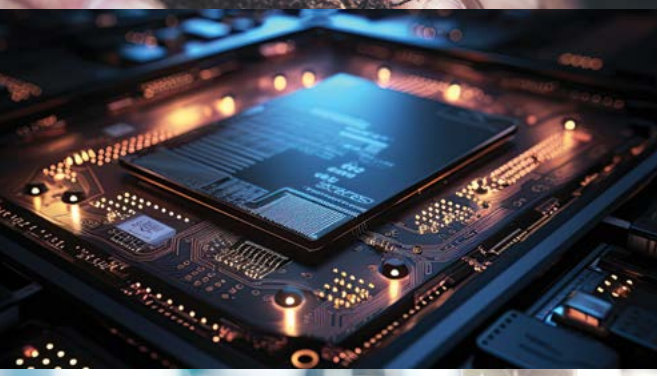
CATALOG

AFP
Schivo Group

# Valves and Fluidic Solutions


www.afplifesciences.com



# AFP: Precision Manufacturing for the Highest-Quality, Ultra-Reliable Valves

AFP's manufacturing capabilities produce high-quality, ultra-reliable rotary valves, diaphragm valves, and accessories that minimize leaks and downtime in chromatography systems. Our valves go through meticulous quality control and 100% testing to eliminate the need for OEM pre-production inspection and validation. This rigorous quality process ensures uninterrupted manufacturing flow for OEMs plus less maintenance and lower cost of ownership for end-users. AFP is the preferred supplier for customers desiring the highest-quality chromatography valves and accessories that offer superior performance in the most challenging environments.

## Elegant, Efficient Fluidic Solutions that Generate Unimagined Instrument Performance

AFP's ability to create complex fluidic solutions allows OEMs to push their instruments' performance to previously unimagined levels. Our application of advanced design and manufacturing methods enable clinical diagnostic and genomic systems that generate higher sensitivity, superior accuracy, and greater repeatability. A single-source provider, AFP has the accountability and deep expertise that save time and mitigates risk. We conceive elegant, efficient manifolds and assemblies that drive diagnostic and research instruments to performance never thought possible.

## AFP's Legacy of Precision and Ultra-Reliability

AFP's story began in 2006 as part of Contrôle Analytique Inc., a company manufacturing gas chromatography (GC) analyzers. We had to develop our own high-performance GC valves to ensure the purity and accuracy required in analytical processes. In 2008, we divested the GC systems business, rebranded the company as AFP, and focused on high-quality valves that solved the industry-wide problems of leaking and contamination. AFP was acquired by APN Global in 2016, and both companies were purchased by Schivo in 2022, enabling increased production capacity to meet rising worldwide demand. Today, AFP is part of a thriving Schivo Group that has more than 600 employees at seven global manufacturing facilities.

AFP's products are easy to purchase online at **www.afplifesciences.com**. Contact **sales@afplifesciences.com** or for inquiries call +1.418.266.1247

SHOP NOW

## Diaphragm Valves

AFP specializes in the design and manufacture of complex chromatography measurement valves for the instrumentation, laboratory, scientific and industrial markets. Our solutions incorporate innovative patented technologies that ensure consistent and extremely precise measurement and they are the choice of the world leading companies in the field. Manufactured with the best technologies available and calibrated and controlled by an expert team dedicated to perfection, our analytical products represent a reliable and affordable option for any company subject to the increasingly stringent requirements of the modern world.

## High-Performance GC Diaphragm Valve

**The only one with an embedded patented purge system.**

- Unique patented purge feature
- Valves to fit your application
- The only diaphragm valve for vacuum application
- Real-time health monitoring
- Available with no-purge option except MDVG series

The GC diaphragm valve family is available with multiple configurations to answer to your specific needs. We offer different valve head materials such as SS-316l, hastelloy® and more. We also offer coatings like silconert® 2000 and dursan®. Our valves are rated from 150 to 500 psig but can be tuned up to 1500 psig if required. Actuation pressure is normally 65 psig but can be lowered if needed. Custom requests are welcome.

### ELDV1

**Standard Mini-Diaphragm Valve**
*Purge And No Purge Options*

**LT version:** Max 100 oC
Pressure: Max 150 psig
Port Sizes: 1/16”
Cross-port leak rate
Max Pressure: $1x10^{-9}$ atm-cc/s He

### ELDV2

**High-Performance Mini-Diaphragm Valve**
*Purge And No Purge Options*

**LT version:** Max 100 oC
**MT version:** Max 180 oC
Pressure: Max 300 psig
Port Sizes: 1/16”
Cross-port leak rate
Max Pressure: $4.7 \times 10^{-11}$ atm-cc/s He

### MDVG

**Premium-Grade Mini-Diaphragm Valve**
*Purge And No Purge Options*

**LT version:** Max 100 oC
**MT version:** Max 180 oC
**HT version:** Max 250 oC
Pressure: Max 500 psig
Port Sizes: 1/16”
Cross-port leak rate
Max Pressure: $1x10^{-11}$ atm-cc/s He

**ELDV/MDVG Series Configuration** (*for other configurations, contact us*)

| Series | # of Port | → | Connection | Temp | → | Model |
|---|---|---|---|---|---|---|
| ELDV1 | 06 | | 16 = 1/16 | LT = 100 oC | | 0005 |
| ELDV2 | 10 | | | MT = 180 oC | | 0007 |
| MDVG | 14 | | | HT = 250 oC | | 0025 |
| | | | | | | 0030 |


*Covered by Pat# 7,931,043 - 8,104,506 - EP2331858 and (5) patents pending.

# The Only One With An Embedded Patented Purge System.

**Finally, GC valves that allow your highly sensitive detectors to unleash their full potential.**

Diaphragm based chromatographic valves have been around for more than a half century. Originally, they were in use in BTU analyzers and hydrocarbon measurement GC. With time, their size and built-in actuator feature made them attractive for other applications. Unfortunately, their sealing performance and problems associated with atmospheric diffusion through diaphragm have limited their usage. Users had no choice but to stick to conical rotary valve.

Now, this situation is behind us, thanks to all the innovative concepts we introduced in GC diaphragm valve technology.

Indeed, we are providing an entirely new set of performance parameters, which is many times greater than those found in today's market, with a sizable reduction in cost. Indeed, the valves shown in the following section overcome all the problems of previous diaphragm valve designs. They perform better and longer than GC rotary valves. In fact, the new valves can be used instead of GC rotary and sliding valves for most applications, with the exception of a few specific cases.

The unique purging feature, actuator design and assembly procedures result in an outstanding level of performance. Choice of performance grade, multiple ports fitting configuration and the possibility of custom designs allow maximum flexibility to instrument manufacturers and integrators.

## THREE SERIES: ELDV1 / ELDV2 / MDVG

| | |
|---|---|
| ELDV1 | Standard level of performance, optimized for cost sensitive applications. |
| ELDV2 | High performance level, better leak performance and lifetime, at medium cost. |
| MDVG | Premium performance grade, low, medium and high temperature grade. |

# Features and Benefits

## Purge

Add some intelligence to your system with real time valve smart diagnostic capability

- Eliminates permeation and diffusion for low level trace measurement.
- Eliminates inboard/outboard contamination. There are no fugitive emission.
- Creates an inert atmosphere underneath the diaphragm for hazardous application.
- Allows vacuum operation by balancing pressure over and under the diaphragm.
- Allows real time monitoring of valve condition by verifying the purge outlet quality.

This unique purging feature makes GC instrument much more reliable.

## Relief Pins

- Eases the process of diaphragm replacement in the field by pulling down all plungers.
- Relief pins remove stress on diaphragm for long term storage.

## Diaphragm Design

- Mutli-layer diaphragm.
- Optional coating / metallization.
- Choice of material.

## Plunger Design

- Precisely machined in metal.
- Tight length tolerance.
- Patented self aligned compressible (spring return), two-part-plungers.
- Tied base plunger design.
- Valve can be operated in any position. Plungers will not stick, and there is no friction.
- Force is applied to the total plunger surface area.
- Uniforms sealing force on the diaphragm.

