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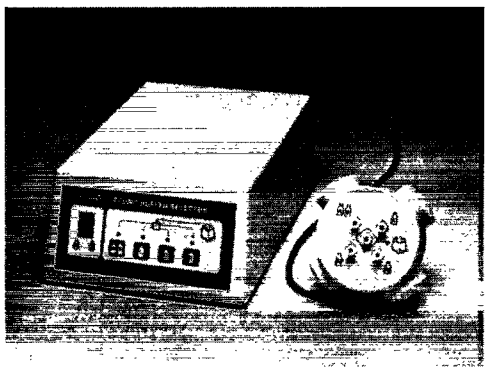
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Model EV-1 Econo Buffer Selector

Instruction Manual

Catalog Numbers

731-8170

731-8171

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in the U.S. Call **1-800-4BIORAD**
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Model _____

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Section 1
Introduction

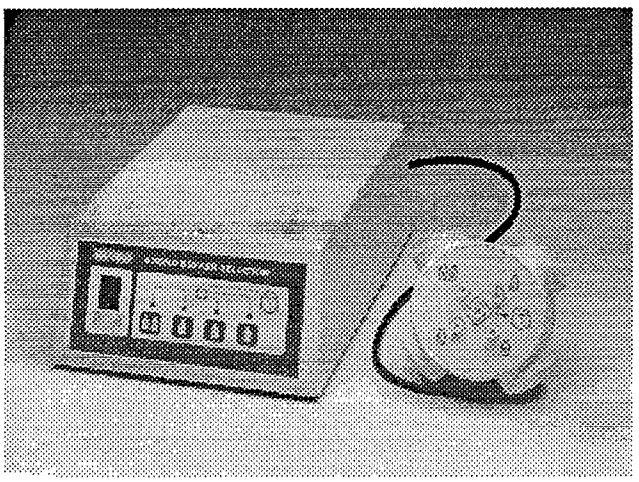


Fig. 1.1 Model EV-1 Econo Buffer Selector.

The Model EV-1 Econo Buffer Selector consists of a valve control unit and an external solenoid valve pod. The valve pod is fitted with luer connectors for rapid tubing connection, and mounts directly to the Econo Rack or Econo System Controller for efficient plumbing.

When connected to the Econo System low pressure chromatography system, the Model EV-1 Econo Buffer Selector allows the control of a total of five solutions (buffers or samples). The Buffer Selector is controlled by the Econo System software but may also be controlled manually.

As a stand-alone instrument, the Model EV-1 Econo Buffer Selector functions as a four-port valve controller.

For technical specifications, refer to Appendix C.

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Section 2
Unpacking

Carefully remove the contents of the shipping box, and check for any obvious damage or problems with the instrument. Figure 2.1 shows the parts included with the Model EV-1 Econo Buffer Selector. Check off all parts against the supplied packing list.

If any parts are missing or damaged, contact Bio-Rad Laboratories immediately.

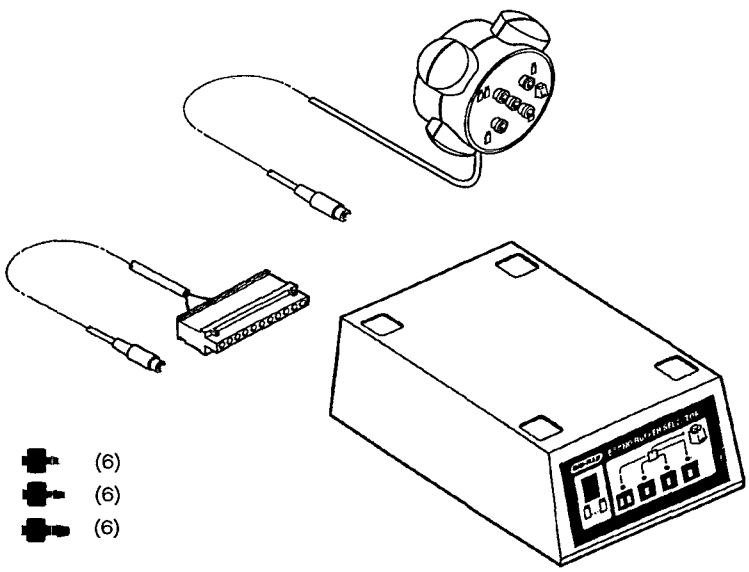


Fig. 2.1 Parts supplied with the Model EV-1 Econo Buffer Selector.

