Diaphragm valves

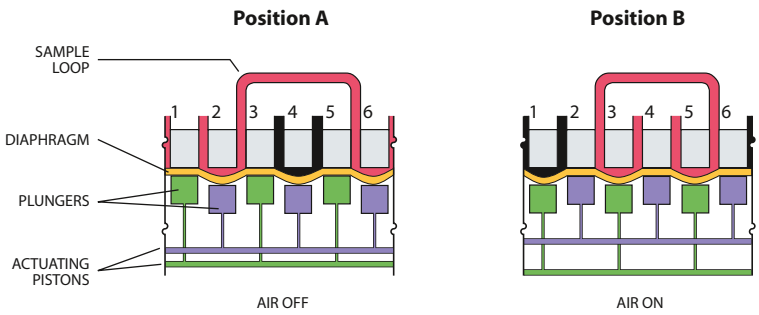
FOR CONTINUOUS AUTOMATED OPERATION

- Only 35 mm (1.375") in diameter
- >1,000,000 cycle lifetime
- Three configurations – 6 port, 10 port, and 4 port internal sample
- Built in actuator
- 1/16" or 1/32" Valco zero dead volume fittings

The VICI mini diaphragm valve is designed for trouble-free use in applications requiring minimal maintenance and maximum lifetime, making it an ideal choice for the process industry, automated lab analyzers, or continuous-monitoring environmental analyses.

Design

The mini diaphragm valve consists of plungers and ports arranged in a circular pattern, with the plungers controlled by the reciprocation action of two air actuated pistons. Maintenance procedures are greatly simplified, since a single screw holds the valve together and locating pins ensure proper alignment. Extremely long lifetime, very short actuation time (10 milliseconds), minimum internal dead volume, and reliability have made this type of valve very successful in process gas chromatography for both sample injection and column switching.



TECH TIP
For optimal zero dead volume connections, make sure your tubing meets the best industry standards. OD tolerance should be nominal dimension ± .002".

Fractional dimension	Nominal dimension
1/32"	.031
1/16"	.062
1/8"	.125
1/4"	.250
3/8"	.375
1/2"	.500

Dimensions

Valve diameter is 35 mm (1.375"), height is 42 mm (1.625"), and weight is less than 255 g (9 oz).

Valve Fittings

The valve cap has Valco 1/32" or 1/16" ZDV fitting details – a rugged design which allows easy replacement of tubing or of the valve itself.

Standard bore size is 0.40 mm (.016"). Optional bore sizes are 0.25 mm (.010") and 0.75 mm (.030").

Lifetime

Diaphragm valve lifetime can exceed 1,000,000 cycles at ambient temperature or 500,000 cycles at 175°C.

Actuation

Actuator air (50-60 psi) is supplied to a side port with 10-32 female threads, permitting use of a variety of compression or barbed fittings. A 3-way solenoid is required for actuation. *(See page 198.)*

Optional Mounting Kit

The mounting kit consists of a ring which is mounted on a flat surface. A slot allows the ring to be tightened around the collar of the valve.

Temperature/Pressure Specifications

Diaphragm valves can be operated at temperatures up to 200°C, at 300 psi. The standard valve is for applications in which the sample is above ambient pressure. An optional version works with subambient pressures, such as when the sample is "pulled" through the valve by a vacuum pump.

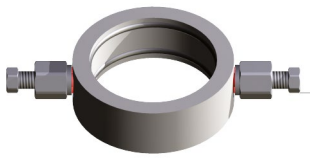
Materials of Construction

The cap is Nitronic 60 stainless (optional Hastelloy C or Type 316 stainless), with remaining metal parts of 300 series stainless. The diaphragm is formed from a specialized polyimide.

Purge Option

Purging improves sensitivity when a diaphragm valve is used in conjunction with a VICI Pulsed Discharge Detector, for example, since air cannot diffuse into the flow path.

The optional purge ring, easy to install on any VICI diaphragm valve, is equipped with two 1/16" ports for the purge gas inlet and outlet.