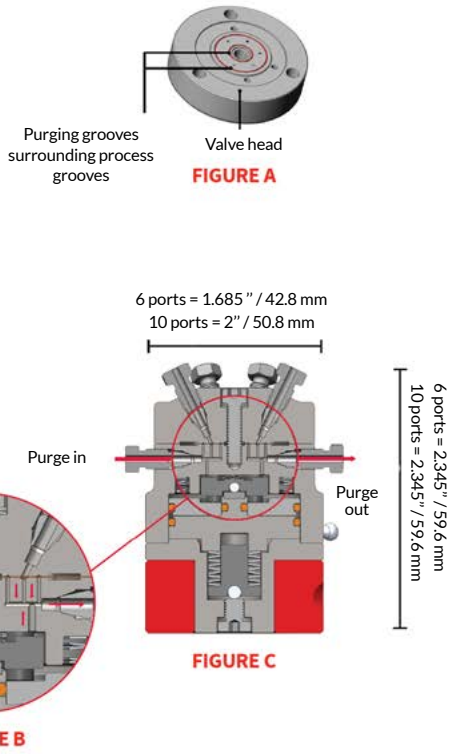


FIGURE A



FIGURE C

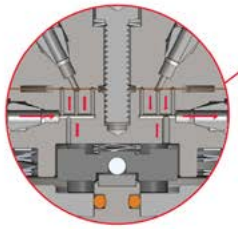


FIGURE B

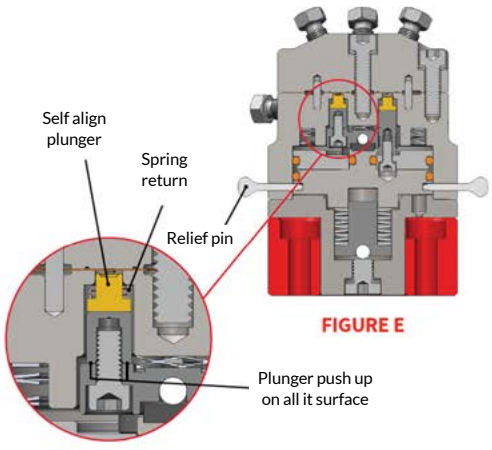


FIGURE E

FIGURE D

## 3 Choices of Performance Mode

### ELDV 1 Standard and ELDV 2 High-Performance Grade GC Diaphragm Valve

Mission critical applications demand the best available product, but not every system requires the Premium Grade MDVG series. This family of chromatographic diaphragm valves have been designed to fill the need for standard and high performance specifications.

The ELDV series will fill the need of most bench top laboratory GC while providing a high level of sealing performance and lifetime, better than the standard GC rotary valve generally available on the market and this at a lower cost and better offering value.

### Description

The user may choose only the configuration option needed, contributing to a further cost reduction. The valve is available in two (2) configurations, ELDV 1 and ELDV 2.

### ELDV Series Configuration

- Aluminum actuator body, SS-316L valve head
- Both configurations are purge, as per premium grade MDVG series, but can also be ordered without purge. See purging description section to understand the purge concept and its benefits.

### Selection Guideline

- ELDV1 (standard grade): Optimize for cost sensitive application.
- ELDV2 (high performance grade): Better leak performance and lifetime at medium cost.


## MDVG

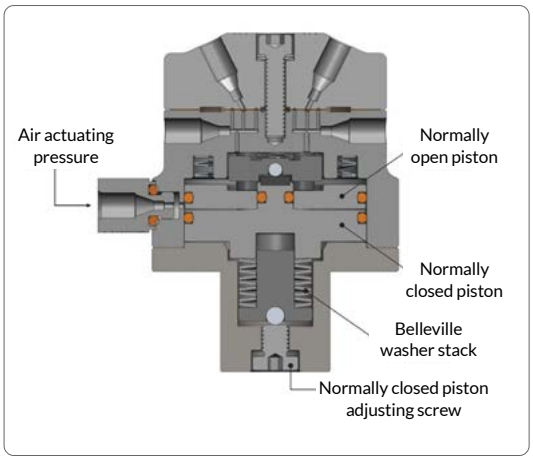
### Premium Grade, GC Diaphragm Valve

It allows higher pressure and temperature operation. It is also available with VCR 1/8" fittings. This is the choice for mission critical applications, process GC, fast temperature cycling and where a special coating is required. Ideal for sensitive GC/MS vacuum application.

## Actuator Type

### ELDV/MDVG
Standard actuator type i.E. pneumatic, single acting

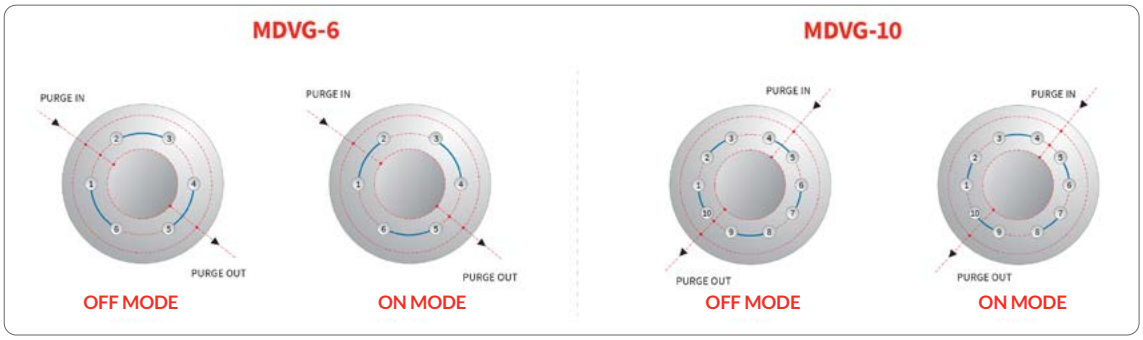
This standard version is in use in most of the ELDV / MDVG-series valves. It's based on a single acting pneumatic actuator, supplied by an only inlet actuation port. When pressure (60-65 psig) is applied, the normally open piston and plungers will move up closing connections between ports, while the normally closed piston and plungers will go down opening new connections. The non-mixing time is determined by adjusting the compression of the belleville washer stack. The non-mixing time is defined as the time that all plungers are up during the actuation process. This make sure that there is no cross-port flow contamination during actuation. Indeed all ports are isolate before to move to next position. This is true when actuating and deactuating the valve.



# Flow Paths

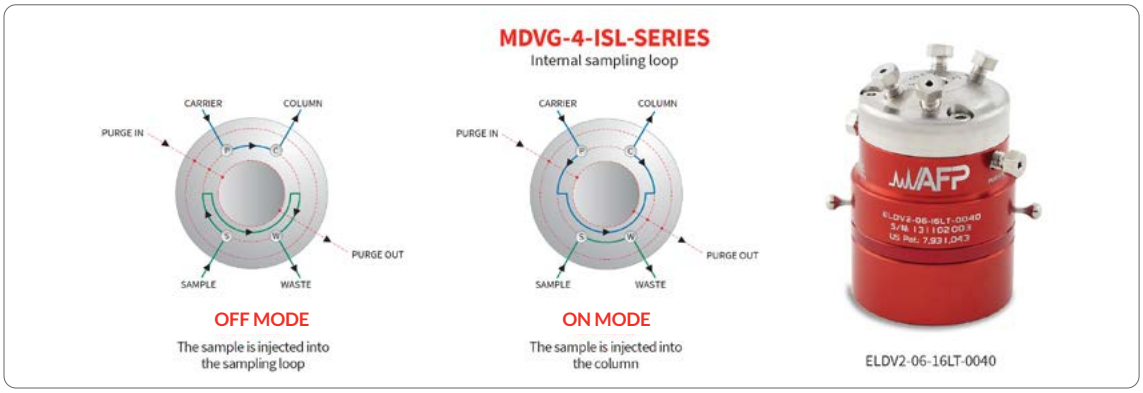
## Conventional Flow Path

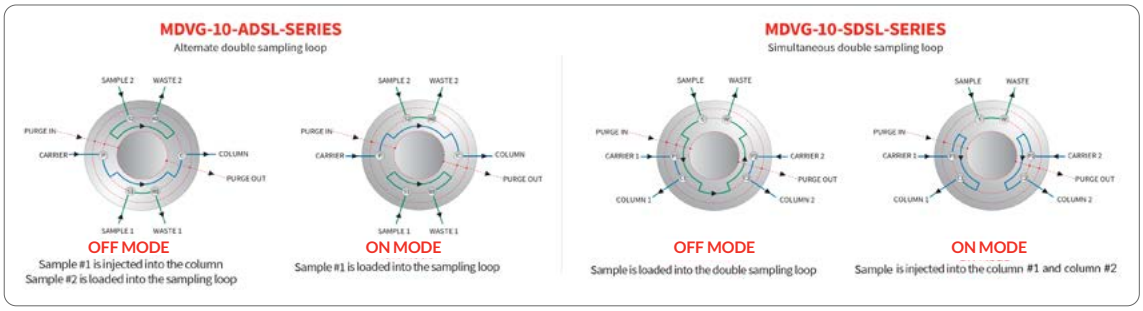
The conventional flow path is the most common one used in gas chromatography. The main benefit of this configuration is to never interrupt the fluid, upon normal operation. So, fluid is continuously flowing in all ports, whether the valve is actuated or not. This particularity comes from the fact that actuation plungers are stopping the flow between the ports, instead of acting directly on the port.




