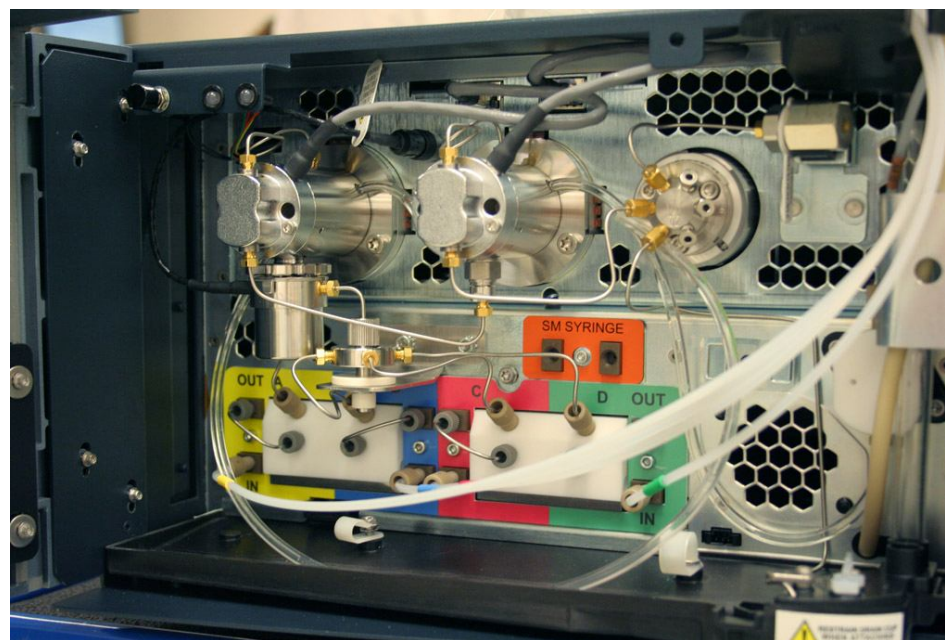


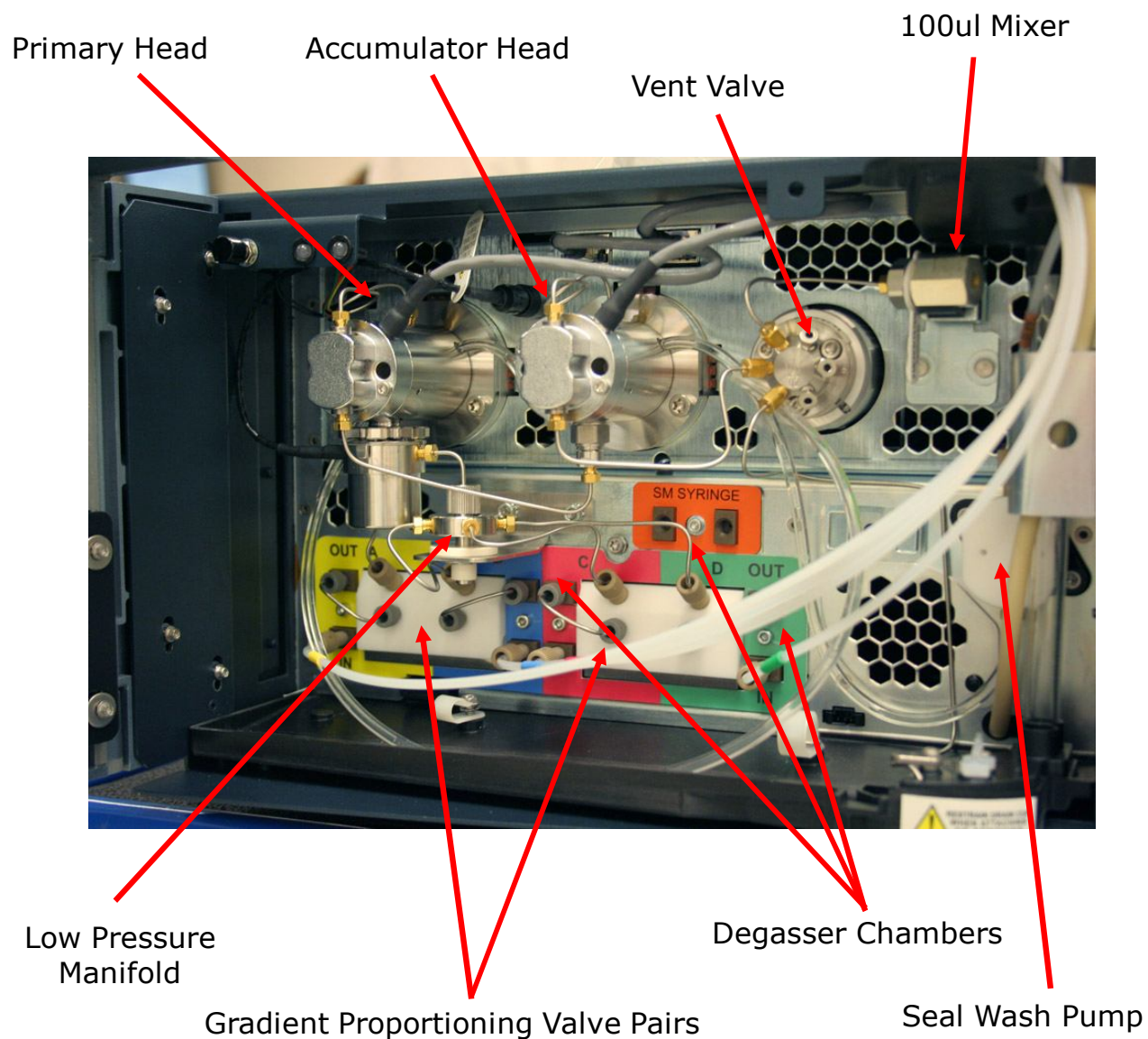


ACQUITY H-Class QSM Overview

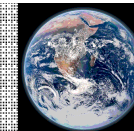


- Adapt the best, most proven design aspects from both ACQUITY and Alliance to create a UPLC capable quaternary solvent manager
 - Based on state of the art low pressure mixing technology
 - Keeping system dwell volume as low as possible
 - Supporting the full UPLC pressure range
 - Using already proven ACQUITY fluidics, electronics and software where appropriate
- Make it cost competitive
 - Only need one pump, CPU and personality card
 - Degasser functionality added to personality card
- Proven reliability