Purge ring
Page 144

ACTUATION
A 3-way solenoid is required for actuation.

MORE INFORMATION
Materials

Valve descriptions

Valve prices

DIAPHRAGM VALVES

Diaphragm valves, 1/32" fittings, 0.25 mm ports (.010")

Process GC
1/32" **0.25 mm**

Includes stainless steel nuts and ferrules.
A 3-way solenoid is required for actuation. Order separately on page 198.

4 port
.5 µl internal sample
Prod No
DV12-1114-.5

4 port
1 µl internal sample
Prod No
DV12-1114-1

6 port
sampling/switching
Prod No
DV12-1116

10 port
multifunctional
Prod No
DV12-1110

SPECS
Internal sample:
750 psi liq
50°C max
Sampling/switching:
300 psi gas
175°C max
Sample:
Above ambient pressure*
Nitronic 60 valve body
Polyimide diaphragm
* For vacuum applications, contact the factory.

Diaphragm valves, 1/16" fittings, 0.40 mm ports (.016")

Process GC
1/16" **0.40 mm**

Includes stainless steel nuts and ferrules.
A 3-way solenoid is required for actuation. Order separately on page 198.

4 port .5 µl internal sample	4 port 1 µl internal sample	6 port sampling/switching	10 port multifunctional
Prod No	*Prod No*	*Prod No*	*Prod No*
DV22-2114-.5	DV22-2114-1	DV22-2116	DV22-2110

SPECS
Internal sample:
750 psi liq
50°C max
Sampling/switching:
300 psi gas
175°C max
Sample:
Above ambient pressure*
Nitronic 60 valve body
Polyimide diaphragm
* For vacuum applications, contact the factory.

Diaphragm valves, 1/16" fittings, 0.75 mm ports (.030")

Process GC
1/16" **0.75 mm**

Includes stainless steel nuts and ferrules.
A 3-way solenoid is required for actuation. Order separately on page 198.

4 port .5 µl internal sample	4 port 1 µl internal sample	6 port sampling/switching	10 port multifunctional
Prod No	*Prod No*	*Prod No*	*Prod No*
DV22-3114-.5	DV22-3114-1	DV22-3116	DV22-3110

SPECS
Internal sample:
750 psi liq
50°C max
Sampling/switching:
300 psi gas
175°C max
Sample:
Above ambient pressure*
Nitronic 60 valve body
Polyimide diaphragm
* For vacuum applications, contact the factory.

1/16" sample loops

Each stainless steel loop includes two 1/16" stainless nuts and ferrules.

Volume	*Prod No*
2 µl	CSL2
5 µl	CSL5
10 µl	CSL10
20 µl	CSL20
50 µl	CSL50
100 µl	CSL100
250 µl	CSL250
500 µl	CSL500
1 ml	CSL1K
2 ml	CSL2K
5 ml	CSL5K
10 ml	CSL10K

1/32" sample loops

Each stainless steel loop includes two 1/32" stainless steel nuts and ferrules.

Volume	*Prod No*
1 µl	CSLN1K
2 µl	CSLN2K
5 µl	CSLN5K
10 µl	CSLN10K

6 port
1/16" fittings

Replacement diaphragms

	Prod No
Polyimide diaphragm	
.010" bore	DV22-21D
.016" bore	DV22-21D
.030" bore	DV22-31D
PTFE diaphragm	DV22-22D

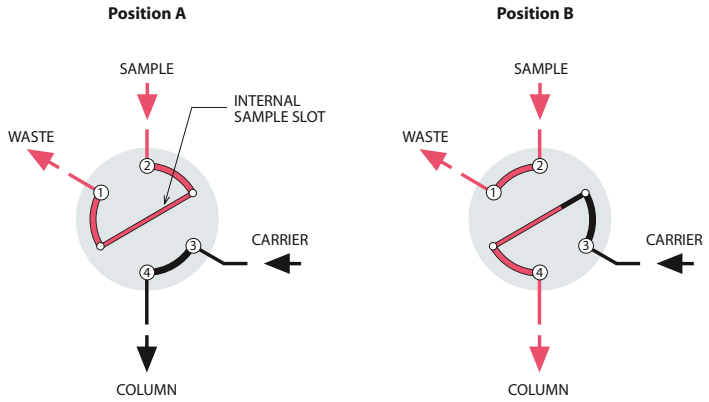
Accessories

	Prod No
Purge ring	DV22-PURGE
Mounting kit	DVBRKIT

OPTIONS
■ Materials:
Hastelloy C
Type 316 stainless
For more information, refer to the metals discussion on page 254-5.