## ISL - Internal sampling loop

The internal sampling loop is available in all models and the size of the sampling loop is available in 1.0 uL and 2.0 uL, contact AFP to discuss other volumes. There is also the double internal sampling loop diaphragm valve. It can be configured in two different modes i.e. alternate or simultaneous. The ADSL version (Alternate Double Sampling Loop) will inject the two samples on an alternate base. On the other end we also have the SDSL version (Simultaneous Double Sampling Loop) that will inject both samples simultaneously. We off er the possibility to have different size of sampling loop in the same valve in a range, be sure to contact AFP to discuss application. It is also possible to have one internal sampling loop and one external on the same valve head. Useful when the instrument measuring range must be change in real time.



# GC Diaphragm Valves Performance Specifications

- Longer lifetime, and better performance than rotary valves.
- Eliminates/reduces detector upset and valve artifacts.
- Allows new GC methods, not possible with commercial GC diaphragm valves.
- Includes all fittings, adaptors and mounting clamps.
- Parts traceability.

| ELDV Series | | MDVG Series |
|---|---|---|
| Standard grade, low temperature | High performance grade, medium temperature | Premium grade valves high pressure / high temperature |
| ELDV 1 | ELDV 2 | MDVG |



| Features | | (Aluminum Body & SS-316L Valve Valve Head) | (Aluminum Body & SS-316L Valve Head) | (All SS-316L Body & Valve Head) |
|---|---|---|---|---|
| Standard Maximum Working Pressure (PSI / kPA)*1 | | 300 / 2068 | 300 / 2068 | 500 / 3450 |
| Maximum Working Temperature (°C / °F) | LT | 100 / 212 | 100 / 212 | 100 / 212 |
| | MT | N/A | 180 / 356 | 180 / 356 |
| | HT | N/A | N/A | 250 / 482 |
| Diaphragm Type (LT / MT / HT)*2 | | AFPD-1 | AFPD-1 / AFPD-2 | AFPD-1 / AFPD-2 |
| Leak Rate*3 | Cross Ports (Max Pressure) | $10^{-9}$ Atm-cc/sec He | $10^{-11}$ Atm-cc/sec He | $10^{-12}$ Atm-cc/sec He |
| | In / Outboard | $10^{-10}$ Atm-cc/sec He | $10^{-12}$ Atm-cc/sec He | $10^{-12}$ Atm-cc/sec He |
| Estimated Working Lifetime (Actuation Cycles)*4 | | > 1,000,000 cycles | | |
| Valve Cap Material*5 | | SS-316L | SS-316L | SS-316L |
| Number Of Ports (6/10) | | 6/10 | 6/10 | 6/10 |
| Port Connection (“)*6 | | 1/16 | 1/16 | 1/16 |
| Port Size (“)*7 | | .030 | .030 | .030 |
| Actuator Type*8 | | Pneumatic single actuation (spring return) with relief pin | | |
| Actuating Pressure (PSI / kPA)*9 | | 65 / 450 | 65 / 450 | 65 / 450 |
| Gas Consumption Per Actuation (6/10) | $IN^3$ | .05 / .07 | .05 / .07 | .05 / .07 |
| | CC | .75 / 1.00 | .75 / 1.00 | .75 / 1.00 |
| Cylinder Body Material | | Anodized aluminum | Anodized aluminum | SS-316L |
| Typical Applications | | GC / Standard performance / Low temperature | GC / High performance / Low and Medium temperature | GC / LC, Low / Medium / High performance |
| Weight (6/10) | g | 285 / 365 | 285 / 365 | 440 / 565 |
| | oz | 10 / 12.9 | 10 / 12.9 | 15.5 / 19.9 |

**NOTES :**

1. Working pressure of the internal sampling loop configuration is available up to 1500 PSI. Please see ISL section.
2. AFPD-1 and AFPD-2 refer to the diaphragm type being use in the valve. Special surface treatment is also involved. Be sure to always use your valve with the specified diaphragm type.
3. Leak rates are verified at maximum operation conditions with an AFP® proprietary online leak detection system.
4. Lifetime of valve can be affected by sample chemistry and temperature of operation.
5. Standard material is SS 316L, Hastelloy is also a common one. Silcotek coating are also available. High temperature grade, HT, have the valve head with special coating.
6. Standard port fitting are 1/16” and 1/8” VCR could be ordered with a minimum quantity.
7. Other port size are available like .010” for capillary column application.
8. Standard actuation is the pneumatic single acting (spring return) type, with a single actuation inlet port.
9. See specific valve configuration (i.e. LT, MT, HT or vacuum) for proper actuation pressure.

# ELDV/MDVG/Series Configuration

1 - 2 - 3 - 4 - 5 - 6 - 7

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
| Models | # Of port | Fitting | Temperature | Sampling | S.L. Size | Option |
| ELDV1 | 4 | 16 = fitting 1/16” | LT = 100 °C | 0 = N/A | 10 = 1.0 µL | S = SilcoNert2000™ |
| ELDV2 | 6 | LS16 = Lip Seal 1/6” | MT = 180 °C | ISL | 20 = 2.0 µL | D = Dursan™ |
| MDVG | 10 | V8 = VCR 1/8” | HT= 250 °C | ADSL | | V = Vacuum |
| | | | | SDSL | | HC = Hastelloy® |

**Ex: MDVG-6-16MT-0-0**
Mini Diaphragm Valve Grooved, with purge, 6 ports of .030”, Fitting 1/16”, 180°C, 500 psi, diaphragm AFPD-2, All SS-316L valve.

***Lip Seal:** Lip Seal fitting is our new patent pending AFP fitting detail. This reduces the dead volume, eliminates the rotation of the ferrule and improves the sealing resulting in an improved connection for valve and fitting. This is very beneficial for any analytical high sensitivity instrumentation. Sealing integrity of a VCR fitting with the flexibility of a compression fitting.

*Patent Pending

# Spare parts

## Valve head

1 - 2 - 3 - 4 - 5 - 6 - 7

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
| Models | # Of port | Fitting | Temperature | Sampling | S.L. Size | Option |
| VH | 4 | 16 = fitting 1/16” | LT = 100 °C | 0 = N/A | 10 = 1.0 µL | S = SilcoNert2000™ |
| | 6 | LS16 = Lip Seal 1/6” | MT = 180 °C | ISL | 20 = 2.0 µL | D = Dursan™ |
| | 10 | V8 = VCR 1/8” | HT= 250 °C | ADSL | | HC = Hastelloy® |
| | | | | SDSL | | P10 = .010” Ports Size |

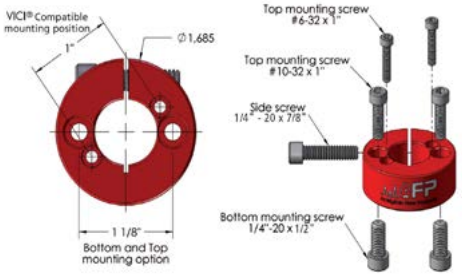
## Replacement diaphragm

1 - 2 - 3 - 4 - 5

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| Models | # Of port | Temperature | Sampling | S.L. Size |
| MDVGD | 4 | LT = 100 °C | 0 = N/A | 10 = 1.0 µL |
| | 6 | MT = 180 °C | ISL | 20 = 2.0 µL |
| | 10 | HT= 250 °C | ADSL | |
| | | | SDSL | |

1 - 2

| 1 | 2 |
|---|---|
| Models | # Of port |
| BWBC | 6 |
| | 10 |




**Clamp Ring**
Part number: CR-MDV

**Tool Kit** (This include all the tools and spare relief pins to do the maintenance i.e. replacing a valve head, diaphragm, actuator)

Part number: TK-01

## OPTION

**S =** Silconert 2000 is a surface treatment recommended for the analysis of ppb levels of organo-sulfur compounds and mercury. It reduces the surface adsorption of active compounds on steel.

**D =** Dursan is a coating designed to improve inertness and corrosion resistance of stainless steel. Ideal for $H_2S$, mercaptan, ammonia, HCl and other corrosive compounds.