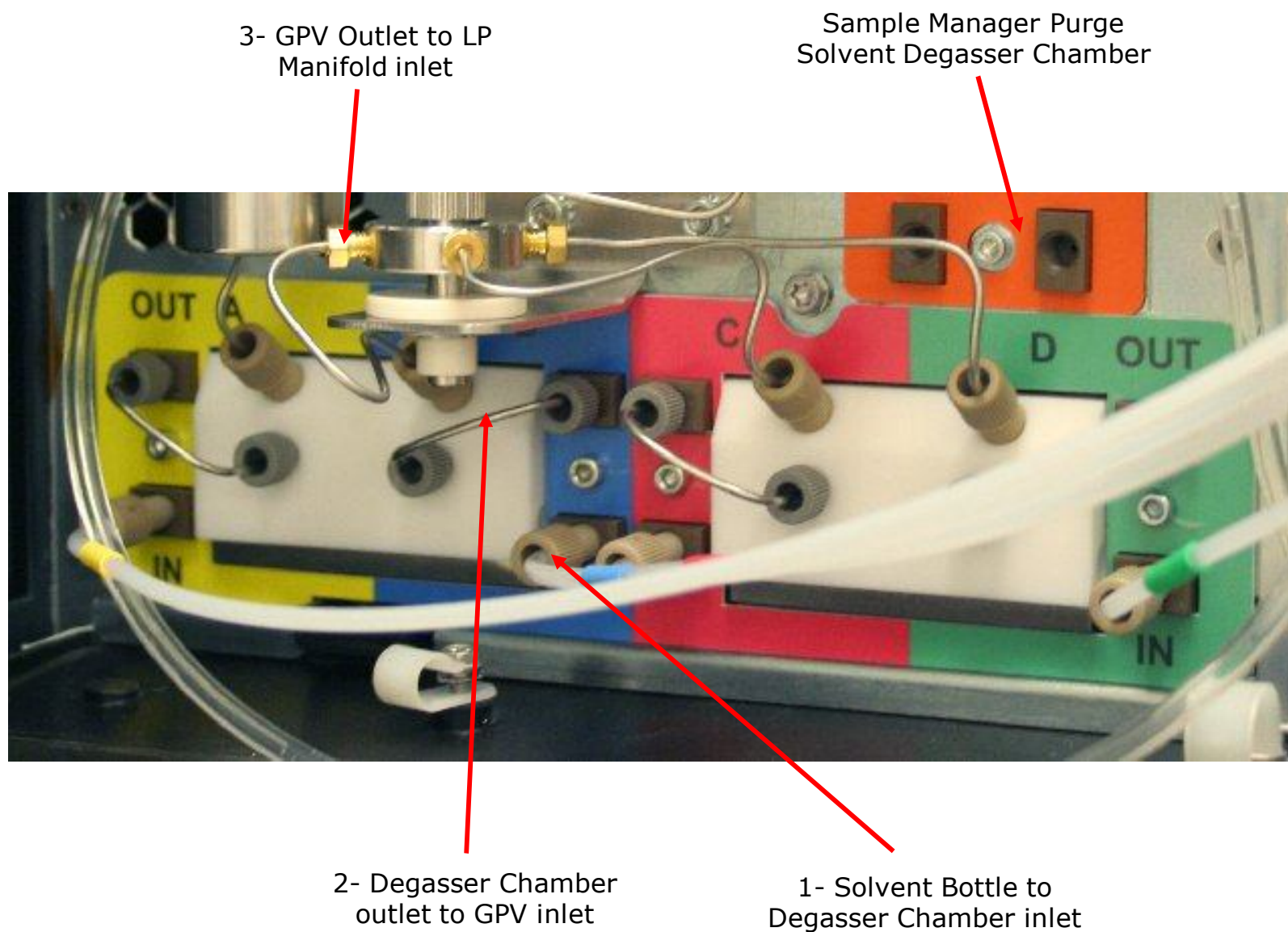
QSM Fluidics-Front View



QSM Degasser / GPV Flow Path



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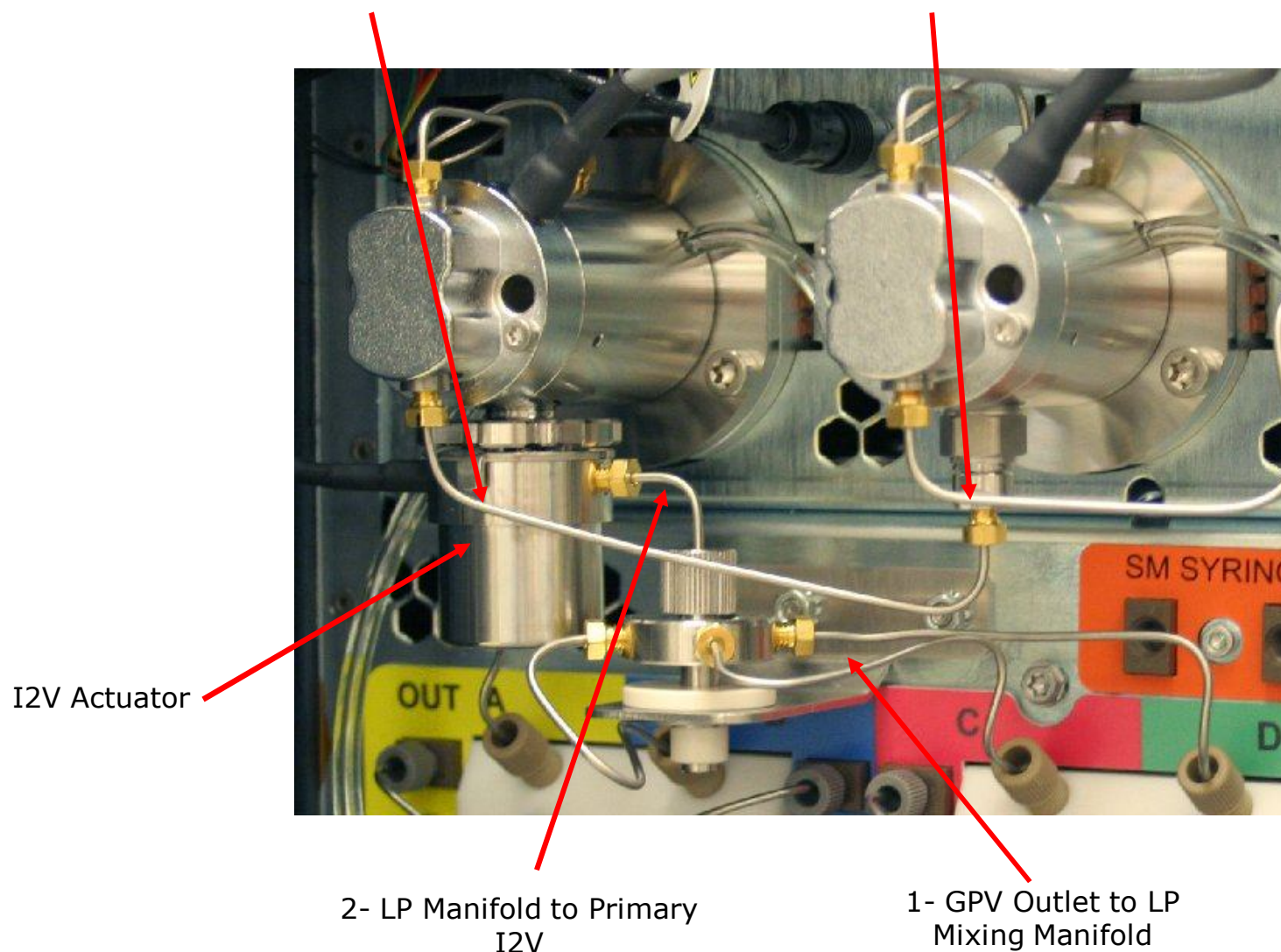


QSM Pump Head Flow Path



3- Primary Head Transducer to
Accumulator Check Valve

4- Accumulator Head Transducer
to Vent Valve



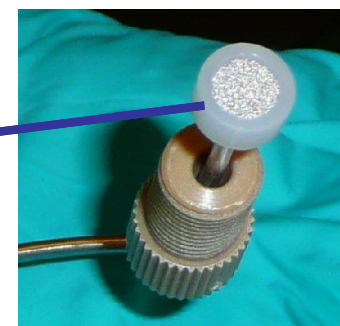
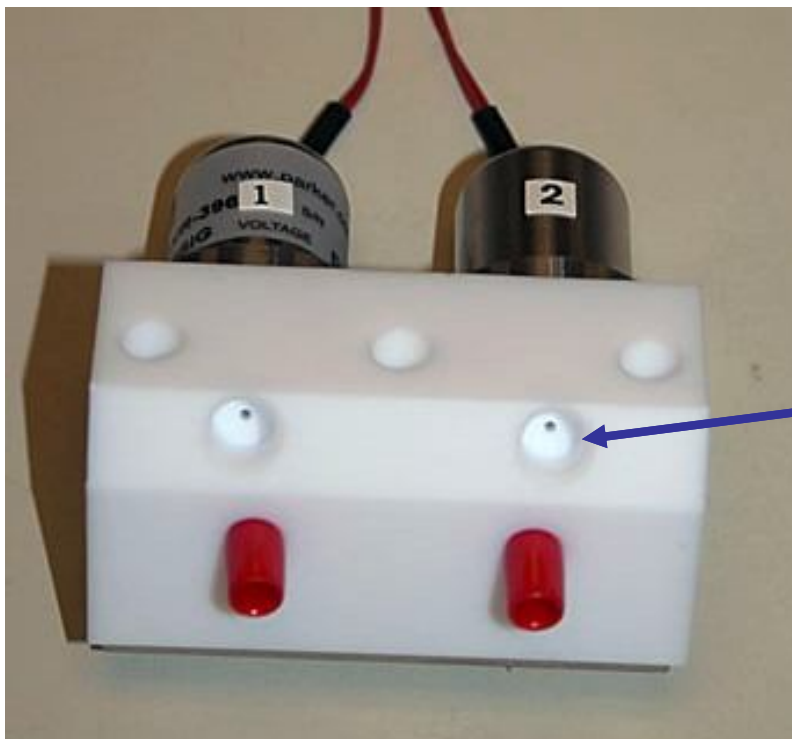
GPV Degasser Assembly



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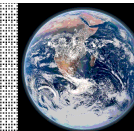
GPV Valve Pair and Filter



GPV FILTER
(20 MICRON FRIT)
All 4 are changed at PM

- Same proven Alliance type GPV valve
- Located closer to the head to keep dwell volume down
- Can be replaced as a pair for lower maintenance costs

LP Manifold

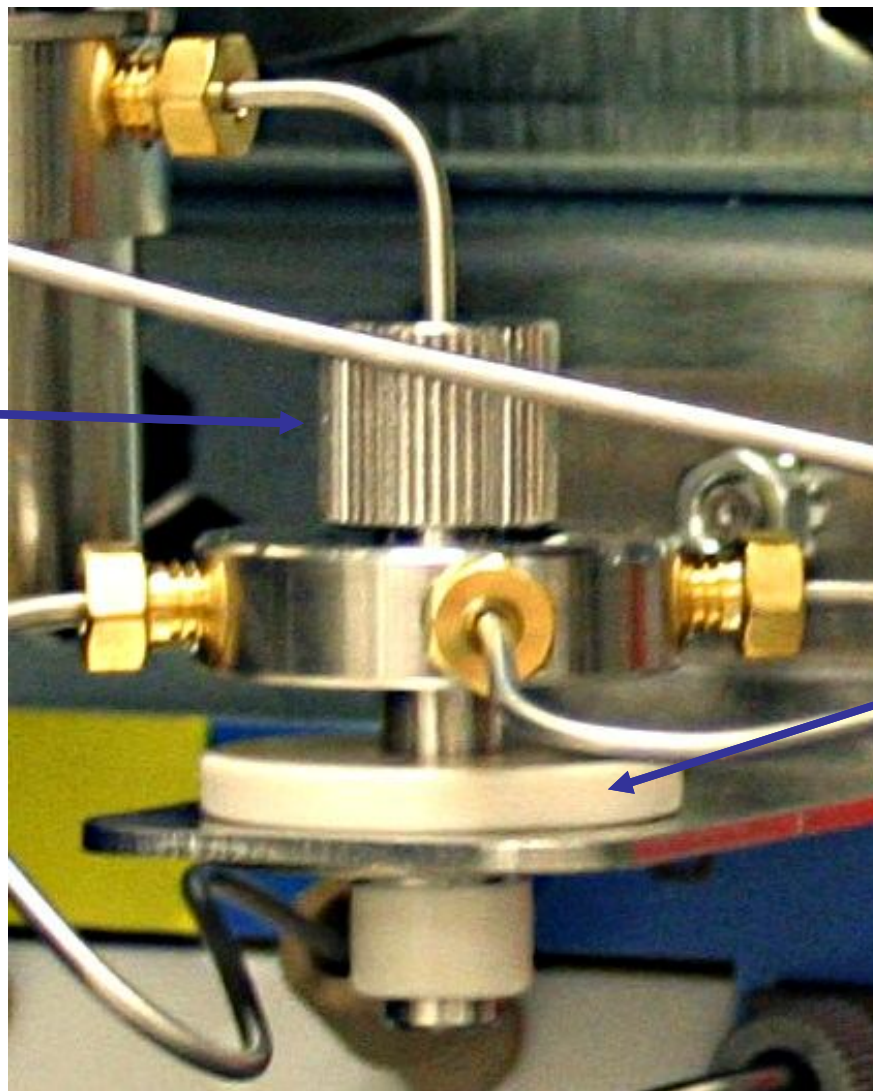


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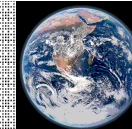
Knurled Knob
SS Fitting



