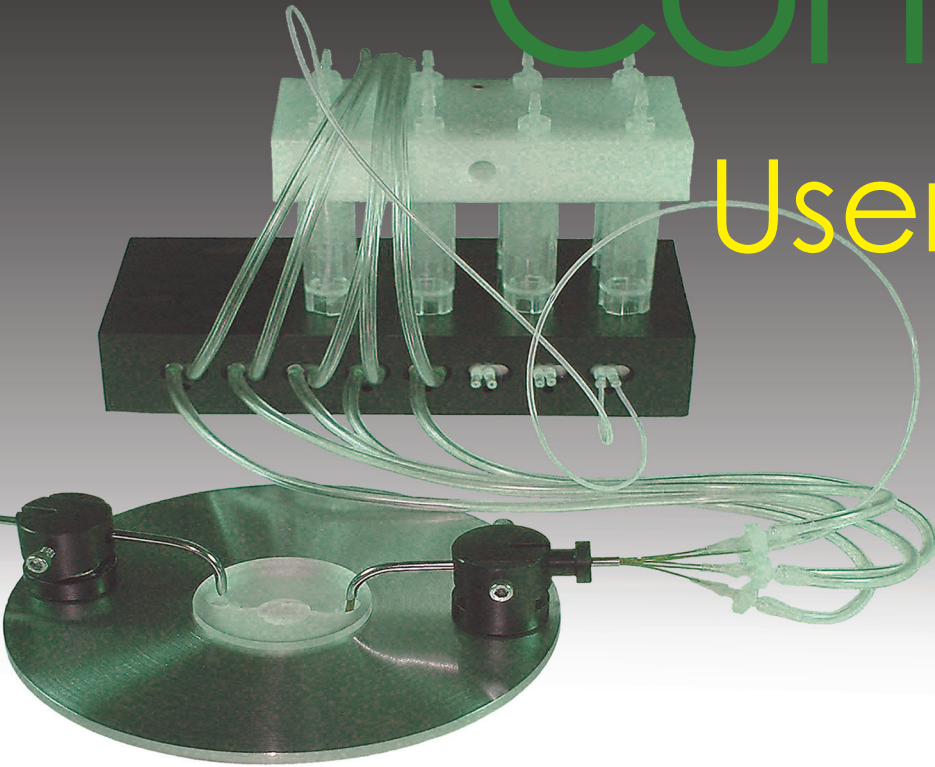


Flow Control

User's Guide



Pressure Controller for liquid delivery systems

- Precise Pressure Control throughout the experiment
- Flow control
- Compatible with any perfusion system
- Ideal for Small Volume Delivery systems
- Compatible with Imaging setups



Ph: 877-853-9755
www.biosciencetools.com

Contents

Specifications	2
Introduction	3
Installation Guide	3
Software control and monitoring	4
Warranty	5
Gas Mixture Adapter, SH-A	6
Pressurized Cylinders, PC	7
Small Volume Delivery System, SVDS1	8



Specifications

Output Range 0 to 385/750+/-0.5mmHg (other ranges available upon request)

Input not required

Sensors built-in pressure sensors

Feedback from output pressure sensor

RS232 port To monitor and control pressure

Output: easy disconnect for 1/8 O.D. tubing
#10-32 threaded
includes barbed and luer fitting
includes easy disconnect fitting for 1/4in. O.D. tubing