**V =** Vacuum operation configuration.

**HC =** Valve head made of Hastelloy®.

**P10** = Valve head with .010” Ports Size.

# MRV series

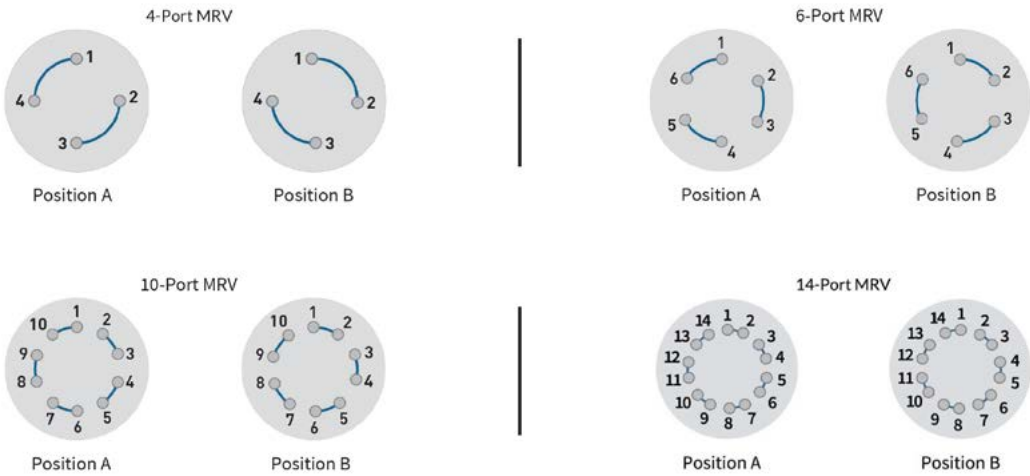
- Sample injection and switching 2 positions rotary valves
- Standard valves work up to 400 Psi
- Maximum temperature 225°C
- Individually tested for leaks at ppb level
- Longer lifetime due to our patented double stopper designed
- Drop-in replacement with all GC valves available on

## The Market

In many applications where a purge was not necessary and space inside instruments was limited, there was a need for a small form factor rotary valve. The MRV was designed from our purged rotary valve series (RVP series) where our embedded purge system made this valve slightly bigger. The MRV series has several patented features making it so reliable: double stopper, etc. like the double stopper, coated guide bushing drive adaptor, anti-rotational dowel pins and treated rotors.

**MRV series (non purged)**
**Available with 4, 6, 10 and 14 ports, Internal sampling (LSV)**
**Port size available: 1/16”**

**Rotor R2** (modified PEEK)
T = ambient to 225°C
Pressure: 425 psig




**MRV Configuration** (*for other configurations, contact us*)

| Series | # of Port | Connection | Rotor | Model | Standoff | Actuator |
|---|---|---|---|---|---|---|
| MRV | 04 | 16 = 1/16 | $R_2$ = 225 oC | 0006 | C = Close mount | M = Manual |
| | 06 | | $R_3$ = 350 oC | 0007 | 2 = 2” | P = Pneumatic |
| | 10 | | | 0019 | 3 = 3” | E = Electric |
| | 14 | | | | 4 = 4” | |

# Rotary Valves: MRV-HT Series

The MRV-HT high-performance rotary valve extends your chromatography applications up to 350°C. The rotor (R3) in the MRV-HT is constructed with a PFAS-free high-temperature polyimide/ graphite composite. This rotary valve solves the common issues of current high-temperature valves, sudden failures due to rotary stripping, and while eliminating complex reconditioning procedures.

## The MRV-HT Advantages

- Ideal for applications that require temperatures in the range of 225°C to 350°C, with the optimal temperature being 330°C
- Allows for up to 50 actuation cycles at room temperature without damaging the rotor/sealing for instrument tuning and leak testing
- No reconditioning is required to tune the system, which leads to faster installation times
- Compatible with AFP pneumatic actuators and electrical actuators (MEA-I) in an assembly using a standoff
- 6 or 10 port
- Certified up to 300 psi gas
- PFAS Free

## The MRV-HT Extented Advantages

- Hexagonal preload design for improved maintenance.
- Extended lifetime: more than 80,000 cycles at 330°C.
- Capable to extend the temperature range of operation: 80°C – 350°C.

## Dimensional Information

The **Standard MRV-HT** model is designed for instruments where the drop-in-replacement factor is critical. When the dimensions are not the limiting factor and there is clearance on the length of the valve, the **Extended model** can be used, as it will provide additional range of temperature and extended lifetime.

## Increased Productivity for Gas Analysis

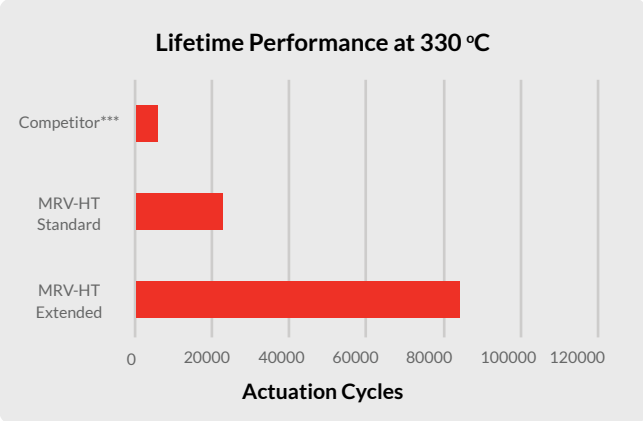
The ideal temperature for the MRV-HT valve in terms of lifetime value is 330°C, but the MRV-HT can perform at higher temperatures of up to 350°C with only a 15% reduction of service in the lifetime tests. In a comparative study of AFP's MRV-HT with a similar high-temperature valve currently on the market, the R3 rotor achieves almost four times more actuation cycles than its competitor at the maximal continuous operation temperature that the competitor's valve can withstand (330°C). With the addition of the Extended MRV-HT model, the lifetime of the high temperature valves is further pushed to another level. This new model is capable to achieve more than 10 times what the common high temperature valves can do.

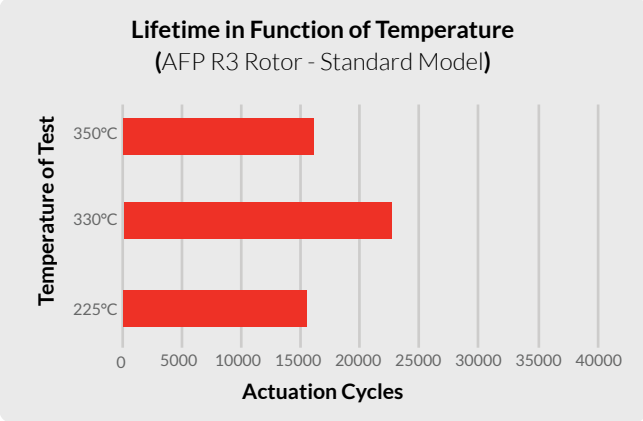
## Lower Total Cost of Ownership

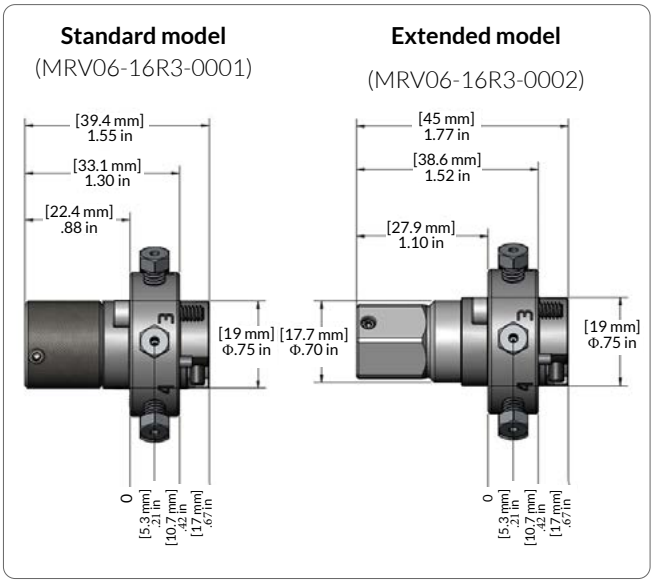
The R3 rotor's material was selected by AFP to allow end users to turn off the oven and resume their analytical analyses without compromising performance. The MRV-HT's hexagonal preload design improves access to the rotor, speeds up the maintenance process, and reduces instrument downtime.

Extensive cycling at temperatures below 225°C are not advantageous for the MRV-HT rotor, as its performance does not compare to the medium temperature rotor (AFP-R2).

