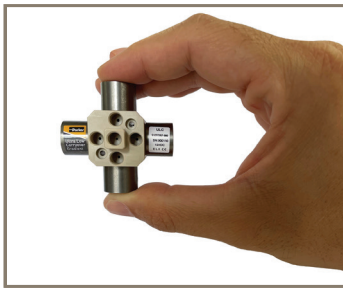
Improving Gradient Accuracy and Precision in HPLC Instrumentation



ENGINEERING YOUR SUCCESS.

Ultra Low Carryover Gradient Valve Miniature Liquid Valve

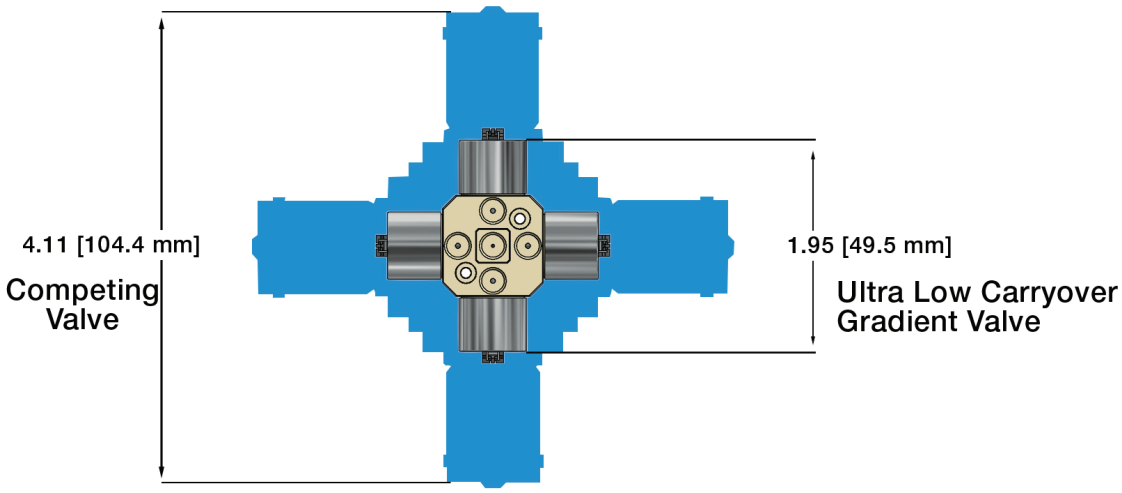
Reduce instrument size and weight

Reduced Size

An 80% size reduction and 75%decrease in weight vs. competing gradient valves with superior flow capabilities

Increase Design Flexibility

Space occupied by the Ultra Low Carryover Gradient Valve is about 80% less than competing valves



Reduced Dwell Volume

The Ultra Low Carryover Gradient Valve reduced size enables the valve to be placed closer to the injector reducing dwell volume and increasing throughput

Enables Smaller and Lighter Systems

This can reduce footprint and instrument weight

Ultra Low Carryover Gradient Valve Miniature Liquid Valve

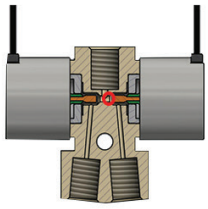
Improve fluidic performance & improve change over between solvent channels

The Ultra Low Carryover Gradient Valve reduces internal volume in two ways:

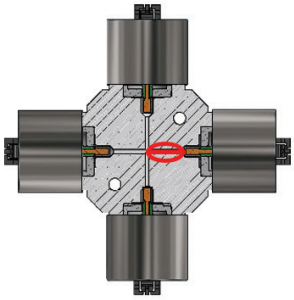
- Reducing the overall size of the valve shortens fluid passageways
- The unique armature design extends into the manifold body further reducing internal volume

