# Diaphragm valves FOR CONTINUOUS AUTOMATED OPERATION

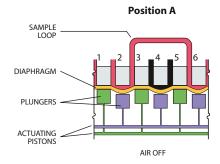
- Only 35 mm (1.375") in diameter
- >1,000,000 cycle lifetime
- Three configurations 6 port, 10 port, and 4 port internal sample
- Built in actuator
- 1/16" or 1/32" Valco zero dead volume fittings

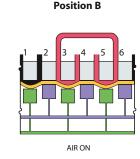
The VICI mini diaphragm valve is designed for trouble-free use in applications requiring minimal maintenance and maximum lifetime, making it an ideal choice for the process industry, automated lab analyzers, or continuous-monitoring environmental analyses.

# 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.
3-way solenoid ... p 198

# MORE INFORMATION Materials

Metals..... 254-255

# 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 Prod No DV22-2114-.5 4 port 1 µl internal sample Prod No DV22-2114-1

6 port sampling/switching Prod No DV22-2116 10 port multifunctional Prod No 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	
Prod No	
DV22-31145	

4 port
1 µl internal sample
Prod No

DV22-3114-1

6 port sampling/switching Prod No DV22-3116 10 port multifunctional Prod No

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

CSLN10K

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





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.

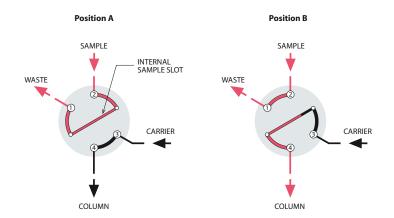
#### MORE INFORMATION

More

applications . . pp 119-123 3-way solenoid . . . . . . 198

### **DIAPHRAGM VALVES**

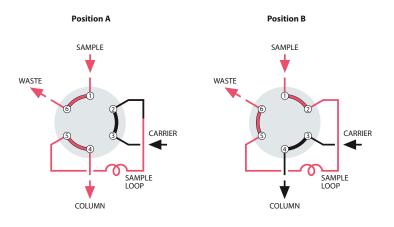
#### 4 port sample injector



#### 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



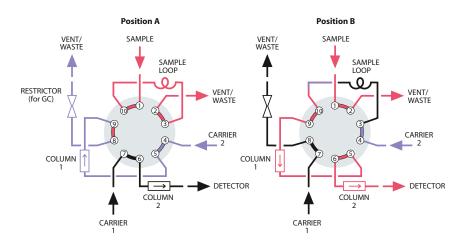
#### **SAMPLE INJECTION**

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 injecto



# 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