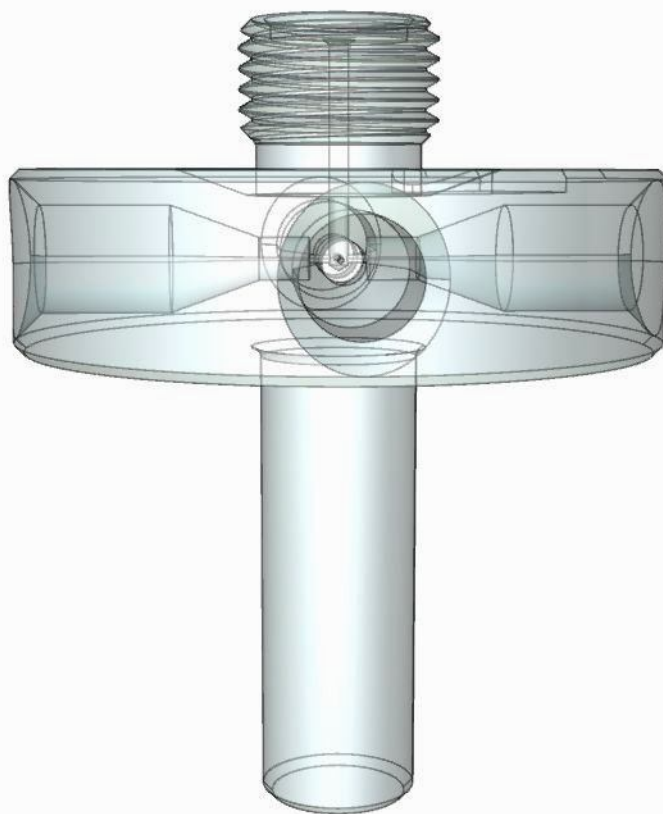
Support
Bracket



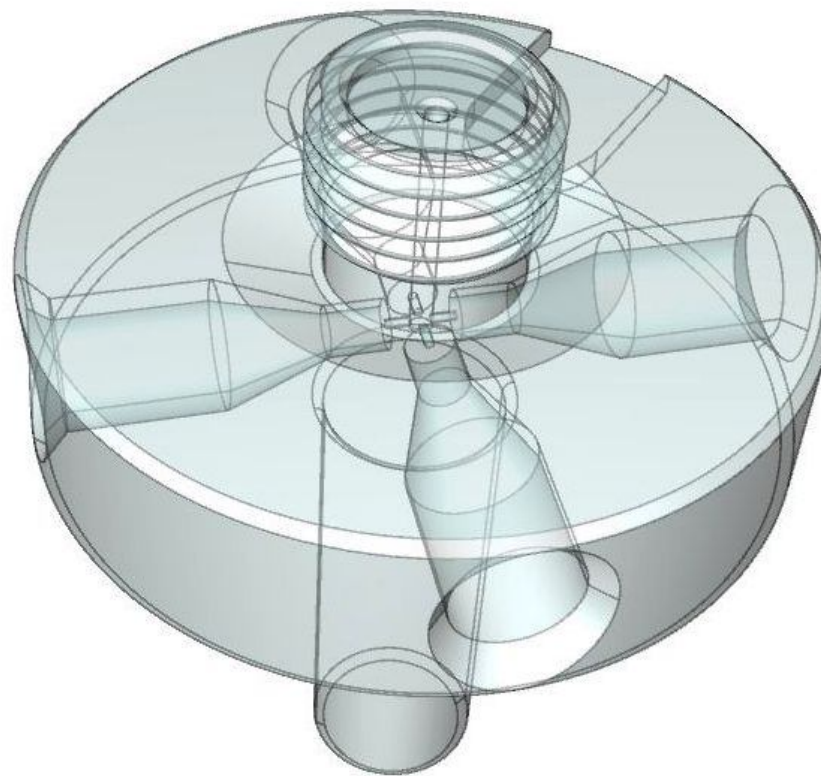
LP Manifold



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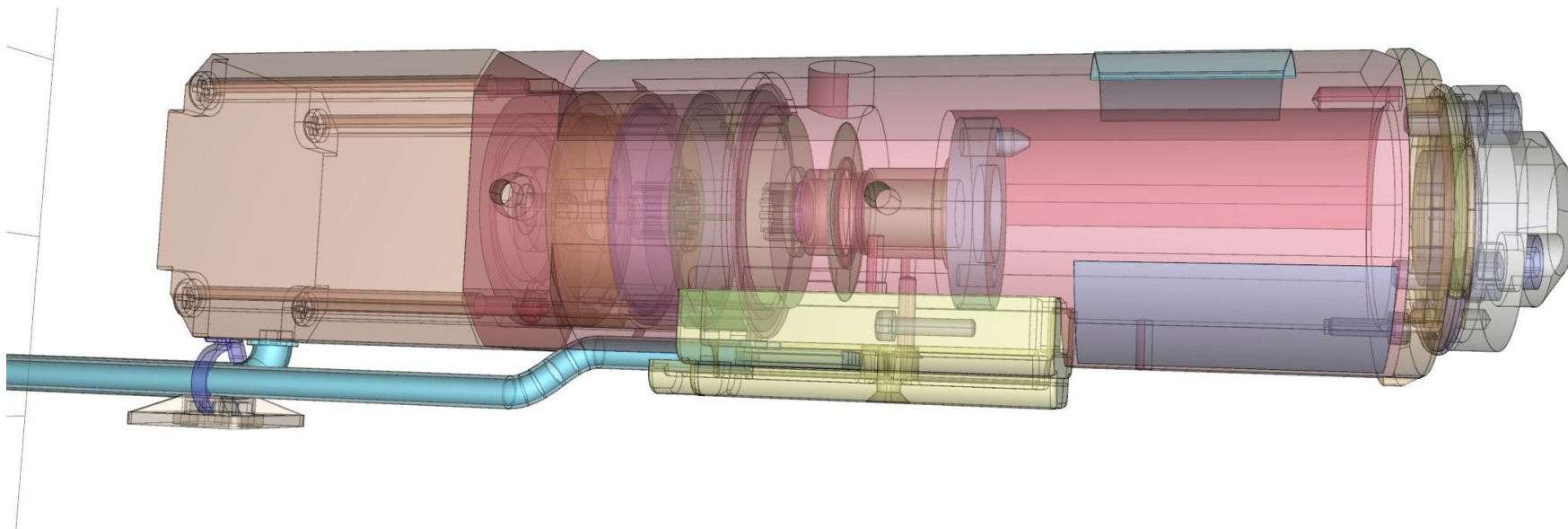


