements for 35mm chambers and dishes, after removal inline pre-heater tubing (also fits cooling stages). Double optical quality glass top. Barb fitting to connect to a CO2/O2 controller. Simply put the coverslip chamber or a petri dish inside the heating element and place the incubator-cover on top. Can be used on any microscope with an appropriate microscope adapters. **Item#: TC-I**



Incubator-cover for slides and chambered cover glasses, IMA-ISL

- **Outside dimensions:** 28 x 78 mm
- **Height:** 25mm
- **Top Optical window:** 23 x 57 mm
- **CO2 control:** x2 barbed ports

Can be used for imaging of samples on rectangular coverslips, standard slides, and chambered cover glasses. Fits on top of universal microscope adapter for standard microscopes IMA, after removal the fitting ring for 35mm chambers (also fits heating & cooling stages for slides). Double optical quality glass top. Barb fitting to connect to CO2 controller. Simply put the sample inside the microscope adapter and place the incubator-cover on top. Can be used on any microscope with an appropriate microscope adapters IMA. **Item#:** IMA-ISL



Incubator-covers

Catalog No.	Description
TC-I	Incubator-cover for coverslip holders and petri dishes
IMA-ISL	Incubator-cover for slides and cover glasses
TC-E35	Replacement Heating Element, 35mm bottom window
TC-E35x15	Heating Element for 35mm dishes, 15mm window
TC-E35x11	Heating Element for 35mm dishes, 11mm window
CSC	Round Coverslip Holder Specify coverslip diameter when ordering
TC-PA-C	Reducing adapter-ring, for Corning type dishes
TC-PA-W	Reducing adapter-ring, for Willco dishes
TC-PA-F	Petri Dish Adapter, for Fluo dishes from WPI
TC-PA-G	Petri Dish Adapter, for Greiner Bio-One dishes, glass bottom
IMA	Microscope adapter

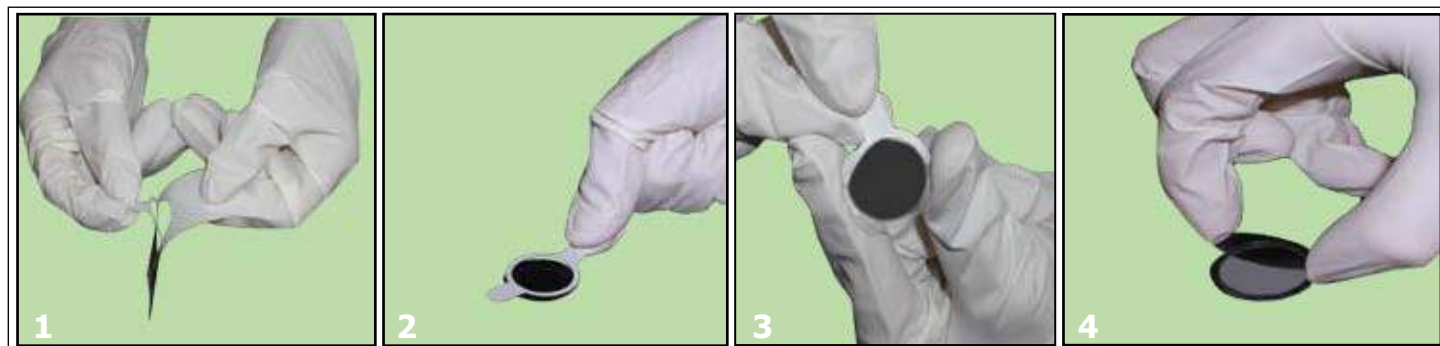
Sealed Chambers for High Resolution Imaging



Ultra-Thin Sealed Imaging Chamber for 25mm Coverslips UTIC

The chamber is formed by putting a thin spacer between two 25mm coverslips. The minimum thickness is 150 micron. You can change thickness by using a number of spacers. The inside opening is 21mm. Smaller openings are available upon request. The adhesive gaskets form sealed chambers if used with smooth surfaces, even with cell media on top. The adhesive is easy to remove after use. Procedure: put the coverslip into the holder; remove one protective layer from adhesive gasket; position the gasket above the coverslip; remove the second protective layer; put your sample inside the opening; cover with the second coverslip. These ultra-thin chambers can be used with heated chambers and regular glass slides. Can be used with oil-immersion optics and for multi-photon imaging.. **Item#: UTIC-21, UTIC-13**

- **Optical clearance:** 21, 20, 13 mm
- **Thickness:** 150 micron
- **Working volume:** 52, 47, 20 microl



High Resolution Imaging Chambers

Catalog No.	Description
UTIC-25	Holder for Ultra-Thin Imaging Chambers, fits 25mm CoverSlips, microscope adapters or heated stage are required..
UTIC-21	Adhesive ultra-thin Gaskets for 25mm round coverslips, 21mm optical clearance, pack of 100
UTIC-13-24x24	Adhesive Ultra-thin Gaskets 24x24mm with 13mm optical clearance, pack of 100
CS-No1-25	Glass Cover Slip, box of 100, 25mm diameter.
CS-No1.5-22x22	Glass Coverslips, 22x22mm, No 1.5, box of 100



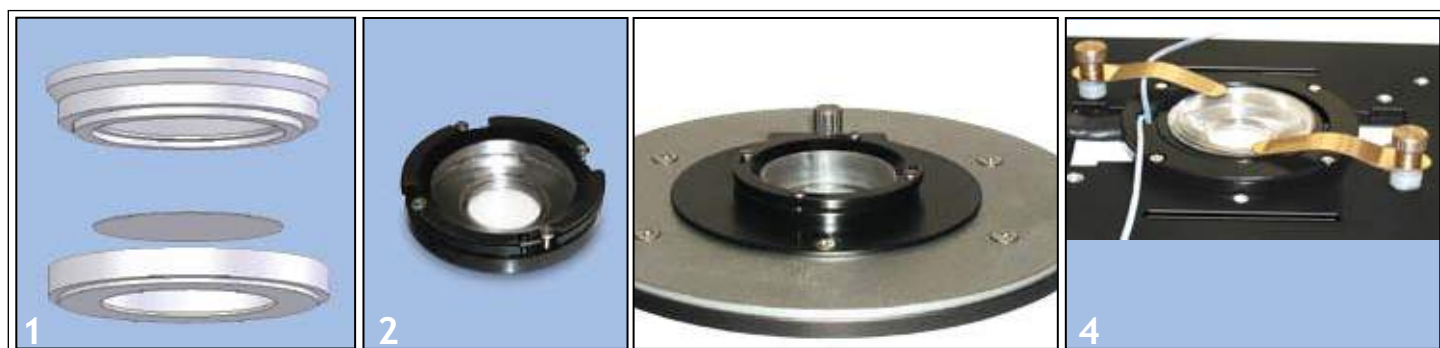
Micro-Incubators

Chamber-incubator for replaceable round coverslips, CSC

Can be used for imaging and recording. Consists of a bottom base, and a silicone O-ring to seal the coverslip. There is no contact between solution and the chamber base to prevent ions leakage. The included top glass coverslip can be used to seal your sample from top as well - to from a micro-incubator. The top can be secured using the included metal ring, or using flat springs of microscope adapters. The bottom part has a recessed profile to fit round coverslips. Overall diameter is the same as standard Petri dishes. The included O-rings allows using different thickness coverslips. Simply put the coverslip inside and seal it with silicone ring by a snap-in action. Can be secured with a top metal ring. The silicone ring can be also secured by flat springs of microscope adapters. For low-profile chambers, consider CSC-25L design, where no top clamps are required. Can be used as a perfusion chamber, if combined with miniature tubing holders. The metal base facilitates heat transfer. Fits to heating stages and non-heated stages.

Item#: CSC

- **Outside diameter:** 36 mm
 - **Height:** 8.5mm (with top metal ring)
 - **Working volume:**
- | | |
|--|---|
| 20mm coverslip - 16mm, approx. 200 microl | |
| 18mm coverslip - 14mm, approx. 150 microl | |
| 13mm coverslip - 9mm, approx. 50 microl | |
| 25mm coverslip - 21mm, approx. 350 microl | 12mm coverslip - 8mm, approx. 50 microl |
| 22x22mm coverslip - 19mm, approx. 280 microl | 10mm coverslip - 6mm, approx. 30 microl |



Coverslip Holders and Chambers

Catalog No.	Description
CSC-25	Chamber for replaceable 25mm round coverslips
CSC-20	Chamber for replaceable 20mm round coverslips
CSC-18	Chamber for replaceable 18mm round coverslips
CSC-13	Chamber for replaceable 13mm round coverslips
CSC-12	Chamber for replaceable 12mm round coverslips
CSC-22x22	Chamber for replaceable 22x22mm square coverslips
CS-No1-25	Glass Coverslips, 20mm, No 1, box of 100
CS-No1-20	Glass Coverslips, 25mm, No 1, box of 100
CS-No1-18	Glass Coverslips, 18mm, No 1, box of 100
CS-No1-13	Glass Coverslips, 13mm, No 1, box of 100
CS-No1-12	Glass Coverslips, 12mm, No 1, box of 100
CS-No1-10	Glass Coverslips, 10mm, No 1, box of 100
CS-30	Replacement top glass cover for CSC holders, 30mm diameter

High precision cover glasses, No.1.5, CSHP

Cover glasses for high performance microscopes, made of chemically resistant borosilicate glass of the first hydrolytic class with precision thickness No. 1.5 ($0.170 \text{ mm} \pm 0.005 \text{ mm}$), suitable for in-vitro diagnostic applications.. **Item#: CSHP**

- for objectives with high numerical aperture and resolution
- accurate thickness of 0.170 mm with tolerance reduced to $\pm 0.005 \text{ mm}$
- non-corroding borosilicate glass
- refractive index n_D : $1.524\text{-}1.527$ at 546.07 nm
- Abbe coefficient: $v_D=55$
- recommended for the following objectives:
 - dry objective: N.A. 0.7
 - water immersion: N.A. 1.0
 - glycerol immersion: N.A. 1.2
 - oil immersion: N.A. 1.3
- developed in cooperation with Zeiss and Schott

High precision cover glasses

Catalog No.	Description
CSHP-No1.5-25	High Precision Glass Cover Slip, box of 100, 25mm diameter
CSHP-No1.5-10	High Precision Glass Cover Slip, box of 100, 10mm diameter
CSHP-No1.5-12	High Precision Glass Cover Slip, box of 100, 12mm diameter
CSHP-No1.5-13	High Precision Glass Cover Slip, box of 100, 13mm diameter
CSHP-No1.5-18	High Precision Glass Cover Slip, box of 100, 18mm diameter
CSHP-No1.5-22x22	High Precision Glass Cover Slip, box of 200, 22x22mm
CSHP-No1.5-18x18	High Precision Glass Cover Slip, box of 200, 18x18mm



Heating Elements for Microincubators CSC, UTIC and TC-I



Heating element for 35mm Coverslip Chambers and Petri dishes TC-E35

Ready to use heated system for samples cultured/placed on coverslips. Used with bath chambers for replaceable coverslips CSC and UTIC. Replaceable coverslips allow to culture cells before performing experiments. The heater preheats perfusion solution before it enters the chamber. This keeps temperature stable even if used with perfusion systems. Inline heated Teflon tubing fits manifolds included with perfusion systems. Can be used for imaging and recording. Can be used with 35 mm petri dishes. Since some brands of petri dishes have different diameter, reducing adapters TC-PA might be required. Requires a microscope adapter (specify microscope model when ordering, ships installed inside the microscope adapter). Requires a temperature controller TC2-80-150-C. **Item# TC-E35**

- **Dimensions:** 50mm diameter
- **Temperature stability:** 0.01°C, built-in sensor
- **Optical aperture:** 35mm, 15mm, 11mm
- **Use with:** Coverslips and Petri dishes,
- including 35mm glass bottom dishes
- **Solution Pre-heater:** Replaceable/Removable Teflon tubing, easy to wash
- **Microscope adapter:** Fits to 50mm cutout of standard microscope adapters MA and IMA

Heating Elements

Catalog No.	Description
TC-E35	Replacement Heating Element, 35mm bottom window
CSC	Round Coverslip Holder Specify coverslip diameter when ordering
TC-I	Incubator-cover for coverslip holders and petri dishes
TC-PA-C	Reducing adapter-ring, for Corning type dishes
TC-PA-W	Reducing adapter-ring, for Willco dishes
TC-PA-F	Petri Dish Adapter, for Fluo dishes from WPI
TC-PA-G	Petri Dish Adapter, for Greiner Bio-One dishes, glass bottom
IMA	Microscope adapter

Heated Microincubators TC-CSC and TC-CSC-I



Heated chamber-incubator for replaceable coverslips, TC-CSC

Can be used for imaging and recording. Consists of a heated bottom base, and a silicone O-ring to seal the coverslip. The metal base facilitates heat transfer. There is no contact between solution and the chamber base to prevent ions leakage. The included top glass coverslip can be used to seal your sample from top as well - to from a micro-incubator. The top can be secured using the included metal ring, or using flat springs of microscope adapters. The bottom part has a recessed profile to fit round or square coverslips. The included O-rings allows you to use different thickness coverslips. Simply put the coverslip inside and seal it with silicone ring by a snap-in action, then secure with a top metal ring (the silicone ring can be also secured by flat springs of microscope adapters). For low-profile chambers, consider TC-CSC -L design, where no top clamps are required. Can be used as a perfusion chamber, if combined with miniature tubing holders. The heating element incorporates replaceable Teflon perfusion tubing inside, which makes the element to work as inline pre-heater. Requires a microscope adapter and a temperature controller TC2-80-150-C. **Item# TC-CSC**



- **Dimensions:** 50mm diameter
- **Temperature stability:** better than 0.01°C, built-in sensor
- **Solution Pre-heater:** Replaceable/Removable Teflon tubing, easy to wash
- **Microscope adapter:** Fits to 50mm cutout of standard microscope adapters MA and IMA
- **Working volume:**
 - 25mm coverslip - 21mm, approx. 350 microl
 - 22x22mm coverslip - 19mm, approx. 280 microl
 - 20mm coverslip - 16mm, approx. 200 microl
 - 18mm coverslip - 14mm, approx. 150 microl
 - 13mm coverslip - 9mm, approx. 50 microl
 - 12mm coverslip - 8mm, approx. 50 microl
 - 10mm coverslip - 6mm, approx. 30 microl

Heated micro-incubators

Catalog No.	Description
TC-CSC-25	Heated chamber for replaceable 25mm round coverslips
TC-CSC-20	Heated chamber for replaceable 20mm round coverslips
TC-CSC-18	Heated chamber for replaceable 18mm round coverslips
TC-CSC-13	Heated chamber for replaceable 13mm round coverslips
TC-CSC-12	Heated chamber for replaceable 12mm round coverslips
TC-CSC-22x22	Heated chamber for replaceable 22x22mm square coverslips
CS-30	Replacement top glass cover for CSC holders, 30mm diameter



Heated Micro incubator with CO2 and hypoxia control for coverslips, TC-CSC-I

The incubator can be used with round replaceable coverslips for long-term time-lapse high resolution imaging. Comes with thin high optical quality glass cover to prevent evaporation (can be removed). Easy to use: simply drop the sample coverslip into the holder, seal with silicon chamber, and secure with the top ring. There is no contact between solution and the chamber base to prevent ions leakage. The bottom part has a recessed profile to fit round coverslips. The air-tight seal will prevent media evaporation for hours. Incorporates a temperature sensor and a heating element for

temperature control TC2-80-150-C. Requires a CO2 controller. Requires a microscope adapter. Specify microscope model when ordering. Can be upgraded with an objective heater for immersion optics. **Item# TC-CSC-I**



- **Dimensions:** 50mm diameter
 - **Height:** 30mm
 - **Top Optical window:** 28mm
 - **Temperature stability:** 0.01°C, built-in sensor
 - **CO2 control:** x2 barbed ports
 - **Microscope adapter:** Fits to 50mm cutout of standard microscope adapters MA and IMA
- **Working volume:**
 - 25mm coverslip - 21mm, approx. 350 microl
 - 22x22mm coverslip - 19mm, approx. 280 microl
 - 20mm coverslip - 16mm, approx. 200 microl
 - 18mm coverslip - 14mm, approx. 150 microl
 - 13mm coverslip - 9mm, approx. 50 microl
 - 12mm coverslip - 8mm, approx. 50 microl
 - 10mm coverslip - 6mm, approx. 30 microl

Heated micro-incubators

Catalog No.	Description
TC-CSC-I-25	Heated chamber for replaceable 25mm round coverslips
TC-CSC-I-20	Heated chamber for replaceable 20mm round coverslips
TC-CSC-I-18	Heated chamber for replaceable 18mm round coverslips
TC-CSC-I-13	Heated chamber for replaceable 13mm round coverslips
TC-CSC-I-12	Heated chamber for replaceable 12mm round coverslips
TC-CSC-I-22x22	Heated chamber for replaceable 22x22mm square coverslips
CS-30	Replacement top glass cover for CSC holders, 30mm diameter



Temperature Controller TC-1-100i

Low electrical noise, heating 2-channel temperature controller for incubators. Flexible self-adjusting controls for stable operation. The second channel is connected to the incubator lid to prevent condensation. An optional external temperature probe might be used to monitor bath temperature. External probes are plastic-encapsulated: no metal ions leakage into solutions. Includes the incubator connecting cables. Built-in power supply (120-240VAC).

- Range up to 150°C with accuracy 0.1°C
- **Stability:** 0.01°C, self-adjusting
- **Temperature Set** manually or externally
- Built-in overheating protection
- **Temperature probes:** miniature 0.87mm (fits small volume chambers)
- **RS232 port** for programmed temperature changes
- **Analog Input** to set temperature changes
- **Analog Output** to monitor temperature
- **Standby mode** activated manually or by external TTL signal
- **No vibrations** during imaging and recording - no internal fan
- **Dimensions:** 6.5 x 5 x 9in.
- **Settings:** flexible, allow to stabilize temperature in different sample volumes and heating stage sizes

2-Channel Temperature Controller for incubators, with rs232 interface

Catalog No.	Description
TC-1-100-I	Incubator version of 2-Channel Temperature Controller, high stability, no electrical noise, includes power supply and cables
TC-TP	External temperature probe, 0.87mm



Objective Heater

Objective Heater with temperature controller

A flexible silicone heater

for any objective. Used with oil or water immersion optics. Includes easy disconnect cable and incorporates a temperature sensor. Easy to attach and remove. Simply wrap the heater around objective and secure it with included Velcro tape. The heater is usually attached to a cylindrical surface of the objective, closer to the sample. Dimensions: 0.5 x 5 in., less than 1mm thick. **Item#:** MTC-HLS-025

- **Dimensions:** 0.5in. wide x 5in long
0.25in. wide x 10in long
- **Temperature stability:** better than 0.01°C,
- built-in sensor, dual overheating protection
- **Easy to install:** Fits any objective

Objective heaters

Catalog No.	Description
MTC-HLS-025	Objective Heater with temperature controller, 0.5x5in
TC-HLS-025	Objective Heater, 0.25x10in

CO2 & O2 Controllers

CO2 and hypoxia controller - CO2-O2-MI

For use with miniature incubators. Connects to a cylinders with compressed CO2 gas and balance gas - Nitrogen usually. The output connects directly to a gas port of the incubator or a humidifier. The controller makes 0-20% CO2 and 0-20% O2 mixture to supply inside the incubator. CO2 control at 5% level keeps pH of media constant. Simple to use: the controller ships calibrated for 5% CO2 level requirement. Can be adjusted to fill incubators of different volumes. The instrument not only controls gas content inside the incubator, but also brings the gas consumption to the minimum. **Item#: CO2-O2-MI**



- **Inputs:** max 150PSI
- **Output:** 750 sccm max
- **Connectors:** Easy-connect, 5/32in. (4mm) O.D. input tubing; 1/8in. output tubing; or 1/4in. O.D. tubing, or #10-32 threaded connectors
- **Indicators:** digital display of CO2, O2 and flow levels
- **Controls:** CO2 level 0-20%
O2 level 0-20%
FLOW up to 750 sccm
INPUT PRESSURE regulators 0-25PSI,
CLOSE switches for CO2 and N2,
- **Dimensions:** 12 x 6 x 9in..
- **Power:** 100-230VAC 25W

CO2 controller CO2-MI

For use with miniature incubators. Connects to a cylinder with compressed CO2 gas. The output connects directly to a gas port of the incubator or to a humidifier. The controller continuously senses CO2 concentration inside the incubator through CO2-UP attachment. CO2 control at 5% level keeps pH of media constant. Simple to use. A digital indicator will display the actual CO2 concentration inside incubator. Can be adjusted to fill incubators of different volumes. The instrument not only controls gas content inside the incubator, but also brings the gas consumption to the minimum. Note: if using pre-mixed 5% CO2/95% O2 gas source - a different PC-MI controller is required. **Item#: CO2-MI**



- **Inputs:** max 150PSI
- **Output:** max 750sccm
- **Connectors:** Easy-connect, 5/32in. (4mm) O.D. input tubing; 1/8in. output tubing; 10-32 threaded; includes fitting for 1/4in. O.D. tubing;
- **Power:** 100-230VAC 35W
- **Controls:** SET CO2 1-20%
INPUT PRESSURE regulator 0-25PSI,
CLOSE/OPEN input,
FLOW 100-750sccm
DC and AC levels 0-100%



Mixing Chamber, CO2-MIX

Designed to provide CO2 control inside small custom chambers and micro-incubators, where the small size does not allow mounting CO2-UP sensor attachment. The mixing chamber dimensions are 100x100x32mm, which are small enough to fit on a microscope stage. The chamber has x4 ports to connect multiple micro-incubators, and one input from CO2 controller. CO2-UP can be attached to the side of the mixing chamber. After mixing to the required concentration (5% CO2 for example), the gas mixture can be pumped into the micro-incubator using an optional pump or the miniature flow controller CFPS-1U, that can deliver from micro-liters to 22ml/min gas flow. **Item#: CO2-MIX**





CO2 Controller and Accessories

Catalog No.	Description
CO2-O2-MI	CO2/O2 Hypoxia Controller for Miniature Incubators
CO2-MI	CO2 Controller for Miniature Incubators
CO2-UP	CO2 Upgrade for Miniature Incubators - incubator modification, connects to CO2 Controller
CO2-500ML	Heated Humidifier
CO2-MIX	Mixing chamber for CO2 controller

Gas regulator PC-MI

The controller is used to deliver gas mixture inside miniature incubators. Connects to a cylinder with compressed pre-mixed (5% CO2/95% O2 or any other, including nitrogen and low O2) gas. The output connects directly to a gas port of the incubator or a humidifier. The controller regulates output gas flow to provide continuous slow stream of gas mixture, to replace residual gases inside the incubator. Can be used as a source of regulated pressure to saturate solutions with gases and to control flow of solutions. Simple to use. Can be adjusted to fill incubators of different volumes. Balanced CO2 content inside the incubator not only controls pH of cell media, but also brings the gas consumption to the minimum. If using a source of pure CO2, a different CO2-MI controller is required. **Item#: PC-MI**

- **Inputs:** max 150PSI
- **Output:** 750 sccm max
- **Connectors:** Easy-connect input, 5/32in. (4mm) O.D. tubing; 10-32 threaded; includes fitting for 1/4in. O.D. tubing;
- **Indicators:** digital display
- **Power:** 100-230VAC 35W
- **Controls:** INPUT PRESSURE regulator 0-25PSI, SET OUTPUT % pressure, CLOSE/OPEN input, FLOW rate up to 750 sccm max



CO2 Controller and Accessories

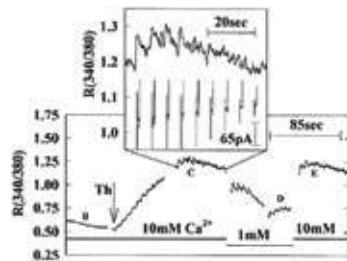
Catalog No.	Description
PC-MI	Gas Controller for Miniature Incubators
CO2-500ML	Heated Humidifier.

