QuickSplit Automated Flow Splitter
Model *AS*650

Theory of Operation

Incoming flow from the HPLC system is split by a static splitter S into low flow (LF) and high flow (HF) channels (Figure 1). Pressure drop across both channels is measured by low volume transducers P0, P1, and P2. The ratio of the differential pressures P0-P1 and P0-P2 are measured and maintained by automatic feedback control of variable resistor R3. The low volume of the splitter and resistors allows an accurate means to calculate and deliver a split flow rate which is independent of solvent viscosity.

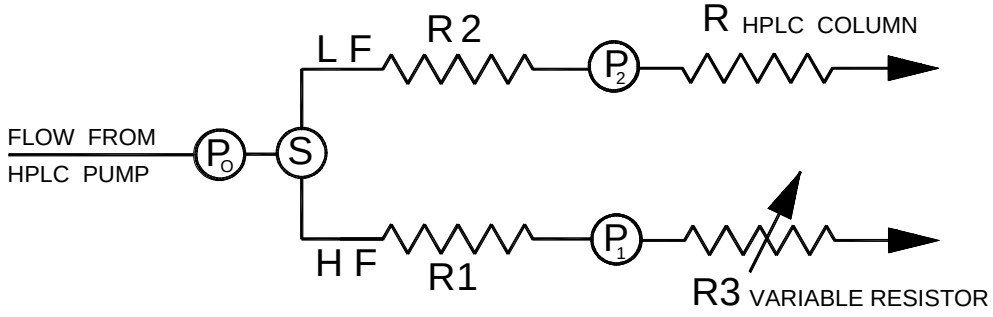

Figure 1 Schematic diagram of the Model *AS*650

Product Specifications:

Split Flow Ranges:	
Pre-column	100 nL/min. to 50 µL/min.
Post-column	25 µL/min. to 250 µL/min.
Input flow range:	0.200 to 0.500 mL/min.
Internal volume low flow:	Est. 1 µL, depends on configuration
Internal volume high flow:	Est. 30 µL, depends on configuration
Maximum pressure:	5,000 psi
Split flow accuracy:	Max flow deviation +/- 3% or 10 nL/min. whichever is greater
Outputs:	RS232
Power:	85 - 264 VAC; 47 - 63 Hz.; 60 Watts
Display:	4 line, 20 character LED
Dimensions:	6.5”W x 7.8”H x 13.6”D
Weight:	15 Lbs.

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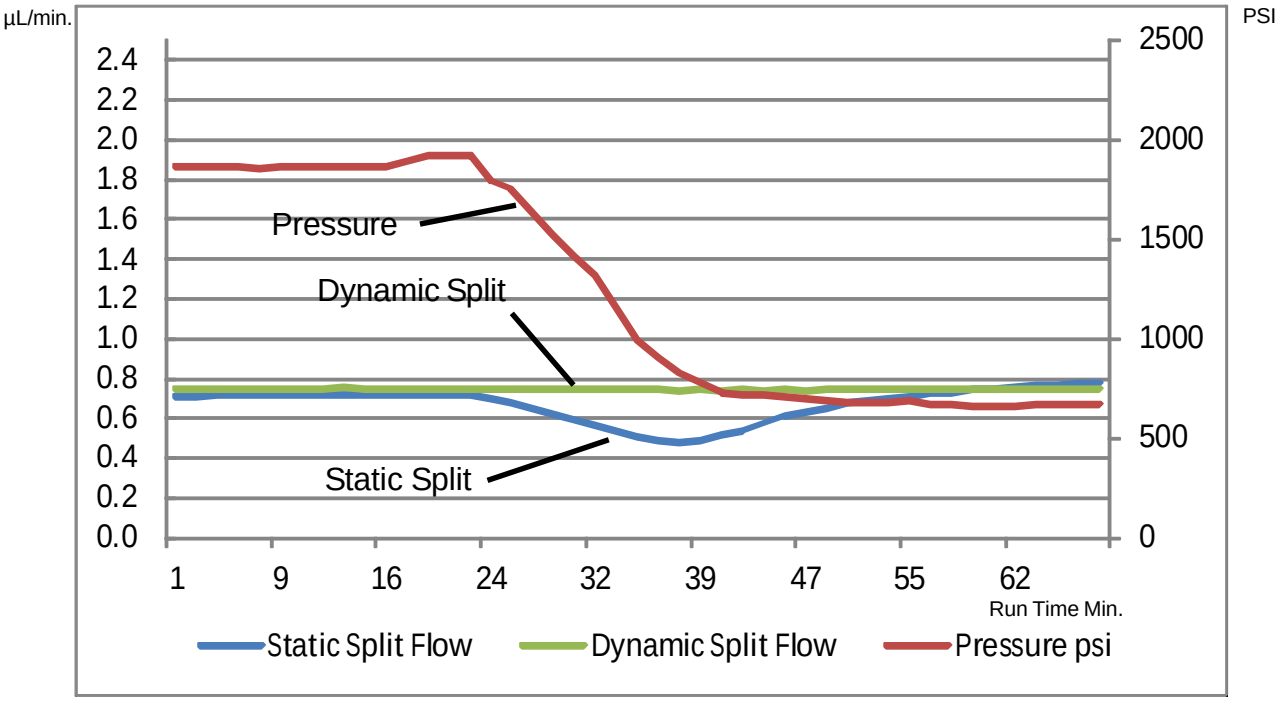
Performance:

The data below demonstrates the unique dynamic flow rate compensation underlying the performance of the *AS*650 Autosplitter. The chart includes three traces. The pressure trace depicts a pressure gradient which is typical of capillary chromatography. The shape of the pressure gradient is determined by the mobile phase, flow rate, and gradient profile. The static split trace represents the split flow profile associated with a static flow splitter. The final trace represents the split flow profile generated by the *AS*650. By comparing the split flow profiles of static and dynamic flow splitters you can see that the dynamic split flow remains constant throughout the gradient run while the static split flow changes during the run. Like the gradient profile itself, the magnitude of the static split flow deviation will be determined by several factors including, but not limited to, HPLC column geometry, mobile phase, gradient profile, and gradient time.