**AFP recommends the usage of the MRV-HT valve at applications with temperatures higher than 225°C to obtain its full benefit.**

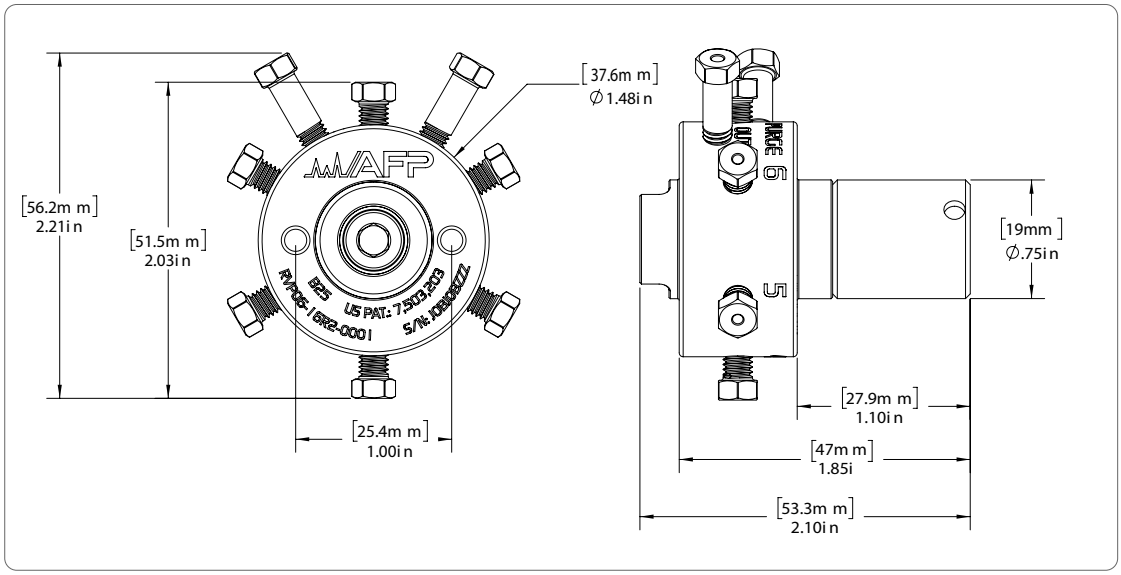


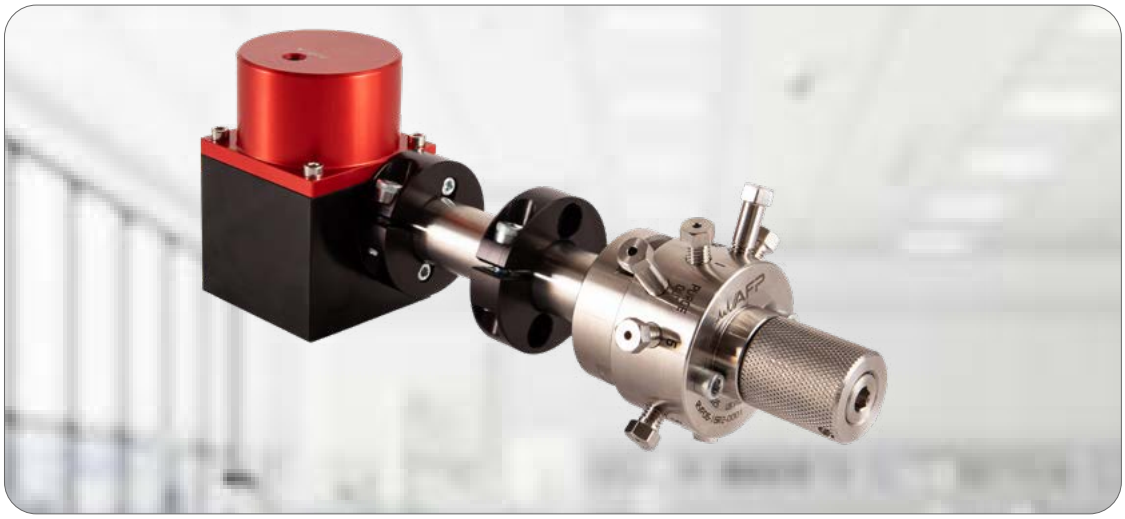



## MRV-HT High Temperature Rotary Valves and Replacement

| Product Description | AFP SKU | Competitor SKU |
|---|---|---|
| High Temperature Rotary Valve<br>6 Ports \| 350°C \| Nitronic 60 \| 325 PSI<br>*Assembled On A Pneumatic Actuator With A 4" Standoff* | MRV06-16R3-0001-4P | A4C6UWT |
| High Temperature Rotary Valve<br>6 Ports \| 350°C \| Nitronic 60 \| 325 PSI<br>*Assembled On An Electronic Actuator With A 4"Standoff* | MRV06-16R3-0001-4I | EUD-4C6UWT |
| High Temperature Rotary Valve<br>6 Ports \| 350°C \| Nitronic 60 \| 325 PSI | MRV06-16R3-0001-00 | DC6UWT |
| High Temperature Replacement Rotor<br>6 Ports | MRV-ROT06-R3 | SSAC6UWT |
| High Temperature Rotary Valve<br>10 Ports \| 350°C \| Nitronic 60 \| 325 PSI<br>*Assembled On A Pneumatic Actuator With A 4 " Standoff* | MRV10-16R3-0001-4P | A4C10UWT |
| High Temperature Rotary Valve<br>10 Ports \| 350°C \| Nitronic 60 \| 325 PSI<br>*Assembled On An Electronic Actuator With A 4" Standoff* | MRV10-16R3-0001-4I | EUD-4C10UWT |
| High Temperature Rotary Valve<br>10 Ports \| 350°C \| Nitronic 60 \| 325 PSI | MRV10-16R3-0001-00 | DC10UWT |
| High Temperature Replacement Rotor<br>10 Ports | MRV-ROT10-R3 | SSAC10UWT |
| High Temperature Rotary Valve, Extented version<br>6 Ports \| 350°C \| Nitronic 60 \| 325 PSI | MRV06-16R3-0002-00 | N/A |
| High Temperature Rotary Valve, Extented version<br>10 Ports \| 350°C \| Nitronic 60 \| 325 PSI | MRV10-16R3-0002-00 | N/A |





# RVP Series

**AFP's Purged Rotary Valves** for Gas Chromatography systems feature a patented **real internal purged rotor** design. This feature eliminates the need for an external purged housing, or multiple o-ring seals that increase the risk of atmospheric contamination due to tendency to wear by friction under normal valve operation.

### Features

- 6 or 10 port
- Certified up to 225°C
- Certified up to 325 psi gas
- Compatible with AFP actuators and accessories
- The purged rotary valve can be offered with inert coatings (Dursan®)

### RVP Advantages

- Does not require an external purge box or purge housing
- Cost saving/space saving
- All RVP valves are leak-tested and certified ad no additional charge

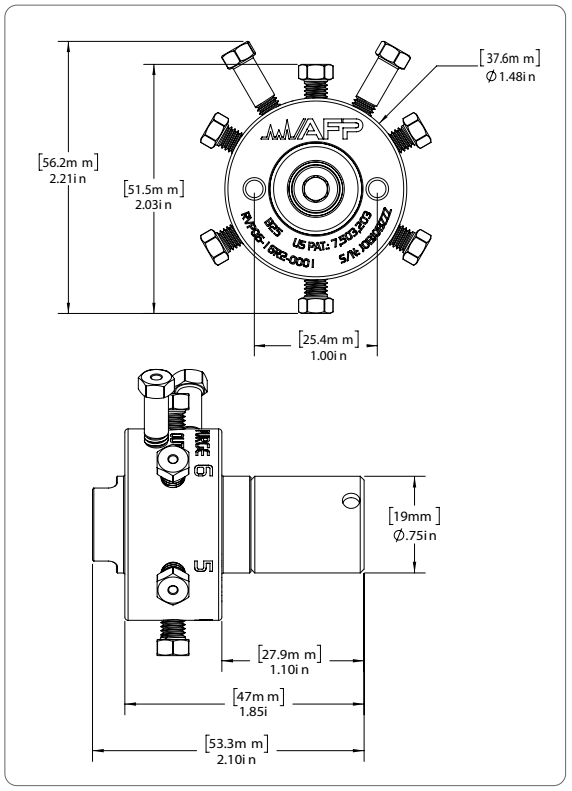



**Figure 1.** Valves dimensions.

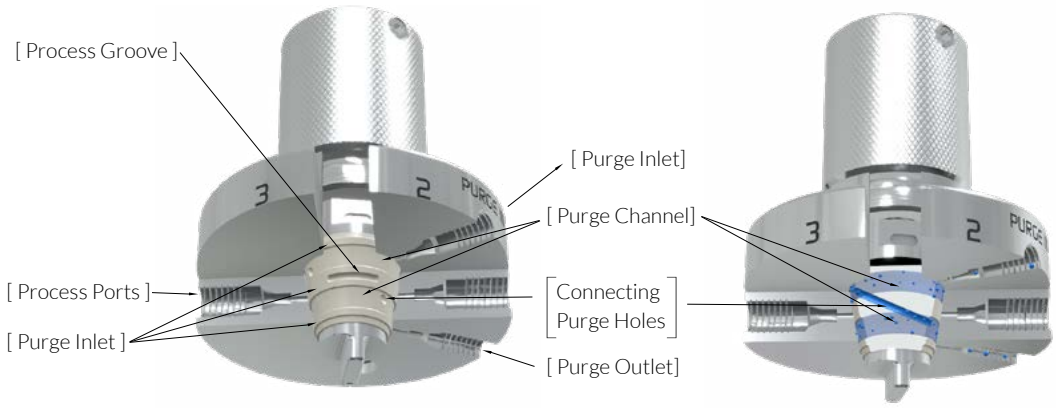
## Innovative Design

The patented design of the AFP's Purged Rotary Valve, including guiding pins and double stoppers, prevents inboard/outboard contamination and allows for ppb and trace detection limits.