Side View



Top View

QSM Internal Components



QSM Internal Components- Top View



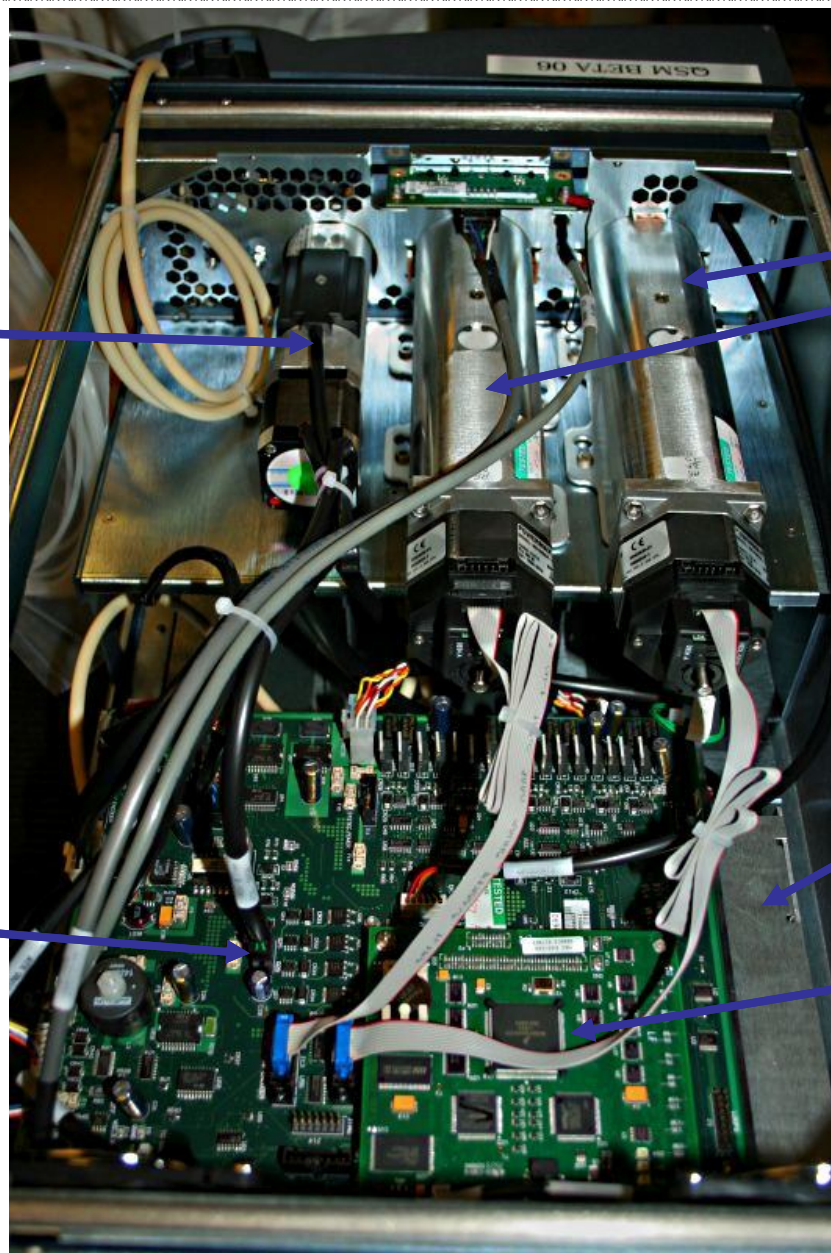
Vent Valve

Primary and
Accumulator
Actuators

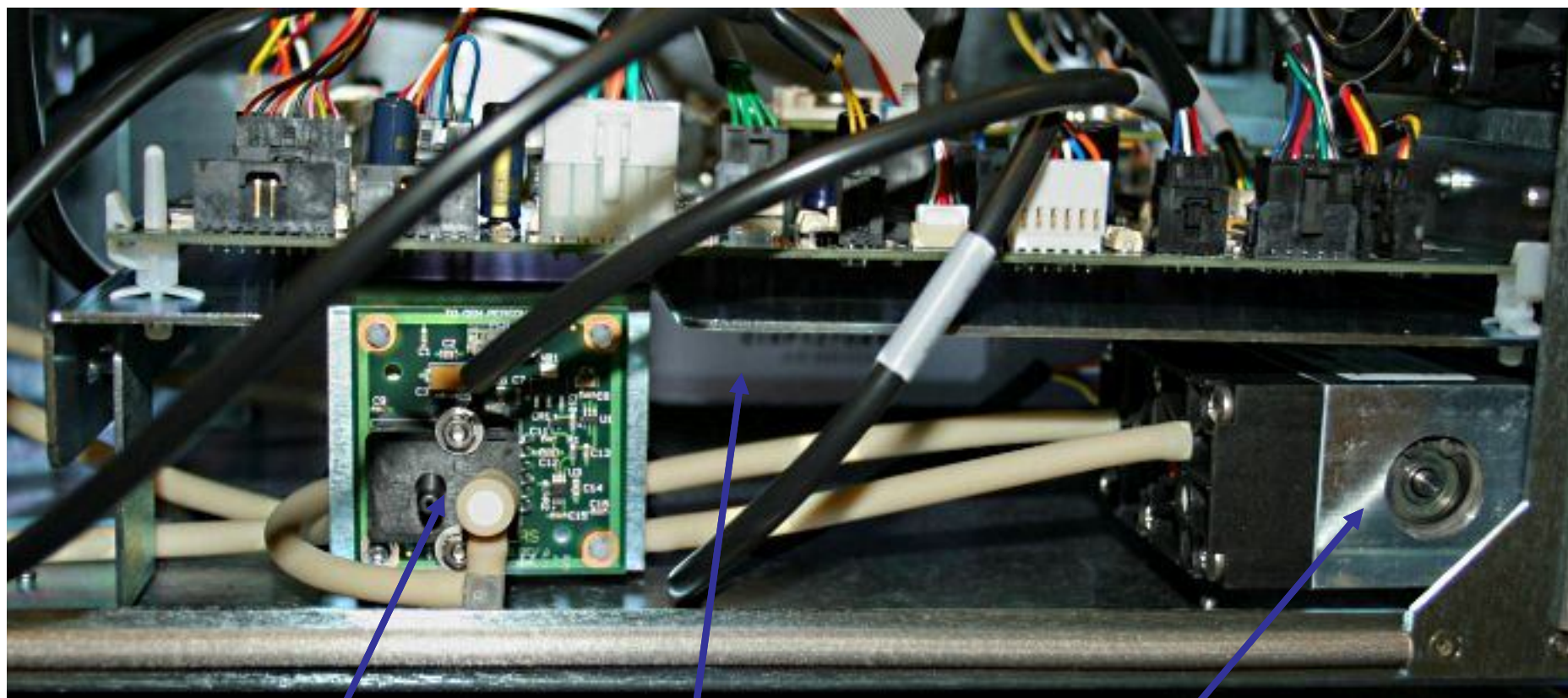
Personality
Card

Power Supply

CCPU2K3V



QSM Right Side View



Degasser
Gauge PCB

Power Supply

Degasser
Pump

QSM Rear Panel



Vacuum Pump
Attachment
Screws

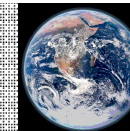
ENET and
RS232
Connectors

Power Supply

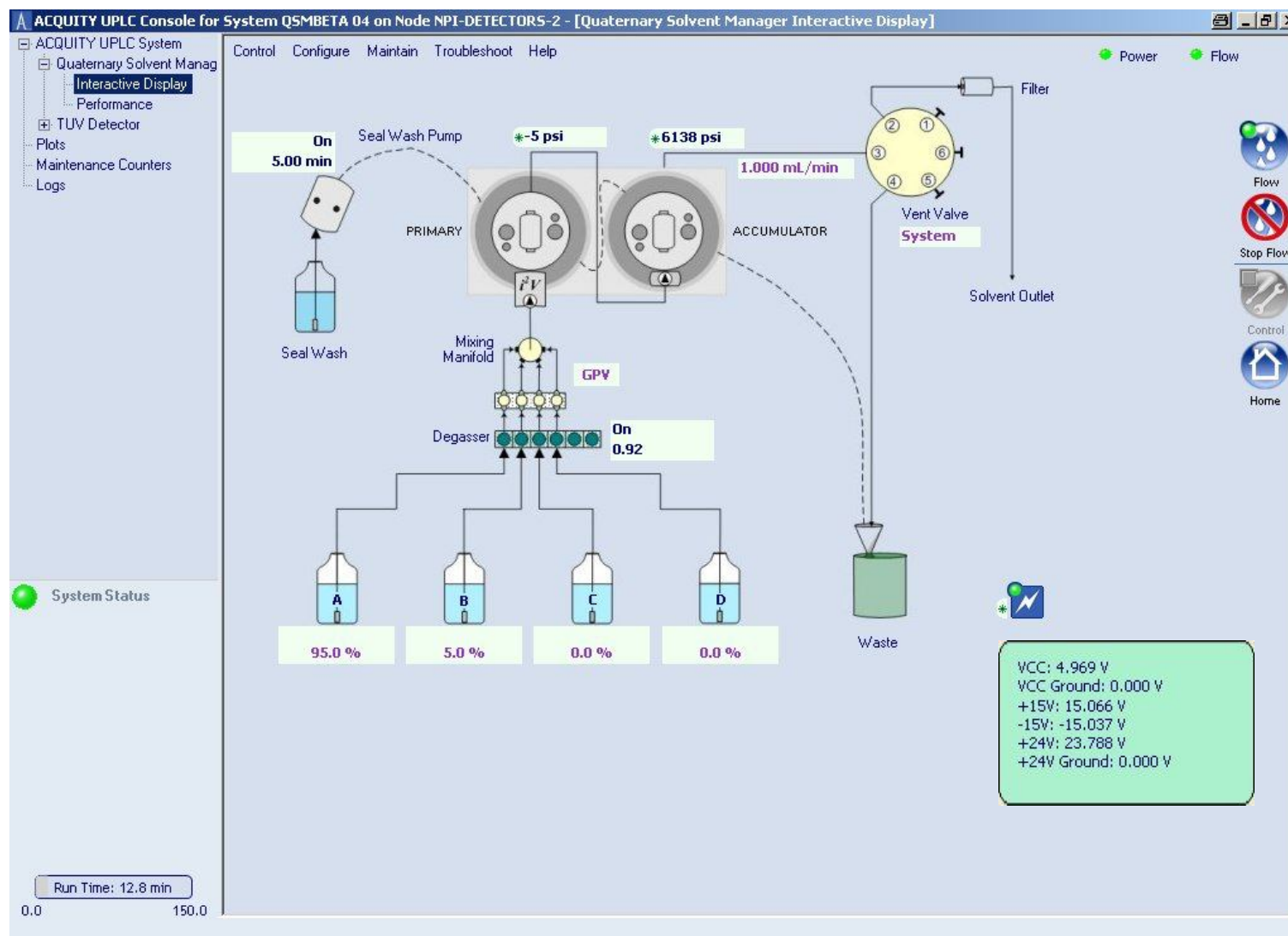
**Global Training
& Development**



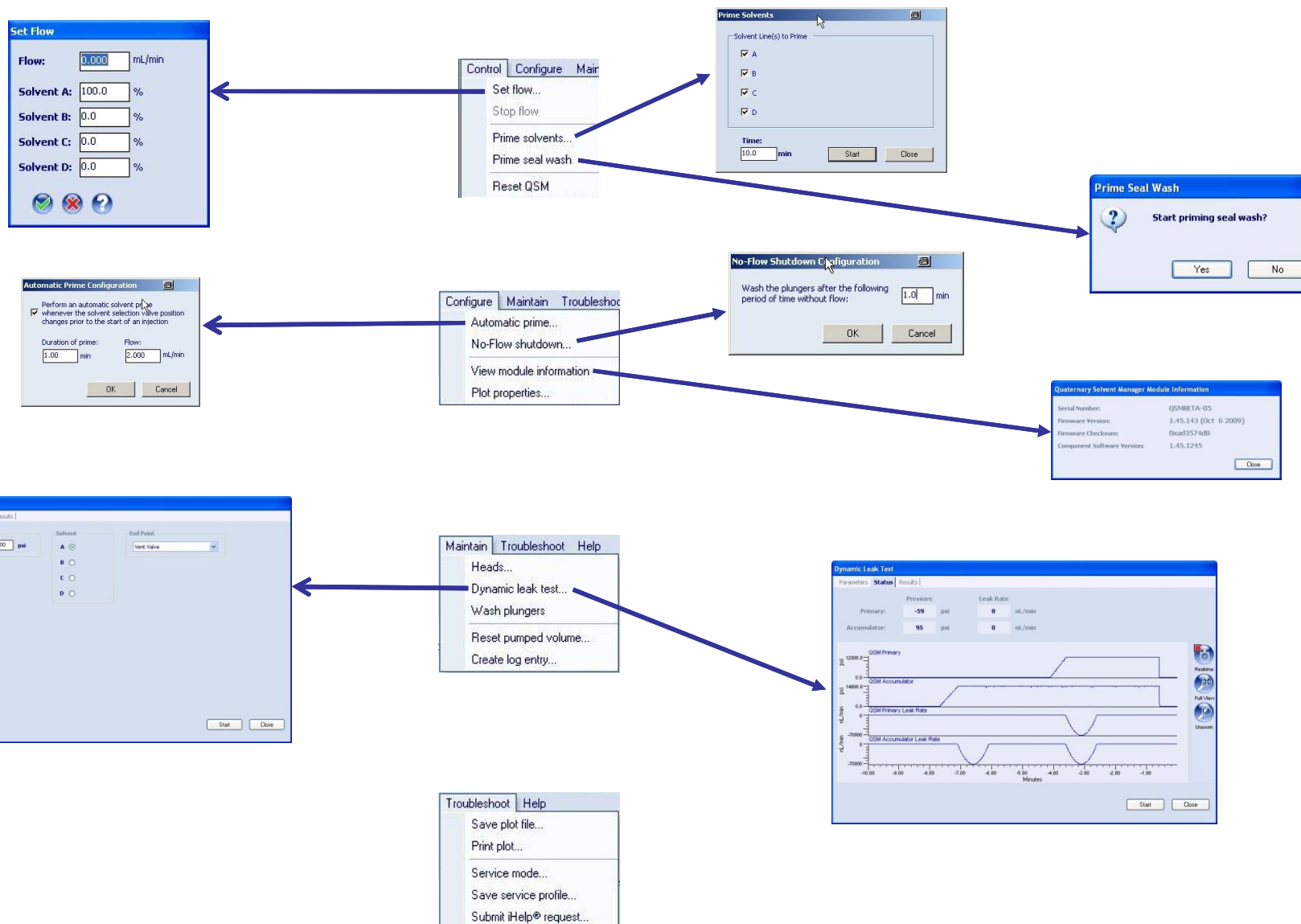
QSM Console Interactive Menu



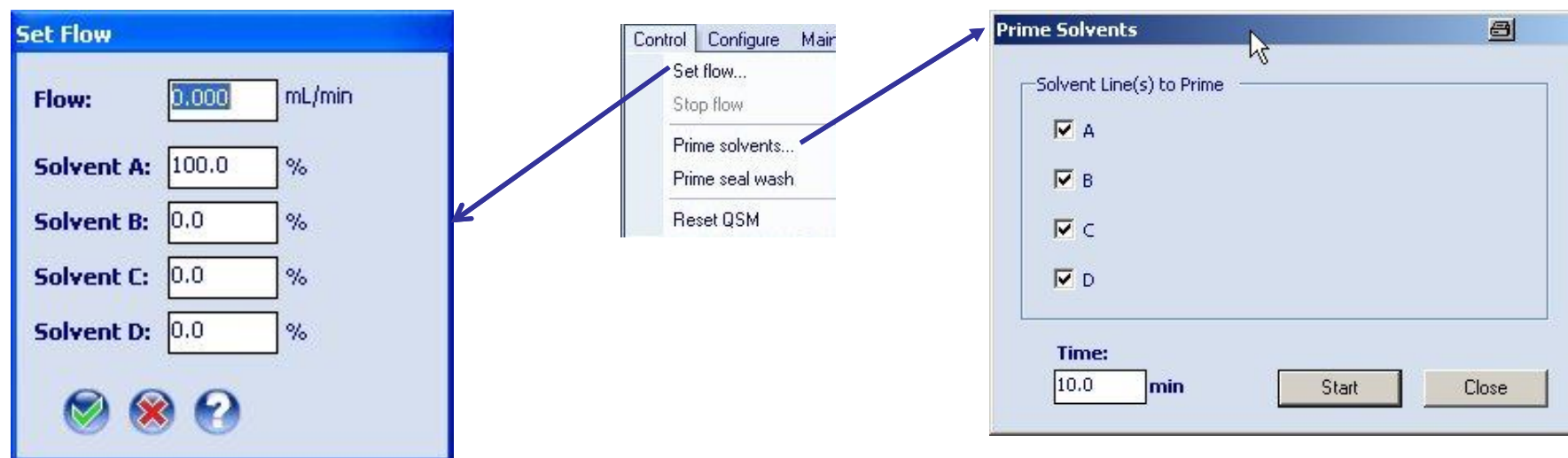
Global Training
& Development



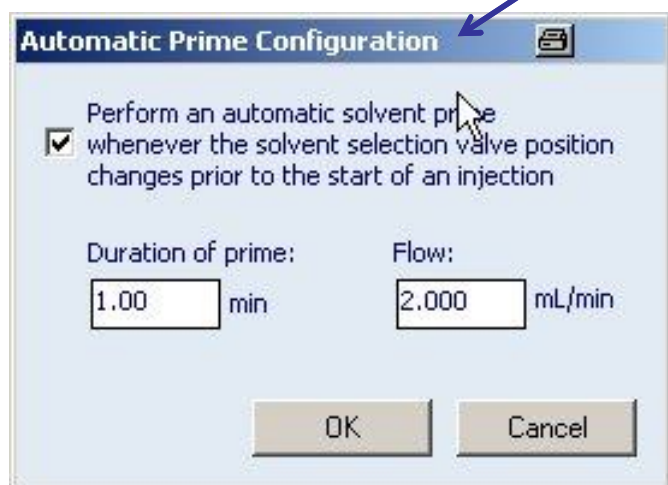
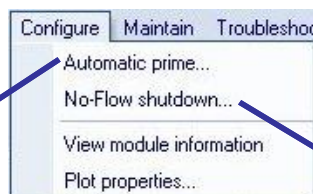
QSM Console- New Pull-Down Menus



Set Flow and Priming Menus



New QSM Console Functions



Automatic Prime Configuration
Used with the Solvent Select Valve. Allows the user to automatically run a prime when they switch to a different "D" solvent line while running samples.



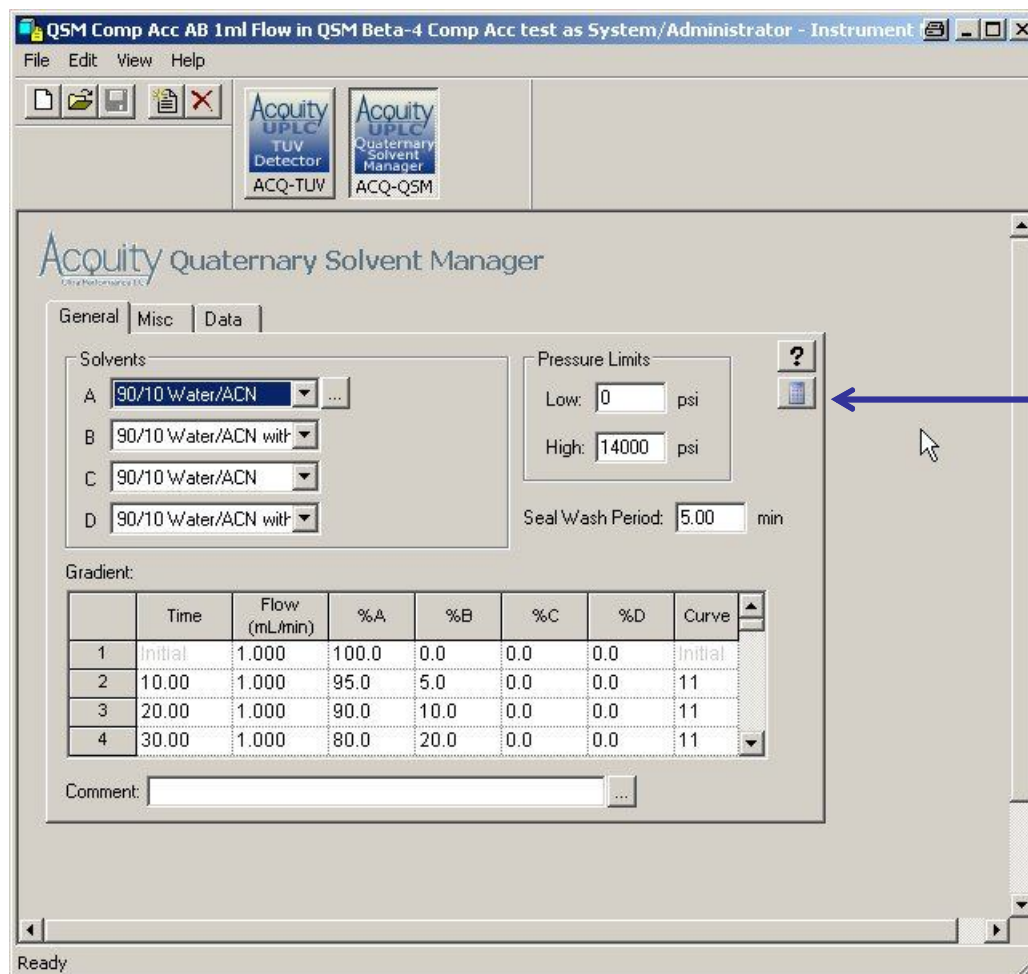
No-Flow Shutdown Configuration
Runs the Wash Plunger function automatically after the specified period without flow.