Also includes: Instruction Manual

Note: The Model EV-1 Econo Buffer Selector requires a power adaptor. If you did not receive one, please contact your local Bio-Rad representative.

Warning: Insure that the power adaptor you received matches the line voltage in your laboratory.

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Section 3
Description and Features

The Model EV-1 Econo Buffer Selector consists of a control unit and an external valve pod with four solenoid valves. The following tables and illustrations describe the features of the Model EV-1 Econo Buffer Selector.

3.1 Front Panel Functions

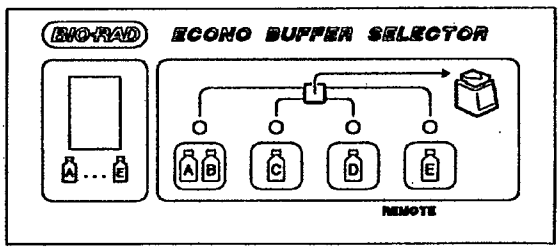
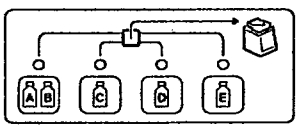
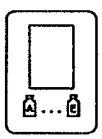


Fig. 3.1. Front panel controls.

Display	Function
Valve Position 	When the indicator light is lit, the valve, shown on the Valve Position key below the light, is open. These keys are active only when the Buffer Selector is not connected to the Econo System, or when the Econo System is configured in the "Standard" mode.
Single Digit Display 	When the Buffer Selector is connected to the Econo System Controller, configured in the "Enhanced" mode, the Single Digit Display indicates: • the method's inflection point (**1-9**), when programming or editing a method, or • which buffer is in use (**A, b, C, d, E**) or that a binary gradient is in process (**L**). When the Buffer Selector is connected to the Econo System Controller configured in the Standard mode, or, when the Buffer Selector is used as a stand-alone unit, the Single Digit Display will show a "-" to indicate that the unit has power.

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3.2 Rear Panel Sockets

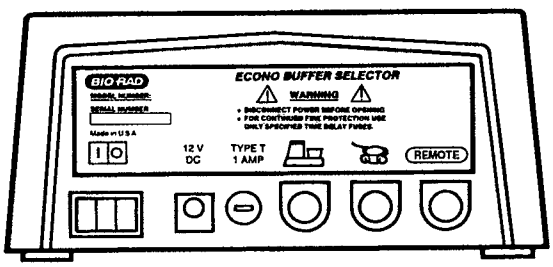


Fig.3.2. Rear panel sockets.

The rear panel of the Model EV-1 Econo Buffer Selector control unit contains an On/Off power switch and four sockets for electrical connections (see Figure 3.2). Below is a brief description of each socket.

Socket		Function
12 V DC	Power Entry	For connection of the 12 V DC power adaptor.
	Econo System Socket	For connection of the Model EV-1 Buffer Selector to the Econo System Controller using Cable #10.
	Valve Pod Socket	For connection of the valve pod's Signal Cable.
REMOTE	Remote Socket	This socket is not used in the Model EV-1.

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3.3 Valve Pod

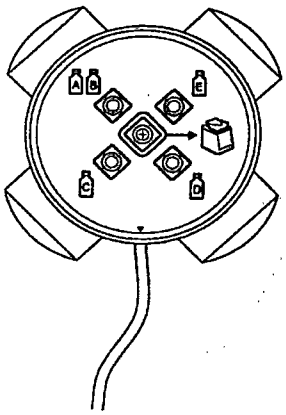
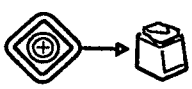


Fig.3.3. The valve pod.