Petri Dish Inserts



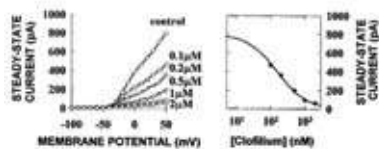
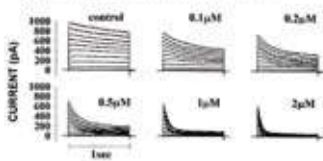
Temperature Control & Perfusion in Petri Dishes

- Minimize working volume
- Use with any petri dishes
- Use with any perfusion system
- Compatible with Temperature Controlled stations



ANOTHER EXAMPLE: EFFECTS OF CALCIUM CHANNELS AND MEMBRANE CURRENTS IN
HUMAN SKIN EPIDERMAL CELLS. THESE PETRI DISHES WITH GLASS BOTTOMS SUPPORTED
LONG-TERM CULTURES AND A PERFUSION SYSTEM. (MARTIN ET AL., J. NEUROSCI., 1998)

BELOW: CURRENTS FROM HUMAN SKIN EPIDERMAL CELLS IN OUTSIDE-OUT MODE. A MEMBRANE
PATCH FROM CELLS CULTURED IN PETRI DISHES (OUTSIDE-OUT PETRI DISH) AND
A PERFUSION SYSTEM. (MARTIN ET AL., J. NEUROSCI., 1998)



Petri Dish Insert PDI and Self-Adhesive Gaskets The insert converts a regular petri dish into a perfusion chamber. The biocompatible gasket form airtight and leak-proof contact with the bottom surface of the dish, even if the dish is filled with media or has an uneven surface. Simply press the insert to the bottom of the dish for a few seconds to form a perfusion system right in your dish. The low 3 mm profile allows you to use recording electrodes, upright microscopes with water immersion objectives as well. It has small working volume: conical opening with 11 mm I.D. on the bottom and 19 mm on the top. The chamber has two separate openings for solution inflow and outflow to prevent bubbles from entering the working compartment. The laminar profile facilitates perfusion and provides faster solution exchange. Can be used with 50mm glass bottom dishes for easy access with water immersion objectives. **Item#: PDI**

- **Outside diameter:** 35mm
- **Height:** 3mm
- **Working volume:** 11mm diameter, approx. 100 microl



top



bottom



Low Profile Perfusion Set for Petri dishes Comes with PDI insert and 50 self-adhesive biocompatible gaskets, which allow to use the assembly with regular 35 mm petri dishes.

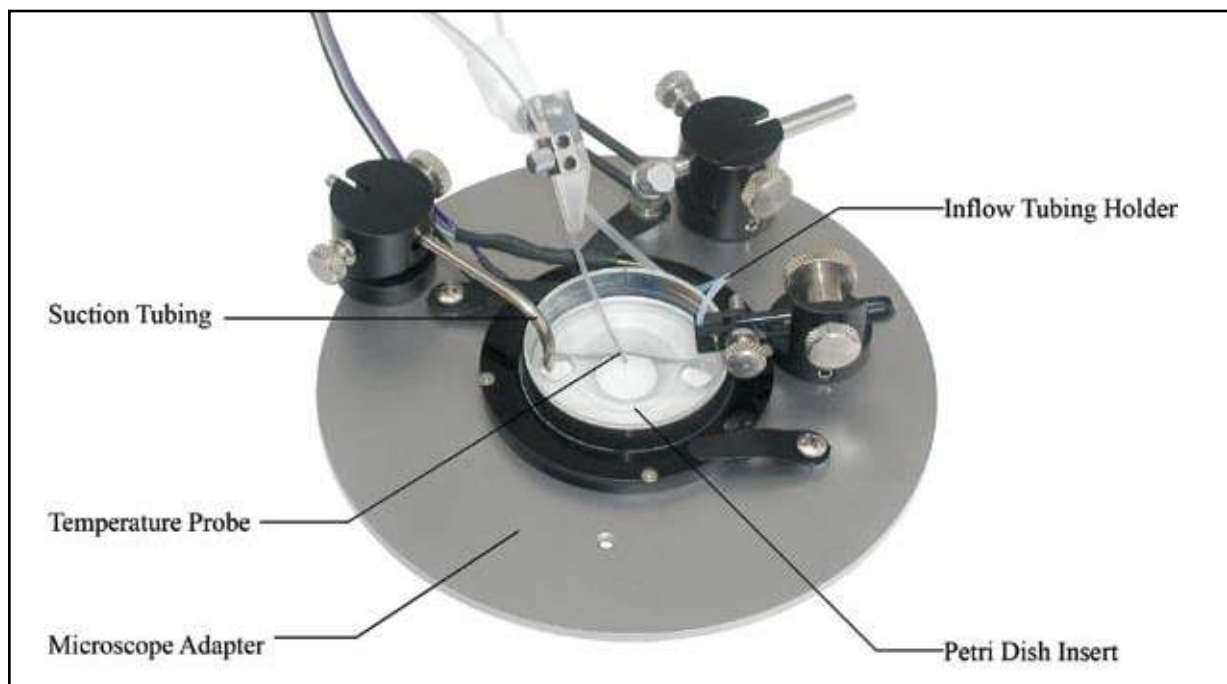
Cells cultured in 35 mm Petri dishes are a popular research tool used in numerous applications, including patch clamping and intracellular ion probe imaging. However, true perfusion (continuous inflow and out-flow) of solutions can be difficult to configure. Drug delivery without an outflow requires a spritzer-type microinjector, but ultimately results in contamination of the entire dish after only a few applications. This forces scientists to plate cells on cover slips for placement into specially designed perfusion chambers. However, such transfer is a time consuming process which introduces the potential for contamination plus additional expense.

The PDI chamber was designed by scientists after several years of patch clamp research combined with external perfusion of single cells cultured in Petri dishes. The chamber has separate openings for solution inflow and outflow that dump the fluctuations of the liquid level in the working compartment and prevents bubbles from entering the chamber. The laminar profile facilitates perfusion and provides faster solution exchange. An adjustable metal suction tube (included) controls the level of liquid in the dish. The chamber was designed for use with perfusion systems and magnetic holder with miniature ball-joint, which can accommodate perfusion manifolds. Can be used with glass bottom dishes for imaging. In fact, some glass bottom dishes are made from standard petri dishes like Corning 35 mm, for example. Can be used with temperature controlled systems. The suction tubing requires connection to an outflow source CFPS-1U.

Includes three magnetic tubing/electrode holders, and stainless suction tubing. A microscope adapter MA is required. Can be used with both magnetic and non-magnetic microscope adapters. If used with non-magnetic adapters, a IMA-MH set of miniature holders is required. **Item#: LPPCP1**

Petri Dish Inserts

Catalog No.	Description
PDI	Low Profile Chamber-Insert for Petri Dishes
LPPCP1	Low Profile Perfusion Set for Petri Dishes
TC-E35x15	Heating Element for 35mm dishes with 15mm aperture
TC-E35x11	Heating Element for 35mm dishes with 11mm aperture
TC-PA-C	Petri Dish Adapters, for Corning and Mattek petri dishes
TC-PA-W	Petri Dish Adapters, for Willco dishes
TC-PA-F	Petri Dish Adapters, for FluoroDishes
TC-PA-G	Petri Dish Adapter, for Greiner Bio-One dishes, glass bottom



Shown here is a Corning petri dish with PDI insert inside. It is placed into a TC-PA-C adapter to fit a TC-E35 heating element, which is mounted into a magnetic MA type microscope adapter. The magnetic adapter allows to position miniature holders from MA-MTH set.



Perfusion cover for 35mm petri dishes, FLOW-PETRI

Can be placed on a standard petri dish to form a flow cell. Incorporates two inflow/outflow ports that extend down to the bottom of the dish. Glass optical window in the middle: 12mm. Can be used with perfusion systems and PDI inserts. Can be sterilized with ethanol solution or autoclaved (100°C max). **Item#:** FLOW-PETRI



Perfusion tubing and luer-lock ports fitting set x8, part of PS-KIT.

Tygon tubing (50 feet), a set of threaded luer-lock fitting (x8) for use with TC-MIS, TC-MWP, TC-MIW, and TC-MWPHB incubators, and a set of luer fitting (x8) to connect PETRI-FLOW top, enough to provide inflow and outflow for four dishes. **Item#:** PS-KIT



FLOW-PETRI and Petri Dish Inserts

Catalog No.	Description
FLOW-PETRI	Perfusion cover for 35mm petri dishes, with luer-lock ports
PS-KIT	Perfusion tubing and luer-lock ports fitting set



Petri Dish adapters for incubators and heating stages

Catalog No.	Description
TC-PA-C	Petri Dish Adapters, for Corning and Mattek petri dishes
TC-PA-W	Petri Dish Adapters, for Willco dishes
TC-PA-F	Petri Dish Adapters, for FluoroDishes
TC-PA-G	Petri Dish Adapter, for Greiner Bio-One dishes, glass bottom
TC-PA50	50mm reducing adapter-ring for 35mm dishes.
PA-EG	Petri Dish Adapter, 38mm easy-grip Falcon dishes



Perfusion Insert for 50mm Glass Bottom dishes, PCCS2

Can be used with 50mm dishes to form perfusion chamber around your sample placed on glass bottom. Facilitates perfusion inside the dish. Separate inflow and outflow compartments prevent bubbles from entering the working compartment and provide smooth perfusion. Can be used with perfusion systems and cooling / heating stages for 60-50mm dishes. Can be used with adhesive layers PCCS2-PDI **Item#:** PCCS2



Insert for 50mm dishes

Catalog No.	Description
PCCS2	Small Volume Laminar Perfusion Chamber-insert
PCCS2-PDI	Adhesive layers, pack of 50, for use with PCCS2 perfusion chambers



Adapters, reducing rings, for Petri dishes, TC-PA-

For different brands of 35mm dishes. Since different brands have different diameter, a reducing ring is recommended to center the dish inside the heating element or a microscope stage. Select the appropriate adapter from the table below. If your brand of the dish is not listed, we might be able to find the right adapter if you send us a sample of the dish. **Item#:** TC-PA-x



Adapter, reducing ring, for Easy-grip Petri dishes from BD, PA-EG

For BD easy-grip brand of 35mm dishes. Since the actual diameter of these dishes is more than 38mm, a reducing ring is recommended to center the dish inside the microscope stage. The adapter is the green ring on the picture to the right. **Item#:** PA-EG

Coverslip Chambers

Open Chamber Advantages:

- Local substance application to single cells and small tissue
- Access for electrodes during recording from single cells
- Easy sample placement
- Replaceable coverslips to culture cells before the experiment
- Use with inverted microscopes
- Use with water immersion objectives of upright microscopes
- Use with any perfusion system
- Compatible with Imaging setups and Electrophysiology Workstations



Chambers for Round Coverslips

Low Profile Open Chamber for Coverslips CSC-25L Consists of a metal base to facilitate heat transfer, and a silicone O-ring to seal the coverslip. There is no contact between solution and the metal part to prevent ions leakage. The bottom part has a recessed profile to fit round coverslips. In contrast to regular CSC chambers, it does not need the top ring to keep the assembly together. Instead, the silicone ring holds the coverslip leak-proof, which makes it low-profile. The chamber has x4 threaded holes, #0-80, to attach custom miniature accessories if required. Overall diameter is the same as standard Petri dishes. The O-rings allows using different thickness coverslips. Simply put the coverslip inside and seal it with silicone ring by a snap-in action. Can be used as a perfusion chamber, if combined with miniature tubing holders. Fits to heating stages and non-heated stages. Can be used for imaging and recording. **Item#: CSC-25L**

- **Outside diameter:** 36.8 mm
- **Height:** 6mm from sample to the chamber top
- **Optical clearance/Working volume (25mm coverslips:** 21.5mm / approx. 350 microl



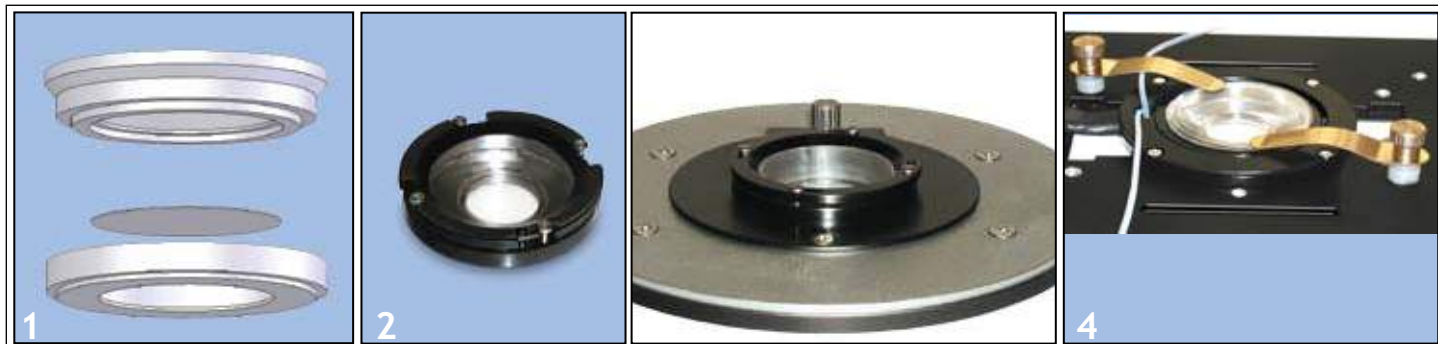
Open Chamber for Coverslips CSC

Can be used for imaging and recording. Consists of a bottom base, and a silicone O-ring to seal the coverslip. There is no contact between solution and the chamber base to prevent ions leakage. The included top glass coverslip can be used to seal your sample from top as well - to from a micro-incubator. The top can be secured using the included metal ring, or using flat springs of microscope adapters. The bottom part has a recessed profile to fit round coverslips. Overall diameter is the same as standard Petri dishes. The included O-



rings allows using different thickness coverslips. Simply put the coverslip inside and seal it with silicone ring by a snap-in action. Can be secured with a top metal ring. The silicone ring can be also secured by flat springs of microscope adapters. For low-profile chambers, consider CSC-25L design, where no top clamps are required. Can be used as a perfusion chamber, if combined with miniature tubing holders. The metal base facilitates heat transfer. Fits to heating stages and non-heated stages. **Item#: CSC**

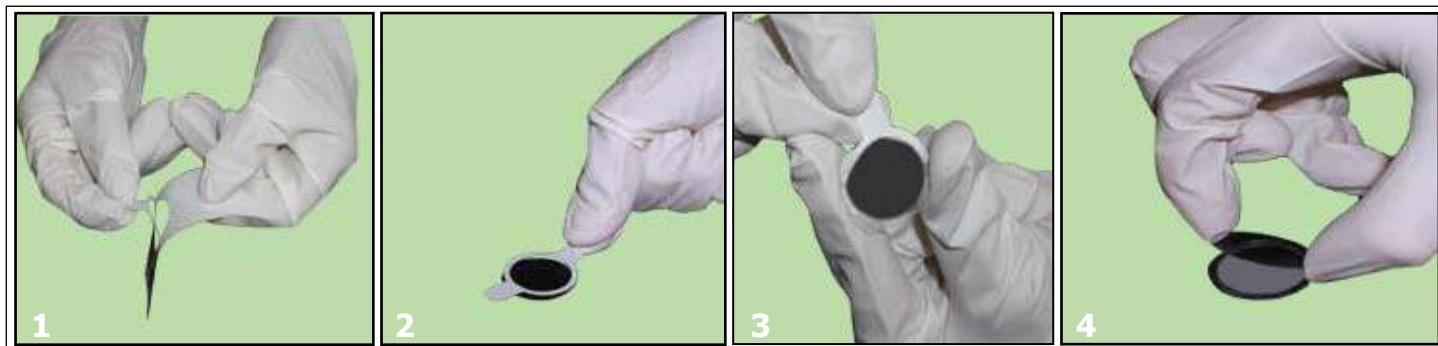
- **Outside diameter:** 36 mm
 - **Height:** 8.5mm (with top metal ring)
 - **Working volume:**
- | |
|---|
| 18mm coverslip - 14mm, approx. 150 microl |
| 13mm coverslip - 9mm, approx. 50 microl |
| 12mm coverslip - 8mm, approx. 50 microl |
| 25mm coverslip - 21mm, approx. 350 microl |
| 10mm coverslip - 6mm, approx. 30 microl |
| 20mm coverslip - 16mm, approx. 200 microl |



Ultra-Thin Live Imaging Chamber The chamber is formed by putting a thin spacer between two 25mm coverslips. The minimum thickness is 150 micron. You can change thickness by using a number of spacers. The inside opening is 21mm. Smaller openings are available upon request. The adhesive gaskets form sealed chambers if used with smooth surfaces. The adhesive is easy to remove after use. Procedure: remove one protective layer from adhesive gasket; position the gasket above the coverslip; remove the second protective layer; put your sample inside the opening; cover with the second coverslip. These ultra-thin chambers can be used with heated chambers and regular glass slides. Can be used with oil-immersion optics and for multi-photon imaging. These adhesive layers can be attached to any smooth surface. Can be used with UTIC-25 holder for 25mm coverslips (see on the right). **Item#: UTIC-21, UTIC-20-24x24, UTIC-13-24x24**



- **Optical clearance:** 21, 20, 13 mm
- **Thickness:** 150 micron
- **Working volume:** 52, 47, 20 microl





35mm Chambers for Round 10-25mm Diameter Coverslips

Catalog No.	Description
CSC-25L	Chamber for 25mm Round Replaceable Coverslips, Low-profile
CSC-18L	Chamber for 18mm Round Replaceable Coverslips, Low-profile
CSC-13L	Chamber for 13mm Round Replaceable Coverslips, Low-profile
CSC-12L	Chamber for 12mm Round Replaceable Coverslips, Low-profile
CSC-25	Chamber for 25mm Round Replaceable Coverslips
CSC-20	Chamber for 20mm Round Replaceable Coverslips
CSC-18	Chamber for 18mm Round Replaceable Coverslips
CSC-13	Chamber for 13mm Round Replaceable Coverslips
CSC-12	Chamber for 12mm Round Replaceable Coverslips
CSC-10P	Perfusion Chamber for 10mm Round Replaceable Coverslips
UTIC-25	Holder for Ultra-Thin Imaging Chambers, fits 25mm Coverslips, microscope adapters and heated stages.
UTIC-20-24X24	Adhesive Ultra-thin Gaskets 24x24mm with 20mm optical clearance, pack of 100.
UTIC-13-24X24	Adhesive Ultra-thin Gaskets 24x24mm with 13mm optical clearance, pack of 100.
UTIC-21	Adhesive Gaskets, pack of 100, for use with 25mm coverslips



Perfusion Chambers

Small Volume Perfusion Chamber for 10mm Coverslips Consists of two parts. The bottom part has a special profile to fit No 2, 10 mm O.D., coverslip. The top part has 8 mm round working compartment with slanted edges for easy access to your sample and two separate compartments for solution inflow and outflow. This prevents bubbles from coming into the chamber. **Item#:** **CSC-10P**

- **Outside diameter:** 35mm
- **Working volume:** 11mm diameter, approx. 100 microl



Laminar Profile Perfusion Chamber Reusable soft plastic chamber with laminar cutout to provide smooth perfusion. Can be attached to 22x40 glass coverslip for use during imaging. Thin 3mm profile allows you to use water immersion optics and access samples for recordings, injection and local substance application. Separate inflow and outflow compartments prevent bubbles from entering the working volume during perfusion. Incorporated channel for reference electrodes or temperature probes. Optional accessories: a mounting adapter PLD-A and a microscope adapter MA with magnetic perfusion set MA-MTH. Consider adding an outflow unit for suction to remove solution during perfusion. **Item#:** **PLD22x40**

Adapter for Laminar Perfusion Chamber This adapter allows you to use laminar flow chamber PLD22x40 with microscope adapters MA or IMA, which can be used to mount miniature holders for different accessories. If ordered together with a microscope adapter, comes with for sets of clamps and mounting thumb screws to fix the chamber. **Item#:** **PLD-A**

Low Profile Small Volume Laminar Perfusion Chamber for Coverslips, PCCS2

Inside diameter is only 10 mm. The chamber has two separate openings for solution inflow and outflow to provide smooth perfusion and prevent bubbles from coming in. Low profile permits easy access with electrodes, pipettes and immersion optics. Combined with miniature holders, forms a perfusion system. Easy to use, simply release adhesive layer on the coverslip (even with media still present), and attach the chamber from the top. Coverslip is flashed on the bottom of the chamber.