## Lower Total Cost of Ownership

AFP's Purged Rotary Valves are designed with lower total ownership costs in mind. No external purge box is required, which simplifies the design and creates a smaller footprint. No external o-rings are used in the valve, which removes failure points. The Purged Rotary Valves are developed to be compatible with AFP's standoffs and actuators, which allows for an easy upgrade for current systems.

### Dimensional Information




## RVP Purged Rotary Valves and Replacement

| Product Description | AFP SKU | Competitor SKU |
|---|---|---|
| Internally Purged Sampling Valve<br>6 ports \| 225°C \| 325 psi | RVP06-16R2-0001-00 | DC6UWEPI |
| Internally Purged Sampling Valve<br>10 ports \| 225°C \| 325 psi | RVP10-16R2-0001-00 | DC10UWEPI |
| Internally Purged Sampling Valve<br>6 ports \| 225°C \| 325 psi<br>*Assembled on a pneumatic actuator with a 4" standoff* | RVP06-16R2-0001-4P | A4C6UWEPI |
| Internally Purged Sampling Valve<br>10 ports \| 225°C \| 325 psi<br>*Assembled on a pneumatic actuator with a 4" standoff* | RVP10-16R2-0001-4P | A4C10UWEPI |
| Internally Purged Sampling Valve<br>6 ports \| 225°C \| 325 psi<br>*Assembled on a electronic actuator with a 4" standoff* | RVP06-16R2-0001-4I | EUDA-4C6UWEPI |
| Internally Purged Sampling Valve<br>10 ports \| 225°C \| 325 psi<br>*Assembled on a electronic actuator with a 4" standoff* | RVP10-16R2-0001-4I | EUDA-4C10UWEPI |
| Internally Purged Sampling Valve Dursan® coated<br>6 ports \| 225°C \| 325 psi | RVP06-16R2-0002-00 | N/A |
| Internally Purged Sampling Valve Dursan® coated<br>10 ports \| 225°C \| 325 psi | RVP10-16R2-0002-00 | N/A |

Contact AFP for information on cables, power supply and other configurations not mentioned in this document.


## MRV-ISL Internal Sampling Rotary Valves

As part of our portfolio expansion to better serve customer needs, AFP has broadened its MRV valve family with additional internal sampling volume options. These valves are engineered to deliver precise sample injections into the GC stream. Constructed from Nitronic 60 valve bodies and AFP's R2 rotor made of a PEEK/PTFE composite, they are also compatible with inert coatings—making them an excellent fit for demanding applications in the oil and gas industry.

- Durable – Nitronic 60 alloy resists wear and galling
- Quality – PEEK/PTFE AFP R2 rotors preserve sample integrity at 1,000 psi liquid and 225 °C
- Proven – Every valve is leak-tested before shipping, no added cost
- Compatible – Inert coating such as Dursan
- Versatile – Internal volumes from 0.05 µL to 3.0 µL

### Key Features:

**Ports:** 4
**Temperature:** 225°C
**Pressure:** 1,000 psi liquid
**Material:** Nitronic 60
**Port Size:** 0.015' or 0.025"' depending on function of model

### Benefits:

- **High Durability:** High performance alloy increases lifespan of the rotary valve
- **Increased Sensitivity:** Maintain sample integrity thanks to the sealing performance of the AFP rotary valve
- **Higher Quality:** Every valve is leak tested before shipping at no additional cost
- **Extended Lifetime:** AFP's double stopper design minimizes wear, reducing maintenance needs and prolonging service life

## High Pressure 4-Port GC Internal Liquid Sampling Rotary Valve

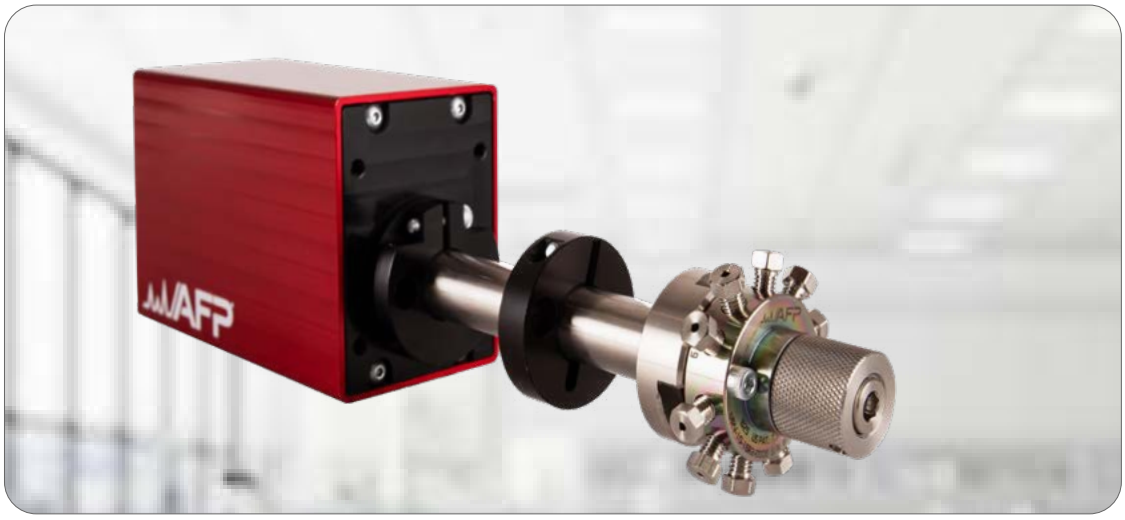
Engineered for maximum efficiency, this 4-port Internal Liquid Sampling Gas Chromatography Rotary Valve is built with Nitronic 60 to resist wear and galling. This valve is designed to operate at a pressure of 1,000 psi liquid at 225°C and has an internal sampling loop making it ideal for demanding applications in the Oil and Gas Industry.

## MRV-ISL 4-Port Replacement Valves


| Internal Sampling Loop | Part No. | Competitor Part No. |
|---|---|---|
| 0.05 µl | MRV04-16R2-0022-00 | DCI4WE.06 |
| 0.1 µl | MRV04-16R2-0023-00 | DCI4WE.1 |
| 0.25 µl | MRV04-16R2-0024-00 | DCI4WE.2 |
| 0.5 µl | MRV04-16R2-0019-00 | DCI4WE.5 |
| 1.0 µl | MRV04-16R2-0025-00 | DCI4UWE1 |
| 2.0 µl | MRV04-16R2-0026-00 | DCI4UWE2 |
| 3.0 µl | MRV04-16R2-0027-00 | |

## MRV-ISL 4-Port Closemount Configuration

| Internal Sampling Loop | Part No. | Competitor Part No. |
|---|---|---|
| 0.05 µl | MRV04-16R2-0022-CP | ACI4WE.06 |
| 0.1 µl | MRV04-16R2-0023-CP | ACI4WE.1 |
| 0.25 µl | MRV04-16R2-0024-CP | ACI4WE.2 |
| 0.5 µl | MRV04-16R2-0019-CP | ACI4WE.5 |
| 1.0 µl | MRV04-16R2-0025-CP | ACI4UWE1 |
| 2.0 µl | MRV04-16R2-0026-CP | ACI4UWE2 |
| 3.0 µl | MRV04-16R2-0027-CP | |



# MEA-I

**AFP's MEA-I is a compact electrical actuator** that works with any AFP rotary valve. The intelligent design of the MEA-I automatically detects the number of ports in a two-position valve. It eliminates the need for multiple devices as it operates in fast actuation or high torque. The actuator is also low power consumption, more then energy-friendly allows for firmware updates via serial communication.

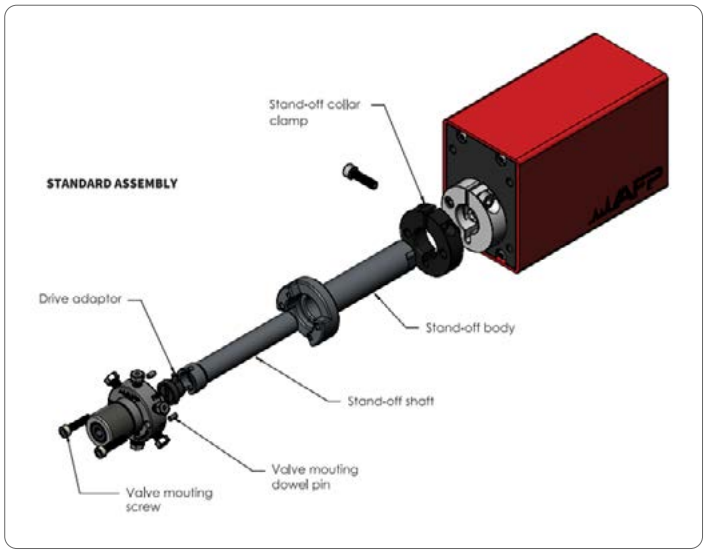



**Figure 1.** Characteristic assembly.

### Features

- 2 modes, fast actuation or high torque by serial command
- Compatible with MRV and RVP rotary valves
- CE approved
- MEA utility software for easy operation of the actuator
- Integration with OEM protocols on request.
- Multiple run time information: track the number of boots, configurations, actuation, etc.
- Status LED for feedback
- Serial Communication features are multi-user, compatible with the AFP product family, easy to use text command (ASCII), and has a return parameter to confirm command execution.