Size (Controller) : 13Wx6Hx9D in

Power Supply 94 to 234 VAC, 50/60 Hz

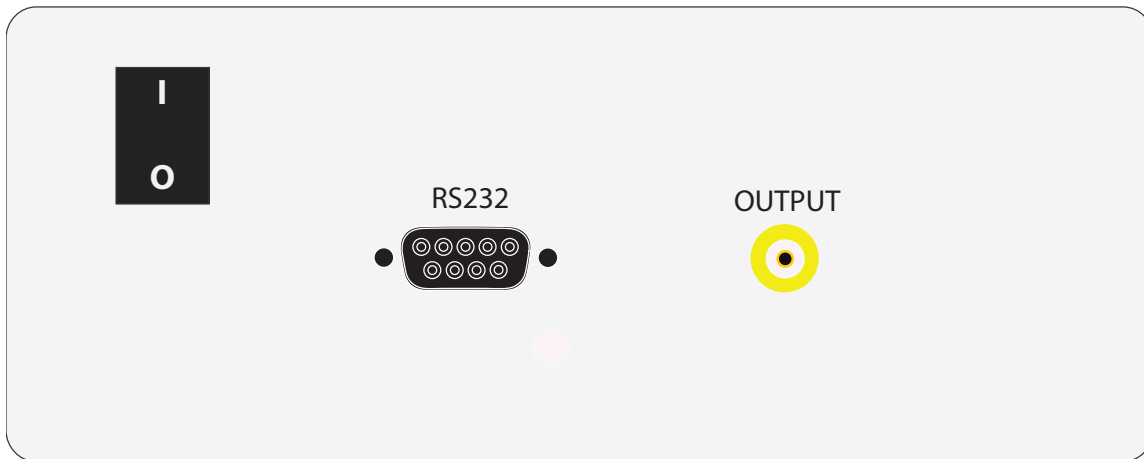
Introduction

The complete pressure control system comes with a controller, tubing to connect to custom setups, and fitting. No pressurized source of gas is required to operate the system. During operation, the controller is continuously monitoring the output pressure level to provide consistent and defined flow of solution.

Installation Guide

1 Using provided fitting connect 1/8" O.D. black tubing to your setup: pressure switch PS-V8P, gas mixture adapter SH-A, pressure cylinders PC or a small volume delivery system SVDS1/2. Some additional tubing and fitting might be required. Usually luer-lock fitting or other easy-connect adapters are used to splice different diameter tubing while connecting to 1/8" O.D. tubing provided, which fits inside OUTPUT port on the back of the controller. make sure there are no obvious leaks. After splicing tubing to your setup, simply push the tubing inside OUTPUT port all way, and slightly pull back to clamp. In order to disconnect the tubing, push YELLOW rim inside the connector, and pull the tubing out.

Connect power cable to the controller. Plug the power cable into the wall outlet.



2 Turn the controller ON. Upon turning the controller ON, the display will show three control buttons, and numerical key-pad.

Buttons:

ZERO – adjust the output by subtracting (offset) the initial pressure readings (when no pressure applied) from every subsequent pressure reading. This is an optional procedure and can be done just after the controller was turned ON.

START – starts the pressure generator, after which the buttons turns to STOP button – stops the generator and releases the output pressure.

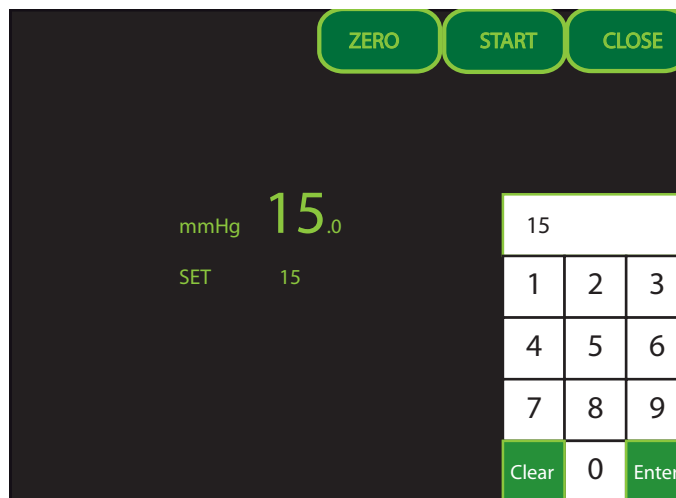
CLOSE – closes the output so no pressure is supplied and regulated by the controller. Can be used to observe the leak in the customer setup. The buttons turns to OPEN – opens the output back to normal configuration.

KEY-PAD is used to adjust the output pressure:

CLEAR – clears the windows from the previous SET pressure level;

ENTER – enters the new SET level into the controller memory.

Initially, the output is OPEN to the air. If the initial pressure is not 0, touch button ZERO to compensate his offset. Adjust/SET the output pressure using the key pad and CLEAR button. Put the SET pressure level into the controller memory by touching ENTER key. Touch button START to generate the pressure.



3 The output pressure will regulate solution flow rates in your liquid delivery setup.

IMPORTANT: in case of open (not-sealed) systems, it is normal for pressure reading being low. This, however, should be avoided since the controller is designed to provide pressure to closed systems in order to regulate flow rates in small volume delivery setups.

Software control and monitoring

Use NULL-modem cable to connect the controller to a computer RS232 port. The port should be set to 115,200 baud, 8bits, 1stop, NO parity. Every command should be followed by decimal 13 code (/n).

!S - Start

!Z - stop and Zero output

!C - Close output

!O - Open output

!V - return pressure Value in mmHg Pvvv.v

!R - return Reference value (Set in mmHg Snnn)

!Pvvv - set Pressure value in mmHg

!N - return serial number

!? - return list of commands

!A - return A scale calibration (An.nnn)

!B - return B offset calibration (Bnnn.n)

!D - return Digital output (Dnn - first n for output valve, second n for Zero valve, 1 - open, 0 - closed)

!L - show caLibration screen

!0 - offset compensation of output pressure, similar to ZERO button

Calibration procedure.