Channel volume from seal to convergence point is reduced by 40%

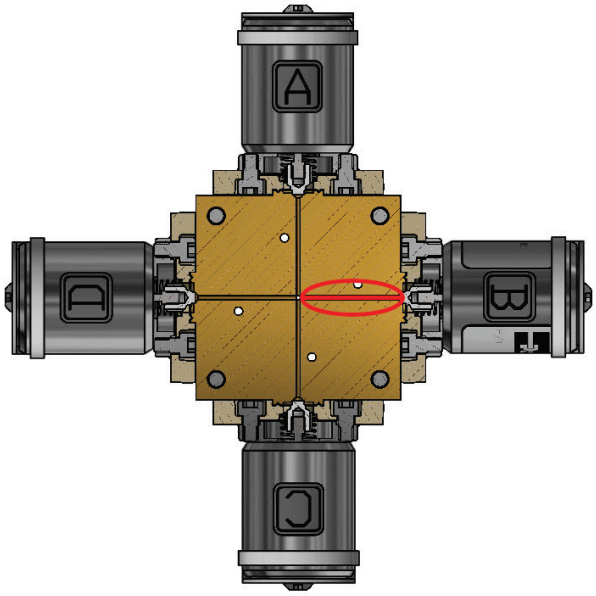
- Improves gradient responsiveness
- This low carryover design reduces crosstalk between channels improving gradient accuracy



Ultra Low Carryover Gradient 2-Channel



Ultra Low Carryover Gradient 4-Channel



Competing Valve

Ultra Low Carryover Gradient Valve Miniature Liquid Valve

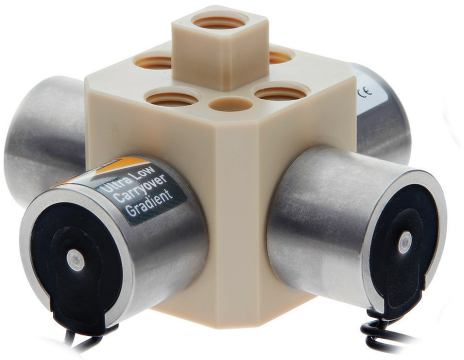
How the electronics design of the Ultra Low Carryover Gradient Valve improves gradient performance

Patented Solenoid

The patented solenoid design enables extremely low response time of 2 msec or less enabling rapid and precise gradient changes

Accuracy

Superior response time and repeatability results in improved compositional accuracy

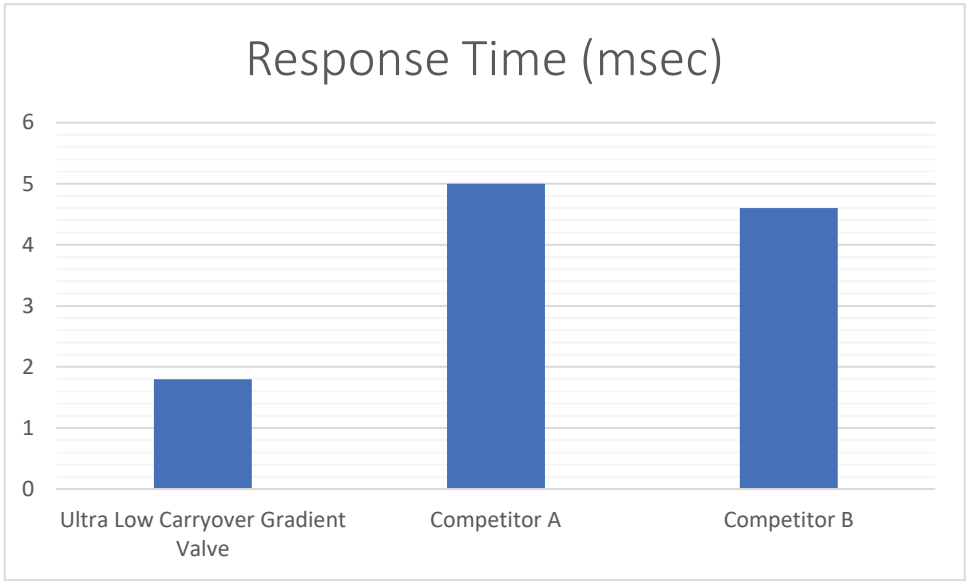


Low Response Time

When tested with competing valves, the Ultra Low Carryover Gradient Valve showed a 60% reduction in response time

Response Time and Low Internal Volume

This best-in-class response time in combination with the lower internal volume of the Ultra Low Carryover Gradient Valve, enable the best compositional accuracy and precisions



Ultra Low Carryover Gradient Valve Miniature Liquid Valve

The Ultra Low Carryover Gradient Valve offers unparalleled long life to your system.