## The MEA-I Advantages

- Eliminates the need for multiple actuators through multiple modes, fast actuation, or high torque
- Compact design, 30% smaller than the previous version
- Detects and adapts to the number of ports in a two-position valve by initialization process; easy switching from 4 ports to 14 ports with an auto-configuration button
- Direct replacement for current 2-position electrical actuators on the market

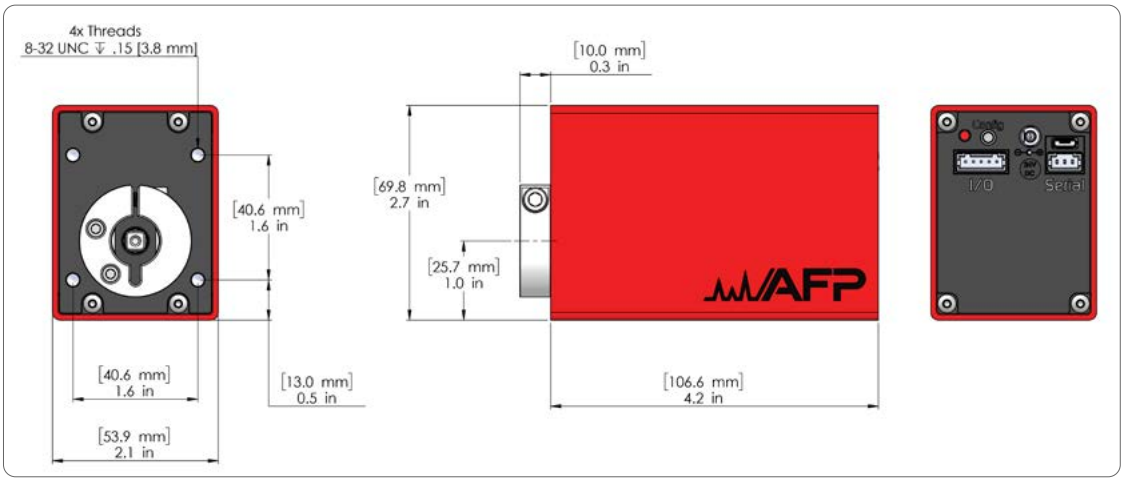



**Figure 2.** MEA-2000 dimensions.

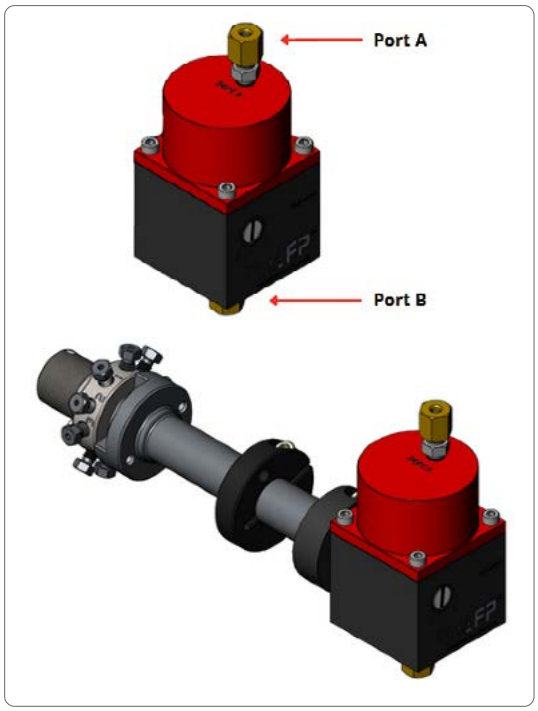
## Replacement Actuator

| Product Description | AFP SKU | Competitor SKU |
|---|---|---|
| Mini Electrical Actuator<br>MEA 2-position multicommunication | MEA-2000 | EUH; EUD; EH; ED |
| Mini Rotary Valve<br>6 ports \| 225°C \| Nitronic 60 \| 400 psi<br>*Assembled on a electronic actuator with a 4" standoff* | MRV06-16R2-0007-4I | EUD-4C6UWE |
| High Temperature Rotary Valve<br>6 ports \| 350°C \| Nitronic 60 \| 325 psi<br>*Assembled on a electronic actuator with a 4" standoff* | MRV06-16R3-0001-4I | EUD-4C6UWT |
| High Efficiency Rotary Valve<br>10 ports \| 225°C \| Nitronic 60 \| 400 psi<br>*Assembled on a electronic actuator with a 4" standoff* | MRV10-16R2-0007-4I | EUD-4C10UWE |
| High Temperature Rotary Valve<br>10 ports \| 350°C \| Nitronic 60 \| 325 psi<br>*Assembled on a electronic actuator with a 4" standoff* | MRV10-16R3-0001-4I | EUD-4C10UWT |
| Purged Rotary Valve<br>6 ports \| 225°C \| Nitronic 60 \| 400 psi<br>*Assembled on a electronic actuator with a 4" standoff* | RVP06-16R2-0001-4I | EUDA-4C6UWEPI |
| Purged Rotary Valve<br>10 ports \| 225°C \| Nitronic 60 \| 400 psi<br>*Assembled on a electronic actuator with a 4" standoff* | RVP10-16R2-0001-4I | EUDA-4C10UWEPI |

Contact AFP for information on cables, power supply and other configurations not mentioned in this document.

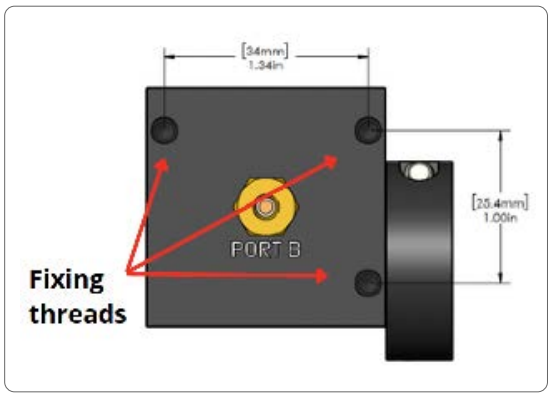
# Mini Pneumatic Actuator

The mini pneumatic actuator (MPA) allows any of the AFP two-position rotary valves toswitch positions by introducing pulses of air into the actuator using a solenoid . The airgoes through the two ports identified as 'Port A' and 'Port B' on the MPA.




Various standoff assemblies can be used to mount the two-position rotary valves on theMPA. As a result, the user can isolate the actuator from the valve outside a heated area.AFP standoff assemblies come in 2", 3" and 4" lengths.

The MPA has three fixing threads (M4x0.7 mm), which can be used to mount theactuator on a plate. They are located on the 'Port B' face of the MPA.




## MRV series

- Sample injection and switching 2 positions rotary valves
- Standard valves work up to 400 Psi
- Maximum temperature 225°C
- Individually tested for leaks at ppb level
- Longer lifetime due to our patented double stopper designed
- Drop-in replacement with all GC valves available on

## The Market

In many applications where a purge was not necessary and space inside instruments was limited, there was a need for a small form factor rotary valve. The MRV was designed from our purged rotary valve series (RVP series) where our embedded purge system made this valve slightly bigger. The MRV series has several patented features making it so reliable: double stopper, etc. like the double stopper, coated guide bushing drive adaptor, anti-rotational dowel pins and treated rotors.

**MRV series (non purged)**
**Available with 4, 6, 10 and 14 ports, Internal sampling (LSV)**

**Port size available: 1/16"**

**Rotor R2** (modified PEEK)
T = ambient to 225°C
Pressure: 425 psig

# Stream Selection

## DV Series

This is the first real analytical tight shut-off diaphragm valve. It has multiple uses in gas chromatographic systems, autosamplers, sampling and general instrumentation. No dead volume effects, continuous flow path and purge systems make it ideal in many situations. From simple three-way to complex configurations with timing sequences, the job is easily done. Wide choice of configurations, from simple pneumatic actuator to fully loaded microprocessor-controlled electrical actuator. The valve head is made of SS-316l and can be coated with SilcoNert® 2000 and Dursan®.

