FCS2 CLOSED CHAMBER

The system is comprised of

- Chamber
- Electronic Controller
- Stage Adapter

Accessories recommended for immersion objectives

- Objective Heater
- Objective Temperature Controller

Features

- Suitable for no flow through high rate flow procedures where a rapid exchange of media is required with low cell surface shear
- Cell temperature can be controlled from ambient to 50 degrees C +/- 0.2 degrees C without the need of an air curtain
- Temperature is controlled uniformly across entire field with media equilibrating as it enters the chamber
- Closed system so that bicarbonate CO2 or organic buffers can be employed
- Compatible with 1/16" tubing for perfusion (C-Flex, Tygon, etc.)
- Easily assembled with ordinary skill (no tools required)
- Stand-alone temperature controller with an alarm circuit to safeguard your cells
- Near laminar flow
- Microaqueduct design enables proper Koehler illumination with high-numeric aperture optics for both transmitted and reflected modes of microscopy

Accurate temperature control with built-in laminar flow perfusion.

FCS2 Closed Chamber for Inverted Microscopy

After rigorous preparation your cells will need a micro-observation environment that is conducive to their viability, compatible with your experiments protocol and all techniques of microscopy!

The Focht Chamber System 2 (FCS2®) is a closed system, live-cell micro-observation chamber, that offers several advantages over other chambers. In addition to its unique perfusion and thermal control systems it is fully compatible with all modes of microscopy. It is also the only chamber to combine high-volume laminar flow perfusion rates with Koehler illumination and precise temperature control without an air curtain.

Temperature Control

The FCS2 was designed to maintain accurate thermal control and allow high-volume laminar flow perfusion. Both of these functions are incorporated into our patented Microaqueduct Slide. The surface of the slide, opposite the specimen side, is coated with an electrically conductive transparent thin film of Indium-Tin Oxide (ITO) and two electrical contacts (busbars). When the FCS2 is completely assembled two electrical contacts, which are contained in the electrical enclosure rest on the busbars. A temperature controller is used to pass a regulated current flow through the ITO Coating. This causes the surface of the slide to heat. The heat is transferred through the perfusable media to the cell surface on the coverslip thereby providing first surface thermal control. The self locking base of the chamber is also temperature regulated to provide peripheral heat as well.

Microaqueduct Perfusion

A fluid pathway is formed by separating the Microaqueduct slide from the coverslip containing cells with a single silicone gasket. This gasket can be any thickness from 50 micron to 1mm and any lateral geometry you choose or create. This arrangement allows the user to define the flow characteristics. Therefore, you are not limited by the geometry of the optical cavity instead you select or create it! Fluid access to this flow channel is made through two 14-gauge needle stock tubes protruding from the sides of the chamber top. These tubes provide fluid connection to two perfusion holes in the Microaqueduct slide that interface two "T" shaped grooves cut into the inner surface of the Microaqueduct slide. The “T” groove allows the media to seek the path of least resistance and become nearly laminar before flowing across the cells. This technique eliminates the need for the metal perfusion ring and additional gaskets, which are the limiting factors, required by most conventional chambers.

FCS2 Closed Chamber Ordering Information

Part No.	Product Description	
Bi-060319-2	**FCS2 Starter Set:** FCS2 Chamber, Chamber Controller, 5 Microaqueduct Slides, 50-40mm, Coverslips, and Gasket Set (30/set)	
Bi-060319-2-0318	**FCS2 Stage Adapters** Cell Robotics Adapter, others avail.	
Bi-060319-2-03	**FCS2 Chamber**	
Bi-060319-2-0303	**FCS2 Chamber Controller**	
Bi-130119-5	**Microaqueduct Slides (5/pk)**	
Bi-40-1313-0319	**40mm Coverslips (250/pk)** -other sizes available	
	Complete Bioptechs product line available.	

U.S./Canada prices shown. International prices add 15%. Email or visit web store for latest prices.