The chamber is made out of polycarbonate. It is only 5.5 mm thick (high). The bottom of the chamber is a replaceable 30mm round coverslip. The coverslip is attached to the chamber by using adhesive layers (or any adhesive, even melted wax). Easy to clean after use. Note: Can be used with any thickness 30mm coverslips.

The chamber fits inside microscope stage adapter, specify microscope model when ordering. The chamber can be rotated inside the stage to provide required orientation of the sample. Custom stages for non-standard microscopes are available upon request.

Screw-type or magnetic tubing/electrode holders extend this flexibility even further. They can be positioned anywhere around the chamber, so that tubing is not in the way of objectives or recording electrodes. Furthermore, the holders can adjust the angle and, as a result, tubing can approach the sample from any direction. The holders fit to perfusion manifolds. They also can be used to position reference electrodes or temperature probes, or even tubing to deliver gases, for example oxygen, over the sample. MTH-S stainless suction tubing provides smooth perfusion. If you are planning to use this system during perfusion experiments, all you need is an outflow unit for suction to remove solution during perfusion. Can be used for imaging and recording. Can be also used with 50mm BD Falcon and Willco glass bottom dishes.

Item#: PCCS2

- **Outside diameter:** 35mm
- **Height:** 4mm
- **Working volume:** 11mm diameter, approx. 100 microl

Perfusion Chambers

Catalog No.	Description
PCCS2	Small Volume Perfusion Chamber for 30mm Glass Coverslips or 50mm Glass Bottom dishes
PCCS2-PDI	Adhesive layers, pack of 50, for use with PCCS2 perfusion chambers.
PLD22x40	Laminar Profile Perfusion Chamber
PLDA	Adapter for Laminar Perfusion Chamber
MA-MTH	Miniature Magnetic Holders Set, x3. Includes stainless suction tubing.
MA	Magnetic microscope adapter. Specify microscope model when ordering.
IMA	Microscope Adapter, specify microscope model
IMA-MH	Miniature Adjustable Holders Set, x3



Chambers for Rectangular Coverslips

Chamber for Replaceable Square 22x22mm Coverslip Consists of two parts. Similar to CSC chamber, but for square 22x22mm coverslip, and parts are threaded into each other. The coverslip is sealed with O-ring between two threaded parts. Bottom part is aluminum, for use in temperature controlled applications. Inside opening is 19mm diameter. Fits to heating stages and non-heated stages. Can be used for imaging and recording. **Item#: CSC-22x22**

- Outside diameter: 36.7mm
- **Height:** 8.5mm
- **Working volume:** 19mm, approx. 280 microl

Chambers for Rectangular Coverslips

Catalog No.	Description
CSC-22x22	Chamber for Replaceable Square 22x22mm Coverslip
CS-No1.5-22x22	Glass Coverslips, 22x22mm, No 1.5, box of 100.

Flow Cell for High Resolution Imaging



This is a glass bottom perfusion dish for high resolution imaging. The same size as a regular Petri dish. Fits to our temperature controlled stages and miniature incubators. No. 1.5 glass top and bottom for high resolution imaging. Working volume (15.5mm diameter) is small enough for fast solution exchange. Luer-locks on the top for laminar perfusion. Can be used to culture your samples before imaging. The cover can be removed for independent access to the working volume. **Item#: Flow-Cell**

- **Outside diameter:** 35mm
- **Working volume:** 11mm diameter, approx. 100 microl

Flow cell for High Resolution Imaging

Catalog No.	Description
FLOW-CELL	Perfusion Dish, Laminar Profile, Glass Bottom and Top, with Luer-Lock Ports



Insert for x4 coverslip holders and Petri dishes, TC-I-4 Designed to hold x4 CSC coverslip holders (shown on the picture) and Petri dishes (up to 36.8mm diameter) dishes. Some brands of Petri dishes require reducing rings (TC-PA-C, -F, -W, -N). Provides wide access for custom accessories. Optical aperture is 34mm. Includes adjustable clumps and thumb screws. **Item#: TC-I-4**



Glass Coverslips

Glass CoverSlips, No 1, CS-No1 High optical quality No.1 (0.13 – 0.16 mm, unless), glass coverslips. Absolutely colorless, perfectly clear, suitable for fluorescence microscopy.

These cover glasses meet the requirements of DIN ISO 8255 and are made of pure, perfectly clear and chemical resistant borosilicate glass of the first hydrolytic class (refractive index n_e (546.07 nm) = 1.524 to 1.527 / Abbe coefficient v_e = 55). Made in Germany. **Item#: CS-No1**

High precision cover glasses, No.1.5H, CSHP-No1.5 Cover glasses for high performance microscopes, made of chemically resistant borosilicate glass of the first hydrolytic class with precision thickness No. 1.5 (0.170 mm $\pm$ 0.005 mm), suitable for in-vitro diagnostic applications. Developed in cooperation with Zeiss and Schott. Made in Germany. **Item#: CSHP-No1.5**



- for objectives with high numerical aperture and resolution
- accurate thickness of 0.170 mm with tolerance reduced to $\pm$ 0.005 mm
- non-corroding borosilicate glass
- refractive index n_e : 1.524-1.527 at 546.07 nm
- Abbe coefficient: $v_e=55$
- recommended for the following objectives:
 - dry objective: N.A. 0.7
 - water immersion: N.A. 1.0
 - glycerol immersion: N.A. 1.2
 - oil immersion: N.A. 1.3

Hydrophobic cover glasses, No 1, CS-No1...-H Made of chemically resistant borosilicate glass of the first hydrolytic class, suitable for in-vitro diagnostic applications. Absolutely transparent, suitable for fluorescence microscopy. With super hydrophobic surfaces on both sides (e.g. for use in crystallography). Thickness No. 1 (0.130 to 0.160mm). Made in Germany. **Item#: CS-No1-...-H**

Glass Coverslips

Catalog No.	Description
CS-No1-30	Glass Cover Slip, box of 100, 30mm diameter
CS-No1-25	Glass Cover Slip, box of 100, 25mm diameter
CS-No1-24	Glass Cover Slip, box of 100, 24mm diameter
CS-No1-22	Glass Cover Slip, box of 100, 22mm diameter
CS-No1-20	Glass Cover Slip, box of 100, 20mm diameter
CS-No1-18	Glass Cover Slip, box of 100, 18mm diameter
CS-No1-16	Glass Cover Slip, box of 100, 16mm diameter
CS-No1-15	Glass Cover Slip, box of 100, 15mm diameter
CS-No1-14	Glass Cover Slip, box of 100, 14mm diameter
CS-No1-13	Glass Cover Slip, box of 100, 13mm diameter
CS-No1-12	Glass Cover Slip, box of 100, 12mm diameter
CS-No1-10	Glass Cover Slip, box of 100, 10mm diameter
CSHP-No1.5-18x18	High Precision Glass Cover Slip, box of 200, 18x18mm
CSHP-No1.5-22x22	High Precision Glass Cover Slip, box of 200, 22x22mm
CSHP-No1.5-24x32	High Precision Glass Cover Slip, box of 100, 24x32mm
CSHP-No1.5-24x50	High Precision Glass Cover Slip, box of 100, 24x50mm
CSHP-No1.5-24x60	High Precision Glass Cover Slip, box of 100, 24x60mm
CSHP-No1.5-10	High Precision Glass Cover Slip, box of 100, 10mm diameter
CSHP-No1.5-12	High Precision Glass Cover Slip, box of 100, 12mm diameter
CSHP-No1.5-13	High Precision Glass Cover Slip, box of 100, 13mm diameter
CSHP-No1.5-15	High Precision Glass Cover Slip, box of 100, 15mm diameter
CSHP-No1.5-18	High Precision Glass Cover Slip, box of 100, 18mm diameter
CSHP-No1.5-24	High Precision Glass Cover Slip, box of 100, 24mm diameter
CSHP-No1.5-25	High Precision Glass Cover Slip, box of 100, 25mm diameter
CSHP-No1.5-30	High Precision Glass Cover Slip, box of 100, 30mm diameter
CS-No1-12-H	Hydrophobic Glass Cover Slip, box of 100, 12mm diameter
CS-No1-18-H	Hydrophobic Glass Cover Slip, box of 100, 18mm diameter
CS-No1-22-H	Hydrophobic Glass Cover Slip, box of 100, 22mm diameter



Microscope Adapters

Most of the microscope adapters are based on two standard sizes (bases): 128x86mm the size of standard multi-well plates, which fits most sample holders on mechanical microscope stages; and 160x110mm insert that fits most motorized stages and type K stages (IMA-motor), which also can be used with extensions to fit larger motorized stages. 128x86mm base plates fit inside IMA-motor base adapter, which also is used with different inserts to hold various samples. Both IMA-type and MA-type adapters with 50mm opening in the middle are used with Petri dishes, CSC and UTIC chambers and small heating elements TC-E35-xx. IMA-74-xx adapters with 74mm cutout are used with incubators TC-MIS, cooling stages and larger heating elements: TC-E50-xx. Magnetic adapters MA-xx are constructed by attaching magnetic plates to IMA-74-type bases and are used to attach miniature magnetic holders.

Microscope Adapter IMA-128x86 This adapter fits in place for standard multi-well plates. Can be used with glass bottom (35/50mm) and standard petri dishes, as well as with slides and cover glasses. You can form imaging and perfusion chambers directly on the surface of standard microscope glass slides or rectangular 25x60mm coverslips and position the chamber on an upright or inverted microscope using this adapter. Can be used with chambered cover glasses. Fits glass bottom dishes, both 35 and 50mm, chambers for replaceable coverslips, and heating stages. Miniature screw-type holders can be attached directly to the surface to fix perfusion tubing, electrodes and sensors. Includes fixing clamps and thumb screws. **Item#: IMA-128x86**

- **Inside opening:** 50mm, & 75x25mm
- **Reducing Ring and Clamp:** to fit all brands of 35mm dishes (including glass bottom dishes)
- **Height:** 3 mm
- **Use with:** 35mm dishes, chambers, 50mm dishes, glass slides, and heating stages

This plate is also used to make IMA-type adapters for microscopes with different stages by attaching to an appropriate IMA-74-type insert to the bottom. For motorized stages and type K stages, IMA-128x86 plate goes inside IMA-motor insert. You can form imaging and perfusion chambers directly on the surface of standard microscope glass slides or rectangular 25x60mm coverslips and position the chamber on an upright or inverted microscope using this adapter.



Miniature Adjustable Holders Set for IMA Adapters The set includes three miniature screw-type holders to arrange micro-accessories around your sample: from electrodes and sensors to media exchange and test solution application tubing. The set includes two miniature ball-joints to fix tubing, including perfusion manifolds; and double-clamp to fix fragile electrodes and sensors, including glass micro-pipettes. The holders are mounted on provided stand-off, which fit threaded holes in IMA adapters. **Item#: IMA-MH**

Microscope Adapters, Magnetic Stainless Steel, MA A microscope stage adapter to provide flexible working area for positioning accessories required for high resolution live sample imaging: from media exchange and test solution delivery tubing, to sensors and electrodes. Specially treated stainless magnetic surface of the adapter provides ideal means to mount miniature adjustable magnetic holders. Adapters for all brands of microscopes, including motorized stages, are available. Incorporates adjustable clamp to fix all brands of 35mm petri dishes and chambers, glass bottom dishes (both 35 and 50mm), and heating stages. Choose the size appropriate for your microscope.

- **Inside opening:** 50mm
- **Reducing ring and clamp:** to fit all brands of 35mm dishes
- **Use with:** 35mm dishes (including glass bottom dishes), chambers, 50mm glass bottom dishes, and heating stages.



Adjustable Magnetic Holders Set Simplified set of three miniature magnetic holders to configure solution exchange lines, electrodes, sensors, and even glass micropipettes around your sample. Includes adjustable stainless steel suction tubing for perfusion chambers, adjustable holder with miniature ball-joint to fix inflow tubing and manifolds of solution application systems, and a double clamp to fix tubing, sensors, electrodes or glass pipettes. The miniature holders were designed not to obstruct optical path. **Item#: MA-MTH**



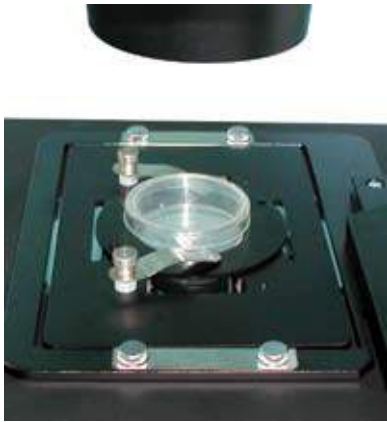
Adapter for Piezo Stages IMA-PI/MCL/piezo To use with imaging and perfusion chambers. Fits glass bottom dishes, chambers for replaceable coverslips, and heating stages. Miniature screw-type holders can be attached directly to the surface to fix perfusion tubing, electrodes and sensors. Includes fixing clamps and thumb screws. For use with PI, MCL and other stages.

- **Inside opening:** 50mm
- **Height:** 3 mm
- **Clamp:** to fix all brands of dishes (including glass bottom dishes)
- **Use with:** 35/50mm dishes, chambers, and heating stages



Magnetic Microscope Adapters

Catalog No.	Description
MA-110	Microscope Adapter, stainless steel, for Olympus microscopes, Narishige stages, Burleigh Gibraltar stages, Applied Precision stages, 110mm
MA-MTH	Miniature Magnetic Holders Set
MA-108	Microscope Adapter, stainless steel, for Nikon microscopes, SISKIYOU stages, Burleigh Gibraltar stages, 108mm
MA-LM	Microscope Adapter, stainless steel, for Leica microscopes and Zeiss type M stages
MA-motor	Microscope Adapter, stainless steel, for motorized stages
MA-128x86	Microscope Adapter, 128x86mm



Microscope Adapters with 74mm cutout

Catalog No.	Description
IMA-74-110	Microscope Adapter for Olympus microscopes, Applied Precision stages, Burleigh Gibraltar stages, Narishige stages 110mm
IMA-74-108	Microscope Adapter for Nikon microscopes, SISKIYOU stages, Burleigh Gibraltar stages 108mm
IMA-74-LM	Microscope Adapter for Leica microscopes and Zeiss type M stages
IMA-74-128x86	Microscope Adapter with 74mm cutout, 128x86mm
IMA-74-150x150	Microscope Adapter for Leica 150x150mm stages
IMA-74-90	Microscope Adapter for stereo microscopes, 90mm

Universal Microscope Adapters

Catalog No.	Description
IMA-MH	Miniature Adjustable Holders Set, x3
IMA-128x86	Microscope Adapter, 128x86mm
IMA-LM	Microscope Adapter for Leica microscopes and Zeiss type M stages
IMA-motor	Microscope Adapter for motorized stages from Ludl, ASI, Prior, Marhauser, Zeiss
IMA-150x150	Microscope Adapter for Leica 150x150mm stages
IMA-PI	Microscope Adapter for PI piezo stages
IMA-MCL	Microscope Adapter for MCL piezo stages
IMA-piezo	Microscope Adapter for piezo stages



Adapter for motorized and type K stages, IMA-motor

This standard 160x110mm insert fits most motorized and type K stages. Extensions to fit larger motorized stages from Nikon, ThorLabs and Ludl Bioprecision, for example, are available (see the table below). Standard multi-well 128x86mm plates fit inside this base. The base can be used with various 128x86mm inserts, including MA-128x86 magnetic insert, for heating elements, glass bottom (35/50mm) and regular different size Petri dishes, as well as coverslip CSC holders and cover glasses. Miniature magnetic and screw-type holders can be attached to the surface of these inserts to fix perfusion tubing, electrodes, and sensors. Most inserts include fixing clamps and thumb screws, plus the reducing ring for 35mm dishes. Shown on the picture is IMA-motor adapter with IMA-74-128x86 insert and 50mm heating element attached.. **Item#:**

IMA-motor



Adapters for motorized stages

Catalog No.	Stage Model
Not required	Ludl, Prior, ASI, Marhauser, Zeiss, and type K stages
TC-MI-THOR	Adapter for ThorLabs stages, 170x130mm
TC-MI-NIK	Adapter for Nikon motorized stages, 236x155mm
TC-MI-LUDL	Adapter for Ludl Bioprecision II stages, 172x116mm

- **Outside dimensions:** Fits 160x110mm cutout of motorized stages; height 10mm; the bottom is recessed 7mm below the mounting surface; comes with 3mm spacers to reduce this recessed profile to 5mm; can be leveled by set screws positioned in the corners of base.
- **Optical aperture:** 112x72mm
- **Use with:** plates, and optional inserts for coverslip holders, 35-60mm dishes, and 1x3in. glass coverglasses/slides.
- **Media exchange and perfusion:** Two optional side bars with inflow/outflow ports and openings can be attached on both sides of the base; optional tubing fitting kit for the threaded ports; luer-lock or barbed connectors to sources of liquid media; optional sets of adjustable tubing holders to position inflow and outflow tubing inside sample chambers.

Insert IMA-128x86 This insert fits in place for standard multi-well plates. Can be used with glass bottom (35/50mm) and standard petri dishes, as well as with slides and cover glasses. You can form imaging and perfusion chambers directly on the surface of standard microscope glass slides or rectangular 25x60mm coverslips and position the chamber on an upright or inverted microscope using this adapter. Can be used with chambered cover glasses. Fits glass bottom dishes, both 35 and 50mm, chambers for replaceable coverslips, and heating stages. Miniature screw-type holders can be attached directly to the surface to fix perfusion tubing, electrodes and sensors. Includes fixing clamps and thumb screws. **Item#:** IMA-128x86



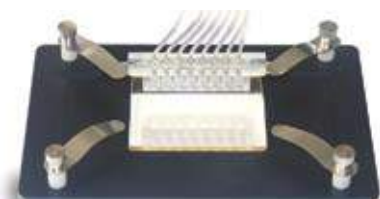
IMA-74-128x86 insert This insert with 74mm opening is to attach larger heating elements and magnetic plates. Shown on the picture at the right is IMA-74-128x86 insert, with 50mm heating element attached, inside IMA-motor base. **Item#:** IMA-74-128x86



Magnetic insert, MA-128x86 This insert provides flexible working area for positioning accessories required for high resolution live sample imaging and recording: from media exchange and test solution delivery tubing, to sensors and electrodes. Specially treated stainless magnetic surface of the adapter provides ideal means to mount miniature adjustable magnetic holders. Incorporates adjustable clamps to fix all brands of 35mm Petri dishes and CSC chambers, glass bottom dishes (both 35 and 50mm), and heating elements. **Item#: MA-128x86**



Insert for standard slides, TC-I-20x30 Designed to hold standard 1x3in. slides. Provides wide access for fluidics tubing. Optical aperture is 20x30mm, 1mm thick lip to hold slides up to 76x26mm. Includes adjustable clumps and thumb screws. **Item#: TC-I-20x30**



Insert for custom devices, TC-I-30x50 Designed to position custom microfluidics devices and slides. Provides wide access for fluidics tubing. Optical aperture is 70x20mm. Includes adjustable clumps and thumb screws. **Item#: TC-I-30x50**



Insert for slides and microfluidics devices, TC-I-SL Designed to position custom microfluidics devices and slides. Provides wide access for fluidics tubing - 80x70mm recessed area. Optical aperture is 72x24mm, 1mm thick lip to hold slides up to 76x28mm. Includes adjustable clumps and thumb screws. **Item#: TC-I-SL**



Insert for 35mm dishes, TC-I-35 Designed to position standard 35mm Petri dishes. Provides wide access for custom accessories and fluidics tubing. Optical aperture is 25mm. Includes adjustable clumps and thumb screws. **Item#: TC-I-35**



Insert for 50-60mm dishes, TC-I-60 Designed to position larger (up to 60mm diameter) dishes. Provides wide access for custom accessories and fluidics tubing. Optical aperture is 30mm. Includes adjustable clumps and thumb screws. **Item#: TC-I-60**



Side bar with threaded ports, IMA-9 This bar incorporates x9 threaded 1/4x28 ports to provide connectors for tubing to deliver liquid media. An optional fitting kit includes x8 1/4x28 threaded luer fitting with barbed end, plus x8 mating luer/barbed connector.. **Item#: IMA-9**



Side bar tubing holder, IMA-23 Allows you to fix multiple tubing for microfluidics devices simply by placing the tubing into provided openings (x23) from the top. **Item#: IMA-23**

Insert for x4 coverslip holders and Petri dishes, TC-I-4 Designed to hold x4 CSC coverslip holders and Petri dishes (up to 36.8mm diameter) dishes. Some brands of Petri dishes require reducing rings (TC-PA-C, -F, -W, -N). Provides wide access for custom accessories. Optical aperture is 34mm. Includes adjustable clumps and thumb screws. **Item#: TC-I-4**

Insert for x3 slides/coverglasses, TC-I-3 Designed to hold x4 coverglasses and custom slides. Optical aperture is 70x20mm. **Item#: TC-I-3**

Inserts for IMA-motor adapter

Catalog No.	Description
TC-I-35	128x86mm insert for 35mm dishes
TC-I-60	Insert for 50-60mm dishes
MA-128x86	Magnetic insert, stainless steel, 128x86mm
TC-I-20x30	128x86mm insert for standard slides, 20x30mm aperture
TC-I-30x50	128x86mm insert for custom devices, 50x30mm aperture
TC-I-SL	Insert for slides and fluidics devices, 24x72mm aperture
TC-I-4	Insert for x4 dishes and chambers up to 38mm diameter
TC-I-3	Insert for slides and coverglasses
IMA-9	Side bar with threaded ports
IMA-23	Side bar tubing holder
TC-MI-LUDL	Adapter for Ludl Bioprecision II stages, 172x116mm
TC-MI-THOR	Adapter for ThorLabs stages, 170x130mm
TC-MI-NIK	Adapter for Nikon motorized stages, 236x155mm

Miniature Holders

Adjustable Clamps for Fragile Accessories



- Modular Design
- Holds Sensors, Electrodes, Tubing and Pipettes
- Use with any perfusion system
- Use with any microscope
- Compatible with Imaging setups and Electrophysiology stations



Miniature Multi-Holder MH-2

Holds multiple tubing, electrodes and pipettes around your sample chamber. This miniature holder can be attached to microscope adapters or any magnetic surfaces. It can be also attached to any surface using included standoffs (M3 or 4-40 thread). The holder includes a number of extension arms, each 1 in. long, two double clamps for fragile accessories, and two ball joints. The extensions are attached using thumb screws, which allow easy configurations and adjustments of tilt, swing, and rotation angles in multiple axes. On the next page are possible configurations made using the included parts, plus all configurations possible with MTH and MH-1 holders. **Item#: MH-2**

- **Foot print:** 12mm
- **Extensions:** x4 1 in. long and x2 right-angle
- **Ball-joints:** x2
- **Tubing clamps:** x2, and x2 double-clamps
- **Mounting:** Magnetic, M3, #4-40, M6 and #1/4-20 threaded surfaces, and surfaces with through holes (optional MH-SCR adapter might be required).