QSM Instrument Method-General Tab



Solvent Descriptions here form the pull-down menus. Descriptions can be added by clicking the edit button.

Gradients or isocratic conditions are entered in the Gradient Table. Binary to Quaternary gradients may now be specified. Standard Waters gradient Curves apply.



	Time	Flow (mL/min)	%A	%B	%C	%D	Curve
1	Initial	1.000	100.0	0.0	0.0	0.0	Initial
2	10.00	1.000	95.0	5.0	0.0	0.0	11
3	20.00	1.000	90.0	10.0	0.0	0.0	11
4	30.00	1.000	80.0	20.0	0.0	0.0	11

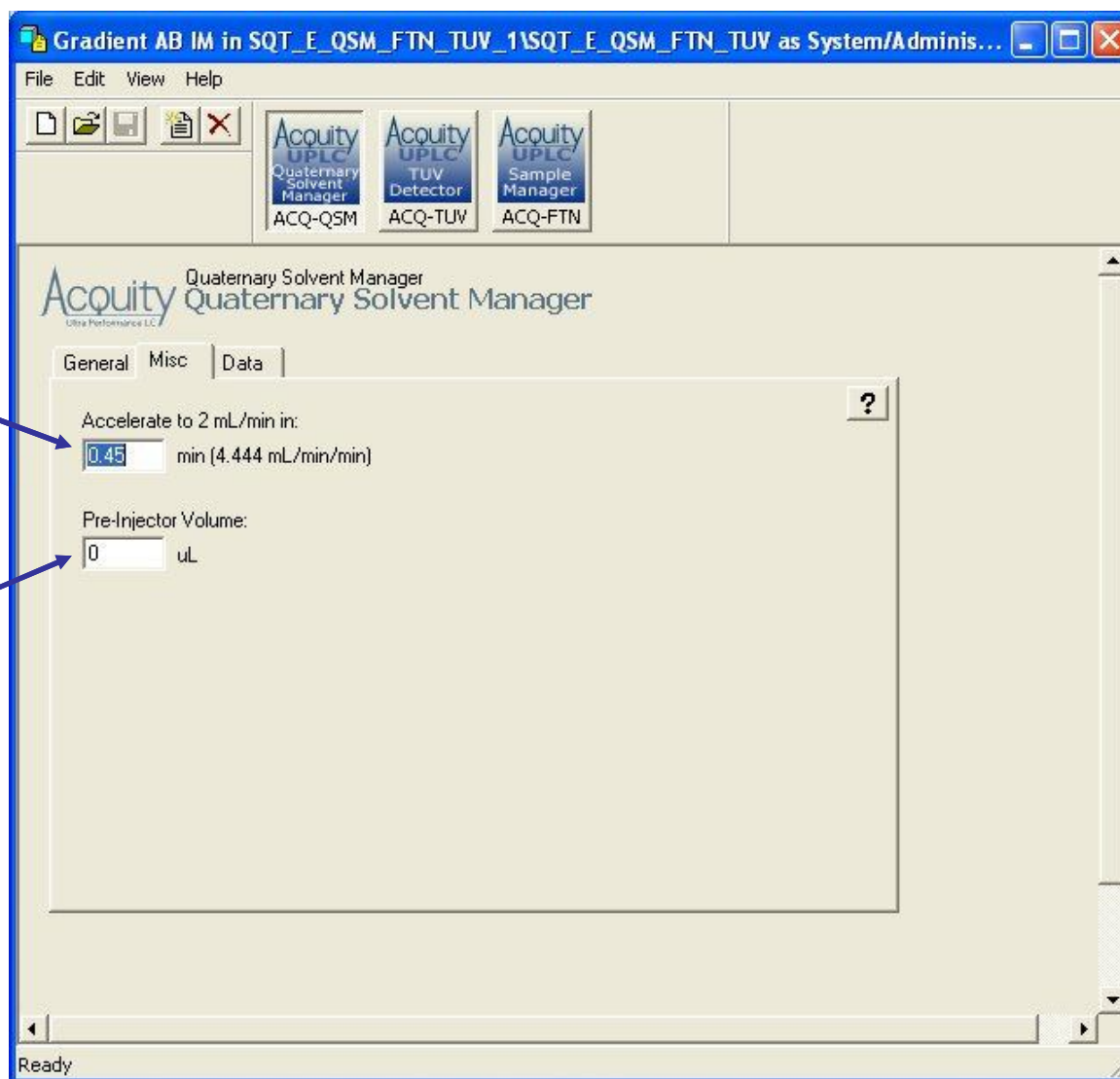
The ACQUITY Calculator can be accessed by clicking the Calculator button or alternately from the ACQUITY console top-level menu.

QSM Instrument Method-Misc Tab

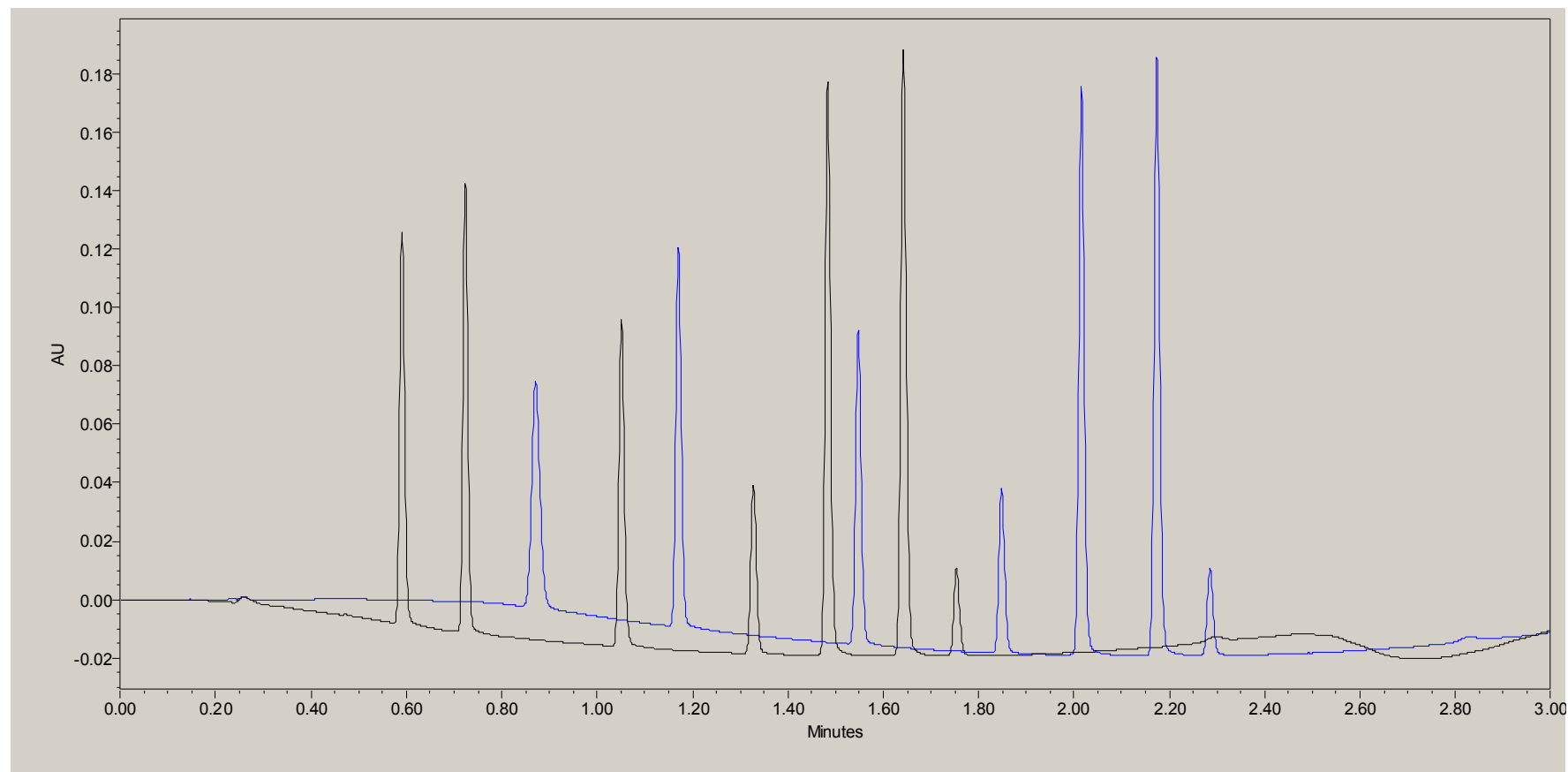


A flow acceleration rate can be entered in this field. Once downloaded to the QSM the flow rate will ramp up at the prescribed rate.

The Pre-Injector Volume specifies the volume from the QSM to the SMDI inject valve. When a value other than zero is entered, the injection will be delayed until the QSM has pumped the prescribed volume of the gradient. Approximate volume is 345ul.



Effect of the Pre-Injector Volume Field



Blue Chromatogram- No PI Delay

Black Chromatogram- 300ul PI Delay

QSM Instrument Method-Data Tab



Plot Properties

Time Range | All | QSM |

- ☒ QSM % A
- ☒ QSM % B
- ☒ QSM % C
- ☒ QSM % D
- ☒ QSM Accumulator
- ☒ QSM Accumulator Leak Rate
- ☒ QSM Degasser
- ☒ QSM Flow Rate
- ☒ QSM Primary
- ☒ QSM Primary Leak Rate
- ☒ QSM System Pressure

Color

lineColor Blue

Data Processing

dataProcessing **Sampled**

Description

(name) ACQ-QSM#QSMBETA021.PercentSolventA

Misc

LocalName **QSM % A**

Scaling

autoscale **True**

manualMinScale **-5**

OK Cancel

Select the QSM diagnostic data channels to acquire. These will be saved as independent channels in Empower or MassLynx. Note: some of the above channels are enabled for beta testing only and will not be available in the released product.