FCS2 Specifications

Physical Size:
75mm OD 13mm high

Coverslip No:
1.5 thick x 40mm Diameter

Imaging Aperture:
22mm

Maximum Volume:
706mm³

Minimum Volume:
<31mm³

Maximum Volume Exchange Rate:
1/sec

Minimum Fluid Aperture:
0.6mm²

Separation between optical surfaces:
50 - 1000 microns

External port ID:
1.6mm

Temperature Stability:
+/- 0.2 degrees C

Important Notes

If you are using immersion objectives on mammalian specimens, you will need an Objective Heater!

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AutoMate Scientific®
READY FOR RESEARCH.™

The Gasket Set Includes:

(3) 0.1mm 30mm Round
(2) 0.1mm 14 x 24
(3) 0.25mm 30 mm Round
(2) 0.25mm 14 x 24
(1) 0.25mm Blank
(3) 0.5mm 30mm Round
(2) 0.5mm 14 x 24
(2) 0.5mm Blank
(5) 0.75mm 30mm Round w/holes
(2) 0.75mm 14 x 24
(1) 0.75mm Blank
(2) 1.0mm 30mm Round
(1) 1.0mm 14 x 24
(1) 1.0mm Blank

Custom shapes are available. Simply contact AutoMate to make arrangements for their production.

Your stage, your cells, your flow.

FCS2 Accessories and Stage Adapters

Singular Lower Gasket

By simply changing this one gasket you can change the volume of the chamber. This gasket can have any internal geometry you desire and can be any thickness from .1mm to 1mm. The drawing below shows the standard shapes of the gaskets that we include with every FCS2. We also include solid gaskets for you to custom fit to your application. Once you have found the shape that works best for your experiment you can contact us to have a die made to those specifications

30mm Standard Round

14mm x 24mm Rectangle

30mm Round w/ perfusion holes

Blank 40mm

Open Mode Top for the FCS2

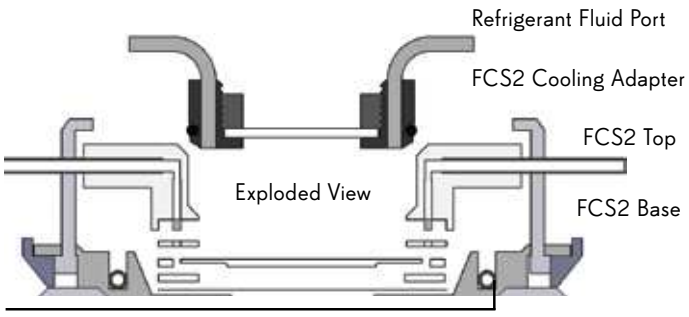
The open mode option allows for the FCS2 to be assembled without the microaqueduct slide thus exposing the cell on the cover slip for microinjection. The coverslip can then be removed and reassembled with the microaqueduct slide for long term, time-lapse.

FCS2 Stage Adapters

The FCS2 Starter set requires a stage adapter for precise positioning. Due to the diversity of microscope stages, a stage adapter cannot be included with the FCS2 starter kit. Select a stage adapter for your scope from the drawings below. When ordering please indicate the brand of microscope and the manufacturer's stage identification number with the description and the corresponding Bioptechs part number. Custom designs are available upon special order.

FCS2 Cooling Adapter

This configuration is designed to allow high N.A. observation of specimens at below ambient temperatures on an inverted microscope. This design provides the same optical and flow characteristics as the warmed FCS2 but provides an adjacent secondary perfusion chamber through which a refrigerant fluid is circulated. Caution: When working below ambient temperatures with high numeric aperture lenses, an Objective Cooling Ring and Objective Thermal Isolator should be used.



Open Mode Adapter Installed on FCS2 Base

Round Stage Adapter

Leica DMIRB

Zeiss IM35 with three plate stage

Zeiss IM35 with single plate

FCS2 Closed Chamber Ordering Information

Part No.	Product Description	
Bi-060319-2-0719	FCS2 Gasket Set (30/set)	
Bi-060319-2-0301	FCS2 Cooling Adapter	
Bi-060319-2-1513	FCS2 Open Mode Adapter	
Bi-060319-2-1242	FCS2 Low Dead Volume Top	
Bi-03060319-2	Cooled FCS2 (CFCS2)	
	Complete Bioptechs product line available.	

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