MORE INFORMATION
More applications . . pp 119-123
3-way solenoid 198

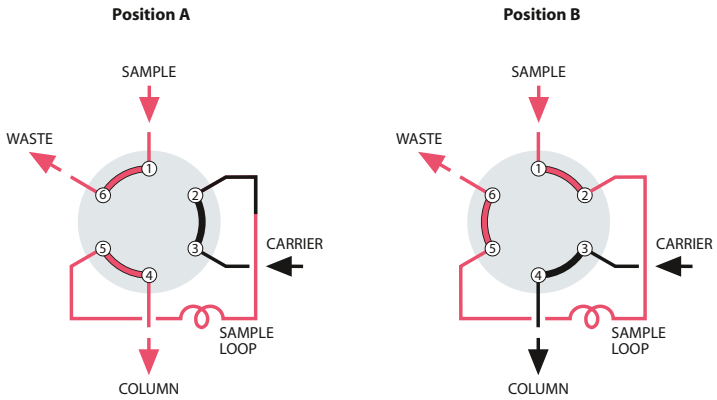
4 port sample injector



MICROVOLUME SAMPLE INJECTION

The internal sample (fixed volume) flowpath is used when very small sample volumes are required. The sample size is determined by a passage engraved on the valve cap, allowing precise, repeatable injections. In Position A, the sample flows through the sample passage while the carrier flows through to the column. In Position B, the sample passage is in line with the column and the carrier injects the contents of the sample passage into the column.

6 port sample injector



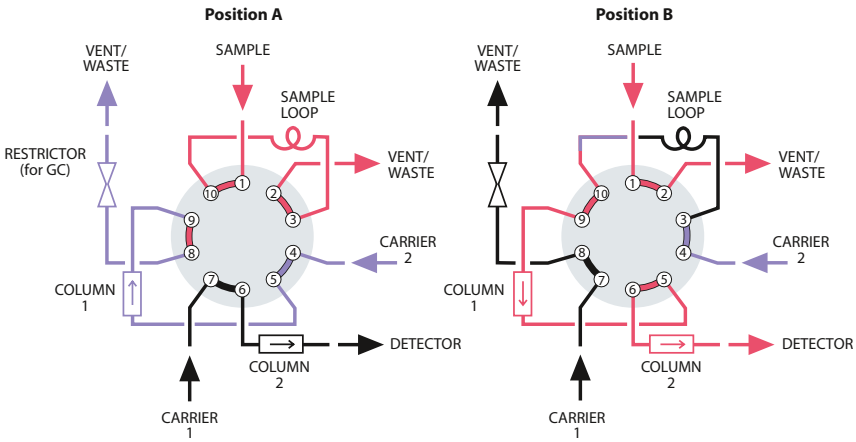
SAMPLE INJECTION

With the valve in Position A, sample flows through the external loop while the carrier flows directly through to the column. When the valve is switched to Position B, the sample contained in the sample loop and valve flow passage is injected into the column.

MORE INFORMATION

More applications . . . . . .pages 120-121

10 port sample injector



LOOP SAMPLING WITH BACKFLUSH OF PRE-COLUMN TO VENT

When components of interest are low boiling, this plumbing scheme allows "heavy" components with long retention times to be backflushed to waste. After the sample loop is loaded in Position A, the valve is switched to Position B to inject the sample into column 1. As soon as all components of interest have entered column 2, the valve is switched back to Position A. Column 1 is backflushed to vent during the analysis, reducing the total analysis time.

MORE INFORMATION

More applications . . . . . .pages 122-123