Life Rating

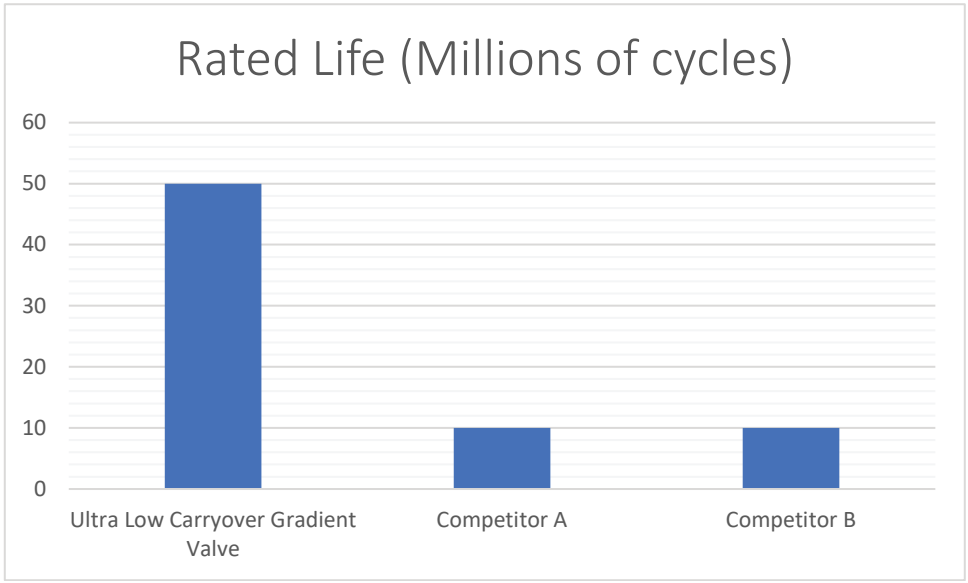
With a life rating of 50 million cycles the Ultra Low Carryover Gradient Valve offers five times the life of competing valves.

Replacement Interval

With this remarkable life rating this valve can last the life of the HPLC instrument

Reduce Warranty Cost

This improved reliability will reduce failures within the HPLC system warranty period decreasing warranty costs and downtime



Ultra Low Carryover Gradient Valve Miniature Liquid Valve

The Ultra Low Carryover Gradient Valve provides the best crystallization resistance to your design

Saline Tests

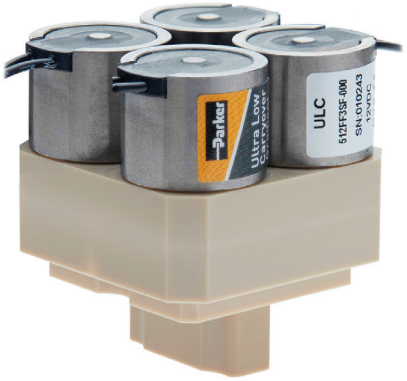
In side by side testing the Ultra Low Carryover Gradient Valve still passed specifications after 30 Million cycles with saline solution*

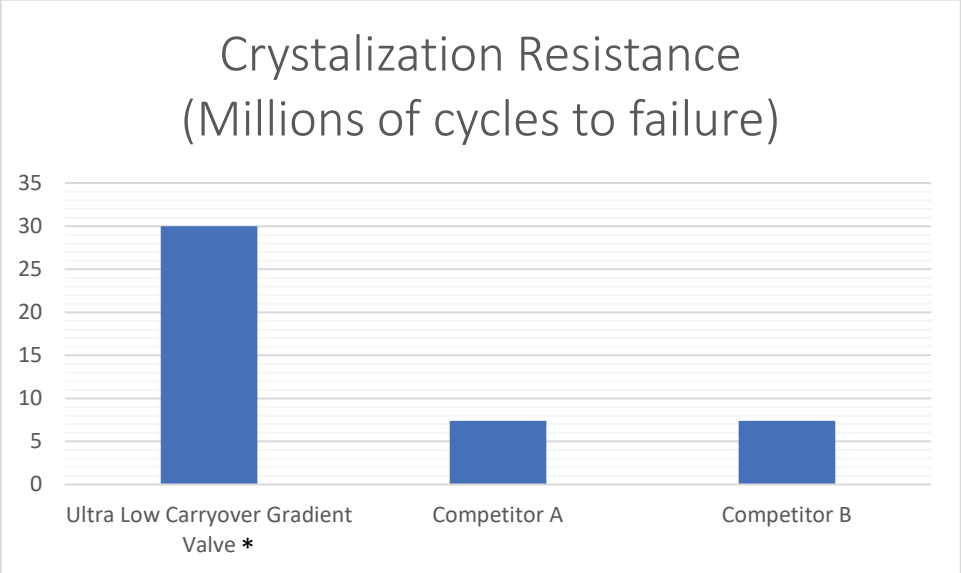
Outperforms Competition

Competing valves failed before their 10M cycle rating

Reduce Downtime

The ability to pass crystals without impacting valve performance reduces warranty and downtime costs



