QuickSplit 600 Series

Adjustable Flow Splitter & Makeup-Flow Splitter

Methods for Setting Low Split Flow

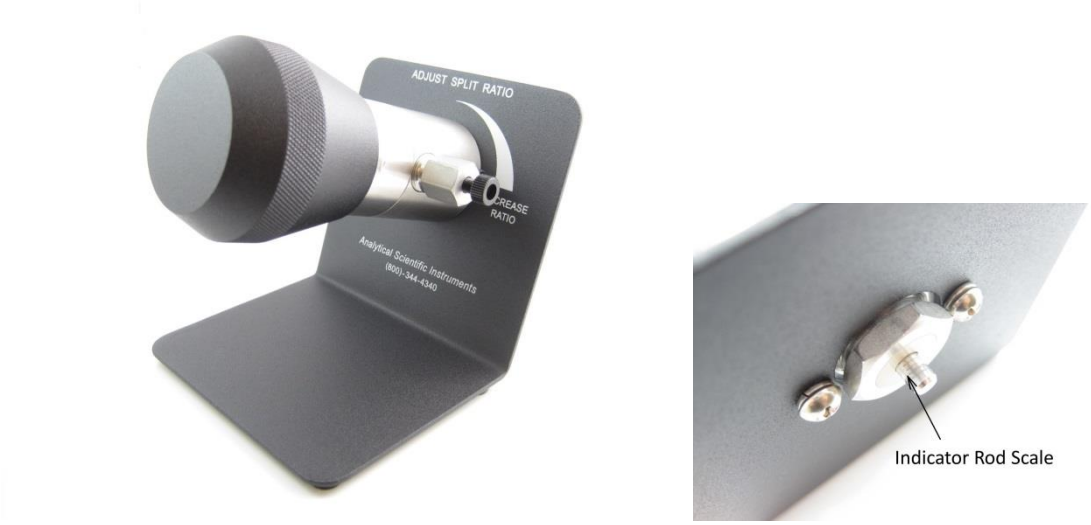

Figure 1: (left) *QuickSplit* 600 Series Adjustable Flow Splitters (right) Split flow indicator rod scale on rear panel

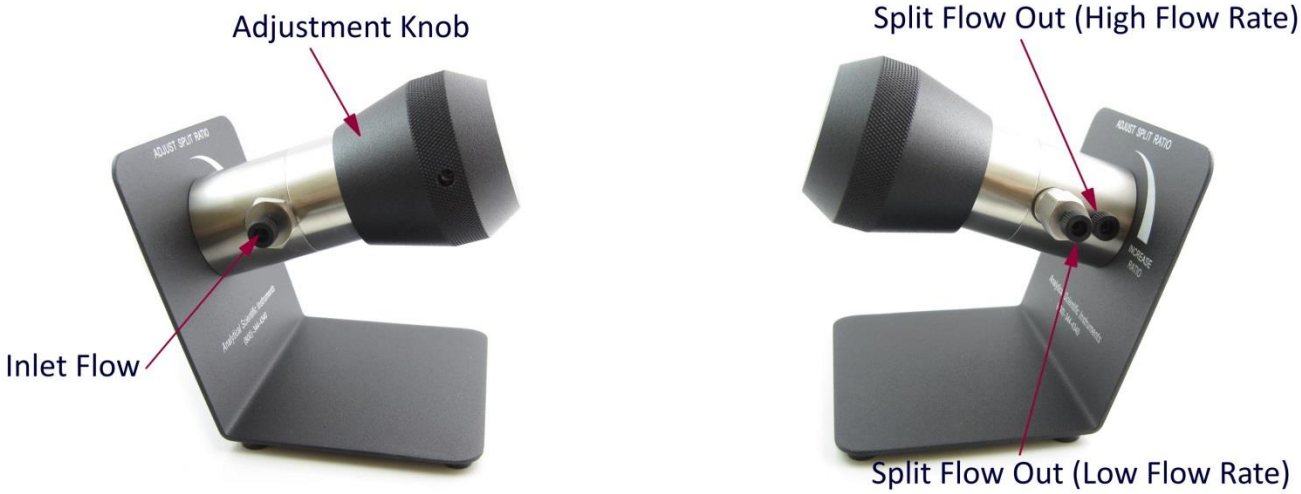

Figure 2: *QuickSplit* 600 Series Adjustable Flow Splitter

Adjusting the Split Ratio

Split ratios are increased by turning the adjustment knob (Figure 2) clockwise and decreased by turning the adjustment knob counterclockwise. The split ratio range can be changed by exchanging the replaceable resistor cartridge. The model 600 series adjustable splitter can be configured for either post column or pre-column splitting.

Setting the Split Ratio

Listed below are several options for setting the split ratio of an adjustable splitter. Choose the method that best suits your purposes.

Routine split ratio setting

Each flow splitter is shipped with a Manufacturing Test Log unique to that splitter. If you require a replacement copy, contact ASI and provide the splitter part number and serial number. Refer to Figure 3 for a sample copy.

Set the inlet flow and the restrictor rod setting to the value listed on Manufacturing Test Log. The metering rod scale projects from the rear of the bracket (Figure 1, right photo).

Note: Once it's set, the split ratio will remain constant regardless of changes to inlet flow rate or solvent viscosity. Regarding gradients with different viscosity mobile phases, the low split flow will remain constant for Post-column applications. Accuracy is ± 10% of the listed value, on account of system-to-system variability.