Adjustable Tubing/Electrode Holder MTH

Position multiple tubing, probes, glass capillaries and electrodes around your sample chamber. This miniature holder can be attached to a microscope adapter or any magnetic surfaces. Several holders can be placed on the same adapter. The holder includes a number of extension arms, ball joint and double-clamp for fragile accessories (electrodes for example). Each arm adds approx. 1 in. to extend. The extensions are attached using thumb screws, which allow easy configurations and adjustments of tilt, swing, and rotation angles in multiple axes. Below are possible configurations. No extra tools are needed. Simply put the holder on any iron surface and the strong magnet will keep the tubing and other accessories firmly in place



anywhere around your sample. The base of the holder is only 0.75in. diameter. The magnetic bottom is covered with Teflon film to move the holder easily along metal surfaces. Comes with standoffs to mount on M6 or 1/4-20 threaded surfaces without magnet. Comes with adhesive magnetic strip to attach the holders even to non magnetic and plastic surfaces. Can be used with perfusion, controlled flow and micro-perfusion systems as well as to hold electrodes. On the next page are possible configurations made using the included parts, plus all configurations possible with MH-1 holders **Item#: MTH**

- **Foot print:** 18mm
- **Extensions:** x2 1in. long, x1 right-angle, x1 mounting 4mm rod. with double clamp.
- **Ball-joint:** x1
- **Tubing clamp:** x1 and x1 double-clamp
- **Mounting:** Magnetic, M6, and #1/4-20 threaded surfaces, and surfaces with through holes (optional MH-SCR adapter might be required).

Magnetic Holder with Suction Tubing MTH-S

Comes with stainless steel suction tubing to provide smooth solution removal from perfusion chambers, if connected to an outflow unit. Two thumb screws adjust tubing height (tilt) and length. No extra tools are needed. Simply put the holder on any iron surface and the strong magnet will keep the tubing firmly in place anywhere around your sample. If you do not have suitable surface available, use a magnetic adhesive strip provided or accessories below. The suction tubing can be replaced with any custom tubing up to 4mm diameter. Can be used with perfusion systems. Can be mounted on M6 and 1/4-20 threaded surfaces using included adapters. **Item#: MTH-S**

- **Foot print:** 18mm
- **Tilt:** Adjustable
- **Length:** Adjustable, up to 1.5in..
- **Fit:** Designed to work with any bath chamber, including petri dishes.
- **Mounting:** Magnetic, M6, and #1/4-20, M3, and #4-40 threaded surfaces, and surfaces with through holes (optional MH-SCR adapter might be required).



The Smallest Holder, MH-1

The base of this ultra-small magnetic holder is only 8mm wide. Includes extensions arms and a ball joint. Thumb screws are used to adjust height, tilt and angle. Extends up to 2in. long. Can be used with perfusion, controlled flow and micro-perfusion systems, as well as to hold temperature sensors and electrodes. Includes screw-type adapters to mount on any surface with M3 or 4-40 threaded holes. **Item#: MH-1**

- **Foot print:** 12mm
- **Extensions:** x1 1in. long, and x1 right-angle
- **Ball joint:** x1.
- **Tubing clamp:** x1
- **Mounting:** Magnetic, M3, and #4-40 threaded surfaces.



Configurations Made Using Parts Included with MTH System



Configurations Made Using Parts Included with MH-2 System





Zero-Dead Volume Manifold, ZMM

Zero-dead volume facilitates solution exchange inside small volume perfusion chambers. The output channels can be adjusted at a different height to prevent contamination of solutions. The outputs for lower concentration solutions, for example, can be positioned higher so that they do not mix with other solutions. The upper channels can be also used to provide suction of excess of solution from small volume perfusion chambers.

Incorporated magnetic holder allows you to position the manifold anywhere around your sample. Two thumb screws fix the manifold in required position: height, angle, length. Comes with 2 ft. long Teflon tubing, attached to polyimide 250/360 micron I.D. channels. All tubing is replaceable and washable. Perfusion system or/and pressurized Small Volume Delivery System SVDS1 is required. Can be used with small volume PCCS2, CSC chambers and petri dish inserts. Consider microbore tubing fitting PS-kit. Ships configured with six 360micron channels, which allow you do make from 1 to 6-channel manifolds. Specify if 8-channel 250 micron I.D. channels are required. **Item#: ZMM**

- **Channels:** removable 6-channel, 360 micron
- **Connecting tubing:** incorporates 2ft. tubing per channel, with luer connector



Miniature Accessories For Custom Adjustable Holders



The sets below allow you build adjustable holders for any purpose. The example on the left is an adjustable magnetic stand-holders for an in vivo heated plate constructed using x4 MTH1 bases, x4 1in. extensions, x4 right-angle clamps MH-RA, and a threaded rods set, MH-TRDS. The stands can be elevated to the required heights to accommodate different size animals.

Mounting Adapter Allows you to attach MTH, MMH and ZMM miniature holders to un-threaded non-magnetic surfaces with through holes. **Item#: MTH-SCR**

Microscope Adapter, Stainless Steel, MA A microscope stage adapter to provide flexible working area for positioning accessories required for high resolution live sample imaging: from media exchange and test solution delivery tubing, to sensors and electrodes. Specially treated stainless magnetic surface of the adapter provides ideal means to mount miniature adjustable magnetic holders. Adapters for all brands of microscopes, including motorized stages, are available. Incorporates adjustable clamp to fix all brands of 35mm petri dishes and chambers, glass bottom dishes (both 35 and 50mm), and heating stages. Choose the size appropriate for your microscope.. **Item#: MA**

- **Inside opening:** 50mm
- **Reducing ring and clamp:** to fit all brands of 35mm dishes
- **Use with:** 35mm dishes (including glass bottom dishes), chambers, 50mm glass bottom dishes, and heating stages.



Adjustable Tilt Miniature Magnetic Base, MTH1 This adjustable base can be used to fix your miniature accessories, from tubing and manifolds to electrodes and sensors, right on your microscope stage. Measures only 3/4in. diameter and height. Removable tilting part allows you to attach different extensions. Requires a magnetic microscope adapter. The magnet can be removed to mount on included screw-type adapters for M6 and 1/4-20 threaded surfaces. This is a part of MTH system.

Item#: MTH1

Extension with Double Tubing/Electrode Clamp, MTH-T This extension fits inside MTH1 base to provide means to fix your electrodes, tubing and sensors around your sample. Extends up to 3in. This is a part of MTH system. **Item#: MTH-T**



Miniature Ball-Joint with Right-Angle Extension, MH-RB

This adjustable extension can be used to position your miniature accessories in any direction and angle. The right angle attachment provides extra freedom to adjust height and length. Ideal to fix tubing above your sample. Incorporates tubing clamp. Can be used to attach double tubing/electrode holder/clamp of MTH-T as well. Extends up to 2in. Does not obstruct optical field. This is a part of MTH, MH-1 and MH-2 systems. **Item#: MH-RB**



Extensions Set, 1in. long, and Right-Angle Extension MH-E

This set of two 1in. long extensions includes thumb screws and nuts to extend your accessories to the required length. The right-angle extension provides extra flexibility for adjustment in 3-D space. **Item#: MH-E**



Miniature Right-angle clamp MH-RA

Creates flexible joint at a right-angle. Includes a tubing clamp. Ultra-miniature size allows you to fix accessories inside small compartments.. **Item#: MH-E**

Magnetic stainless steel plate MA-74-150x120

Specially treated 150x120mm plate to mount magnetic holders. A 74mm cutout in the middle fits 50mm heating elements to form low profile perfusion setups. Cutout on the side can be used to mount the plate on microscope stages. **Item#: MA-180x180**

Magnetic Clamps These two clamps can be positioned anywhere on the stainless steel microscope adapter or temperature controlled stages to fix the chambers firmly in place. Can be used to prevent chamber elevation while working with oil immersion objectives. The surface of the clamp can be used to attach optional or custom accessories, anything that needs to be attached to the microscope stage. **Item#: M-HLD**





Miniature Magnetic Holders

Catalog No.	Description
MH-2	Miniature Multi-Holder
MTH	Adjustable Holder
MH-1	Miniature Magnetic Holder
MTH-S	Magnetic Holder with Suction Tubing
ZMM	Zero-Dead Volume Manifold, 6-channel
M-HLD	Magnetic Clamps
MH-E	Extensions set, 1in. long and right-angle
MH-RB	Miniature Ball-Joint with Right-Angle Extension
MH-RA	Miniature Right-angle clamps
MTH-T	Extension with Double Tubing/Electrode Clamp
MTH1	Adjustable Tilt Miniature Magnetic Base
MTH-SCR	Mounting Adapter
MTH-TRDS	Set of 4-40 threaded rods, assorted length x5, and a set of plastic washers/spacers.
MA	Magnetic microscope adapter (specify microscope model)
IMA	Microscope adapter (specify microscope model)
MA-74-150x120	Magnetic 150x120mm plate, 74mm cutout
MA-74-110	Magnetic 110mm plate, 74mm cutout
MA-74-108	Magnetic 108mm plate, 74mm cutout
MA-74-100	Magnetic 100mm plate, 74mm cutout



Adjustable Micropositioners

Miniature positioner on magnetic holder, MMH-3

This 3-D fine positioner can be used to mount miniature accessories: from micromanifolds to small clamps and holders. It provides 12mm working distance in all axes and micron resolution. The third Z-axis can be adjusted at a tilt angle to provide easy access to samples without obstructing optical pathways. The clamp to mount rods can be removed to provide a threaded surface to attach custom accessories: holders and clamps. The micro-manipulator can be assembled for both: right-hand and left-hand configurations (Allen wrench is required). The magnetic mounting allows you to position the manipulator on a microscope adapter. If you do not have a magnetic surface, the manipulator can be mounted using provided M6 and 1/4-20 screws adapters. **Item#: MMH-3D**



Miniature positioner on magnetic holder, MMH-2

This 2-D fine positioner can be used to mount miniature accessories: small clamps and holders. It provides 12mm working distance in two axes and micron resolution. The micro-manipulator can be assembled for both: right-hand and left-hand configurations (Allen wrench is required). The magnetic mounting allows you to position the manipulator on a microscope adapter. If you do not have a magnetic surface, the manipulator can be mounted using provided M6 and 1/4-20 screws adapters. **Item#: MMH-2**



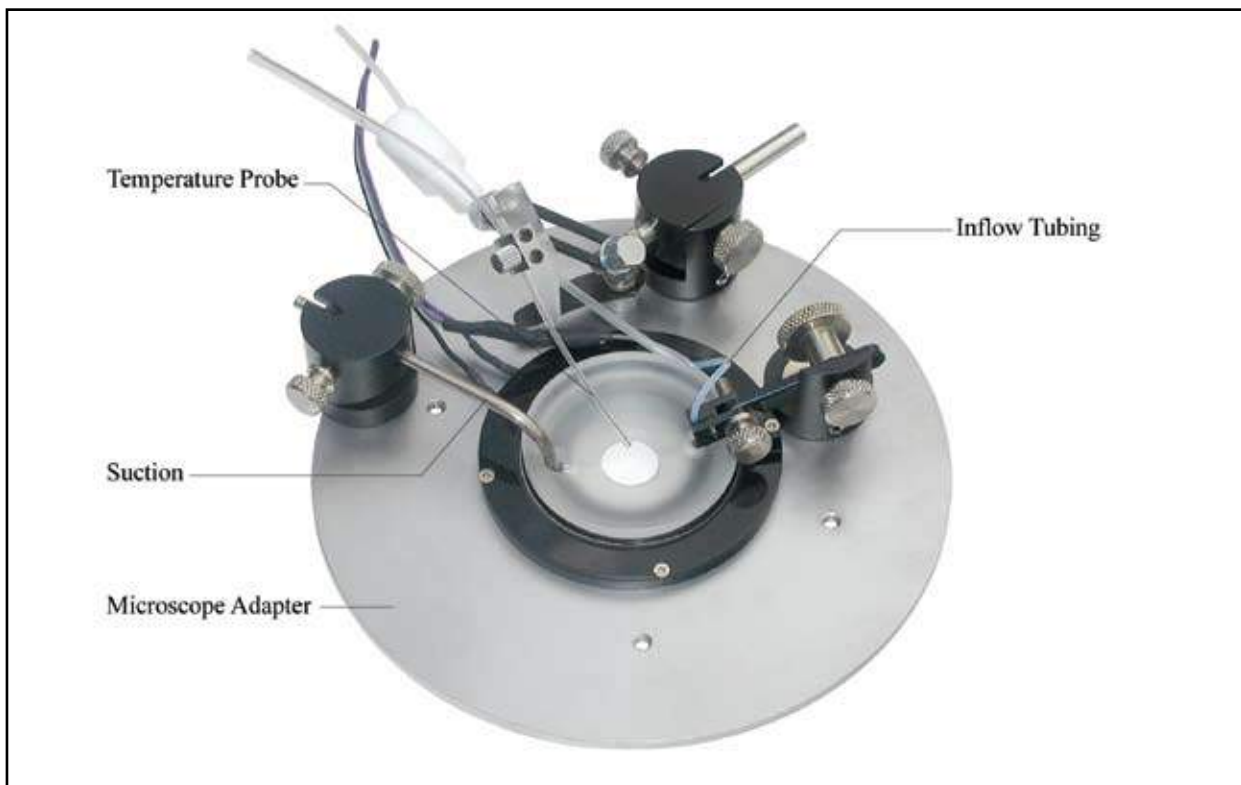
Miniature positioner on magnetic holder, MMH-1

This fine micro-positioner can be used to mount miniature accessories: small clamps and holders. It provides 12mm working distance and micron resolution. The micro-manipulator can be assembled for both: right-hand and left-hand configurations (Allen wrench is required). The magnetic mounting allows you to position the manipulator on a microscope adapter. If you do not have a magnetic surface, the manipulator can be mounted using provided M6 and 1/4-20 screws adapters.

- **Tilt adjustment:** for MMH-3 only, z-axis (included)
- **Working distance:** 12mm
- **Mounting:** Magnetic, M6 and 1/4-20 screws
- **Dimensions:** approx: 50 x 50 x 50 mm

Miniature Magnetic Micro-positioners

Catalog No.	Description
MMH-3	Miniature magnetic micropositioner, 3-D
MMH-2	Miniature magnetic micropositioner, 2-D
MMH-1	Miniature magnetic micropositioner, single-axis



Temperature Control

Heated Microscope Stages



Heating Elements



Heating element with 35mm clearance for Coverslip Chambers and Petri dishes TC-E35

Ready to use heated system for samples cultured/placed on coverslips. Used with bath chambers for replaceable coverslips CSC and UTIC. Replaceable coverslips allow to culture cells before performing experiments. The heater preheats perfusion solution before it enters the chamber. This keeps temperature stable even if used with perfusion systems. Inline heated Teflon tubing fits manifolds included with perfusion systems. Can be used for imaging and recording. Can be used with 35 mm petri dishes. Since some brands of petri dishes have different diameter, reducing adapters TC-PA might be required. Requires a microscope adapter (specify microscope model when ordering, ships installed inside the microscope adapter). Requires a temperature controller. **Item# TC-E35**

- **Dimensions:** 52mm diameter, 5.5mm high including 35mm glass bottom dishes
- **Temperature stability:** 0.01°C, built-in sensor
- **Solution Pre-heater:** Replaceable/Removable Teflon tubing, easy to wash
- **Optical clearance:** 35mm
- **Microscope adapter:** Fits to 50mm cutout of standard microscope adapters MA and IMA
- **Use with:** Coverslips and Petri dishes,

Heating Element with 15mm window TC-E35x15

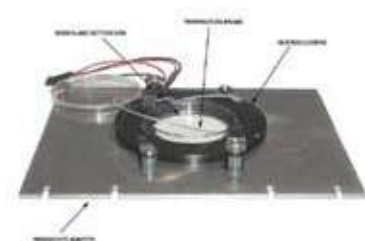
Fits 35mm dishes. The whole bottom is heated to eliminate temperature gradient, which makes it ideal for petri dishes, including glass bottom dishes. Wide 15mm optical clearance to access your sample with immersion optics from the bottom. Built-in temperature sensor. Since some brands of petri dishes have different diameter, reducing adapters TC-PA might be required. Incorporates Teflon perfusion tubing, which makes the element



to work as inline preheater. Requires a microscope adapters with 50mm mounting opening. Requires a temperature controller. This element is a part of TC-PCP-15 heating stages. If wider clearance is required, use TC-E35 with 35mm clearance. **Item#: TC-E35x15**

Heating Element with 11m window TC-E35x11 Fits 35mm dishes. The whole bottom is heated to eliminate temperature gradient, which makes it ideal for petri dishes, including glass bottom dishes with small optical clearance. Wide 11mm optical clearance to access your sample with immersion optics from the bottom. Built-in temperature sensor. Since some brands of petri dishes have different diameter, reducing adapters TC-PA might be required. Incorporates Teflon perfusion tubing, which makes the element to work as inline preheater. Requires a microscope adapters with 50mm mounting opening. Requires a temperature controller. This element is a part of TC-PCP-11 heating stages. If wider clearance is required, use TC-E35 with 35mm clearance. **Item#: TC-E35x11**

Heating Element for 50mm dishes with 40mm window TC-E50x40 Fits 50mm dishes and chambers. The bottom has 40mm optical clearance, which makes it ideal for 50x40 glass bottom dishes. Wide 40mm optical clearance allows you to access your sample with immersion optics from the bottom. Built-in temperature sensor. Incorporates Teflon perfusion tubing, which makes the element to work as inline preheater. Requires a microscope adapters with 74mm mounting opening IMA-74. Requires a temperature controller. This element is a part of TC-PD-50x40 heating stages. **Item#: TC-E50x40**



Heating Element for 50/55mm dishes with 30mm aperture TC-E50x30/TC-E55x30 Fits 50mm or 55mm dishes. The whole bottom is heated to eliminate temperature gradient, which makes it ideal for 50x30 glass bottom dishes. Wide 30mm optical clearance to access your sample with immersion optics from the bottom. Built-in temperature sensor. Incorporates Teflon perfusion tubing, which makes the element to work as inline preheater. Requires a microscope adapters with 74mm mounting opening. Requires a temperature controller. This element is a part of TC-PD-50x30 heating stages. **Item#: TC-E50x30 /TC-E55x30**

- **Dimensions:** 52mm diameter, 5.5mm high (76mm for 50mm dish heaters)
- **Temperature stability:** 0.01°C, built-in sensor
- **Optical aperture:** 15mm, 11mm, 40mm and 30mm
- **Use with:** Petri dishes, including glass bottom dishes
- **Solution Pre-heater:** Replaceable/Removable Teflon tubing, easy to wash
- **Microscope adapter:** Fits to 50mm/74mm cutout of standard microscope adapters

Heating Elements

Catalog No.	Description
TC-E35x15	Heating Element for 35mm dishes with 15mm aperture.
TC-E35x11	Heating Element for 35mm dishes with 11mm aperture.
TC-E50x40	Heating Element for 50mm dishes with 40mm aperture.
TC-E50x30	Heating Element for 50mm dishes with 30mm aperture.
TC-E55x30	Heating Element for 55mm dishes with 30mm aperture.
TC-E35	Heating Element with 35mm aperture.