After sending !L command, the controller will erase the previous calibration values, and will store the default values. After sending !L command to the controller, the display will show two additional buttons:

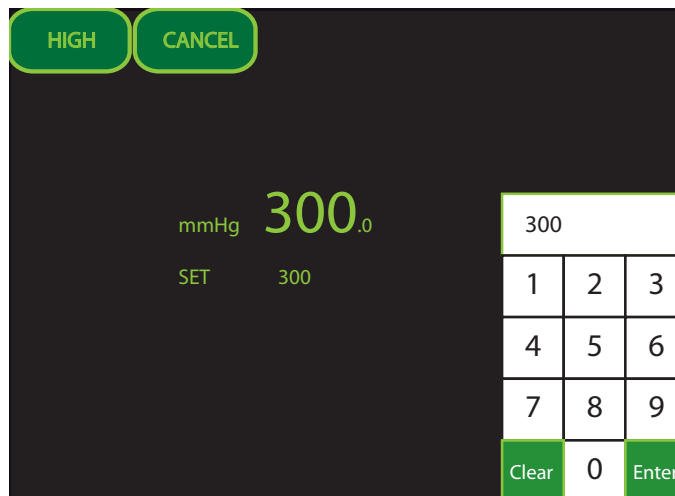
HIGH – initiates the calibration procedure by supplying high level of 300mmHg pressure to the output. After the pressure readings are stabilized, enter the correct value measured with a third party manometer, using CLEAR key, numerical key-pads, and then ENTER key (should be around 300mmHg value). After the first entry, the button turns to

LOW, and the controller starts supplying low level of 50mmHg. Again, after the pressure readings are stabilized, enter the correct value using the key-pad. After, the second entry, the buttons turns to

SAVE button, which can be used to put the calibration values into the controller memory.

CANCEL – cancel the calibration procedure.

The controller should be turned OFF before resuming the normal operation.

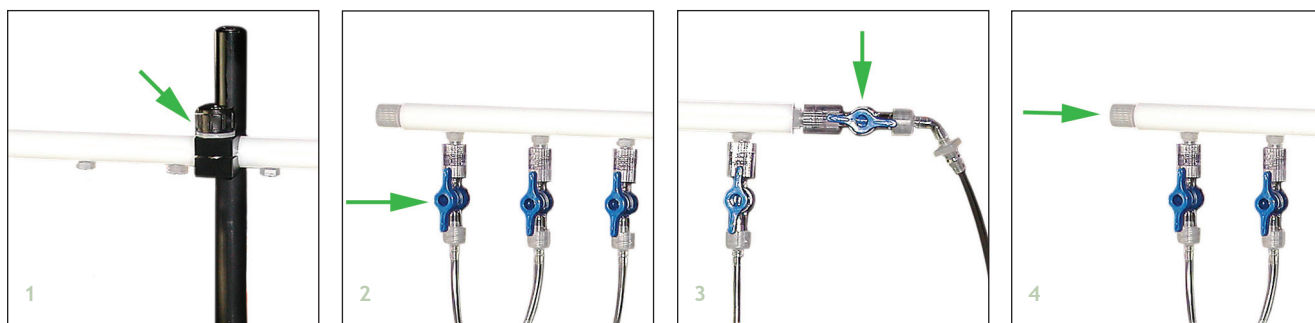


Warranty

This product is warranted to be free from defects in material and workmanship for the duration of one year. Normal wear, or damage resulting from abuse, accident, alteration, misuse, service by an unauthorized party or shipping damage, are excluded from this warranty and are not covered. Bioscience Tools will repair or replace the defective product covered by this warranty free of charge if it is returned, postage prepaid, to Bioscience Tools, ph: 1-877-853-9755.

Gas Mixture Adapter, SH-A

This adapter is used to pressurize or to deliver gases, CO₂/O₂ for example, to experimental solutions in syringe barrels or other containers. Continuous bubbling of the experimental solutions ensures gas saturation inside the solutions. The adapter can be also used to pressurize the solutions by connecting to optional pressure cylinders, PC, available in different sizes - volumes.