QSM Dynamic Leak Test



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Leak Test

Parameters | Status | Results

Pressure

Accumulator: psi

Primary: 12000 psi

Solvent

A ☒ B ☐ C ☐ D ☐

☒ Prime

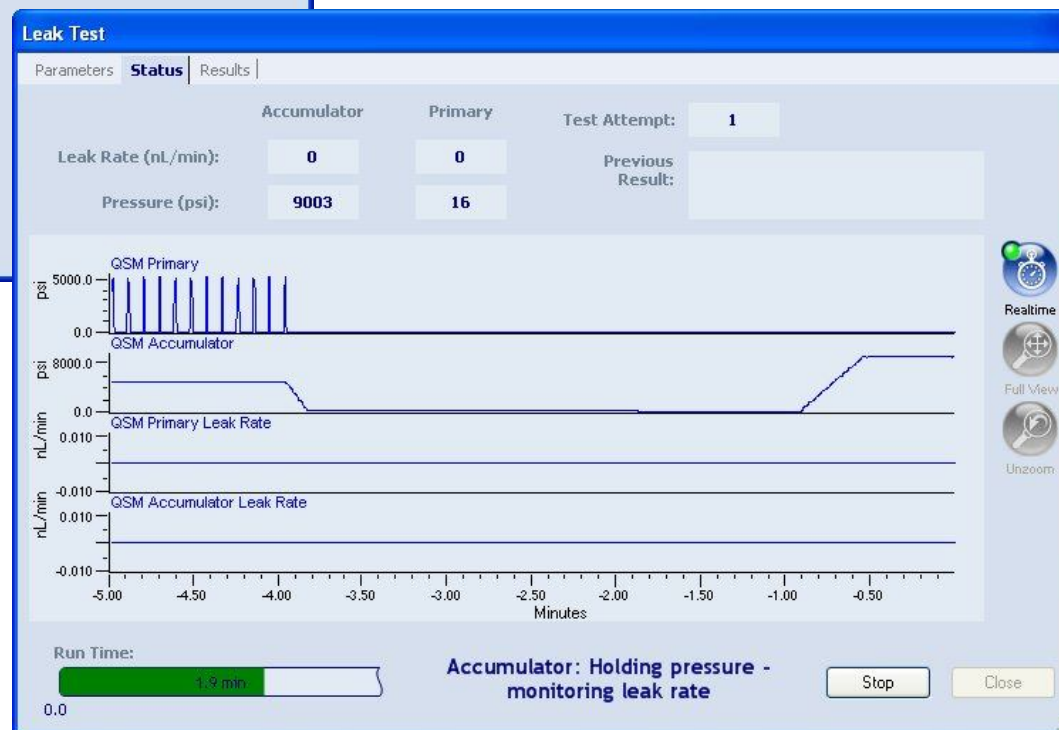
End Point

☒ Vent Valve

☐ Column (Active Pre-heater Outlet)

☒ Include Sample Manager Needle and Seal

Retry the test if it fails, up to a maximum of additional attempts.

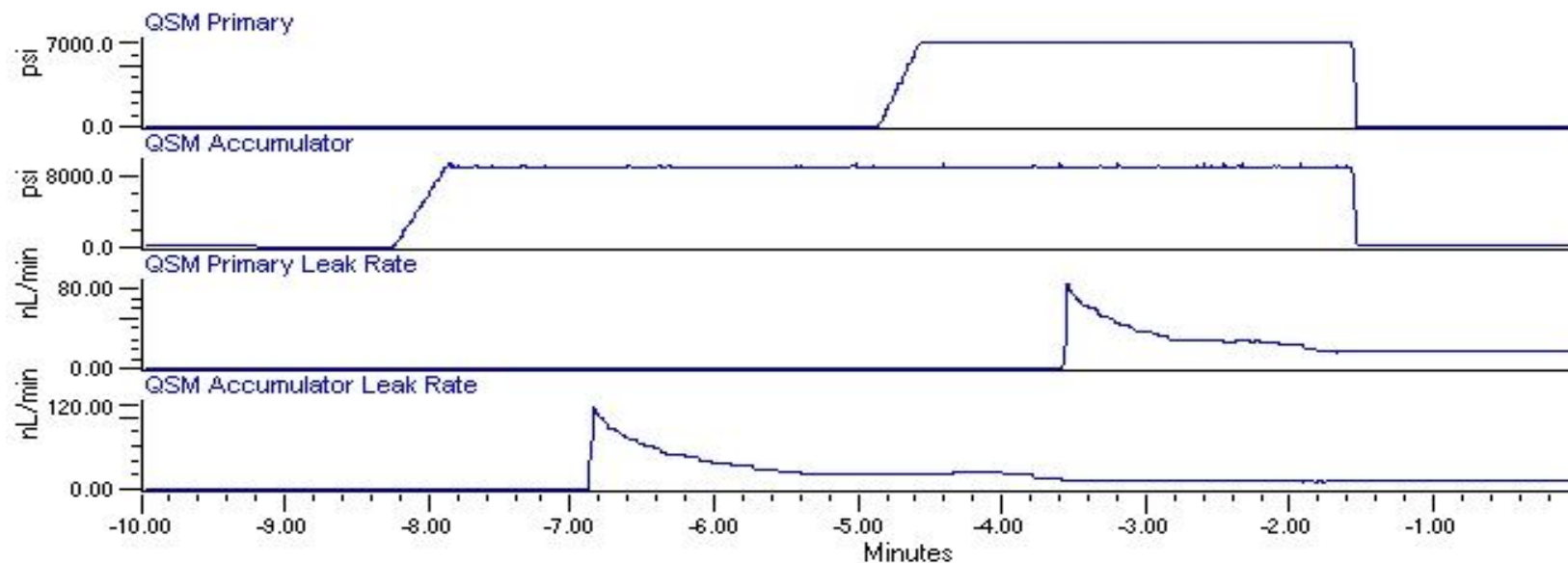


QSM Dynamic Leak Test Results

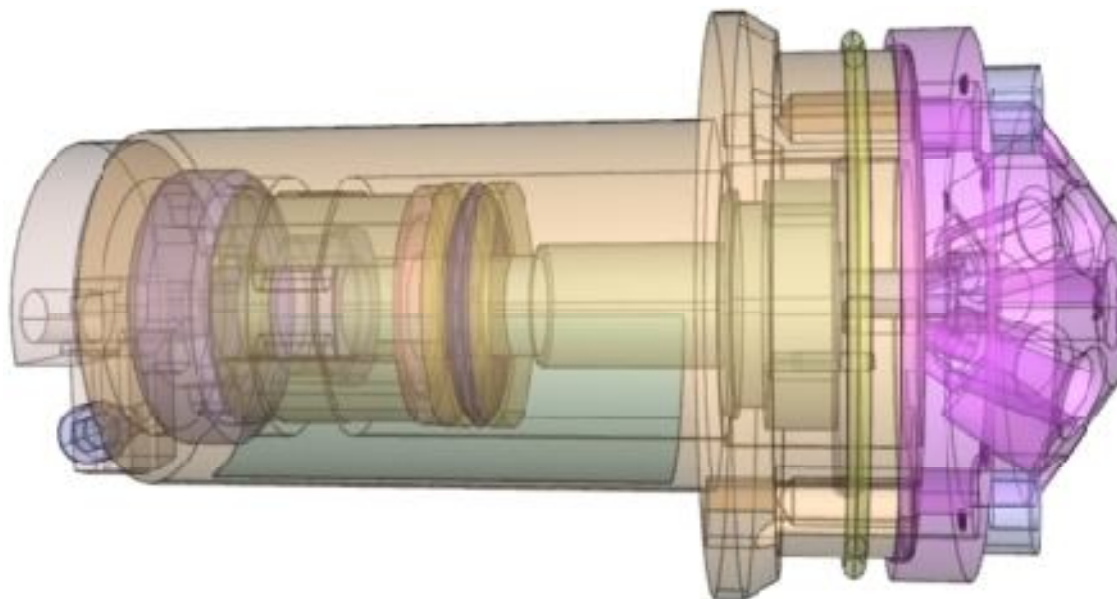


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Leak Test																										
Parameters	Status	Results																								
<table border="1"><thead><tr><th></th><th>Accumulator</th><th>Primary</th></tr></thead><tbody><tr><td>Result:</td><td>Passed</td><td>Passed</td></tr><tr><td>Leak Rate:</td><td>20 nL/min</td><td>16 nL/min</td></tr><tr><td>Maximum Pressure:</td><td>9161 psi</td><td>7027 psi</td></tr><tr><td>Percent of Stroke:</td><td>9 %</td><td>8 %</td></tr><tr><td>Compressed Volume:</td><td>5 uL</td><td>4 uL</td></tr><tr><td>Compression Attempts:</td><td>1</td><td>1</td></tr><tr><td>Test Attempts:</td><td>1</td><td></td></tr></tbody></table>				Accumulator	Primary	Result:	Passed	Passed	Leak Rate:	20 nL/min	16 nL/min	Maximum Pressure:	9161 psi	7027 psi	Percent of Stroke:	9 %	8 %	Compressed Volume:	5 uL	4 uL	Compression Attempts:	1	1	Test Attempts:	1	
	Accumulator	Primary																								
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Leak Rate:	20 nL/min	16 nL/min																								
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Percent of Stroke:	9 %	8 %																								
Compressed Volume:	5 uL	4 uL																								
Compression Attempts:	1	1																								
Test Attempts:	1																									
Print Start Close																										



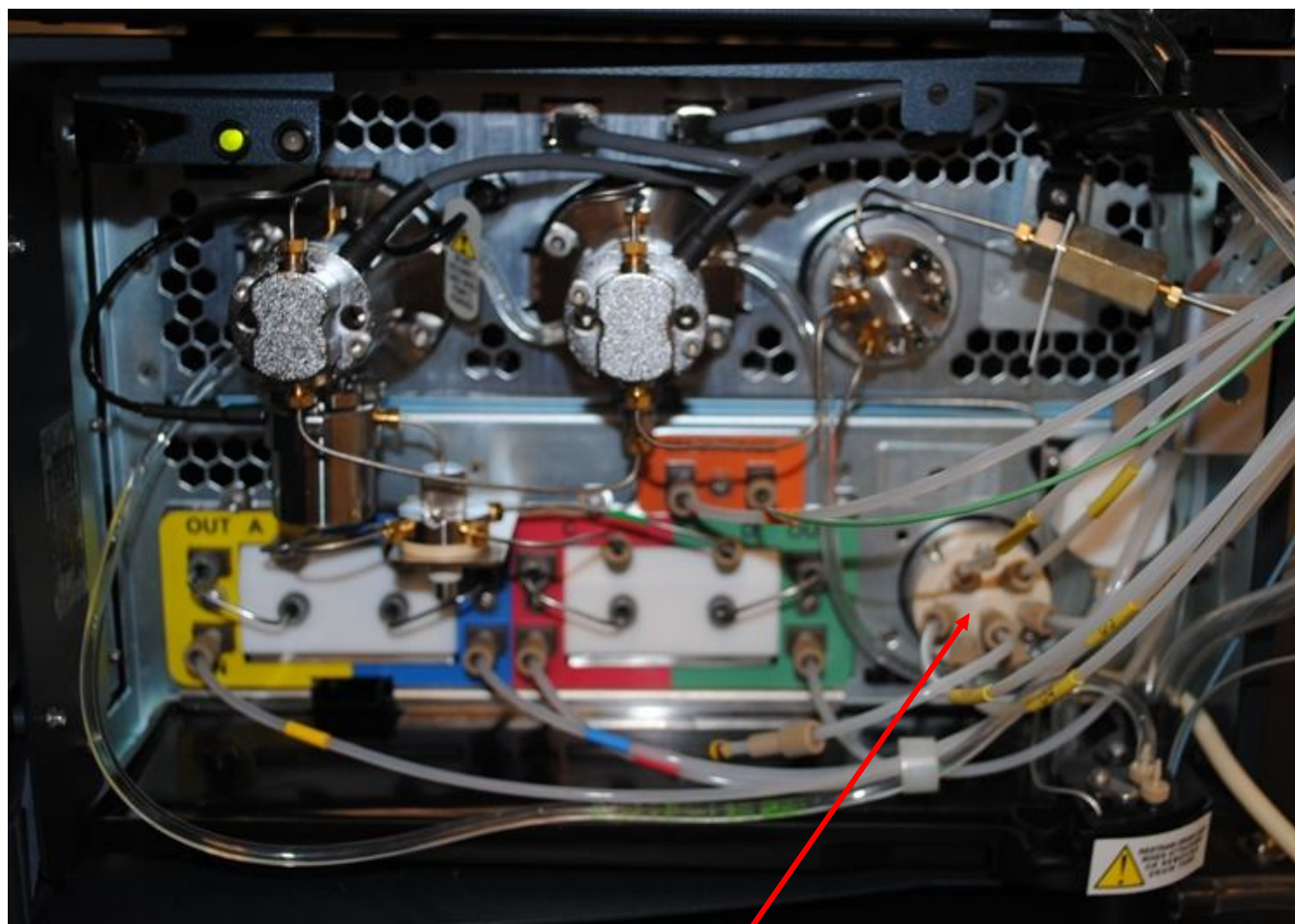
Solvent Select Valve Cartridge



Optional Solvent Select Valve



The optional Solvent Select Valve provides the ability to select between 5 different solvents for the "D" line. It has the same components as the Vent Valve. The pod assembly is of course different.