Glass Bottom Dishes vs. Petri Dishes

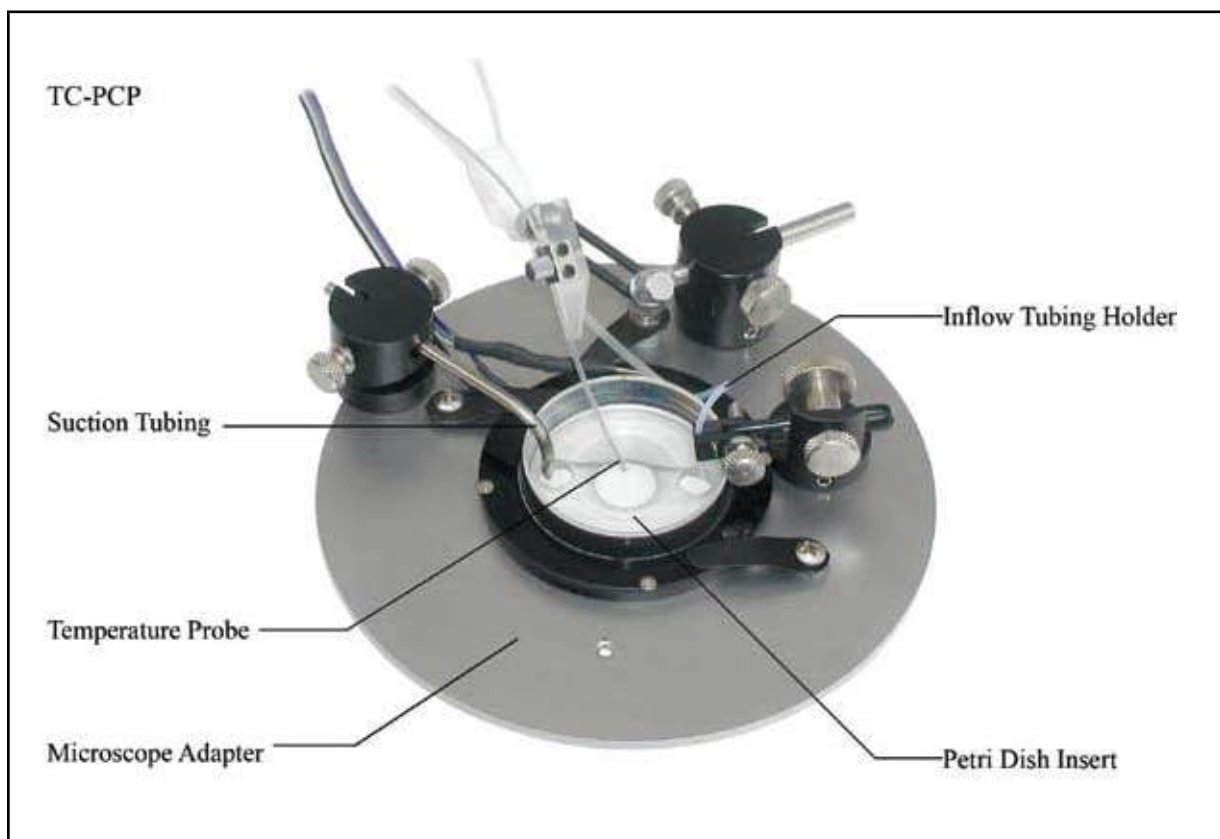
Glass bottom dishes are used with short working distance, high N.A. objective in fluorescence, confocal and image analysis experiments.

The heating elements with reduced optical window in the middle (down to 15 or 11mm) will provide better temperature stability for your sample, and are perfect for use with glass bottom dishes and long-working-distance objectives. If immersion objectives are used, however, this small window will limit access of the large immersion objective to the whole bottom surface. In this case a heating element with 35mm clearance/window TC-E35 should be used. Temperature stability still can be provided by using an objective heater.

In contrast to glass bottom dishes, which provide good thermal contact because of flat glass bottom, standard plastic Petri dishes very often have a protruding rim along the bottom edges of the dish. This rim elevates the dish above heating surface. Metal shims/washes can be used to eliminate this air gap, however. This will reduce access for the immersion optics to the bottom of the dish, so TC-E35x15/11 can be used with long-distance objectives only. If using immersion optics and large objectives, 35mm heating element TC-E35 should be used, combined with an objective heater. Please note, that some glass bottom dishes, Mattek dishes for example, are fabricated from standard Corning (or Falcon dishes).

Since different brands of dishes have different outside diameter, sometimes larger than 38mm, we make reducing inserts to provide better fit and thermal contact to the inside cutout of the heating elements, which is 38mm. We also make a 50mm insert to center the dishes inside incubators and larger heating elements, which have 50mm inside cutout.

Shown here is a heating element TC-E35/15/11 mounted inside a magnetic microscope adapter





Heated Glass Plate for Microscope Stages

Uniformly heated glass plate for stereo, upright microscopes, and long-distance objectives of inverted microscopes, TC-HP75x65

Large 75x65mm optical window. Allows you to heat your samples on 80x70mm glass surface. The heated glass plate provides thin profile and uniformly heated surface. Built-in temperature sensor. Flat glass top surface is flashed with the mounting frame, 128x86mm 5mm thick. The frame fits most microscope stages. Can be used to heat custom devices, micro-fluidics chips, plates, flasks, slides and petri dishes. Open or sealed chambers can be formed directly on glass surface, using self-adhesive gaskets for example. Might require a microscope adapter (specify microscope model when ordering). Can be upgraded with an objective heater and chamber-attachments (TC-DIS, TC-DIS-8, TC-WI). **Item#: TC-HP75x65**

- **Optical window:** 75x65 mm
- **Glass thickness:** 1mm
- **Height (frame/adapter):** 5mm/3mm
- **Use with:** Petri dishes, chambers, including glass bottom dishes, fluidics devices
- **Temperature stability:** 0.01°C, built-in sensor
- **Microscope adapter:** specify microscope model



Uniformly heated quartz plate, TC-HPQ75x50

Fused quartz (1.1 mm thickness) for working in the UV or near infrared range of illumination, where regular glass cannot be used (because it is not transparent in these wavelength ranges of illumination). Quartz can also withstand high temperature applications without cracking. Allows you to heat your samples on 75x50mm surface. Large 70x45mm optical window. The heated quartz plate provides thin profile and uniformly heated surface. Built-in temperature sensor. Flat glass top surface is flashed with the 128x86mm mounting frame (5mm thick). The frame is the size of standard multi-well plates and fits most microscope stages. Open or sealed chambers can be formed directly on glass surface, using self-adhesive gaskets for example. Might require a microscope adapter (specify microscope model when ordering). Can be upgraded with an objective heater. Requires a temperature controller (TC-1-100s-24V model for high temperature applications). **Item#: TC-HPQ75x50**

- **Optical window:** 70x45 mm
- **Glass thickness:** 1.1mm
- **Height (frame/adapter):** 5mm/3mm
- **Temperature stability:** 0.01°C, built-in sensor
- **Microscope adapter:** specify microscope model, ships mounted inside 128x86x5mm metal frame;

Uniformly heated glass plate for motorized and type K stages TC-HP108x72

Uniformly heated glass plate provides thin profile and uniformly heated surface. Built-in temperature sensor. Large 108x72mm optical clearance allows you to heat slides and dishes samples on 118x74mm glass surface and to form open or sealed sample chambers. Electrodes and tubing can be fixed around your sample chamber using adjustable holders MH-MIS attached to optional inserts for slides, petri dishes and coverslip chambers. The holders can be used to position perfusion tubing for continuous media exchange, provided that optional inserts TC-I-100 or TC-I-4/3 are placed inside (see table below). Fits most motorized stages with 160x110mm cutout. Some larger stages might require an adapter extension. Can be upgraded with an objective heater. **Item#: TC-HP108x72**



Large Volume/Miniature Bath/Dissecting Chamber for *in vivo* imaging TC-DIS

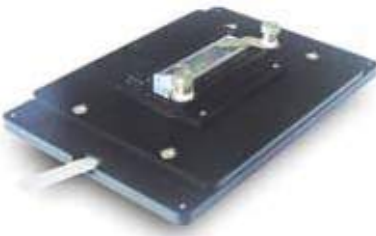
This is a large (54x54x8mm) volume chamber for different applications, including dissecting of tissue. Can be extended up by placing additional 8mm high chambers. The chamber has a glass bottom with transparent coating, which is used as a heater to provide uniform temperature distribution throughout the entire surface. Optical clearance and heated area is 54x54mm. Mounted on a 128x86mm frame, which fits most microscope stages. Might require a microscope adapter. Built-in temperature sensor. An optional magnetic plate can be placed on top upon request. This will allow mounting optional magnetic holders for tubing, electrodes and suction: MTH-S, MTH, and MH-2.

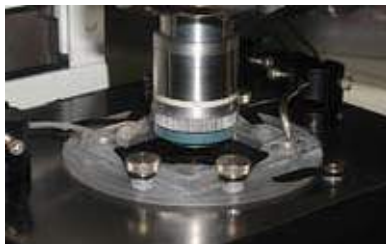
Can be upgraded with an objective heater TC-HLS-05/025. **Item#: TC-DIS/-8**



Uniformly heated cuvette warmer, TC-CUV

This heater can be used with standard 12x12mm cuvettes. The heater surrounds the cuvette from all sides, leaving open top and bottom glass window (1 mm thickness). For working in the UV or near infrared range of illumination, the regular glass can be replaced with quartz heater. The heater is mounted on a 128x86mm 5mm thick frame to fit most microscope stages. Built-in temperature sensors require a 2-channel controller. Might require a microscope adapter (specify microscope model when ordering). **Item#: TC-CUV**





Open Heated Perfusion Chamber for Water Immersion Objective

This chamber has uniformly heated glass bottom with large clearance of 42mm diameter. Separate compartments for inflow and outflow prevent bubbles from entering the chamber and provide smooth perfusion. Built-in temperature probe. Includes 2-channel temperature controller, microscope adapter, two magnetic holders for suction tubing (included), and perfusion manifold (optional). Can be used with controlled flow perfusion systems. Might need an objective heater (above) if water immersion optics is used. Mounted on a 128x86mm frame, which fits most microscope stages. Might require a microscope adapter. Specify microscope model when ordering. **Item#: TC-WI**

Uniform Heaters

Catalog No.	Description
TC-HP75X65	Heated Microscope Plater
TC-HPQ75X50	Heated Quartz Plater
TC-CUV	Uniformly heated cuvette warmer
TC-HP108X72	Heated microscope plate for motorized stages
TC-DIS	Temperature Controller and Large Volume (Dissecting) Chamber
TC-DIS-8	Extension for Large Volume/Miniature Water Bath/Dissecting Chamber, adds extra 8mm in height (volume)
TC-WI	Open Heated Perfusion Chamber for Water Immersion Objective
TC-GSH	Uniformly Heated Glass Slides
IMA-74	Microscope adapter
TC-SYR10x025	TC-SYR10x025 Flexible Syringe Heater, 10in. long

Syringe heater with temperature controller

The syringe heaters are used to heat different sizes syringe barrels (or any other cylindrical surfaces) for degassing solutions or maintaining solutions at temperatures above ambient (up to 150°C). Includes a temperature controller. Can be used with perfusion systems or syringe pumps. Easy to install and remove. The replaceable flexible 0.25x10in. heaters are wrapped around syringes and fixed with included Velcro straps **Item#: TC-SYR10x025**



Low-Profile Heated chambers

Low Profile Heated Stage, TC-E50x30 Larger diameter of this heating element allows you to form low-profile recording and perfusion setups, suitable for use even under upright microscopes. The heating element accepts dishes up to 52mm diameter. Can be used with smaller chambers and 35mm dishes, if combined with reducing adapter-rings. Heating happens from the bottom to eliminate temperature gradient. Optical aperture is 28.5mm. Can be used with PCCS1 and PCCS2 low-profile coverslip chambers, which are only 4mm high. Can be used with sealed thin chambers for high resolution imaging. Can be upgraded with an objective heater for immersion optics. Can be used with CSC coverslip chambers as well. Requires a microscope adapter, specify microscope model when ordering. **Item#: TC-PD-50x30**

- **Dimensions:** 76mm diameter dishes
- **Temperature stability:** 0.01°C, built-in sensor
- **Optical clearance:** 30mm
- **Use with:** Coverslip chambers, 50mm dishes, Petri dishes, including 35mm glass bottom
- **Solution Pre-heater:** Replaceable/Removable Teflon tubing, easy to wash
- **Microscope adapter:** Fits to 74mm cutout of standard microscope adapters

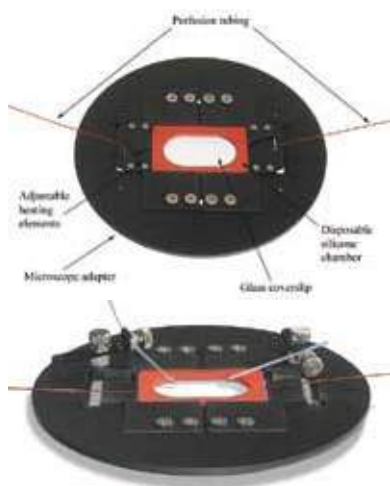
Low Profile Heaters

Catalog No.	Description
TC-E50x30	Heater for 50mm dishes with 30mm optical clearance
IMA-74	Microscope adapters, specify microscope model when ordering
TC-PA50	50mm reducing adapter-ring for 35mm dishes
UTIC-25	Holder for Ultra-Thin Imaging Chambers, fits 25mm Coverslips, microscope adapters and heated stages
CS-No1-25	Glass Cover Slip, box of 100. Optical quality glass cover slip for perfusion bath chambers. Box of 100. Made in Germany. No. 1 thickness.
UTIC-21	Adhesive layers, pack of 100.
PCCS2	Small Volume Perfusion System for 30mm coverslips and 50mm glass bottom dishes
PCCS2-PDI	Adhesive layers, pack of 100, for use with PCCS2 perfusion chambers.

Adjustable Heaters for rectangular Coverglasses and Slides



Adjustable Slide Heater TC-SH A heater for chambered glass coverslips/coverglasses and slides. Can be used with any slide of standard size (width 1in., and length not more than 3in). Two adjustable heating elements can slide along the adapter to accommodate different shapes and dimensions. Can be upgraded with objective heater. Mounted on a 128x86mm frame, which fits most microscope stages. Might require a microscope adapter. Choose microscope adapter when ordering. Built-in temperature sensor. Comes with two holders to fix additional temperature probe and/or tubing. Requires a temperature controller. **Item#: TC-SH**



Low-Profile Adjustable Coverslip Heater TC-CH A heater for chambered glass coverslips/coverglasses. The low profile allows you to use the heater under upright microscopes, including AFM. Two adjustable heating elements can slide along the adapter to accommodate different coverslip length. Can be used with any coverslip: width 1 in., and length not more than 3in. Can be upgraded with objective heater. Mounted on a 128x86mm frame, which fits most microscope stages. Might require a microscope adapter. Choose microscope adapter when ordering. Built-in temperature sensor. Requires a temperature controller. F **Item#: TC-CH**

Adjustable Heaters for rectangular Coverglasses and Slides

Catalog No.	Description
TC-SH	Adjustable Heater for Slides and Coverglasses.
TC-CH	Low-Profile Adjustable Heater for Coverslips.
IMA	Microscope Adapter.



Heaters for In Vivo Experiments

A temperature controlled heater to keep exposed organs at animal body temperature. This heater can be adjusted to position next to or above a small animal. Live attached organs can be placed into a silicone chamber attached to the glass surface of the heater. Easy to clean after use. Custom chambers of any shape are available. Adjustable miniature tubing holders can be used for solution exchange or to apply test compounds (the holders can be also used to fix electrodes and sensors). Magnetic stands provide solid support on the microscope table. The stands are adjustable for easy elevation change during experiments. Requires a temperature controller.

- **Dimensions:** 1x 3 in. transparent glass heater
- **Adjustable elevation:** Flexible, up to 2in.
- **Temperature stability:** better than 0.01°C, built-in sensor
- Can be custom modified

In Vivo Heater

Catalog No.	Description
TC-in-vivo	In Vivo transparent heater, adjustable, 1x3in.

Objective Heater with Temperature Controller



A flexible silicone heater for any objective. Used with oil or water immersion optics. Built-in temperature sensor. Easy to attach and remove. Simply wrap the heater around objective and secure with included Velcro tape. Specify the width/height when ordering. The heater is usually attached to a cylindrical surface of the objective, closer to the sample. **Item#: MTC-HLS-025**

- **Dimensions:** 0.5in. wide x 5in long power output down to 0W; settings eliminate temperature overshoot; adjustable temperature threshold
- **Temperature stability:** 0.01°C, self-adjusting, built-in sensor; dual overheating protection
- **Easy to install:** Fits any objective

Objective heaters

Catalog No.	Description
MTC-HLS-025	Objective Heater with 1-channel temperature controller
TC-HLS-05	Objective Heater upgrade, 0.5x5in
TC-HLS-025	Objective Heater upgrade, 0.25x10in

Heater for chambers from Culture Myograph Systems



A heating element designed for 35mm culture myograph chambers. The mounting frame is 128x86mm, the size of standard multi-well plates to fit motorized stages and type-K mechanical stages. Two set screws and two clamps to fix the chamber from two sides and the top. Recessed area for connecting tubing. Bottom aperture is 25mm, with 1mm thick lip to hold the chamber. Requires a temperature controller. The controller stores two settings in its memory for different temperatures for easy temperature jumps. **Item#: TC-MYO**

- **Dimensions:** 128x86x3mm, 25mm aperture
- **Temperature stability:** 0.01°C, self-adjusting, built-in sensor; dual overheating protection
- **Easy to install:** Fits mechanical, motorized and type-K stages

Culture Myograph Heater

Catalog No.	Description
TC-MYO	Heater for 35mm Culture Myograph chambers



Single channel High stability Precision Temperature Controller TC-1-100s

A simplified controller suitable for application where multiple temperature probes are not required: objective heaters, syringe heaters, heated glass plates, and other simple configurations. Easy to use and flexible self-adjusting controls for stable operation. Connection to an optional external probe (bath). Stores two

settings in its memory for different sample sizes/heating elements (different size objectives, for example), which can also be used to generate fast temperature steps.

No electrical noise

Built-in overheating protection

No vibrations during imaging and recording - no internal fan

Standby mode

Most heating stages work as inline solution pre-heaters. Can be used with flow control and perfusion systems. Includes the connecting cable, and 100-240VAC power supply: 12V output is suitable for most small heating elements and objective heaters (18V and 24V output available).

- **Temperature sensor:** built-in inside heating elements to stabilize temperature in different sample volumes and heating stage sizes
- **Range** from room to 150°C with accuracy 0.1°C
- **Temperature stability:** 0.01°C, self-adjusting, required for sensitive applications: nano/piezo positioning, confocal imaging
- **Settings:** flexible & self-adjusting, allow
- **Temperature probe (optional):** miniature 0.87mm (fits small volume chambers)
- **Feedback:** Stage sensor
- **Output:** 5A max, 165W



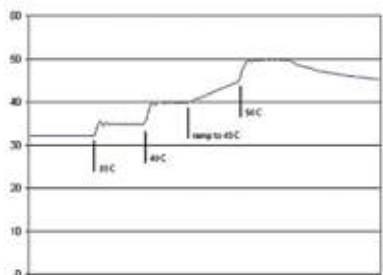
2-Channel Heating Controller, with digital RS232 interface TC-1-100

Low electrical noise, heating and cooling temperature controller for microscope stages. Flexible self-adjusting controls for stable operation. Multiple temperature probes to choose for feedback. Can be used with objective heaters. Can be used with flow control and perfusion systems. Most heating and cooling stages work as inline solution pre-heaters. Can be used with flow control and perfusion systems. The second channel is usually used for objective heaters, or incubator lids. Includes connecting cables. An external temperature probe might be needed, to monitor bath temperature for example. External probes are plastic-encapsulated: no metal ions leakage into solutions. Includes an internal power supply: 12V is suitable for most small heating elements and objective heaters, 18V is required for miniature incubators, 24V is required for cooling stages.

- Range from room to 150°C with accuracy 0.1°C
- Built-in overheating protection
- **Temperature probes:** optional miniature 0.87mm (fits small volume chambers)
- **Feedback:** Stage sensor or External probe
- **RS232 port** for programmed temperature changes
- **Analog Input** to set temperature changes
- **Analog Output** to monitor temperature
- **Standby mode** activated manually or by external TTL signal
- **No vibrations** during imaging and recording - no internal fan
- **Dimensions:** 6.5 x 4 x 9in.
- **Stability:** 0.01°C, self-adjusting
- **Settings:** flexible & self-adjusting, allow to stabilize temperature in different sample volumes and heating stage sizes; allow to regulate output from 0 to 96W; prevents temperature overshoot; provide dual overheating protection
- **Output:** 12V 4A max per channel (18V and 24V optional)

Temperature Controllers, low noise

Catalog No.	Description
TC-1-100	2-Channel Temperature Controller, high stability, no electrical noise (includes cables and 12 power supply)
TC-1-100s	1-Channel Temperature Controller, high stability, no electrical noise (includes cable and 12 power supply)
TC-TP	Replacement temperature probe
TC1-TCR	Replacement Cable Assembly for TC-1-100 controller



Programmable 2-Channel Heating Controller, precision high stability, low electrical noise, with digital RS232 interface, TC2-80-150/BTC-2-100

Provides higher stability required for some sensitive applications, nano/piezo positioning, confocal or AFM imaging for example. Flexible controls for stable operation and easy to use through the graphical touch-screen. Can be used with objective heaters and with perfusion systems. Most heating stages work as inline solution pre-heaters. Self-tuning: does not require manual adjustments to provide stable operation. Automatic cooling.