High accuracy split ratios

Adjust the splitter to generate the back pressure corresponding to the desired test log low split flow. Low split flow can be set with a precision of ±2% by means of this procedure. Even higher accuracy can be achieved using the following methods:

Set splitter by means of the previous procedure. Set the low split flow to desired accuracy by making successive fine adjustments while determining flow rate by measuring volume and time with a graduated cylinder and stop watch. Note down the system back pressure! Use the results to create a low split flow - back pressure table for the system and each column. System back pressure is proportional to column back pressure and splitter back pressure:

$$\textit{System BP} = \textit{column BP} + \textit{splitter BP}$$

Figure 3

Manufacturing Test Log for 600-PO10-04 (Sample)

S/N:xxxx

Customer : xxxxxx
Ship date : xx.xx.xx
Leak check at inlet at 4,000 psi pass
Leak check at outlet at 4,000 psi pass
Solvent = Water
Input flow rate = 0.50 mL/min.
Split Ratio Range = 5:1 to 100:1

Restrictor rod setting	Capillary flow, mL/min	Split ratio	Back Pressure, PSI
0.5	***0.0034***	**146.059**	***40***
1	***0.0073***	**67.4932**	***100***
1.5	***0.0115***	**42.4783**	***150***
2	***0.0171***	**28.2398**	***230***
2.5	***0.0228***	**20.9298**	***310***
3	***0.0298***	**15.7785**	***390***
3.5	***0.0378***	**12.2275**	***500***
4	***0.0474***	**9.54852**	***630***
4.5	***0.06***	**7.33333**	***790***
5	***0.0709***	**6.05219**	***950***
5.5	***0.0873***	**4.72738**	***1140***

Resistor cartridge value = xxxx **psi/(ml/min)**
Comments :

Note: The above data is for zero back pressure downstream from flow splitter. Back pressure generated by splitter will vary depending on solvent viscosity, however split ratio will not be affected.

Adjust Back Pressure

Use pressure drop across the flow splitter and Ohms Law.

$$P = L \times Q2 \times V$$

***Q2*: Desired split flow, mL/min.**
***P*: Pressure drop across splitter, PSI**
***L*: Fluid resistor value PSI/mL/min. (from calibration sheet)**
***V*: Viscosity in centipoise**

Setting the Split Ratio on Pre-column Applications

It is more useful to work with actual flow rate rather than split ratio. Basic procedure is as follows:

1. Measure the pressure drop resulting from column at desired flow rate, using the same mobile phase as used in the method.
2. Refer to the Manufacturing Test Log to find the correct rod setting to achieve the pressure drop found in step1. See a sample test log, Figure 4.

The flow through the column can be adjusted either by changing the splitter setting, or by changing the pump flow rate. Note that during a gradient with different viscosity mobile phase, the flow rate will change as the viscosity changes - but this change will be repeatable.

Configuring for Custom Split Ratio Ranges

A variety of resistor cartridges can be ordered from ASI to configure the Adjustable Flow Splitter for split ratios other than standard. Please contact technical service at 800-344-4340 for assistance in selecting the correct resistor cartridges. We will gladly assist you in determining the best splitter configuration for your application.

ASI Analytical Scientific Instruments US

www.hplc-asi.com

Phone Number: 800-344-4340/+1(country code) 510-669-2250

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Figure 4

Manufacturing Test Log for 600-PR10-03 (Sample)

S.N. xxxx

Customer: xxxx
Ship date: xx.xx.xx
Leak check at inlet at 4000 psi- pass
Leak check at outlet at 4000 psi- pass
Solvent = Water
Input flow rate = 0.9 mL/min

Restrictor rod setting	Back pressure, psi	Capillary flow microliters/min 1 mm column	Capillary flow microliters/min 300 micron colum	Capillary flow microliters/min 150 micron colum	Capillary flow microliters/min, 75 micron colum
0.5	18	0.60	0.06	0.02	0.00
1	21	0.70	0.07	0.03	0.00
1.5	29	0.97	0.10	0.04	0.00
2	83	2.77	0.28	0.11	0.01
2.5	152	5.07	0.51	0.20	0.02
3	223	7.43	0.74	0.30	0.03
3.5	298	9.93	0.99	0.40	0.04
4	358	11.93	1.19	0.48	0.05
4.5	428	14.27	1.43	0.57	0.06
5	533	17.77	1.78	0.71	0.07
5.5	674	22.47	2.25	0.90	0.09
6	815	27.17	2.72	1.09	0.11
6.5	1054	35.13	3.51	1.41	0.14
7	1396	46.53	4.65	1.86	0.19
7.5	1795	59.83	5.98	2.39	0.24
8	2211	73.70	7.37	2.95	0.29
8.5	2620	87.33	8.73	3.49	0.35
9	3059	101.97	10.20	4.08	0.41
9.5	3546	118.20	11.82	4.73	0.47
10	4069	135.63	13.56	5.43	0.54

NOTE:
Flow rate is calculated from following: 1.0 mm column 1500 psi at .050 ml/min = 30 psi/microliter/min
.3 mm id 1500 psi at .005 ml/min
.15 mm 1500 psi at .002 ml/min
.075 mm ⁚.0002 ml/min