Port	Function
Buffer AB Port 	Inlet port for tubing from the outlet of the mixer on the Econo System Controller. Buffer A, Buffer B, and any gradients formed between these two buffers are fed to the system via this port.
Buffer C, D, E Ports 	Inlet ports for tubing from reservoirs "C", "D", and "E".
Outlet Port 	Outlet port for tubing connecting the valve pod to the Model EP-1 Econo Pump.
Signal Cable	For connection of the valve pod to the valve pod socket on the rear panel of the control unit.

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Section 4
Setting Up

4.1 Valve Pod Installation and Plumbing

Place the valve pod as close as possible to both the mixer on the Econo System Controller and the Econo Pump to minimize the length of tubing between them. The valve pod can be mounted on the Econo System Rack, the back edge of the Econo System Controller, or the lip of the Solvent Reservoir.

1. Connect the valve pod's Signal Cable to the Valve Pod socket on the rear panel of the Buffer Selector control unit.
2. Plumb buffers A and B through the proportioning valve and mixer on the Econo System Controller. (Refer to the Econo System Instruction Manual for proportioning valve and mixer plumbing diagrams.)
3. Connect tubing from the outlet of the mixer on the Econo System Controller to the (A B) inlet port on the Model SV-5 Valve Pod.
4. Connect tubing from each buffer/sample reservoir (C, D, E) to the corresponding valve port on the Model SV-5 Valve Pod. Keep tubing connections as short as possible to minimize buffer and sample loss. *Note: If one or more of the ports is not being used, place a male luer plug (included) in it.*
5. Install tubing in the Model EP-1 Econo Pump head. (Refer to the Model EP-1 Econo Pump Manual for pump tubing installation instructions.)
6. Connect tubing from the outlet port of the valve pod to the Model EP-1 Econo Pump.

4.2 Connecting the Model EV-1 Econo Buffer Selector to the Econo System Controller

The Model EV-1 Econo Buffer Selector is shipped with Econo System Cable #10. This cable allows connection of the Econo Buffer Selector to the Econo System Controller for automatic valve control.

Place the Buffer Selector control unit underneath the Econo System Controller (if the Econo System Organizer is used) or beside the Econo System. Use Cable #10 to connect the Econo System socket on the rear panel of the Model EV-1 Econo Buffer Selector to the 11-pin I/O connector on the rear panel of the Econo System Controller.

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4.3 Connecting the Model EV-1 Econo Buffer Selector to Other Systems

The Model EV-1 Econo Buffer Selector can be controlled by instruments from other manufacturers, including HPLC equipment or microcomputer based equipment. Communication is accomplished through the 8-pin mini-DIN Econo System socket on the rear panel of the Econo Buffer Selector. Econo System Cable #7 (available separately) has an 8-pin mini-DIN at one end, for connection to the Model EV-1 Econo Buffer Selector, and wires at the other end. See Appendix B for the pin configuration of the 8-pin mini-DIN Econo System socket on the rear panel of the Econo Buffer Selector.

Section 5
Operation When Connected to the Econo System Controller

5.1 Getting Started: Verification of Econo System Software Version

The Model ES-1 Econo System Controller and Model EP-1 Econo Pump should already be set up.

The Model EP-1 Econo Pump must have software version 2.01 or higher to control the Model EV-1 Econo Buffer Selector.

To check the software version of your system:



Simultaneously press and hold the Direction Key and the "down" Arrow key on the front panel of the Model EP-1 Econo Pump. The four digit LED display on the front panel of the Econo Pump should display: "**v2.01**".

If your Econo Pump displays a number lower than 2.01, you will need to update the system software using a ROM Replacement Kit. To receive this kit at no charge, call your local Bio-Rad representative, or, in the U.S., call Technical Service at 1-800-4BIORAD (1-800-424-6723).

If your pump currently features software version 2.01 or higher, ensure that all connections between the Econo Pump, Econo System Controller and Econo Buffer Selector have been completed and the system power is on.

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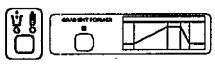
5.2 Econo System Software Mode Selection

Econo System software versions 2.01 and higher, feature two user-selectable programming modes, Standard and Enhanced. The "Enhanced" software mode is required to use the Model EV-1 Econo Buffer Selector.

