

# Fraction Router

## 1. Overall description

Up to 16 valves can be requested during the detector's ordering. Pressing “**Valves**” softkey from the Welcome Screen of the detector will open the Valves Menu. The Valves Menu allows the user to set up a program controlling which valve is open on a given separation moment.

The program consists of a sequence of up to fifty Events. Each Event is assigned by the user to a single valve being open. Therefore, each Event corresponds to a single valve, but several Events can be assigned to the same valve.

On the beginning of a new separation, the program will start from the Event 1. The Event 1 will expire once certain user-set conditions are met. On the expiration of the Event 1, the Event 2 will become active, and so on until an Empty Event (an Event with no conditions) or the Event 50 is reached. At this moment the program will stall indefinitely.

Event	Min Duration	Max Duration	Next After	Valve	Relay
1	-	00:10s	-	V1	1- 2-
2	-	00:10s	-	V2	1- 2-
3	-	00:10s	-	V3	1- 2-
4	-	-	-	V1	1- 2-
5	-	-	-	V1	1- 2-
6	-	-	-	V1	1- 2-
7	-	-	-	V1	1- 2-
8	-	-	-	V1	1- 2-
9	-	-	-	V1	1- 2-
10	-	-	-	V1	1- 2-
11	-	-	-	V1	1- 2-
12	-	-	-	V1	1- 2-
13	-	-	-	V1	1- 2-
14	-	-	-	V1	1- 2-
15	-	-	-	V1	1- 2-
16	-	-	-	V1	1- 2-
17	-	-	-	V1	1- 2-
18	-	-	-	V1	1- 2-

Current event is: 4      Duration: 5h52:05s

Enter      Insert Line      Delete Line      Save and exit

**The user-set conditions may be of three types.**

1. Time Conditions – user specifies the time for each valve to be opened.
2. Effluent Properties Conditions – user specifies an absorption, or conductivity, or RI value to be reached for the Event to expire.
3. Double-type Conditions – user specifies an Effluent Properties Condition, **but** a certain user-specified time **must** elapse before this conditions is checked by the detector's software.

Below are examples of valve programming.

**Example One.** Simple time-based collection (conditions type 1 only):

1. The effluent is routed to a waste vessel through the Valve 1 for the first **1 hour 05 minutes** after the beginning of the separation
2. For the next **14 minutes 30 seconds**, the first useful fraction is collected in a Vessel A through the Valve 2.
3. Afterward, the solution is again routed to the waste vessel through the Valve 1 for **18 minutes**.
4. For the following **7 minutes**, the second useful fraction is collected in a Vessel B through the Valve 3.
5. Afterward, the solution is again routed to the waste vessel through the Valve 1 indefinitely.

Event	Min Duration	Max Duration	Next After	Valve	Relay
1	-	1h05:00s	-	V1	1- 2-
2	-	14:30s	-	V2	1- 2-
3	-	18:00s	-	V1	1- 2-
4	-	07:00s	-	V3	1- 2-
5	-	-	-	V1	1- 2-

**Example Two.** Effluent properties and time-based collection (conditions type 1 and type 2 only):

1. The effluent is routed to a waste vessel through the Valve 1 until absorption at 280 nm rises to **3.9 AU**.
2. The first useful fraction is collected in a Vessel A through the Valve 2 until absorption at 280 nm drops below **0.54 AU**.
3. Afterward, an intermediate fraction is collected to a Vessel B through the Valve 3 for **8 minutes 40 seconds**.
4. Afterward, the solution is again routed to the waste vessel through Valve 1 indefinitely.

Event	Min Duration	Max Duration	Next After	Valve	Relay
1	-	-	UV280 < 3.900	V1	1- 2-
2	-	-	UV280 > 0.5400	V2	1- 2-
3	-	08:40s	-	V3	1- 2-
4	-	-	-	V1	1- 2-

**Example Three.** Double-type Conditions (conditions type 3 only):

1. Initially, the effluent is routed to a waste vessel through the Valve 1. The first fraction to be collected begins after absorption at 250 nm reaches **5 AU**. However, the user knows from previous experience that this can not happen sooner than about **10 minutes** after the beginning of the separation.
2. The user wants to keep collecting the product into a Vessel A through the Valve 2 until the absorption at 280 nm drops below **1.4 AU**. However, the collection can not last for more than **35 minutes**, because after 30 minutes the Vessel A will overflow.
3. Afterward, the solution is again routed to the waste vessel through Valve 1 indefinitely.