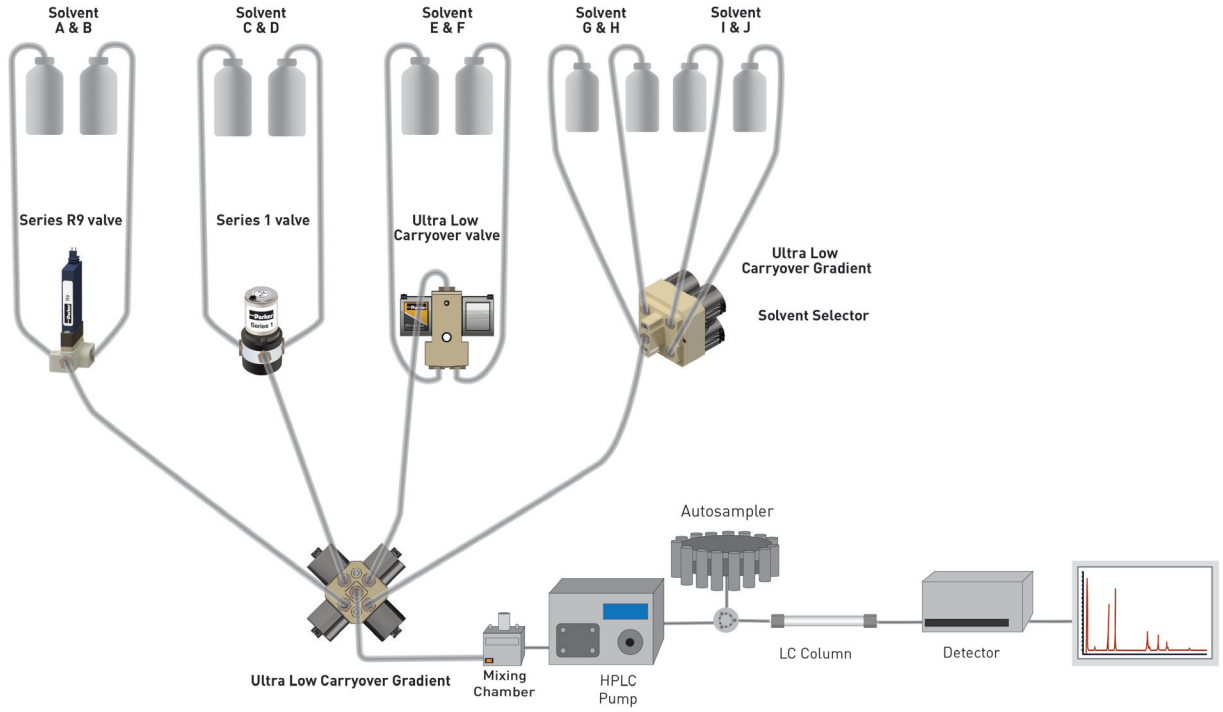


* Valve was still meeting all specifications when test was ended at 30 million cycles

Ultra Low Carryover Gradient Valve Miniature Liquid Valve

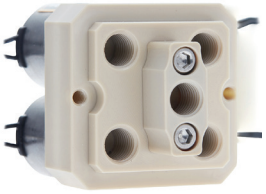
Fluidic System Simplification

The Ultra Low Carryover Gradient Valve can also be used as a solvent selector valve in either 2 or 4 channel configurations.