To choose the software mode of operation:



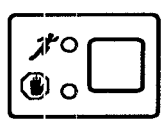
1. Stop the pump.



2. While depressing the Diverter Valve Key, press and hold the Gradient Former Key on the front panel of the Econo System Controller for approximately 3 seconds. The indicator lights on the front panel of the Econo Pump will flash and the four-digit LED display on the pump will display either "Std" for Standard Mode or "Enh" for Enhanced Mode. *(This will not work if you were previously programming a method and did not exit prior to pressing the keys mentioned above. In this case, press the Gradient Former key until the Gradient Former indicator light is off. Repeat Step 2.)*



3. To choose a mode, press the Arrow Keys to choose between "Std" and "Enh". Select "Enh" mode for operation of the Econo Buffer Selector. **The Econo System must be configured in the Enhanced software mode to control the Econo Buffer Selector.**



4. To select the Enhanced mode, insure that it is displayed on the four-digit LED display, and press the Run/Stop Key on the front panel of the Econo Pump. The system will remain in the mode selected until a different mode is selected (even after power-down).

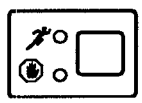
The Standard and Enhanced modes have separate memories. Methods programmed in one mode do not affect the other.

5.3 Manual Valve Control and Priming the Valves

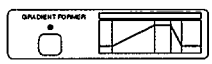
Manual valve control is useful for priming the tubing and valves with buffer prior to starting a method, manually injecting a sample prior to running a method, or purging all tubing lines for cleaning purposes.

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Insure that the Econo Buffer Selector is connected to the Econo System, and the Econo System is configured in the Enhanced mode. Manual control of the valves is achieved through the Gradient Former key on the front panel of the Econo System Controller. The Valve Position keys on the front panel of the Econo Buffer Selector are inactive. To manually control the valves, the pump must be running or purging.



1. Press either the Run/Stop key or the Purge key on the Econo Pump to start the pump running or purging.



2. To scroll through Buffers A through E, press and hold down the Gradient Former key on the System Controller. Release the key when the desired buffer (A, b, C, d, E) is displayed on the Econo Buffer Selector. The valve which is currently open will remain open until the key is released. The single digit LED on the Econo Buffer Selector will display the valve selected.

3. To manually prime the valves, press and hold down the Gradient Former key on the System Controller and release the key at valve position A. When it is apparent that solution A is flowing through the valve pod and the Model EP-1 Pump, with no air bubbles in the tubing, press the Gradient Former key and release at the next valve position, B. Repeat this procedure until all valves are primed with the appropriate solutions.

5.4 Programming Automated Valve Control

Note:

• The Econo System must be configured in the Enhanced software mode (See Section 5.2) for automated valve control.

• If you are not familiar with programming the Standard Econo System, please review Section 7 of the Econo System Instruction manual before proceeding.

Programming methods in the Enhanced software mode involves a method table with a maximum of nine inflection points (equivalent to 8 steps). (See Table 5.4.a. and Table 5.4.b.) Each inflection point is defined by a cumulative time and a buffer/valve position. Any buffer/valve position may be selected at each inflection point.

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Table 5.4.a A typical method table for a Multi-Step Method.

The method outlined consists of four buffers, one sample, and six steps (seven inflection points).

Inflection Point	Cumulative Time	Valve/Buffer
1	0	A
2	10	B
3	13	C
4	23	D
5	33	E
6	43	A
7	55	A
8	55	A
9	55	End

A = Loading Buffer
B = Sample
C = Elution Buffer #1
D = Elution Buffer #2
E = Regeneration Buffer

5.4.a Programming Multi-Step Methods

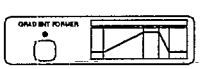
A multi-step method is a method which consists of a sequence of steps from one buffer to another. The Model EV-1 Econo Buffer Selector can control up to five different buffers (one of which could be a sample) and a method can consist of up to eight steps (created by nine inflection points).



1. The Econo Pump must be calibrated. Calibrate the Model EP-1 Econo Pump as described in the Model EP-1 Econo Pump manual, Section 6.3.