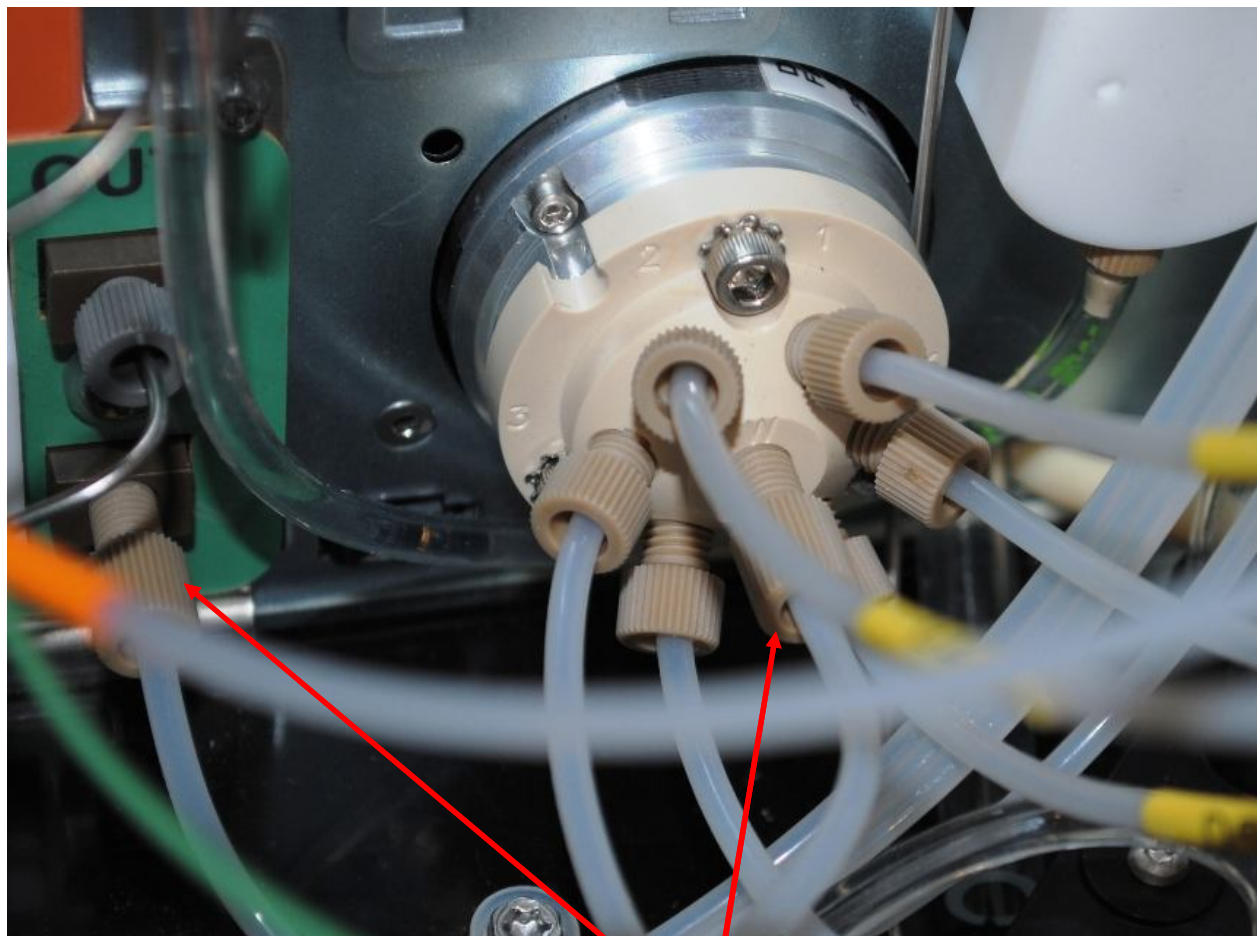


Solvent Select Valve

Solvent Select Valve

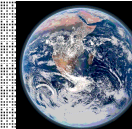


The solvents are switched before entering the degasser assembly.



To D Line Degasser

Solvent Select Valve Cartridge



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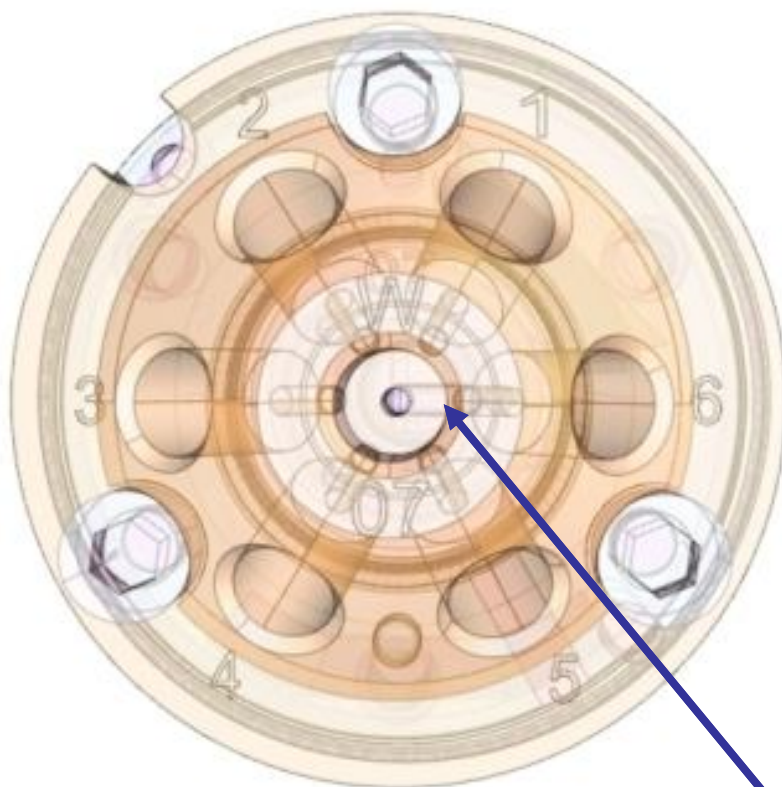


View in 3D with Deep View
Free at
www.righthemisphere.com/dv

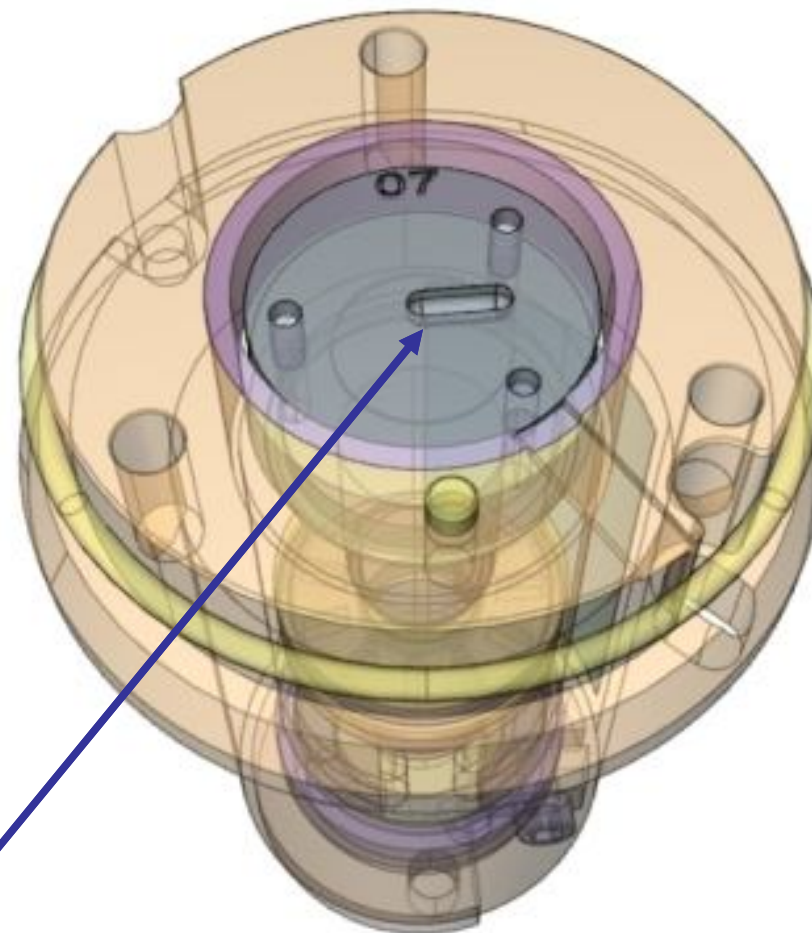
Solvent Select Valve Cartridge



Rotor and Stator
(Transparent View)



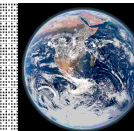
Rotor
(with Stator removed)