Can be programmed through the touch screen to generate ramps and temperature steps, longer than 24hour each, 1sec min.

- No drift due to high stability, 0.01°C.
- No vibrations during imaging and recording - no internal fan.
- Range from -80 to 150°C with accuracy 0.1°C.
- Self-tuning, no adjustments are required.
- Multiple temperature sensors to choose for feedback, STAGE and BATH.
- External probes are plastic-encapsulated: no metal ions leakage into solutions
- Built-in overheating protection.
- Inputs for programmed temperature changes.
- Analog and Digital Outputs to monitor and SET temperature.
- Digital interface for software control.
- No electrical noise - suitable for electrophysiology.

- **Range:** up to 150°C
- **Stability:** 0.01°C
- **Dimensions:** 8x1.8x11.5in.
- **Temperature probe:** miniature 0.87mm thick (fits small volume chambers)
- **Settings:** Self-tuning to stabilize temperature

of different sample volumes and heating stage sizes, no manual adjustments are required

- **Feedback:** from Stage (built-in) or External probe (Bath)
- **Input:** 100-240VAC, 150W

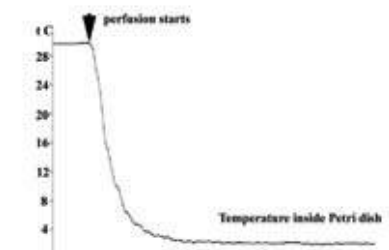
2-Channel Programmable Temperature Controllers

Catalog No.	Description
TC2-80-150	2-Channel Temperature Controller, connecting cables
TC2-TCR	Connecting Cable Assembly. Can be also used to monitor temperature through the second channel of multi-channels controllers.
TC-TP	Replacement Temperature Probe

Cooling & Heating

In-Line Perfusion Cooler/Heater Unit TC-RD

Controls temperature of perfusion solutions in the range from 0 to 100°C. A small heating/cooling element is designed to mount on a manipulator next to your sample to provide fast temperature changes by streaming the solution directly onto the sample.



On the right is an example of fast temperature change inside a petri dish. Experimental conditions: TC-RD system was set at 0°C; the petri dish was set at 30°C using another TC-1 controller and TC-PCP heating stage; two flow control CFPS-1U66 units were used - one for solution suction from the dish, through PDI insert inside the dish; and another CFPS-1U66 to cool heat sink of TC-RD unit; the third CFPS-1U unit was used to perfuse the dish; a slow temperature sensor was used to simulate temperature change in the whole dish; the actual temperature change in the point of solution application is much faster. **Item#: TC-RD**

- **Dimensions:** 1.5 x 2.25 x 4.25in
- **Temperature stability:** better than 0.1°C, built-in sensor
- **Heat Sink:** water cooling for very low temperatures
- **Feedback:** Selectable Stage, or External sensor (Bath)

Cooling & Heating microscope incubator for petri dishes and coverslip chambers, BTC-S /-35

- **Dimensions:** 120x120x23mm
- **Optical aperture:** 22mm diameter/ 35mm for BTC-S-35 stage
- **Objective working distance, minimum:** 0mm (for inverted microscopes)
- **Temperature stability:** 0.1°C, built-in sensor
- **Sink:** optional water cooling for very low temperatures, requires BTC-W unit
- **Microscope adapter:** Fits to 74mm cutout of standard microscope adapters IMA-74



Can be used with: Standard 35mm disposable Petri dishes (petri dish adapters TC-PA might be required), or glass bottom dishes (TC-PA-W or TC-PA-F adapter is required); and replaceable coverslip chambers CSC. Built-in temperature sensor for stable operation. Can be used with high optical quality glass cover



with ports for gas input, to control CO₂ or hypoxia. Built-in lines to cool sink during deep cooling. Consider a different cooling stage for rectangular slides below. Requires a temperature controller. Requires a microscope adapter (specify microscope model). **Item#: BTC-S**

Low-Profile Cooling & Heating plate, BTC-L

- **Dimensions:** 120x160mm, 80x40mm cooling/heating area
- **Optical aperture:** 10mm diameter
- **Objective working distance, minimum:** 0mm (for upright microscopes)/ 3mm (for inverted microscopes)
- **Temperature stability:** 0.1°C, built-in sensor
- **Heat Sink:** optional water cooling for low temperatures, requires BTC-W unit
- **Microscope adapter:** Fits to 74mm cutout of standard microscope adapters IMA-74

Can be used with: standard 35mm disposable Petri dishes, glass bottom dishes, and disposable slides and coverglasses. Can cool the sample down to -2°C (or heat up to 150°C). The cooling area is 40x80mm with 10mm aperture in the middle. The low profile of the stage allows easy access to your samples. Provided clamps will fix the sample in place. Can be placed on upright microscopes. Can be mounted on a microscope stage (specify dimensions of microscope stage cutout, 108mm diameter for Nikon for example). Requires sink cooling and a temperature controller. **Item#: BTC-L**

Cooling & Heating microscope incubator for slides, BTC-SL

- **Dimensions:** 120x120x23mm
- **Optical aperture:** 20x46mm
- **Objective working distance, minimum:** 0mm (for inverted microscopes)
- **Temperature stability:** 0.1°C, built-in sensor
- **Sink:** optional water cooling for very low temperatures, requires BTC-W unit
- **Microscope adapter:** Fits to 74mm cutout of standard microscope adapters IMA-74

Can be used with: Standard 1 in. (25mm) wide disposable slides and chambered coverglasses. Built-in temperature sensor for stable operation. Can be used with high optical quality glass cover with ports for gas input, to control CO₂ or hypoxia. Built-in lines to cool sink during deep cooling. Consider a different cooling stage for petri dishes and coverslips above. Requires a temperature controller. Requires a microscope adapter (specify microscope model). **Item#: BTC-SL**

Slides and Chambered Coverglasses Cooling & Heating stage, BTC-SLM

- **Dimensions:** 110x160x18mm, 26x79mm cooling/heating area
- **Optical aperture:** 20x46mm
- **Objective working distance, minimum:** 0mm (for inverted microscopes)
- **Temperature stability:** 0.1°C, built-in sensor
- **Sink:** optional water cooling for very low temperatures, requires BTC-W unit
- **Microscope adapter:** Fits to 74mm cutout of standard microscope adapters IMA-74



Can be used with: custom devices, disposable slides and coverglasses. Can cool the sample down to -5°C (or heat up to 150°C). Fits 160x110mm cutout of motorized stages, and type K Zeiss stages. The cooling area is an inside cutout 26x79mm (to fit standard slides), with 20x40mm aperture in the middle. The inside cutout is 17mm deep, with 1mm lip to hold the sample. Requires sink cooling and a temperature controller. **Item#: BTC-SLM**

Low Profile Cooling & Heating stage for Slides and Chambered Coverglasses, BTC-SL-128x86



- **Dimensions:** 128x86mm, 29x79mm cooling/heating area
- **Optical aperture:** 20x46mm
- **Objective working distance, minimum:** 0mm (for inverted and upright microscopes)
- **Temperature stability:** 0.1°C, built-in sensor
- **Sink:** optional water cooling for very low temperatures, requires BTC-W unit
- **Microscope adapter:** Fits to 128x86mm holders for standard multi-well plates

This low profile heating/cooling stage designed to fit inside 128x86mm holders for standard multi-well plates. Can be used with: custom devices, disposable slides and coverglasses. Positioned on both sides threaded #4-40 holes can be used to mount optional IMA-MH tubing and probes holders. Can cool the sample down to 0°C (in combination with BTC-W heat exchange unit) or heat up to 150°C. The cooling area is an inside cutout 29x79x1mm (to fit standard slides), with 20x40mm aperture in the middle. Requires a temperature controller. **Item#: BTC-SL-128x86**



Cooling & Heating microscope stage for 50mm dishes, BTC-S50

- **Dimensions:** 145x145x23mm
- **Temperature stability:** better than 0.1°C, built-in sensor
- **Sink:** water cooling for very low temperatures, optional water cooler unit BTC-W
- **Optical aperture:** 33mm
- **Microscope adapter:** Fits to 74mm cutout of standard microscope adapters

Can be used with wider up to 59mm disposable dishes, including Willco 50mm glass bottom dishes. Comes with reducing adapter for 50mm dishes. Built in lines to cool heat sink for deep cooling. 30mm clearance. Click on image to enlarge. Consider a different cooling stage for rectangular slides. Requires a microscope adapter (specify microscope model when ordering), and a temperature controller. **Item#: BTC-S50**



Cooling & Heating Microscope Objective, BTC-O

- **Dimensions:** custom cooling/heating area (22.5x10mm for example)
- **Optical aperture:** custom
- **Objective working distance, minimum:** 0mm (for upright microscopes)/ 0mm (for inverted microscopes)
- **Stability:** 0.1°C, built-in sensor
- **Heat Sink:** optional water cooling for low temperatures

Can be used with any microscope objective (or any cylindrical object). Can cool the objective down to -6°C (or heat up to 150°C). The cooling area should be specified when ordering, for example 22.5mm diameter and 10mm wide for x40 Zeiss objective (technical drawings are required). Built-in clamp will fix the objective in place. Can be placed on upright and inverted microscopes. Requires sink cooling and a temperature controller **Item#: BTC-O**



Cooling & Heating stage for 90mm glass dishes, BTC-90

- **Dimensions:** 120x120x35mm, 95mm diameter cutout, 18mm deep
- **Temperature stability:** better than 0.1°C, built-in sensor
- **Sink:** water cooling for very low temperatures, optional water cooler unit BTC-W
- **Fits:** 90mm I.D. glass dishes

This heating/cooling stage was designed to fit 90mm dissecting glass dishes. Provides black background for better visibility. Might require water heat sink circulator BTC-W for cooling to lower temperatures. The cooling area is an inside 95mm cutout. Requires a temperature controller. **Item#: BTC-S50**



Low Profile Cooling & Heating stage for upright scanning microscopes, BTC-SCAN

- **Dimensions:** 160x110x11mm, can be elevated with provided 3mm thick spacers
- **Temperature stability:** better than 0.1°C, built-in sensor
- **Sink:** water cooling for very low temperatures, optional water cooler unit BTC-W
- **Optical aperture:** none; 77x55x1mm cutout for slides
- **Working distance, minimum:** 0mm (for upright microscopes)

This heating/cooling stage fits inside 160x110mm cutouts of motorized stages. The low profile allows positioning under scanning heads and objectives of upright microscopes. 1mm deep cutout will fit x2 standard 1x3in slides. Can be used with: custom devices, disposable slides and coverglasses. Positioned on both sides threaded #4-40 holes (x4) can be used to mount stainless steel clamps. Might require BTC-W heat exchange unit for deep cooling. Requires a temperature controller. **Item#: BTC-S50**



Heat Exchange Unit for Peltier stages, BTC-W

This liquid heat-exchange was designed to bring temperature of the heat sink in Peltier stages down by actively decreasing temperature of liquid (water, for example) running through the sink. Can be used to cool computer chips and water reservoirs. Able to cool 300ml of water from room temperature of 24°C down to 8°C in 10 min, with the temperature of output liquid reaching 5°C. Built-in peristaltic pump to run liquid through the unit. Includes tubing.. **Item# BTC-W**

- **Dimensions:** 7.9 x 17.3 x 15.8 in
- **Ports:** IN and OUT barbed ports, 1/8 in I.D. (10-32 thread)
- **Power supply:** 100/240VAC
- **Output:** circulates liquid at 150ml/min; can be increased to 500ml/min upon request

Heating and Cooling

Catalog No.	Description
BTC-90	Cooling & Heating stage for 90mm glass dishes
BTC-SCAN	Low Profile Cooling & Heating stage for upright scanning microscopes
TC-RD	In-Line Perfusion Heater/Cooler unit
BTC-S	Heating & Cooling Microscope Stage, 22mm optical aperture
TC-PA-C	Reducing adapter-ring, for Corning and Mattek dishes
TC-PA-N	Reducing adapter-ring, for Nunc type dishes
TC-PA-W	Reducing adapter-ring, for Willco dishes
TC-PA-F	Reducing adapter-ring, for Fluo dishes from WPI
TC-PA-G	Petri Dish Adapter, for Greiner Bio-One dishes, glass bottom
BTC-S-35	Heating & Cooling Microscope Stage, 35mm optical aperture, to use with CSC coverslip chambers
BTC-SL	Heating & Cooling microscope stage for slides
BTC-S50	Heating & Cooling microscope stage for 50mm dishes
BTC-L	Heating & Cooling plate for slides and dishes, low profile
BTC-SLM	Heating & Cooling stage for slides, 160x110mm
BTC-SL-128x86	Low Profile Heating & Cooling stage for slides, 128x86mm
BTC-O-28x10mm	Heating & Cooling attachment for Microscope 28mm diameter objective, 28x10x40mm
BTC-O-32x10mm	Heating & Cooling attachment for Microscope 32mm diameter objective, 32x10x40mm
BTC-O-22.5x10mm	Heating & Cooling attachment for Microscope 22.5mm diameter objective, 22.5x10x40mm
BTC-O-34.5x10mm	Heating & Cooling attachment for Microscope 34.5mm diameter objective, 34.5x10x40mm
BTC-W	Liquid heat exchange unit for Peltier stages
IMA-74	Microscope adapter
BTC-TCR	Replacement Connecting Assembly an easy-disconnect cable for TC2-80-150-C and BTC cooling controllers.
BTC-1-100	Economy 1-Channel Temperature Controller, automatic cooling
BTC-2-100	2-Channel Temperature Controller, automatic cooling, includes cables

Perfusion Systems

Programmable Systems for Liquids Application & Switching



- Up to 16-Channel Complete Systems with programmable timers
- Modular Design to build custom configurations
- Compatible with Imaging & Data Acquisition systems
- No electrical noise during switching
- Automatically switch to preset solutions for easy manual operation
- *in vivo*, Bath Perfusion & Local Application
- Works with Temperature Controlled Systems

Multi-Channel	16 Independent Channels
Controls	Manual
	Wireless Remote Control
	TTL Signals (+5V)
	Binary Encoding
	Analog Input
AUTO Memory	Automatically switches to preset channels for uninterrupted perfusion using programmable timers
SET Outputs	For channel monitoring or automatic outflow control
INHIBIT Mode	Manual and external (+5V) to switch solutions OFF at once
RS232/USB	RS232/USB port for software control

- **Number of channels:** up to 16 channels;
- **Remote control:** wireless
- **Manifolds:** 8-channel, can be reduced down to 1-channel
- **Height:** up to 3ft. adjustable, for gravity driven solution flow
- **Solution cylinders:** 60ml syringes
- **Pressure cylinders:** 10ml x8, 50ml x8
- **Gas adapter/Pressure manifold:** to saturate solutions with gas mixture, or pressurize solutions
- **Pressurized Small volume delivery system:** 8-channel, PTFE connecting tubing 2ft. per channel
- **Tubing:** 100ft. polyethylene tubing, fits valves and perfusion manifold directly; 50ft. Tygon tubing, fits provided barbed luer-locks to connect to syringes
- **Fitting:** barbed luer-locks and ferrule-type to connect to solution cylinders and between Tygon & polyethylene tubing
- **Anti-vibration mounting:**
 - a. 1x1 ft. stand,
 - b. magnetic stand,
 - c. M8 threaded surfaces
- **Digital control**, optically isolated: x16 inputs through BNC connectors; x8 through DB-9 connector; CODE mode to control 16 channels through 4 digital inputs (binary encoding)
- **Analog input:** from to 0 to 9V - controls 16 channels;
- **SET output:** to switch outflow/suction unit;
- **Programmable Timers:** for precise manual control and to generate sequences up to 16 steps (continuous loops are also possible)
- **Software control:** through RS232 input, or USB adapter



Valve Controller with 0-15PSI pressure output, Programmable

PC-16 valve controller is included with every 8- or 16-channel perfusion systems. Ships with wireless remote control. Modifications for N. O. valves are also available. Can be used with any custom solenoids or even motors. Can be programmed to deliver up to 16 step sequences (up to 32 steps, if automatic wash between solution applications is used). Compatible with data acquisition and imaging systems: LabView, MatLab, pClamp, IPlab, PatchMaster, Metamorph, MetaFluor and others.

AUTO Memory

To program individual channel timers and sequences. Allows to switch “wash” solution automatically between channels in sequence.

CODE Mode

The controller has an options for valves control by channel encoding using only 2-4 digital inputs, in case if a limited number of digital outputs is available in your system.

Analog Input

You can also use analog signal input to switch the channels by changing the voltage (0.5V increment).

USB/RS232 Input

The RS232 port allows automation of solution switching and integration with imaging systems.

SET Out 5V TTL output to switch outflow automatically.

INHIBIT Mode

Inhibit mode, input and output.

DIMENSIONS

Size: 5 x 12 x 9in. Includes 120/220VAC internal power supply.

OUTPUT

12V (4A max/channel, 10A total); other outputs for custom devices are available on request;

0-15PSI pressure output (for PC-16P model only)

power supply: 100/240VAC

Item#: PC-16



Pinch Valves

In the pinch valve a soft 1/8in. I.D. tubing is pinched closed by the valve, and opens when the channel is ON. The results are simple tubing replacement and easy system cleanup after experiments. Recommended for strong solvents and reagents, and for hard to wash/clean solutions. Includes shielded connecting cable. The system comes with a manifold that fits to perfusion chambers for cultured cells/tissue slices, petri dish and oocytes. Includes easy disconnect fitting for tubing and syringes. Since valves are inside the metal box and are connected to the controller through shielded cables, there is no electrical noise during switching.

Item#: PS-V8

Complete 8-Channel Pinch Valves Perfusion System, PS-8H

Designed for animal physiology and cell research applications. The valves are mounted inside a metal box to shield your system from electrical noise. The system comes with manifold that fits to perfusion chambers for cultured cells/tissue slices, petri dish and oocytes. Includes soft Tygon, polyethylene tubing and fitting to connect to pinch tubing. Includes 60ml syringes/reservoirs. Includes easy disconnect luer fitting for tubing and included syringes. Comes with gas adapter to saturate solutions with gas mixtures, CO2 and O2 for example, or to pressurize optional PC-10/50 cylinders. Compatible with data acquisition and imaging systems. Since valves are inside the metal box and are connected to the controller through

shielded cables, there is no electrical noise during switching.

The included unique flexible stand provides vibration-free operation and includes both a stand and a small magnetic base. The magnetic base does not take a lot of space from your set-up, but allows to position perfusion solutions near your sample. The post consists of 0.5 in. O.D., 1 foot long aluminum parts and can be extended to 3 feet high. An 1.5 in. flowerette head screw will fix the syringes on the post, making a traditional syringe holder. Comes with 60ml syringes, stop-cocks, and fitting. The holder can be also mounted on threaded M8 surfaces. **Item# PS-8H**

Complete 16-Channel Pinch Valves Perfusion System, PS-16H

To form a 16-channel setup, this system includes two sets of the above parts, included with the 8-channel system, which can be operated by the same 16-channel controller.. **Item#: PS-16H**

Perfusion systems and Valve Controllers

Catalog No.	Description
PS-V8	Pinch Valves, Shielded, Box of 8, for use with PC-16 controller
PS-V8S-15	Miniature 1.5ms Solenoid valves, set of 8, mounted inside an aluminum box
PS-V8S	Solenoid valves, set of 8, mounted inside an aluminum box
PS-8SE	Economy 8-Channel Perfusion System. Includes programmable 16-channel controller and solenoid valves (without SH-1A syringe holder, manifold, tubing and fitting).
PS-8S	Complete 8-Channel Perfusion System. Includes programmable 16-channel controller, solenoid valves, SH-1A syringe holder, manifold, tubing and fitting.
PS-16S	Complete 16-Channel Perfusion System. Includes programmable 16-channel controller, solenoid valves, SH-1A syringe holders, manifold, tubing and fitting.
PC-16	16-Channel Valve Controller, programmable
PC-16P	16-Channel Valve Controller with 15PSI pump, programmable

Pinch Valve Perfusion Systems

Catalog No.	Description
PS-8H	Complete 8-Channel Pinch Valve Perfusion System with controller, Syringe Holder on Magnetic Base
PS-16H	Complete 16-Channel Pinch Valves Perfusion System. Includes programmable 16-channel controller, pinch valves, SH-1A syringe holders, manifold, tubing and fitting.

Accessories

Catalog No.	Description
DB9-C	Connecting Cable for PC-16 controller and valves
CFPS-USB	Adapter USB to RS232
DB9-IMG	Connecting Cable from PC-16 controller to Imaging Systems

Solenoid Valves



Miniature 1.5ms switch, solenoid valves, set of 8, PS-V8S-15

These fast valves can be used for single cell/small sample superfusion, or to switch solutions in micro-fluidics setups. They do not create disturbance due to minimal inside working volume. Provide barbed connection for 0.042in. I.D. soft tubing. The set of eight (x8) valves are mounted in a small aluminum box 125x25x50mm, which comes with 1ft. long mounting 0.5in. rods and x-blocks. **Item#: PS-V8S-15**



Complete 8-Channel Pinch Valves Perfusion System, PS-8S

Designed for animal physiology and cell research applications. Easy to use solenoid valves with luer fitting. Wide orifices will maintain high flow rates. The system comes with manifold that fits to perfusion chambers for cultured cells/tissue slices, Petri dish and oocytes. Includes soft Tygon, polyethylene tubing and fitting to connect to pinch tubing. Includes 60ml syringes/reservoirs. Includes easy disconnect luer fitting for tubing and included syringes. Compatible with data acquisition and imaging systems.