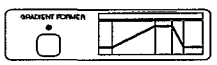
2. Press the Run/Stop key to stop the pump.



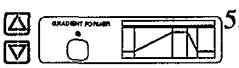
3. Press the Gradient Former key once. The pump display will flash **0**, indicating time = 0. The single digit display on the Buffer Selector will flash **1**, indicating the first inflection point in the method.

Note: The Stop indicator light on the pump will flash at every step during programming to indicate that this key may be pressed at any time to exit the edit mode. Upon exit, any changes made to the method are automatically saved.

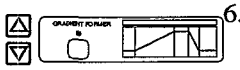
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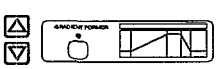
4. Press the Gradient Former key again. The single-digit display on the Buffer Selector will still be flashing "**1**" for inflection point #1. The % light on the pump will flash, and a letter (**A, b, C, d, E, L**) will appear in the left digit of the pump display. (L is used for binary gradient steps and is described in Section 5.4.b.)



5. Use the Arrow keys to select a valve position. Confirm the entry by pressing the Gradient Former key.

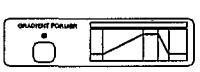


6. The **min** indicator light on the pump will flash and the single-digit display on the Buffer Selector will flash "**2**", indicating inflection point #2. Using the Arrow keys, enter the elapsed time desired for the second inflection point. Confirm entry by pressing the Gradient Former key.



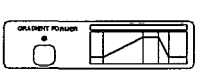
7. The % light on the pump will flash, and a letter (**A, b, C, d, E, L**) will appear on the pump display. Use the Arrow keys to select a new valve position. Press the Gradient Former key to confirm the entry and advance to the next inflection point.

8. Repeat steps 6-7 for the remaining inflection points.



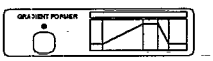
9. If using fewer than the maximum of nine inflection points, scroll through the time and % points for the remaining method inflection points by pressing the Gradient Former key, without changing the values showing, or, exit the edit mode by pressing the Run/Stop key.*

*If the edit mode is exited, data points from any previously entered method are not automatically erased. Insure that the data points in the remaining programming steps will not interfere with the current method.



10. After the last elapsed time point has been entered and confirmed (inflection point #9 as displayed by the Buffer Selector), the pump display will flash "**End**". Press the Gradient Former key once more. The Gradient Former indicator light should be lit, indicating that a method is programmed and enabled.

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11. If a fraction collection program was previously entered (the Fraction Collector indicator light on the pump front panel will be lit), the estimated number of fractions to be collected in the method entered will be re-estimated and the pump display will flash "**F ###**". Press the flashing Gradient Former key to confirm the gradient program. The Gradient Former indicator light should be lit.



12. To begin the method, press the Run/Stop key to start the pump running at the initial gradient condition. To start the method program, press the flashing Program Run key on the pump.



13. The pump display will show a flashing "**n**". "n" is the number of times the method should automatically repeat. Use the Arrow keys to enter a value from 1 to 999. The default for n is 1.

If a manual sample injection is necessary for the method, insure that sample has been injected into the column before starting the program.



14. Press the Program Run key to begin the method. An event mark will appear on the chart paper.

5.4.b Programming Multi-Step Methods Which Include a Binary Gradient

A multi-step method which includes a binary gradient is one of the most common chromatography methods used. For example, a multi-step method could include any or all of the following:

- column equilibration with a Buffer (buffer A)
- automatic injection of a sample (buffer C, >5 ml volume)
- a linear gradient (from 0% buffer B to 100% buffer B)
- column washing with a regeneration buffer (buffer D)
- column washing with a buffer appropriate for column storage (buffer E)

When programming a method, any buffer/valve position may be selected at each inflection point. The relationship between valve positions and buffers is:

Valve Position:	**L**	**C**	**d**	**E**
Buffer:	**A, b**	**C**	**d**	**E**

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The **L** (for "linear") is one choice for the buffer/valve position at each inflection point. *L is identical to the five-segment method that is programmed in the Standard software mode.* Because buffers A and B are plumbed through the proportioning and mixing valves on the Econo System Controller before connecting to the Valve Pod A/B inlet port, L is the only valve position in which a linear binary gradient may be formed. L can be programmed at any step in the Enhanced method table, but can be used only once per method (see Table 5.4.b).