1. Mount the adapter on a 0.5in. post (included with SH-1A syringe holder) using provided X-block.
2. Eight luer connectors positioned along the adapter deliver gases to eight separate solutions through 2-way valves (stop-cocks) and thin Teflon or polyethylene tubing. The tubing can be replaced with any custom tubing and other means to dissipate gases inside solutions (aquarium stones, for example). If less than 8 solutions are used, the extra outlets can be closed.
3. Use soft tubing with luer-lock to connect to a source of gas mixture through a 3-way valve attached to the end.
4. Another end can be plugged, or connected to the second adapter (several adapters can be connected in sequence to use the same gas mixture).

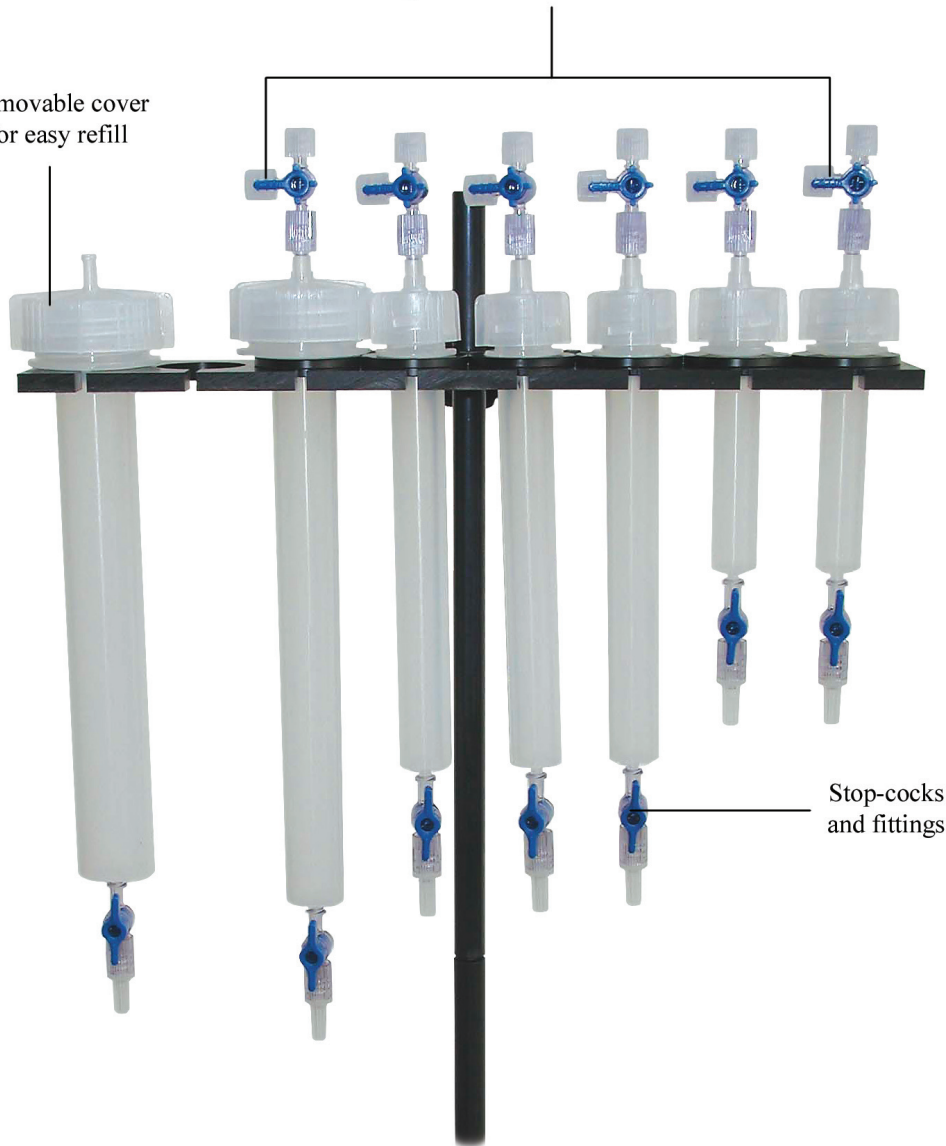


Pressurized Cylinders, PC



3-way valves to connect to a pressure source,
to gas mixture, or to refill solutions