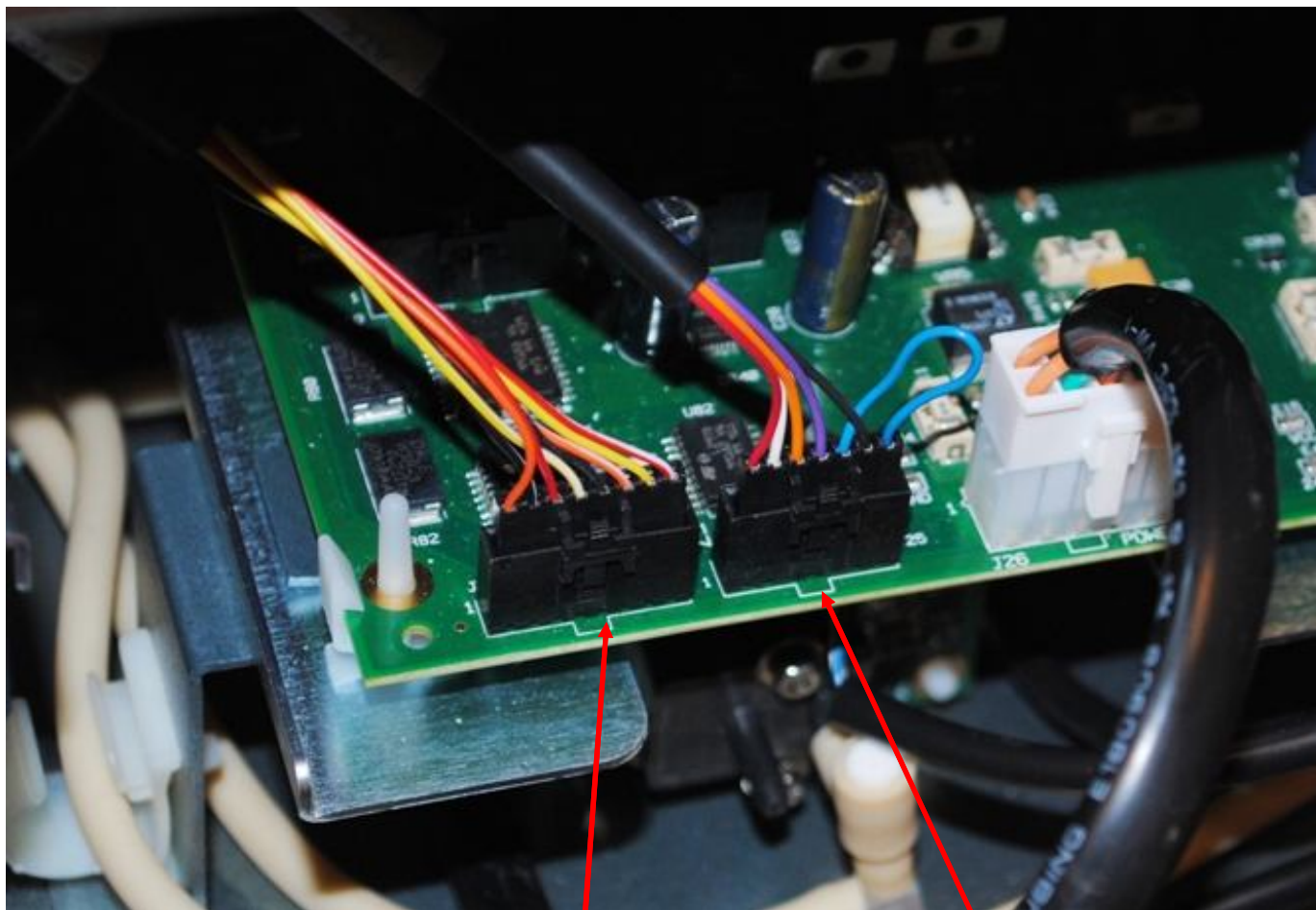
Rotor Channel

The clock style rotor channel connects one solvent at a time to the center port.

Solvent Select Valve PCB Connections



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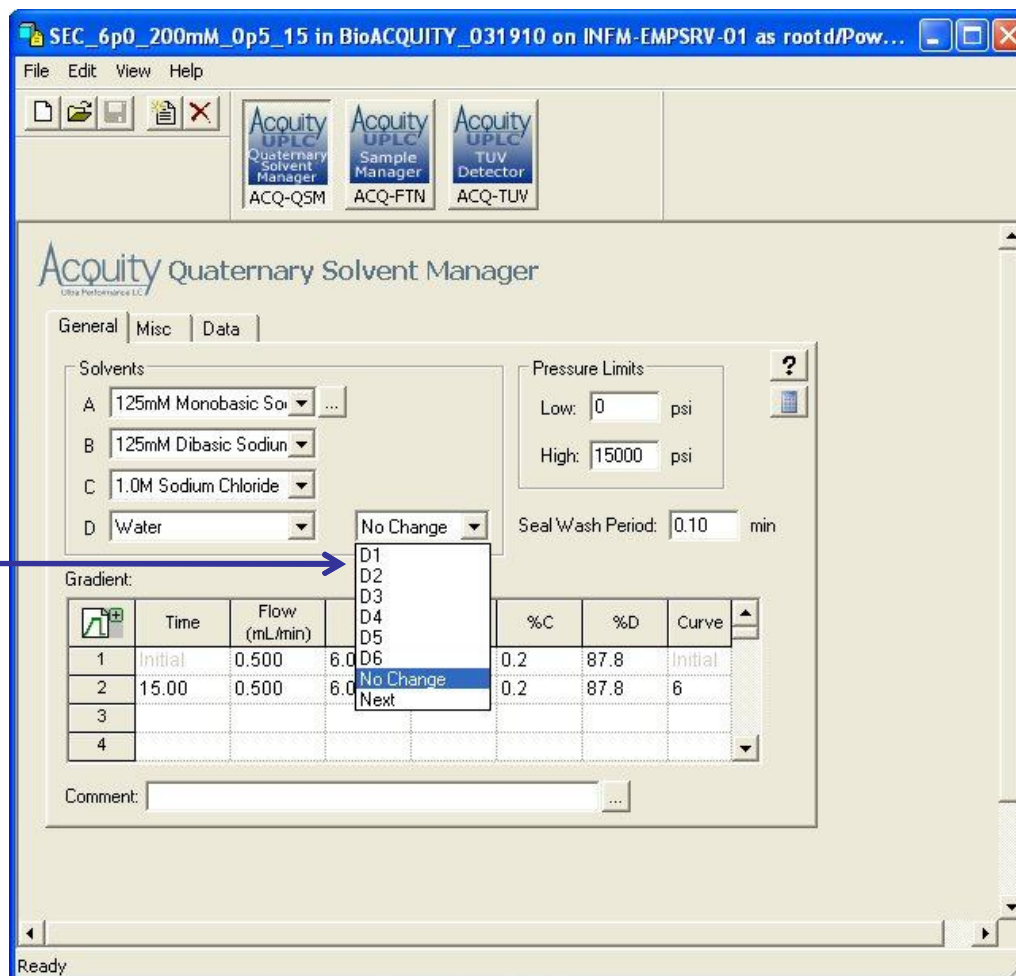
SSV Motor Connection

SSV Encoder Connection

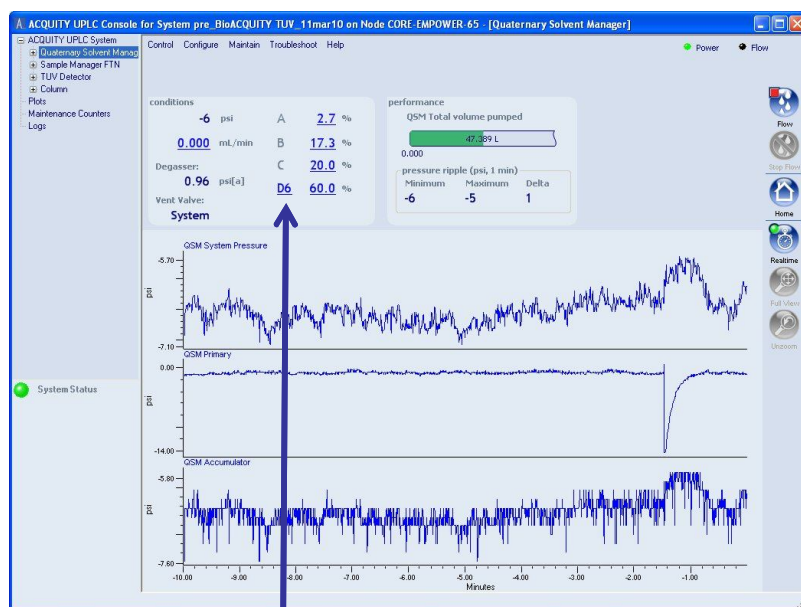
QSM Instrument Method- SSV Enabled



"D" Solvent Selection Menu
This menu becomes active when the optional SSV is installed and detected by the QSM. Once selected, the solvent will be used for the D line until another method is loaded or it is switched in the console.

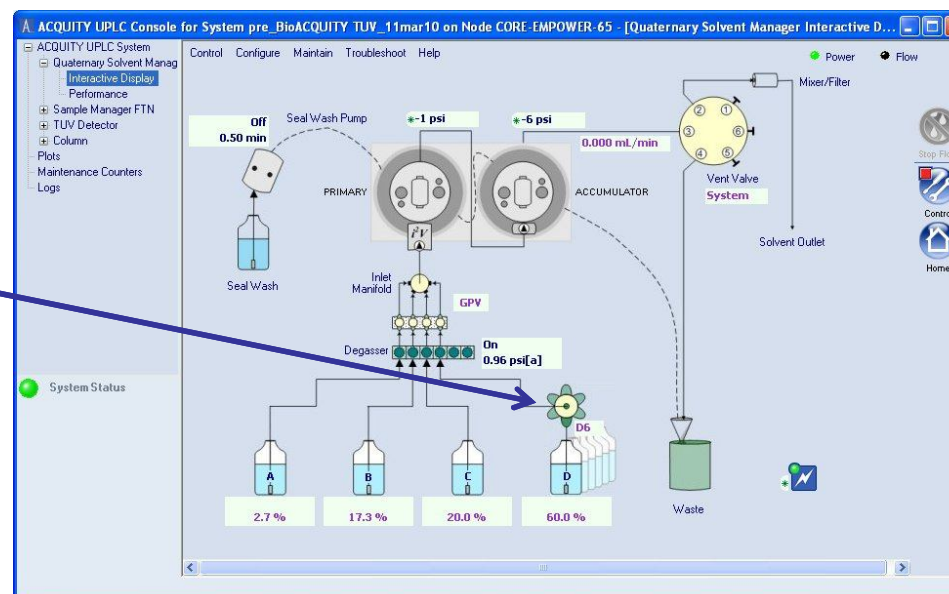


QSM Console Menu- SSV Enabled

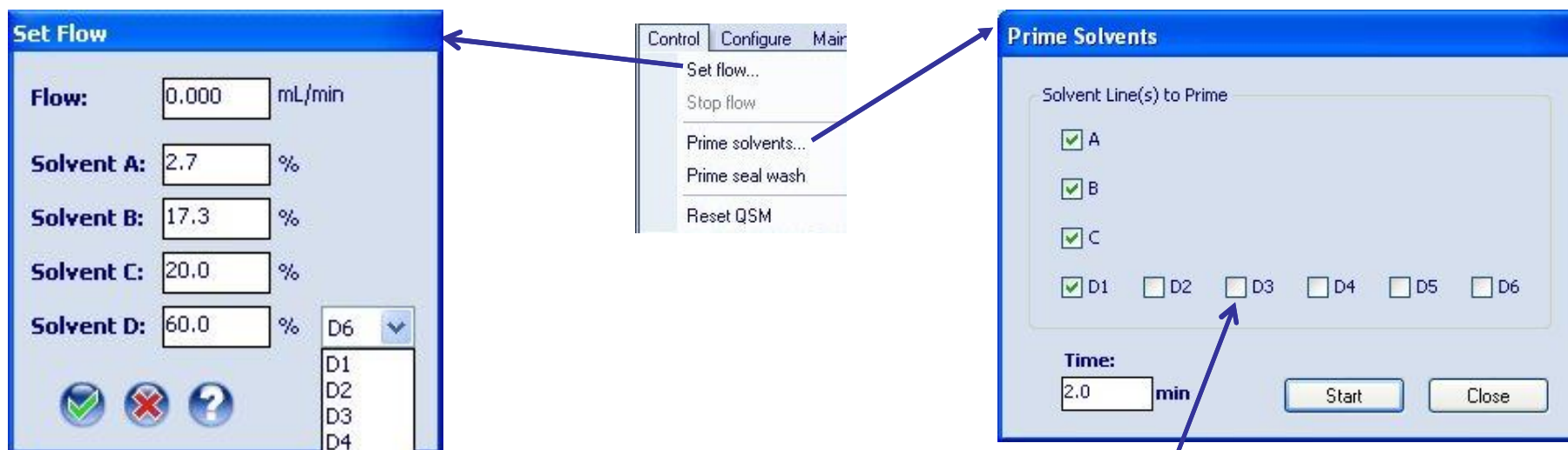


"D" Solvent Status Indicators

The current D line selected is indicated in the QSM top level and Interactive console menus.



Set Flow and Prime Solvents- SSV



"D" Solvent Selection Checkbox
In addition to lines A,B and C, each D line checked will be individually primed for the time specified in the menu above.

QSM Workbook Section



- Familiarize yourself with PM procedures
 - Perform procedures that differ from ACQUITY Classic (BSM)
- Perform key new service procedures
 - Again as they differ from ACQUITY Classic (BSM)
- Disassemble the unit as desired
- Reassemble and run diagnostics
- **Cautions**
 - Do not take apart individual degasser chambers
 - Be careful not to cross-thread the GPV outlet fitting