Table 5.4.b. A Typical Method Table for a Multi-Step Method Which Includes a Binary Gradient

The method table outlines a method which consists of four buffers, one sample, seven steps (eight inflection points), and a binary linear gradient (Step L).

Inflection Point	Cumulative time (min)	Valve/Buffer
1	0	A
2	5	C
3	10	A
4	15	L
5	45	A
6	50	D
7	60	E
8	70	E
9	70	End

A = Loading Buffer
B = Elution Buffer
C = Sample
D = Regeneration Buffer
E = Column Storage Buffer

STEP "L"

Inflection Point	Cumulative time (min)	%B
1	15	0
2	30	50
3	35	50
4	35	100
5	45	100
6	45	0

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5.4.c Options While Running a Method

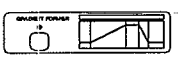
1. While a method is running, the following information can be displayed by pressing the Arrow keys on the pump. The units for the data displayed are indicated by the indicator lights to the right of the display. The following is an example:

Information	Display	Indicator Light	Meaning
Volume	**"30"**	ml	30 ml of solution has been delivered in the current run
Elapsed time	**"123"**	min	Time elapsed in current run is 123 minutes
Flow rate	**"10"**	ml/min	The flow rate is 10 ml/min
Inflection point and buffer	**"7–A"**	%	Method on step #7, valve port A is selected
% B	**"b 50"**	%	System currently forming 50%B of A/B binary gradient
Repeat #	**"n 3"**		The third run of the method is being run

2. After method initiation:



• To hold the method with pump stopped, press the Program Run key. The pump display will show **"Hold"**. To continue, press the Program Run key once more. To abort, press the Run/Stop key.



• To hold the method with pump running (holding the current valve port or proportional rate of the gradient former constant), press the Gradient Former key. The Gradient Former indicator light on the system controller and the pump display will flash.To resume the method, press the Gradient Former key once more. Or, to abort, press the Run/Stop key.

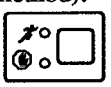
While holding the method with the pump running, the fraction advance and UV threshold level detector (if enabled) are still active. Fractions will continue to be collected on a volume basis. If Time Windows is enabled, fractions will continue to be collected only if the system is collecting at the time the method is held.

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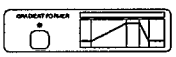
Run-time parameters can also be viewed on the pump display by pressing the Arrow keys. To stop the pump but continue holding the method, press the Program Run key. Press the Program Run key to start the pump again.

3. To terminate the method at any time (e.g. stop the pump and the method):



Press the Run/Stop key twice within 1 second. The pump display will show "Off".

4. To change a program, exit the method (see Step 3) and re-enter the edit mode:



Press the Gradient Former key to enter the edit mode. Scroll through the method to the point where a change is desired. Make desired changes and exit by pressing the Run/Stop key.

5. At each valve change during a method, an event mark will be superimposed on the chromatogram trace.

Once entered, a method is retained in memory even if the power is switched off. Standard and Enhanced modes have separate memories, so methods entered in one mode do not affect the other. If the system is turned off, methods are retained in memory for at least 10 hours.

5.4.d Use of the Econo Buffer Selector for Automated Sample Injection

The Model EV-1 Econo Buffer Selector can be used to automate injection of samples. The recommended minimum sample volume is 5 ml. However, it is possible to load samples as small as 1 ml using a flow rate of 1 ml/min. This is not recommended since sample loss may occur due to tubing volumes.

Samples smaller than 1 ml should be diluted to 1 ml, or loaded manually using the Model MV-6 Sample Injection Valve. Always keep tubing connections as short as possible to avoid excessive loss of sample.

For the automated injection of samples (injection programmed within a method):

1. Calculate the amount of time necessary to pull the sample into the system based on the sample volume and method's flow rate. This calculated time will be the duration of the injection step, programmed in the method.