The included unique flexible stand provides vibration-free operation and includes both a stand and a small magnetic base. The magnetic base does not take a lot of space from your set-up, but allows to position perfusion solutions near your sample. The post consists of 0.5 in. O.D., 1 foot long aluminum parts and can be extended to 3 feet high. An 1.5 in. flowerette head screw will fix the syringes on the post, making a traditional syringe holder. Comes with 60ml syringes, stop-cocks, and fitting. The holder can be also mounted on threaded M8 surfaces.. **Item#: PS-8S**



Complete 16-Channel Pinch Valves Perfusion System, PS-16S

To form a 16-channel setup, this system includes two sets of the above parts, included with the 8-channel system, which can be operated by the same 16-channel controller. **Item#: PS-16S**

- wireless remote control; manual control, digital or TTL signals generated by a computer or other equipment
- analog signal control
- RS232 port (or USB connection) for software control
- **Manifold:** 8-channel, each can be reduced down to 1-channel
- **Height:** up to 3ft. adjustable, for gravity driven solution flow
- **Solution cylinders:** 60ml x16
- **Tubing:** 100ft. polyethylene tubing, fits valves and perfusion manifold directly; 50ft. Tygon tubing, fits provided barbed luer-locks
- **Fitting:** barbed luer-locks and ferrule-type to connect to solution cylinders and between Tygon & polyethylene tubing
- **Anti-vibration mounting:**
 - a. 1x1 ft.. stand,
 - b. magnetic stand,
 - c. M8 threaded surfaces

Accessories

Adapter USB to RS232 Allows you to connect through a computer USB port. Creates a virtual RS232 (COMn) port, so that you can program the controller using your standard software. **Item#: CFPS-USB**

Cable to Connect Perfusion Systems to Imaging Systems A custom cable to fit your imaging system. Used with imaging software to control perfusion systems for automatic liquid handling and test solution applications. Specify imaging package used or define required connectors. **Item#: DB9-IMG**

Digital Pressure Controllers - pumps, with RS232 port

For use with small volume delivery systems, pressure cylinders and solution switches. Generates pressure up to 15PSI (does not require an external source of pressure). The controller regulates output pressure (0.5mmHg stability) to provide defined smooth solution flow through sample chambers, microfluidics chips for example. Prevents flow blockage by bubbles inside solutions. Simple to use. This is an advanced alternative to syringe pumps (easy solution refill and unlimited volume). **PC-R15/10 model provides a source of pressure for smooth flow control in sensitive fluidics devices with 0.5mmHg stability, and RS232 port to monitor and SET pressure. Item#: PC-R15/10**

- **Output:** max pressure 7.5 / 15 PSI (385 / 775 mm Hg)
- **Stability:** 0.5mm Hg
- **Connectors:** Easy-connect, 1/8in. O.D. tubing
- **Indicators:** PRESSURE digital display
- **Controls:** START/STOP, output CLOSE/OPEN, touch screen SET pressure output
- **Dimensions:** 6 x 13 x 9in.
- **Power:** internal 100/240VAC power supply

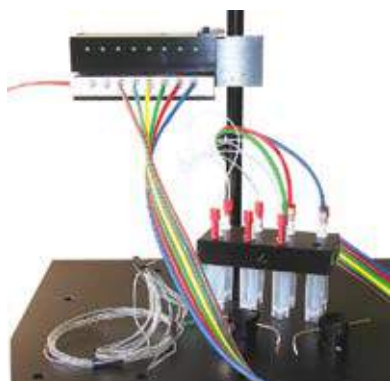


Pressure regulator For use with small volume delivery SVDS1 and pressure cylinders PC. Connects to a cylinder with a compressed gas mixture (max. input 300PSI). The controller regulates output pressure to provide consistent defined solution flow through sample chambers and microfluidics chips (prevents flow blockage by bubbles inside solutions for example). Simple to use. **Item#: PC-100-25**

- **Input:** max 300PSI
- **Output:** max 30PSI
- **Connectors:** Easy-connect, 5/32in. (4mm) O.D. tubing
- **Indicators:** PRESSURE digital indicator, output LOW, output CLOSE
- **Controls:** INPUT PRESSURE regulator 0-100PSI, CLOSE manual switch,
- CLOSE TTL input (+5V to start), OUTPUT PRESSURE settings, MANUAL dial to SET pressure, EXTERNAL input to SET pressure, MONITOR pressure - analog output
- **Dimensions:** 6 x 2.5 x 9in.
- **Power:** Includes external 120/230VAC power supply



8-Channel pressure switch, PS-V8P This small manifold can deliver pressure to eight independent outputs - channels. If connected to sealed containers, small volume manifolds or cylinders, the pressure switch can deliver solutions to any custom chamber or fluidics device (no syringe pump or gravity driven perfusion is required). Can be used with any volume containers, including transfer bottles. Can be also used with zero-dead volume manifolds to deliver solutions into small chambers and dishes. Requires a pressure pump and the valve controller. The controller can be programmed to deliver solution sequences and for continuous periodic solution replenishment. The switch is rated up to 150 PSI input pressure. It has a secondary threaded input port for the balance pressure to prevent back-flow. Dimensions: 5x2x2in. If purchased together with PC-16 valve controller, the switch will ship with free SVDS1 small volume manifold. **Item#: PS-V8P**



Programmable 8-Channel liquid delivery system, PS-8P In addition to 8-channel pressure switch PS-V8P, this setup includes 16-channel programmable valve controller PC-16P, with incorporated 0-15PSI pressure controller-pump, adjustable stand SH-1A, small volume manifolds SVDS1 and SVDS2, and sets of pressure cylinders PC-10 and PC-50 (x8 each), connecting tubing and fitting. Can deliver solutions to any custom chamber or fluidics device (no syringe pump or gravity driven perfusion is required). Can be also used with zero-dead volume manifolds to deliver solutions into small chambers and dishes. **Item#: PS-8P**



Small Volume Delivery System SVDS2 For use with standard 15ml tubes from Sarstedt. This system utilizes eight small plastic tubes with conical bottom and 1/16in. O.D. PTFE tubing to connect to your setup for liquid delivery. Tubes with solutions are simply threaded into the holder. Solutions are easy to refill during the experiment. Requires pressurized gas to deliver the solutions. Can be used with miniature manifolds ZMM, perfusion systems, and pressure controllers. Solutions can be also withdrawn using controlled flow or vacuum systems. Can be used to collect samples by aspiration.

The system comes with all necessary tubing and fitting to connect to a single pressure source. The small size of 200x25x25mm (without tubes attached) allows to position solutions near your sample. Can be attached to a 1 ft. rod (included). Comes with X-block to attach onto a standard 0.5 in. stand. Includes replaceable plastic tubes 15ml, PTFE tubing, fitting and tubing to connect to a pressure source.



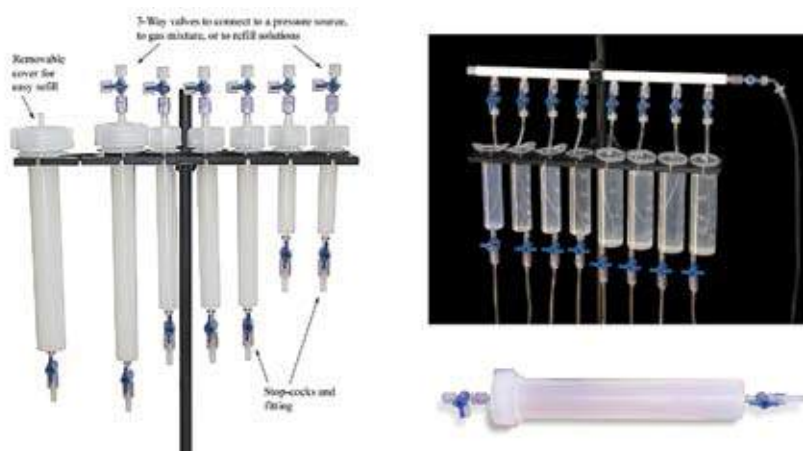
Provided fitting allows you to connect tubes directly to the valves of perfusion systems, and the output from valves directly to the manifolds or custom tubing and chambers. All our manifolds can be connected, including zero-dead volume, luer-lock, and miniature manifold for single cell perfusion. Shown on the picture, is SVDS2 system connected to the pinch valves of PS-8H setup. Output from SVDS2 then goes to ZMM manifold to provide liquid delivery and solution switching inside a Petri dish with PDI insert inside. The outflow is provided through a suction tubing of MTH-S holder. **Item#: SVDS2**



Small Volume Delivery System with pressure switch, SVDS2-P This is the same SVDS2 manifold for 15ml tubes with incorporated pressure switch, which is controlled by PC-16 controller. It allows you to connect tubes directly to the manifolds without using valves. Ideal for use with custom fluidics devices and zero-dead volume manifolds that do not have back-flow, although the system has an input port for the secondary balance pressure. The valve controller can be programmed using built-in timers to generate solution sequences. Requires pressurized gas to deliver the solutions.

The system comes with all necessary tubing and fitting to connect to a single pressure source. The small size allows to position solutions near your sample. Comes with X-block to attach onto a standard 0.5 in. stand. Includes replaceable plastic tubes x8 15ml, PTFE tubing, fitting and tubing to connect to a pressure source, and cable to connect to the valve controller. **Item#: SVDS2-P**

Cylinder to Pressurize/Oxygenate Solutions, Set of 8 A set of autoclavable cylinders to pressurize your solutions. Can be used to drive solutions through 100 micron tip of MM manifold, for example. Can be also used to saturate solutions with gases (bubbling) by feeding a thin tubing inside the cylinder. Comes with stop-cocks and fitting for 1/16 in. I.D. tubing. Includes a 1-way valves to connect to a pressure source, to release the pressure, to refill the cylinder, or to connect to a source of gas mixture (oxygenation, for example). Comes with threaded cover for easy refill. Material: polypropylene. Specify volume when ordering. Large 650ml volumes are available upon request. Cylinders with built-in 10, 25 or 40 micron filters are also available (specify when ordering). Volumes up to 100ml fit to our SH syringe holders. **Item#: PC**



Gas Mixture Delivery Adapter - Pressure manifold

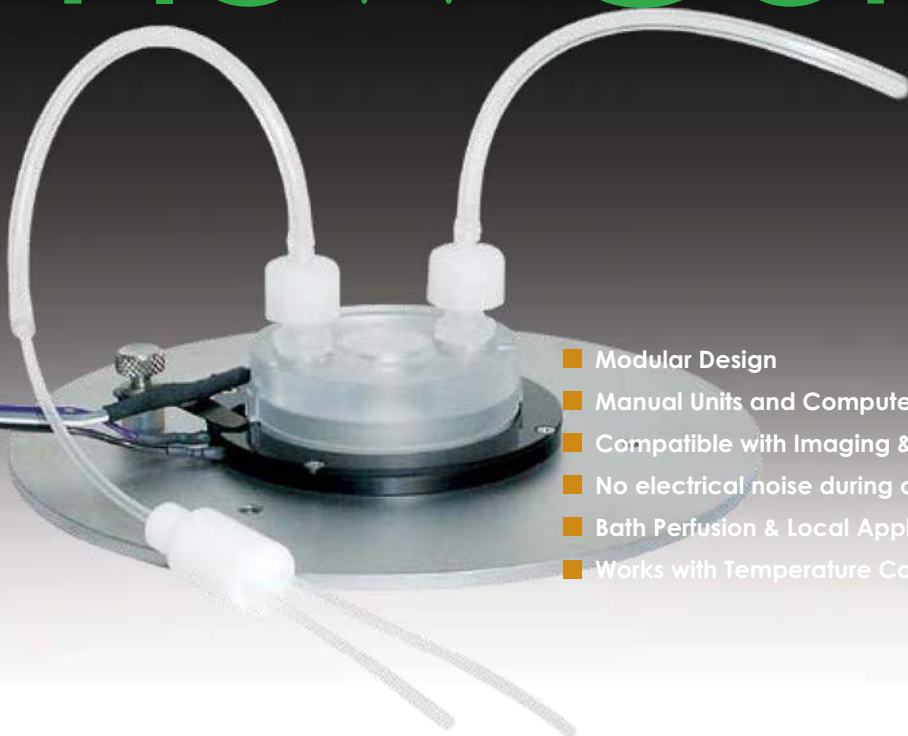
Adapter for syringe holders to connect to a gas source to saturate/bubble eight solutions during experiments (CO₂ saturation or oxygenation, or pressurizing the solution.) Comes with X-block to fit 0.5 in. posts. Includes 9 stop-cocks and plugs to close unused channels or the common inlet. It also comes with tubing and fitting to connect to output barbs and thin tubing to form bubbles inside the solutions. Can be used with stones, or any other diffuser, to bubble larger volumes. Can be also used to pressurize solutions by connecting to pressure cylinders PC. Can be connected to another adapter to use the same source of gas mixture/pressure.. **Item#: SH-A**

Pressure Controllers

Catalog No.	Description
PC-R10	Pressure controller, adjustable up to 7.5PSI - 385 mm Hg - output.
PC-R15	Pressure controller, adjustable up to 15PSI - 775 mm Hg - output, unregulated vacuum
PC-100-25	Pressure regulator, adjustable up to 30PSI output
PS-V8P	8-Channel pressure manifold-switch
PS-8P	Programmable 8-channel liquid delivery system
SVDS2	Small Volume Perfusion System
SVDS2-P	Small Volume Perfusion System SVDS2 with pressure switch
PC-10	Cylinder to pressurize/oxygenate solutions, 10 ml, set of 8
PC-50	Cylinder to pressurize/oxygenate solutions, 50ml, set of 8
SH-A	Gas Mixture Delivery Adapter



Flow Control



*Programmable
pumps for
Dosing and Liquid
Delivery*

- Modular Design
- Manual Units and Computerized Systems
- Compatible with Imaging & Data Acquisition systems
- No electrical noise during operation
- Bath Perfusion & Local Application
- Works with Temperature Controlled Systems

Precision Miniature Dosing Pump, CFPS-1U, 8 μ l/min to 7.3 ml/min

This unit provides precise linear flow rate control in selectable ranges from 340 nl/min to 22 ml/min. The range is defined by tubing I.D. and the drive configuration. Precision design and miniature size minimize pulsations to provide smooth liquid delivery. Designed for stable solution delivery, perfusion, infusion or substance application during microscope imaging, recording, calcium and other ions measurement, and biochemical assays. The miniature size allows to mount the pump next to the sample to minimize the connecting tubing length. High flow rate units can be used for suction to prevent solution overflow during perfusion. Can be used with coverslip chambers, lab-on-chips, miniature incubators, small organs and animals perfusion setups.



The pump can be controlled manually, using wireless remote, analog input, digital input, and by software through RS232 port. The unit can be programmed using built-in timers to provide precise dosing at certain period. Can reverse direction of liquid flow. Can be used to apply multiple solutions, if linked to automated perfusion systems, which can be programmed to deliver sequences of different solutions.

Includes a 100-240VAC power supply, and an X-block to mount on a standard 0.5" posts. All metal body design eliminates electrical noise. Multiple units can be controlled by the same remote control, up to sixteen units. Comes with a set of tubing for different flow ranges: 0.015" I.D. - 8-170 μ l/min; 0.020" I.D. - 20-340 μ l/min; 0.031" I.D. - 50-920 μ l/min; 0.062" I.D. - 170-3400 μ l/min; 0.093" I.D. - 370-7300 μ l/min. **Item#:** CFPS-1U

- **Flow control:** manual dial, RS232 port, analog signal (0 - +10V), reverse direction port, reverse direction
- **Remote control:** wireless ON/OFF and to start programmed sequences
- **Timers:** 1sec resolution; both delivery time and period can be programmed;
- **Programmable Volume:** Can be programmed to deliver volumes, up to 999.9ml
- **Continuous Delivery:** Can be programmed to deliver liquid continuously with set volume/ time and period
- **Dimensions:** 4W x 3.5H x 3.5D in.
- **Power:** external 110/230VAC power supply
- **Mounting:** 0.5in. 1 ft. rod and x-block
- **Fitting:** barbed luer-locks, or optional CFPS-FIT kit
- Peristaltic **Tubing:** 0.015in. I.D.; 0.020in. I.D.; 0.031in I.D.; 0.062in. I.D.; 0.093in. I.D.

Precision Miniature Dosing Pump, 340 nanol - 275 µl/min

Comes with a set of tubing for different flow ranges. Includes a power supply. Power rating: 0.30W.

Item#: CFPS-1U10K

Precision Miniature Dosing Pump, 30µl/min to 22 ml/min

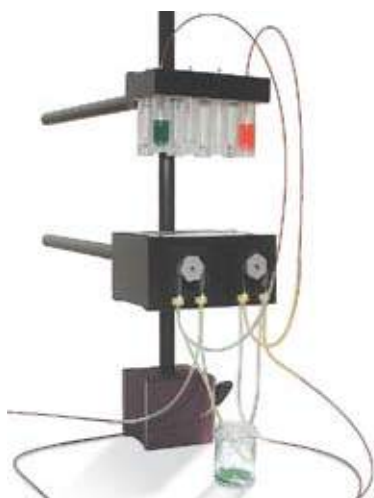
Comes with a set of tubing for different flow ranges. Includes a DC power supply. Power rating: 1.4W.

This high flow rate unit can be used for solution suction/aspiration from open perfusion chambers. **Item#: CFPS-1U66**

Precision Miniature Dosing Pump, 4µl/min to 3.3 ml/min

Comes with a set of tubing for different flow ranges. Includes a power supply. Power rating: 0.30W.

Item#: CFPS-1U9



4-Channel Programmable Dosing System, CFPS-2

- **Flow control:** manual dial, analog signal (-5 - +5V), software control through RS232/USB port, reverse direction
- **Remote control:** wireless channel switch ON/OFF and to start programmed sequences
- **Timers:** 1sec accuracy, up to more than 24hours for each channel
- **Programmable Volume:** Can be programmed to deliver volumes, up to 999.9ml
- **Programmable Sequences:** Can be programmed to activate channels in sequences with programmable delays
- **Continuous Delivery:** Can be programmed to deliver liquid continuously with set volume/ time and period
- **Dimensions:** 4x2.5x1.85 in.
- **Power:** 110/230VAC
- **Mounting:** 0.5in. 1 ft. rod and x-block
- **Fitting:** barbed luer-locks
- Peristaltic **Tubing:** 0.015in. I.D.; 0.020in. I.D.; 0.031in I.D.; 0.062in. I.D.; 0.093in. I.D.

This is a 2-channel perfusion system for precise control of solution flow rate from 8 µl/min to 7.3 ml/min (or choose upgrades below for different flow rates up to 22ml/min). Includes a 4-channel programmable controller, which allows upgrade to a 4-channel system. Precision design and miniature size minimize pulsations to provide smooth perfusion. Designed for stable solution flow or substance application during imaging, recording, calcium and other ions measurement, biochemical assays or small organs and animals perfusion. Used with small chambers in lab-on-chip setups, imaging and recording workstations.

Digital interface and analog inputs allow you to calibrate each channel independently and to apply one or multiple substances by switching channels manually or through data acquisition and imaging software. The controller can be programmed using timers for each channel, or to dispense preset volumes. It also



allows to program continuous sequence of solution applications, which can be used to replenish liquid media during long-term experiments. You can accurately mix different solutions or generate dose-response curves using only two solutions: buffer and concentrated test compound.

Each channel can be controlled through wireless remote, manually, by analog signal, TTL or through RS232 connection for fully automated setups controlled through third party software packages (optional USB adapters are also available).

The system can be upgraded to operate up to 4 channels in parallel. Can be connected to solution switching miniature systems for changing and mixing solutions in sequence. The optional luer-lock manifolds will combine multiple solutions into a single output. The size of the 2-channel system is 4x2.5x1.85 in (separate from the controller). Multiple systems can be attached to each other to form a multi-channel system. Includes 1 ft. mounting rod and X-block to attach a standard 0.5in. posts. Comes with a set of tubing for different flow ranges: 0.015" I.D. - 8-170 µl/min; 0.020" I.D. - 20-340 µl/min; 0.031" I.D. - 50-920 µl/min; 0.062" I.D. - 170-3400 µl/min; 0.093" I.D. - 370-7300 µl/min; dual 0.015" I.D. x2 8-170 µl/min (for different ranges select upgrades below). Includes 4-channel controller **Item#: CFPS-2**

Flow Rates, ml/min

Tube ID	CFPS-2/1U	Upgrade		
		10K	900	66
.015"	0.008-0.17	0.34-6.7 µl/min	0.004-0.08	0.03-0.6
.020"	0.017-0.34	0.59-12 µl/min	0.007-0.14	0.05-1.0
.031"	0.046-0.92	1.6-34 µl/min	0.020-0.40	0.15-3.0
.062"	0.17-3.4	6.7-145 µl/min	0.08-1.7	0.5-10
.093"	0.37-7.3	13.5-275 µl/min	0.16-3.3	1.1-22

Accessories



4-Channel Flow Controller This 4-channel programmable controller, which allows upgrade to 4-channel system. Designed for stable solution flow or substance application during imaging, recording, calcium and other ions measurement, biochemical assays or small organs and animals perfusion. Used with small chambers in lab-on-chip setups, imaging and recording workstations. Each channel can be controlled through wireless remote, manually, by analog signal, TTL or through RS232 connection for fully automated setups controlled through third party software packages (optional USB adapters are also available).