Removable cover
for easy refill

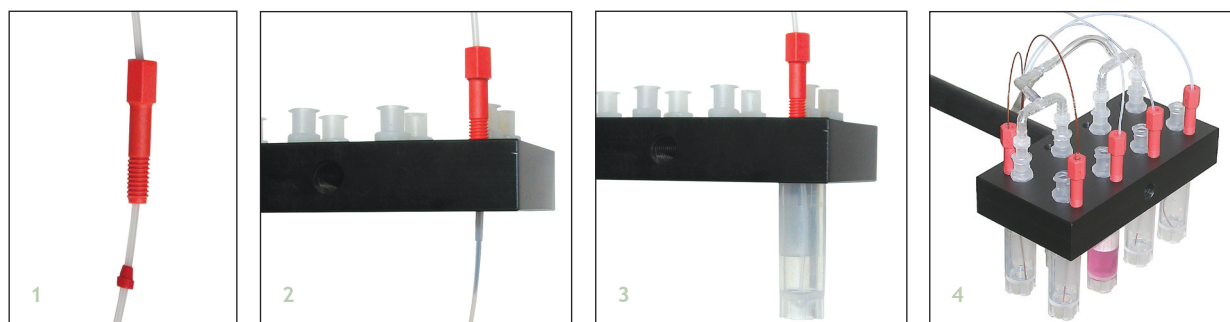


Stop-cocks
and fittings

Small Volume Delivery System, SVDS1

SVDS1 system can be used with a pressure source, or solutions can be withdrawn by a negative pressure supplied by CFPS-1U units. The output solution tubing can be connected to valves of a solution switch, and then to a MM, PM or ZMM micro-manifolds. The pressure input should be connected to a regulated pressure source using 1/16" I.D. tubing and T/Y-connectors – one pressure input to all eight (or less) pressure input luer ports positioned on the top. The solutions will be switched by turning ON/OFF the appropriate valves by the controller of the perfusion system. The applied pressure will push the solution through the opened line.

The system ships fully assembled. Below are the instructions on connecting the replacement tubing.



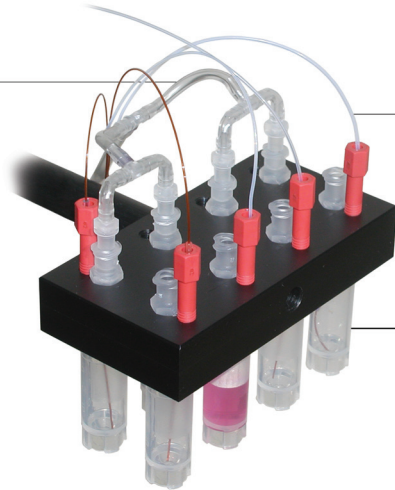
1. Measure and cut eight (or fewer) pieces of polyethylene tubing, 1/16" O.D. - fitting sleeves. Put a short piece of the fitting sleeve over delivery tubing (the system is shipped with 2' of Teflon tubing per each channel). Insert the sleeve into the ferrule.
2. Secure the tubing inside the plastic block by tightening the threaded nut (do not tighten completely yet).
3. Screw in conical plastic tube (included), and pull the delivery tubing so that the end of it still touches the conical bottom. Tighten the threaded ferrule fitting.

ALTHOUGH PROVIDED FITTING WILL ENSURE AIRTIGHT SEAL, THREADED PORTS AND TUBES MIGHT REQUIRE SOME GREASE TO MAKE AIR-TIGHT SEAL INSIDE THREAD.

4. The system can be mounted on a custom 6 mm O.D. rod or on 1' long threaded aluminum rod, which can be mounted on a standard 0.5" O.D. stand through X-block (X-block and a threaded rod are included). This allows positioning the solutions near your samples, to minimize the dead volume.

If valves used to open solution lines, connect Teflon tubing to valve's inlet using sleeves of soft tubing. The valve's outlet should be connected to a micropipette, a micro-manifold or a chamber using another tubing.

Connecting tubing to a source of pressure



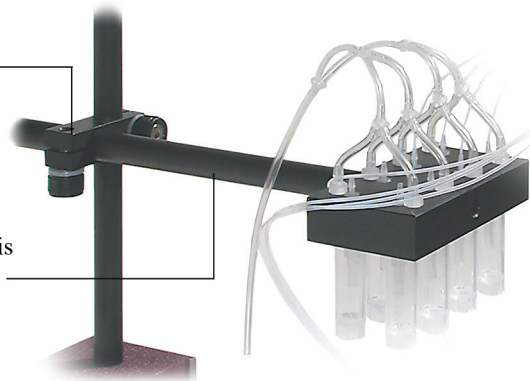
Connecting tubing goes inside small reservoirs. (NOTE: This tubing should be sealed using ferrule-type fitting.) The other end of this tubing should be connected to the valves of PS15 System using ferrule fitting provided.

Small reservoirs attached to the bottom of SVDS1 System. The reservoirs can be sealed air-tight using grease.

4a

Mounting Rod is attached to a 1/2" post through X-Block

The other end of Mounting Rod is threaded inside SVDS1 System



4b