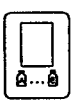
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2. Prime the tubing connecting the Model SV-5 Valve Pod and the sample reservoir with either the appropriate "binding" buffer for the column, or with sample itself. Plumb the sample reservoir to either valve port C, D, or E. Minimize the tubing length between the valve pod and the sample reservoir as much as possible. If excessive lengths of tubing are used, the amount of sample delivered to the column may differ from the amount used in the calculations in step #1.

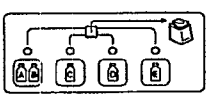
3. For very large volume samples and especially when automatically repeating injections by self-looping methods, insure that the actual volume of sample plumbed to the system matches the calculated volume of sample to be injected by the method program.

5.5 Operation When the Econo System is Configured in the Standard Software Mode

When the Econo Buffer Selector is connected to an Econo System configured in the Standard software mode:



1. The Single-Digit Display will show a "-" to indicate that the unit has power and is not being controlled by the Econo System Controller.



2. The Valve Position keys are active. An open valve is indicated by a lit indicator light above a key. The Valve Position keys are used for the manual control of buffers plumbed through the Valve Pod. Only one valve may be opened at a time.

Section 6
Stand-Alone Operation (No Connection to the Econo System Controller)

When the Model EV-1 Econo Buffer Selector is NOT connected to the Econo System Controller, manual control of the valves is achieved by pressing the Valve Position keys on the front panel of the Buffer Selector. Multiple valves can be opened and closed at any time by pressing the desired Valve Position key. The single-digit LED display on the front panel of the Buffer Selector will display a "-" indicating that the unit has power. An open valve is indicated by a lit indicator light above a key.

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Section 7
Care and Maintenance

The Model EV-1 Econo Buffer Selector requires very little maintenance to assure reliable operation. Following are general procedures for maintenance of the control unit and valve pod.

Model EV-1 Econo Buffer Selector control unit and valve pod:
The control unit may be left on continually (power consumption is negligible).

Although the cases are chemical resistant, spills and splashes may cause precipitates to form on the component cases. Unplug the unit before cleaning. Use a squirt bottle and soapy water to wash down the outer cases of the instrument. Avoid wetting the connectors on the rear panel.

Model SV-5 Valve Pod:
Clean the outside surfaces of the valve pod as described above.

Solutions containing dissolved solids should never be allowed to dry inside the valve pod. The valve ports should be flushed out periodically with deionized water. (SDS, 1 M HCl, 1 M NaOH, EtOH, and acetone will not harm the Model SV-5 Econo Valve Pod.)

For long-term storage, first flush the valve with hot water, then inject a dilute solution (15-25%) of ethanol or isopropanol into the ports to prevent microbial growth. Use the end caps provided to seal all ports. Always rinse out the valve pod with water prior to introduction of aqueous buffers. To prevent the formation of salt crystals and solute deposits, do not allow buffer solutions to dry inside the valve pod.

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Section 8
Troubleshooting

Problem	Possible Cause	Solution
No flow through a port on the valve pod	Crystallized salts may be blocking the flow	Clean the valve pod (see Section 7)
	Wrong valve position selected	Re-select the valve position: 1. Press the Run/Stop key to start the pump 2. Press and hold the Gradient Former key until the desired valve position appears on the Single-digit display on the Buffer Selector
No power	Faulty power connection	Check power cable connection
	Blown fuse	Check fuses (see Appendix A)
	Unit not switched on	Check power On/Off switch on rear panel
Single-digit display shows a "-" even though the Econo System is configured in the Enhanced software mode	Econo System Cable #10 is broken	Examine cable for broken wires and replace if necessary.
	The buffer selector may have been turned on before connecting to the Econo System Controller	1. Press the Run/Stop key to start the pump 2. Press the Gradient Former key to select a valve position: a letter (A, b,C, d, E) should appear on the Buffer Selector Single-Digit display
Air bubbles in lines	Incomplete line purging	Re-purge lines
	Out-gassing of buffers	Degas buffers
	Selection of an unprimed valve line	Cap off unused valve ports rather than keeping them plumbed to system

looks good!