Digital interface and analog inputs allow you to calibrate each channel independently and to apply one or multiple substances by switching channels manually or through data acquisition and imaging software. The controller can be programmed using timers for each channel, or to dispense preset volumes. It also allows to program continuous sequence of solution applications, which can be used to replenish liquid media during long-term experiments. You can accurately mix different solutions or generate dose-response curves using only two solutions: buffer and concentrated test compound. **Item#: CFPS-UC2**



Additional 2-Channel Upgrade Adds another two independent channels. Turns ON/OFF independently by analog signals, TTL or/and RS232 connection, or manually (depending on the controller used). Attached together to another system, forms a single unit. Can be mounted horizontally, vertically or simply left on the desktop. Includes mounting hardware. Tubing is not included. **Item#: CFPS-2U**



USB Adapter Converts your computer USB ports into RS232 ports. Includes cables and software drivers. **Item#: USB-RS232**

Fitting Kit

Includes a set of fitting for tubing used inside controlled flow system and microbore tubing, including our Teflon, polyimide, and polyethylene PPT tubing. **Item#: CFPS-FIT**

Mounting Brackets Kit Allows you to attach multiple flow control units together into one solid piece. Includes 2 brackets (top and bottom) and 12 screws. **Item#: CFPS-MB**

Flow Control

Catalog No.	Description
CFPS-1U	Flow Control Unit, 8µl/min to 7.3ml/min
CFPS-1U10K	Flow Control Unit, 0.34-275 µl/min
CFPS-1U66	Flow Control Unit, 30µl/min to 22 ml/min
CFPS-1U9	Flow Control Unit, 4µl/min to 3.3 ml/min
CFPS-2	Programmable 2-Channel Controlled Flow Perfusion System
CFPS-UC2	Programmable 4-Channel Flow Controller
CFPS-2U	Additional 2-Channel Upgrade
CFPS-10K	Upgrade for flow rates 0.34-275 µl/min
CFPS-900	Upgrade for flow rates 4-3300 µl/min
CFPS-66	Upgrade for flow rates 30-22000 µl/min
USB-RS232	USB Adapter
CFPS-FIT	Fitting Kit
CFPS-MB	Mounting Brackets Kit
CFPS-ST-15	Tubing set, 0.015", x5
CFPS-ST-15	Tubing set, 0.020", x5
CFPS-ST-15	Tubing set, 0.031", x5
CFPS-ST-15	Tubing set, 0.062", x5
CFPS-ST-15	Tubing set, 0.093", x5
CFPS-ST-15	Dual Tubing set, 0.015", x5
CFPS-S	Replacement protective tape

Small Volume Delivery Systems



Pressurized Delivery of MicroVolumes

- Flow control in microfluidics systems
- Injection into single cells and tissue
- Local extracellular perfusion
- Compatible with Imaging & Data Acquisition systems
- Works with Temperature Controlled Systems

Small Volume Delivery



Small Volume Delivery System SVDS2 For use with standard 15ml tubes from Sarstedt. This system utilizes eight small plastic tubes with conical bottom and thin PTFE tubing to connect to your setup. Tubes with solutions are simply threaded into the holder. Solutions are easy to refill during the experiment. Can be used with miniature manifolds, perfusion systems, and pressure controllers. Requires pressurized gas to deliver the solutions. Solutions can be also withdrawn using controlled flow or vacuum systems. Can be used to collect samples by aspiration.

The system comes with all necessary tubing and fitting to connect to a single pressure source. The small size of 200x25x25mm (without tubes attached) allows to position solutions near your sample. Can be attached to a 1 ft. rod (included). Comes with X-block to attach onto a standard 0.5 in. stand. Includes replaceable plastic tubes 15ml, PTFE tubing, fitting and tubing to connect to a pressure source.



Provided fitting allows you to connect tubes directly to valves of perfusion systems, and the output from valves directly to the manifolds or custom tubing and chambers. All our manifolds can be connected, including zero-dead volume, luer-lock, and miniature manifold for single cell perfusion. Shown on the picture, is SVDS2 system connected to the pinch valves of PS-8H setup. Output from SVDS2 then goes to ZMM manifold to provide liquid delivery and solution switching inside a Petri dish with PDI insert inside. The outflow is provided through a suction tubing of MTH-S holder. **Item#: SVDS2**



Small Volume Delivery System with pressure switch, SVDS2-P This is the same SVDS2 manifold for 15ml tubes with incorporated pressure switch, which is controlled by PC-16 controller. It allows you to connect tubes directly to the manifolds without using valves. Ideal for use with custom fluidics devices and zero-dead volume manifolds that do not have back-flow, although the system has an input port for the secondary balance pressure. The valve controller can be programmed using built-in timers to generate solution sequences. Requires pressurized gas to deliver the solutions.

The system comes with all necessary tubing and fitting to connect to a single pressure source. The small size allows to position solutions near your sample. Comes with X-block to attach onto a standard 0.5 in. stand. Includes replaceable plastic tubes x8 15ml, PTFE tubing, fitting and tubing to connect to a pressure source, and cable to connect to the valve controller. **Item#: SVDS2-P**



Small Volume Delivery System SVDS1 For use with small chambers, lab-on-chips, and intracellular perfusion. Can be used with miniature manifolds, perfusion systems. Requires pressurized gas to deliver the solutions. Solutions can be also withdrawn using controlled flow or vacuum systems. Can be used to collect samples by aspiration.

The majority of available perfusion systems have long lines of tubing, which have to be filled before conducting experiments. However, sometimes applied substances are available only in limited quantities or are extremely expensive, prohibiting the usage of conventional perfusion. This system utilizes small plastic tubes with conical bottom and thin PTFE tubing to connect to your setup. It can be used with as little as 100 μ l volumes of perfusate. Tubes with solutions are simply threaded into the holder. Solutions are easy to refill during the experiment. The system comes with all necessary tubing and fitting to connect to a single pressure source, if required. The small size of 91 x 48 x 17 mm (without tubing attached) allows to position solutions near your sample. Can be attached to a 1 ft. rod (included). Comes with X-block to attach onto a standard 0.5 in. stand. The body has 6.5 mm I.D. opening, which allows to mount the system on a micromanipulator. Includes replaceable plastic tubes 2/3.5ml, PTFE tubing, fitting and tubing to connect to a pressure source. when ordering. **Item#: SVDS1**

Small Volume Delivery Systems

Catalog No.	Description
SVDS2	Small Volume Perfusion System SVDS2
SVDS2-P	Small Volume Perfusion System SVDS2 with pressure switch
SVDS1	Small Volume Perfusion System SVDS1



Digital Pressure Controllers with RS232 port

For use with small volume delivery systems, pressure cylinders and solution switches. Generates pressure up to 15PSI (does not require an external source of pressure). The controller regulates output pressure to provide defined solution flow through sample chambers, microfluidics chips for example. Prevents flow blockage by bubbles inside solutions. Simple to use. This is an advanced alternative to syringe pumps (easy solution refill and unlimited volume). **PC-R15/10 a source of pressure with stability of 0.1mmHg for smooth liquid flow in sensitive fluidics devices, and RS232 port to monitor and SET pressure.**

Item#: PC-R15/10

- **Output:** max pressure 7.5 / 15 PSI (385 / 775 mm Hg)
- **Stability:** 0.5 mm Hg
- **Connectors:** Easy-connect for 1/8in. O.D. tubing; 10-32 threaded
- **Indicators:** PRESSURE digital display
- **Controls:** START/STOP, CLOSE/OPEN output touch screen PRESSURE settings, RS232 port to set and monitor pressure
- **Dimensions:** 6 x 13 x 9in.
- **Power:** internal 120/230VAC power supply

Pressure regulator For use with small volume delivery SVDS1 and pressure cylinders PC. Connects to a cylinder with a compressed gas mixture (max. input 300PSI). The controller regulates output pressure to provide consistent defined smooth solution flow through sample chambers and microfluidics chips (prevents flow blockage by bubbles inside solutions for example). Simple to use. Different output pressure ranges are available upon request. **Item#: PC-100-25**

Pressure Controllers

Catalog No.	Description
PC-R10	Pressure controller, adjustable up to 10PSI - 510 mm Hg - output.
PC-R15	Pressure controller, adjustable up to 15PSI - 775 mm Hg - output, unregulated vacuum
PC-100-25	Pressure regulator, adjustable up to 30PSI output

Digital Pico-Injectors Spritzers with RS232 port

Generate pressure up to 15PSI (higher pressure range is available upon request) or uses external pressure source (100PSI max). Do not require an external source of pressure (unless pressures above 25PSI are required). The controller regulates output pressure to provide defined solution flow through puffer pipettes and tubing. Simple to use. Programmable timers and sequences with 100ms resolution. **RS232 port to switch, monitor and SET pressure.**



1-Channel Programmable Pressure Pico-Injector - Spritzer and aspirator, UC-1

For use with pipettes, thin tubing, and small volume delivery systems. Connects to an external pressure source up to 100PSI for injection and to a vacuum source (100PSI max) for aspiration. Built-in programmable timers (100 ms min). Manual push button Includes a foot pedal control for easy operation. **Item#: UC-1**

4-Channel pico-injector spritzer with x4 independent pressure controls

Provides independent control for each channel, even if one of the channels remains open to the air. For use with puffer pipettes, small volume delivery SVDS1 and pressure cylinders PC. The controller regulates output pressure up to 14.5PSI to provide consistent defined smooth solution flow through sample chambers and microfluidics chips (prevents flow blockage by bubbles inside solutions for example). Simple to use. Different output pressure ranges are available upon request. **Item#: UC-4**

8-Channel pico-injector spritzer

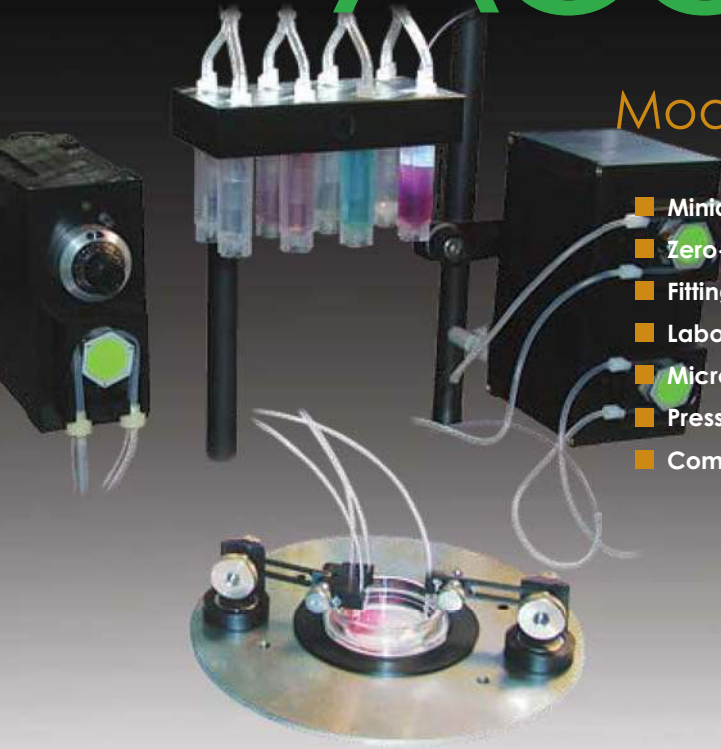
For use with puffer pipettes, small volume delivery SVDS1 and pressure cylinders PC. The controller regulates output pressure up to 14.5PSI to provide consistent defined smooth solution flow through sample chambers and microfluidics chips (prevents flow blockage by bubbles inside solutions for example). Simple to use. Different output pressure ranges are available upon request. **Item#: UC-8**

Pressure Injectors, Spritzers and Aspirators

Catalog No.	Description
UC-4	4-Channel pico-injector spritzer with x4 independent pressure pumps
UC-8	8-Channel pico-injector spritzer
UC-1	1-Channel programmable pico-injector spritzer
PC-16P	16-Channel Valve Controller, programmable, with 15PSI pressure pump, for use with PS-V8P 8-channel pressure switch
PS-V8P	8-Channel pressure switch, requires a valve controller

Perfusion Accessories

Modular Design for Extreme Flexibility



- Miniature Manifolds for single cell superfusion
- Zero-dead volume manifolds
- Fitting to any custom systems and tubing
- Laboratory stands for vibration free operation
- Microscope adapters
- Pressurized solution holders
- Compatible with Temperature controlled and Perfusion systems

Miniature Manifolds



Zero-Dead Volume Manifold Zero-dead volume facilitates solution exchange inside small volume perfusion chambers. The output channels can be adjusted at a different height to prevent contamination of solutions. The outputs for lower concentration solutions, for example, can be positioned higher so that they do not mix with other solutions. The upper channels can be also used to provide suction of excess of solution from small volume perfusion chambers.

Incorporated magnetic holder allows you to position the manifold anywhere around your sample. Two thumb screws fix the manifold in required position: height, angle, length. Comes with 2 ft. long Teflon tubing, attached to polyimide 250/360 micron I.D. channels. All tubing is replaceable and washable. Perfusion system or/and pressurized Small Volume Delivery System SVDS1 is required. Can be used with small volume PCCS2, CSC chambers and petri dish inserts. Consider microbore tubing fitting PS-kit. Ships configured with six 360micron channels, which allow you do make from 1 to 6-channel manifolds. Specify if 8-channel 250 micron I.D. channels are required.. **Item#: ZMM**

- **Output Channels:** 6-channel, 360 micron per channel with luer connectors
- **Connecting tubing:** incorporates 2ft. tubing



Luer-Lock Manifold This luer-lock manifold can be used with any needle, connecting tubing, nozzle or catheters that have luer connector. Inside tubing is 360micron diameter. Incorporates 2 ft. long connecting tubing with luer connectors. Light weight design allows one to attach the manifold directly to small chambers and animals for infusion/perfusion. Can be used with regular, controlled flow or pressurized perfusion systems. Includes a set of nozzles, from 30 to 16 gauge. **Item#: PM**

- **Channels:** specify, from 2 to 16, 360 micron
- **Connecting tubing:** incorporates 2ft. tubing per channel with luer connectors
- **Output:** replaceable luer nozzles

Teflon Perfusion Manifold For use with PS-xx perfusion systems. Comes with short pieces of Teflon tubing inserted, which fit PPT tubing. Tygon tubing fits over 0.067 in. OD polyethylene tubing. Fits into MTH1 magnetic holders. This item is included with automated miniature perfusion systems. Can be reduced to less number of channels by inserting plugs to close the unused channels. **Item#: TPM**

Miniature Manifolds

Catalog No.	Description
PM-2	Luer-Lock Manifold, 2-channel
PM-6	Luer-Lock Manifold, 6-channel
PM-8	Luer-Lock Manifold, 8-channel
PM-10	Luer-Lock Manifold, 10-channel
PM-12	Luer-Lock Manifold, 12-channel
PM-14	Luer-Lock Manifold, 14-channel
PM-16	Luer-Lock Manifold, 16-channel
ZMM	Zero-Dead Volume Manifold, 6-channel
TPM	Teflon Perfusion Manifold

Tubing and Fitting

Tygon Tubing 1/16 inch I.D. 50 ft. Crystal clear, flexible durometer 55 tubing of superior quality. Non-oxidizing, non-toxic, non-contaminating, odorless, tasteless. Grips tightly to glass or metal, bends to sharp radius. Complies with Federal Specifications L-T-790A Type II for lab applications. .
Item#: TYGON-16

Perfusion Fitting Kit This kit has everything you need to match different tubing and systems together. Compatible with 1/16in. I.D. soft tubing, and polyethylene PPT tubing. Comes in a plastic box, more than 100 pieces. **Item#: PS-KIT**

Silicone Pinch Valve Tubing 1/16 in. I.D., 1/8 in. O.D., 50 ft. Can be used with pinch valve perfusion systems. **Item#: SILICON-8**

Tubing and Fitting

Catalog No.	Description
TYGON-16	Tygon Tubing 1/16 inch I.D., 50 ft.
PS-KIT	Perfusion Fitting Kit
PPT	Polyethylene Tubing, 100 ft.



Syringe Stand - Holders

Threaded Post and X-Block For use with stands, or syringe holders. These 1 foot long 0.5in. posts can be threaded into each other to form modular constructs. They fit to our perfusion accessories and systems, including solution switches and flow control units. Includes X-block.. **Item#: SH-PX**

Syringe Holder, Anti-Vibration, SH-1A This is a universal 0.5in. stand. The mounting base inhibits vibrations from perfusion systems to pass through microscope tables. Several mounting options: the stand can be mounted to surfaces with M8 threaded holes. It also includes both, a stand to place the holder on non-magnetic surfaces, and a strong magnetic base. Includes three 0.5in. posts, which allow you to extend the holder up to 3 feet high. Elevated to sufficient height, this stand can be used for animal perfusion, if combined with manual flow control valves (see below). Comes with SH-10 syringe holder for 50-60ml syringes, and 16 adapters for smaller volume syringes. Includes eight stop-cocks and fitting for 1/16 in. I.D. soft tubing. The magnetic base diameter is only 2.50 in. Includes 50 feet of Tygon tubing. **Item#: SH-1A**





Syringe Holder SH-10 Syringe holder for eight 50 ml syringes. Can be fixed on a 0.5 in. post with a floweret head screw. The syringe holder has slots for tubing, so that syringes do not have to be disconnected while taking them out for refill. Comes with eight 50ml syringes and adapter rings for smaller volume syringes. Included with item SH-A1 above. **Item#: SH-10**

Cylinder to Pressurize/Oxygenate Solutions, Set of 8 A set of autoclavable cylinders to pressurize your solutions. Can be used to drive solutions through 100 micron tip of MM manifold, for example. Can be also used to saturate solutions with gases (bubbling) by feeding a thin tubing inside the cylinder. Comes with stop-cocks and fitting for 1/16 in. I.D. tubing. Includes a 3-way valve to connect to a pressure source, to release the pressure, to refill the cylinder, or to connect to a source of gas mixture (oxygenation, for example). Comes with threaded cover for easy refill. Material: polypropylene. Specify volume when ordering. Large 650ml volumes are available upon request. Cylinders with built-in 10, 25 or 40 micron filters are also available (specify when ordering). Volumes up to 100ml fit to our SH syringe holders. **Item#: PC**



Gas Mixture Delivery Adapter - Pressure manifold SH-A

Adapter for syringe holders to connect to a gas source to saturate/bubble eight solutions during experiments (CO₂ saturation or oxygenation, or pressurizing the solution.) Comes with X-block to fit 0.5 in. posts. Includes 9 stop-cocks and plugs to close unused channels or the common inlet. It also comes with tubing and fitting to connect to output barbs and thin tubing to form bubbles inside the solutions. Can be used with stones, or any other diffuser, to bubble larger volumes. Can be also used to pressurize solutions by connecting to pressure cylinders PC. Can be connected to another adapter to use the same source of gas mixture/pressure.. **Item#: SH-A**

Accessories

Catalog No.	Description
SH-PX	Threaded Post and X-Block
SH-1A	Syringe Holder on Magnetic Base
PC-10	Cylinder to pressurize/oxygenate solutions, 10 ml, set of 8
PC-50	Cylinder to pressurize/oxygenate solutions, 50ml, set of 8
SH-10	Syringe Holder
SH-A	Gas Mixture Delivery Adapter

Manual Flow Control



Two-ways manual valve - stop-cock Manual valve to stop inline liquid/gas flow. Female luer-lock is on one end, and male luer-lock is on the other end. Eight pieces are included in PS-FLOW kit (see table below). Mating luer-lock barbed connectors for different size tubing are included in PS-KIT.

Three-ways manual valve This manual valve redirects flow of liquid/gas between three outlets: two are female luer-locks and one is with male luer lock. Eight pieces are included in PS-FLOW kit (see table below). Mating luer-lock barbed connectors for different size tubing are included in PS-KIT.

Flow Dial Regulates liquid flow in gravity driven perfusion setups. Can be used to provide uniform flow rate in different lines of multi-channel systems. Barbed connectors on both ends for 1/8in. I.D. tubing. Eight pieces are included in PS-FLOW kit (see table below).

Manual Flow Control

Catalog No.	Description
PS-FLOW	Flow control kit
PS-KIT	Perfusion Fitting Kit



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4-Channel Complete perfusion system	75	Chambers for High Resolution Imaging	22
8-Channel Complete perfusion system	75	Chambers for Round Coverslips	36
8-Channel Micro Injector - Spritzer	86	Closed Controlled Environment Chambers	10
8-Channel Micro Injector - Spritzer, for use with external pressure source		Closed Controlled Environment Chambers for microfluidics devices	9
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The background of the advertisement is a composite of scientific and technological images. It includes a network of blue and green lines resembling a neural or molecular structure in the top left, a colorful sphere in the top center, a rack of test tubes with blue liquid in the top right, a large red fluorescently labeled cell in the middle left, a blue cylindrical component in the middle right, and a green line graph in the bottom center. The graph has a y-axis labeled '330)' and '1.3', and a horizontal scale bar labeled '20sec'.

KF Technology

LIFE SCIENCE TOOLS

KF Technology S.r.l.

Via A.Bocchi, 84 00125 Roma - Tel. +39 06 45434179 - Fax +39 06 97253131 - Cell. +39 339 5330322

www.kftechnology.it - info@kftechnology.it