Three different designs to meet your needs:

4-Channel Radial Design



4-Channel Panel Mount

(Can be installed on a panel separating the liquid connections from the electronics)

2-Channel Design

Ultra Low Carryover Gradient Valve Miniature Liquid Valve

Product Specifications

Physical Properties

Valve Type:	
4-Channel & 2-Channel	
Media:	
Liquid	
Operating Environment/ Media Temperature:	
4°C to 50°C (39°F to 122°F)	
Storage Temperature:	
-20°C to 70°C (-4°F to 158°F)	
Weight:	
4-Channel Radial Design	2.56oz (72.5g)
4-Channel Panel Mount	2.45oz (69.5g)
2-Channel Design	1.19oz (33.7g)
Porting:	
1/4-28	
Internal Volume: (seal to common port)	
4-Channel Radial Design	9.4 µL
4-Channel Panel Mount	12.99 µL
2-Channel Design	4.05 µL
Orifice Size:	
.030" (0.76 mm)	

Electrical

Voltage (VDC ±):	12	24
Power (Watts):	3.0	3.0
Current (mA):	250	116
Resistance (Ohm):	48	207
Ω ± 10% @ 68 °F, 20 °C Note: For actuation exceeding 100ms Hit & Hold is required.		
Electrical Termination:	Molex Housing: #50-57-9402 Molex Contacts: #16-02-0098	

Wetted Materials*

Seals:	FFKM or EPDM
Body:	PEEK
Regulatory:	RoHS directive (2002/95/EC) and REACH EC 1907/2006
Mounting Options:	1/4-28 Threaded Female Design

Performance Characteristics

Leak Rate:
0.150 sccm of Air (bubble tight)
Operating Pressure:
45 psig (3.1 bar)
Proof Pressure:
120 psig (8.3 bar)
Response Time:
<2 msec at 2X rated Voltage <10 msec at rated Voltage
Recommended Filtration:
16 µm
Reliability:
50 Million Cycles
Flow Rate:
Minimum water flow of 320 mL/ min @ 45 psig (3.1 bar)

ULC	3	24	FF	3	R	F	-000
Series	**Configuration**	**Voltage**	**Seal Manifold**	**Orifice**	**Mounting**	**Electrical Connection**	**Configuration**
ULC-	3: 2-Channel	12: 12 VDC 24: 24 VDC	FF: FFKM EP: EPDM	3: 0.030" (0.76mm)	4: 1/4 - 28	F: Latching Connector	-000
ULC-	5: 4-Channel	12: 12 VDC 24: 24 VDC	FF: FFKM EP: EPDM	3: 0.030" (0.76mm)	S: Panel Mount 1/4-28 R: Radial Body 1/4-28	F: Latching Connector	-000

Accessories	
Part Number	**Description**
290-006061-005	19.5 in (495.3mm) Wire Extension with Flying Leads

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With over 30 years of expertise in integrating fluidic circuits, Parker is in a unique position to assist you with your instrument designs. We are the only company that manufactures liquid valves, liquid pumps, gas valves, and gas pumps. Because we manufacture both pumps and valves, you can rely on our expertise to provide a reliable and cost-effective solution. This expertise helps solve your fluidic needs by providing products or integrating them onto manifolds. If you are looking for a pre-tested solution, the entire subsystem can be delivered as a module.

Clinical Diagnostics and Analytical Instrumentation Expertise

Liquid Valves

Miniaturized valves featuring inert materials for the highest chemical compatibility, long life, low carryover and high pressure.

40 YEARS

Material Science – Sealing Elastomers and Valve Bodies

Elastomers and other wetted path materials developed for improved chemical compatibility, long life and optimized temperature performance.

30 YEARS

Customization for OEM Projects

As your valve and pump engineers, we can optimize valve and pump performance to suit your OEM application.

40 YEARS

Ultra Low Carryover Gradient Valve Miniature Liquid Valve

Serving a broad spectrum of life science, air quality, and process instrumentation OEM fluidic needs

Providing Pressure and Vacuum:
Broad range of diaphragm pumps for Gas and Liquid

Gas Flow Control:
High to Low Flow Proportional Valves

On/Off & Channel Selection Capabilities:
Gas and Liquid Solenoid Valves

High Precision Thermal Flow Control:
Mass Flow Controllers and Meters

In order to provide the best possible solution for your application, please provide the following requirements when contacting Applications Engineering:

- Media, Inlet & Outlet Pressures
- System Supply Voltage
- Ambient Temperature Range
- Minimum Required Flow Rate
- Media and Media Temperature Range
- Carryover requirement and how measured

For more information call **+1 603 595 1500** or email **ppfinfo@parker.com**

Visit **www.parker.com/precisionfluidics**

Recommendations on application design and material selection are based on available technical data and are offered as suggestions only. Each user should conduct their own tests to determine the suitability for their own use. Parker offers no express or implied warranties concerning the form, fit, or function of a product in any application.

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