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Appendix A
Fuse Replacement

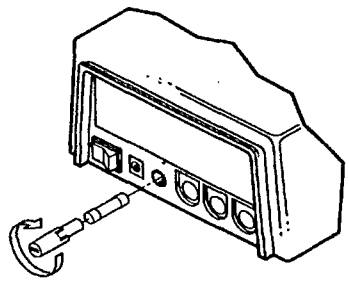


Fig.A. Fuse replacement.

1. Disconnect unit from power source.
2. Remove the fuse cover with a small-blade screwdriver or similar tool.
3. Pull the fuse holder out of the fuse compartment and, if necessary, replace the fuse. Use 5 mm x 20 mm fuses, type T, 1 Amp.
4. Reinsert the fuse holder, with fuse, into the fuse compartment.

Appendix B
Rear Panel Connections

The connector described below is used for connecting the Model EV-1 Econo Buffer Selector with other manufacturers instruments including HPLC equipment or micro-computer based systems. The Econo System socket on the rear panel of the Model EV-1 Econo Buffer Selector is an 8-pin mini-DIN. To open a particular valve, a contact closure must be provided from logic ground to the desired pin.



Pin	Function
1	Logic Ground
2	Controller Sense. Used exclusively with the Econo System.
3	Logic Ground
4	Econo Data. Used exclusively with the Econo System.
5	Valve E
6	Valve D
7	Valve C
8	Valve A/B



Pin Configuration

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Appendix C
Technical Specifications

General	
Operating temperature	4 - 40 °C
Power requirements	90-264 V, 50-60 Hz (depending upon power adaptor used)
Power consumption	19 W maximum
Dimensions	Control Unit: 15.60 x 22.86 x 8.89 cm (W x L x H) Valve Pod: 10.16 cm diameter x 6.35 cm width
Weight	800 g
Case material	Control Unit and Valve Pod: Chemical and fire resistant polypropylene
Valve Pod	
Type	Solenoid activated
Maximum operating pressure	15 psi
Mounting position	Any orientation
Internal volume	41 µl
Cable length	1.22 M
Wetted parts	TFE, Kel-F, and Tefzel
Fittings	Removable luer (will also accept 1/4"-28 flat bottom fittings)
Weight	600 g

Appendix D
Ordering Information

Model EV-1 Econo Buffer Selector

Product Description	Catalog Number
Econo Buffer Selector, Model EV-1, with 100-120 V power adaptor (catalog number 731-8270), and valve pod (catalog number 731-8236)	731-8171
Econo Buffer Selector, Model EV-1, requires power adaptor, includes valve pod (catalog number 731-8236)	731-8170
Econo Valve Pod, Model SV-5, 1	731-8236
Power Adaptor, 100-120 V, for USA, Canada, Japan, Mexico, Taiwan, Latin America	731-8270
Power Adaptor, 220-240 V, for Europe (Except the UK) and other countries not specifically listed	731-8271
Power Adaptor, 220-240 V, for UK, Australia, New Zealand	731-8272

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Cables

Product Description	Catalog Number
Econo System Cable #10, 8-pin mini-DIN to 11-pin connector (for connection of the Econo Buffer Selector to the Econo System Controller)	731-8281
Econo System Cable #7, 8-pin mini-DIN to bare wires	731-8267

Tubing

Silicone Tubing, 0.8 mm ID, 10 m	731-8210
Silicone Tubing, 1.6 mm ID, 10 m	731-8211
Silicone Tubing, 3.2 mm ID, 10 m	731-8212
Tygon® Tubing, 0.8 mm ID, 10 m	731-8214
Tygon Tubing, 1.6 mm ID, 10 m	731-8215
PharMed® Tubing, 0.8 mm ID, 10 m	731-8207
PharMed Tubing, 1.6 mm ID, 10 m	731-8208
PharMed Tubing, 3.2 mm ID, 10 m	731-8209

Fittings

Low Pressure Fittings Kit, includes over 17 different fittings and stopcocks (250 fittings total)	731-8220

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