Comparison of dynamic and static splitter flow profiles



Conditions:

Gradient:	ACN 5% to 95% in 25 min., 10 min. hold
Column:	0.150 mm x 100 mm, C-18, 3 µm
Static splitter:	Tee type splitter with fused silica resistors
Dynamic splitter:	ASI AS650 Automated Flow Splitter

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Dynamic flow control and measurement:

The key question for any automated splitting device is, of course, how accurately does it control the split flow under gradient conditions, and secondarily, how reproducible is it. To measure these parameters, *ASI* has developed a chromatographic model to dynamically measure flow rate. The measurement is based on injecting a nonretained UV absorbing peak at a specified dwell or cycle time marker. Any change in time between the marker and peak is directly proportional to changes in flow rate. To demonstrate accuracy and reproducibility we have overlayed 3 chromatographic runs described below in Figure 2. Under constant flow conditions, retention times for isocratic and gradient runs should be nearly identical and that is exactly what is seen. To emphasize robustness and challenge the *AS*650 we have purposely chosen challenging isocratic (5% and 95% 2-prop) and gradient (5 to 95% B in 10min.) conditions.

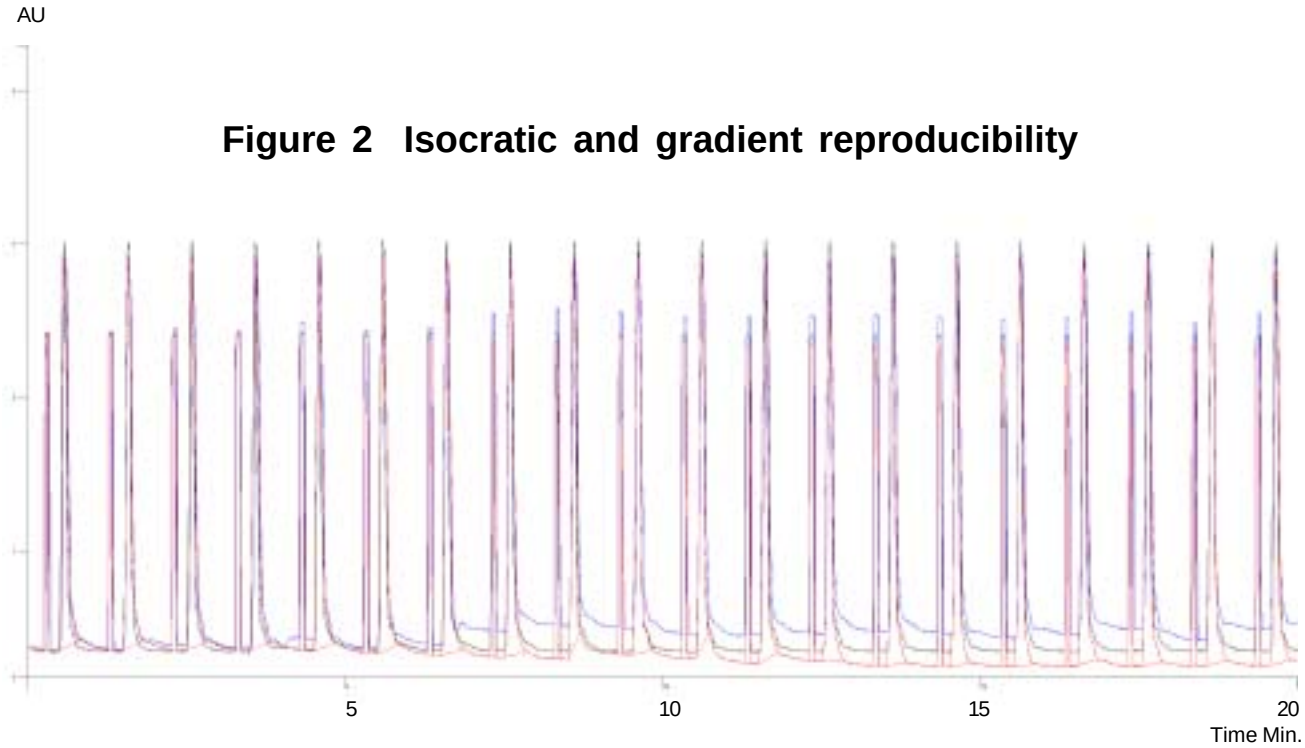

Figure 2 Isocratic and gradient reproducibility

Conditions:

Instrument:	Shimadzu LC 10ADvp with ASI *AS*650 Autosplitter
Solvents:	A = H^2O, B = 50/50 H^2O/2-propanol
Column:	0.30 mm x 50 mm, C-18, 3 µm, HAI
Inlet flow:	0.250 mL/min.
Split flow:	8.0 µL/min.
Injection:	Approx. 1 µL neat acetone, 1 min. dwell time
Detection:	UV, oncolumn
Runs (3):	5% isocratic, 95% isocratic, gradient 5 - 95% B in 10 min., 5 min. hold