Event	Min Duration	Max Duration	Next After	Valve	Relay
1	10:00s	-	UV250 < 5.000	V1	1- 2-
2	-	35:00s	UV280 > 1.400	V2	1- 2-
3	-	-	-	V1	1- 2-

In this case, setting of Double-type Conditions prevents the situation when a spurious air bubble, or a solid particle, or a line power glitch would cause a short (a second or two) spike of absorption over 5 AU, and the program advances to the next event collecting the waste solution into Vessel A.

## 2. Editing the Valve Table

Once in the Valve Menu, select an Event by rotating the knob, which will move the yellow arrow up or down the Event Table. Moving the pointer before the bottom of the screen will scroll up revealing more Events.

**When the arrow points to the white-font Event row**, the softkeys have the following meanings:

“**Insert Line**” – pressing this softkey will insert a new blank Event line at the pointer, while the very last (fiftieth) line will be deleted, line numbering will be kept consecutive.

“**Delete Line**” – pressing this softkey will remove the line at the pointer, a blank fiftieth line will be added at the very end on the table.

“**Save and exit**” – pressing this softkey will save the Event Table to the detector's permanent memory and exit to the Welcome Screen.

“**Enter**” – pressing this softkey will change the softkey's legends to “→”, “←”, “**Faster**” and “**Done**”. The pointer will jump in to the next column (Min Duration) of the table. Now, Min Duration can be edited by rotating the knob. Faster rotation will cause faster value change. If you hold the “**Faster**” softkey while rotating the knob, the value will be changing even more rapidly. Pressing “→” or “←” allows the user to move horizontally along the Event line. Once the line is edited, pressing “**Done**” will return the user to the Valves Menu, where the next Event may be chosen for editing.

When the arrow points to the yellow font special row, only “Enter” softkey may be pressed.

While the Event Table is edited by the user before the beginning of the separation, the special yellow row will read “E Current event is: 1 Duration 00:00s“. Pressing the “Enter” softkey at this time is meaningless.

Only after the actual separation is started, and the automatic events count is underway, the special line may be used.

While the separation is running, a magenta line “Valve:X Event:Y Duration mm:ss” is always shown on the Acquisition Screen, informing the user about the Event Table progress. The user can skip an Event(s) or return to a previous Event(s) to be repeated. To do so, the user needs to execute the following:

Event	Min Duration	Max Duration	Next After	Valve	Relay
1 →	-	00:10s	-	V1	1- 2-
2	-	00:10s	-	V2	1- 2-
3	-	00:10s	-	V3	1- 2-
4	-	-	-	V1	1- 2-
5	-	-	-	V1	1- 2-
6	-	-	-	V1	1- 2-
7	-	-	-	V1	1- 2-
8	-	-	-	V1	1- 2-
9	-	-	-	V1	1- 2-
10	-	-	-	V1	1- 2-
11	-	-	-	V1	1- 2-
12	-	-	-	V1	1- 2-
13	-	-	-	V1	1- 2-
14	-	-	-	V1	1- 2-
15	-	-	-	V1	1- 2-
16	-	-	-	V1	1- 2-
17	-	-	-	V1	1- 2-
18	-	-	-	V1	1- 2-
Current event is: 4		Duration: 5h52:05s			
→		←		Faster	Done

- suspend the acquisition
- go to Valves Menu, navigate to the special yellow line and press the “Enter” softkey
- change the current event number by rotating the knob. The Duration will be automatically set to 00:00. Optionally, the user may now edit the Event Table.
- press “Done” to return to the Valves Menu
- press “Save and exit” to save the edited Event Table and to exit to the Welcome Screen
- press “Run”, then press “Continue” to continue the acquisition.

### 8.3. Optional relays

On user request, optional relays 250 VAC, 4 A can be installed. If the relays are installed, an operator “GO TO EVENT #N will be available to allow for process control loops. The relays are controlled by the last column in the Valve Menu. Notations are as follows:

Both relays are OFF: 1- 2-

Relay 1 is ON, Relay 2 is OFF: 1+ 2- .