### Common Features Description

- Purge feature to prevent inboard/outboard contamination, fugitive emissions and permeation through the diaphragm (optional)
- 100% leak tested
- Elimination of dead volume effects
- Continuously swept flow path
- Tight positive port shut-off design
- Working pressures from vacuum to 1000 psig (or more)
- Usable with liquid or gas media
- Low pressure drop
- Independently controlled portst

### Fields of Application

- Gas Chromatography / Liquid Chromatography / GCMS / LCMS
- On-line gas analyzer / various sampling systems
- Automated laboratory sample injection systems
- Sample preparation systems / sample concentration systems
- Continuous flow analyzer
- Purge and trap GC sampler / headspace sampling
- Total organic compound analyzer
- Automated process analyzer panel
- Refining and hydrocarbon analyzer / natural gas analyzer
- Ion chromatographic systems

# Electric Actuation

**Available for all the DV-Series Valves**

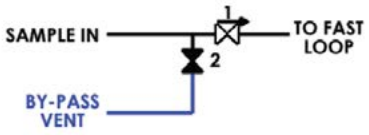
## Common Features

- Included diagnostic and configuration software
- Microprocessor-controlled motors
- Green power: consumes power only during actuation, sleep mode between actuations
- User-selectable default position; normally closed (NC) or normally open (NO), position selected on power up
- Servo loop torque controlled, compensating for long-term wear; maintaining sealing level over time

**ON/OFF STREAM CONFIGURATION**
SINGLE STREAM OPERATIONAL STATE #1


OPEN POSITION

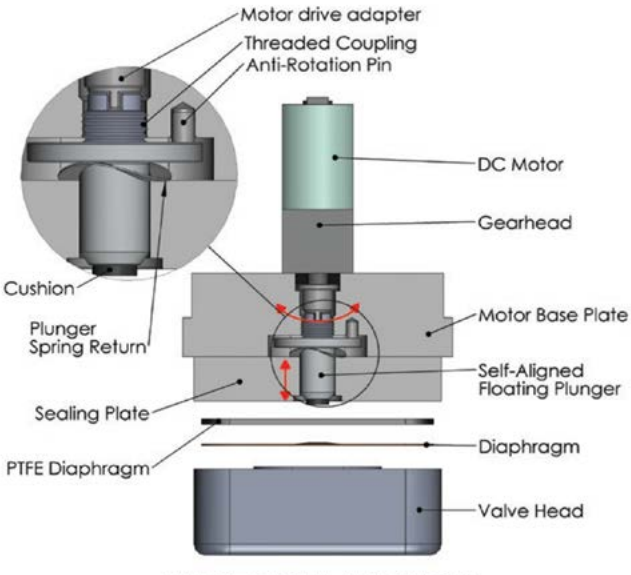
**SAMPLE BY-PASS STREAM CONFIGURATION**
SINGLE STREAM OPERATIONAL STATE #1




SAMPLING POSITION

## Applications

- Electrically controlled sample stream selection systems
- Analyzer auto-calibration systems
- Built-in analyzer sample and calibration gas selection
- Liquid autosamplers
- Sample panel automation
- Purge and trap systems
- GC front-end sample processing (concentration/ purification)
- Syringe pump / dispenser / diluter systems




**ELECTRICAL VERSION**

TABLE OF CONTENTS



# Other Valves

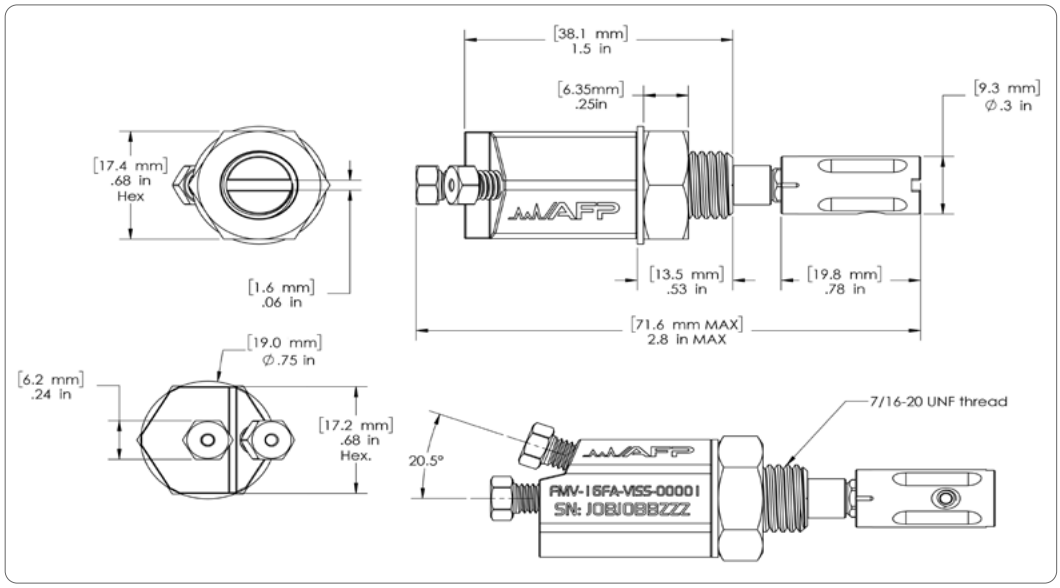

## Flow Metering Valves

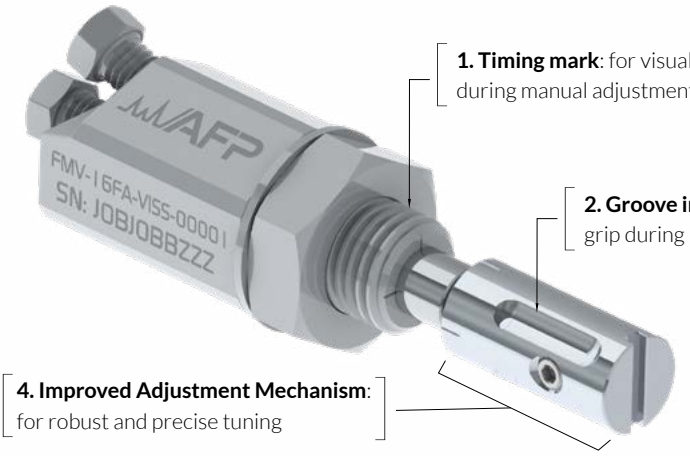
The new AFP needle valve was designed to provide a high resolution adjustment and sealing performance required in trace analysis.

Timing marks and screw driver compatibility on the body of this product provide the operator additional tools to achieve precise adjustment in laboratory and process gas chromatographs.

**Advantages**

- Better sensitivity for smoother adjustment.
- Stability over time, less drift caused by the adjustment knob.
- Available with Dursan® coating for $H_2S$



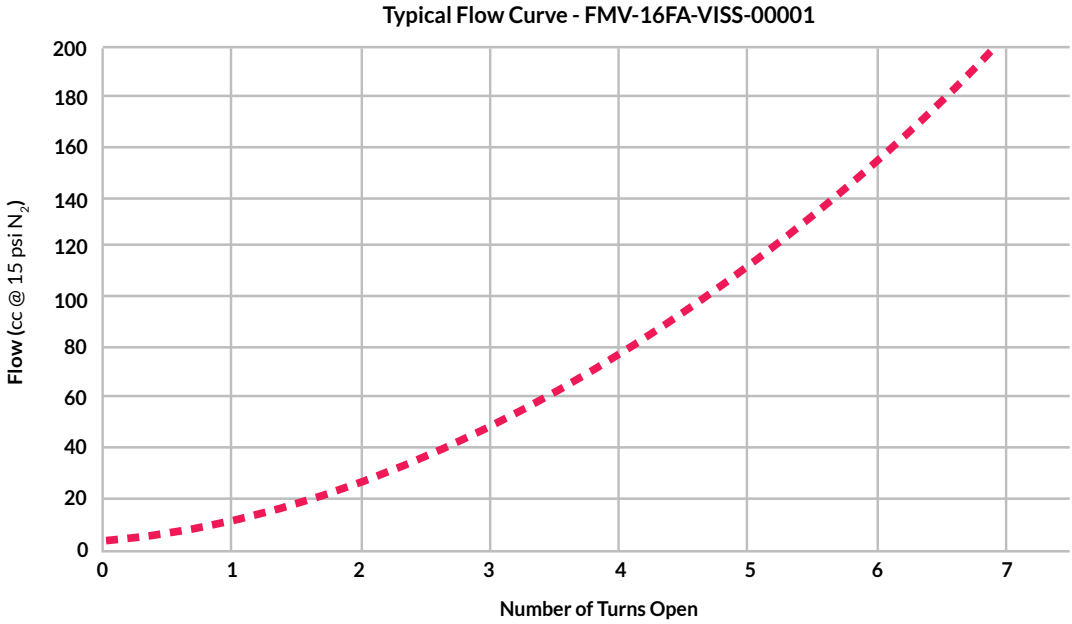



**1. Timing mark**: for visual support during manual adjustment

**2. Groove in the knob**: For better grip during manual adjustment

**3. Slot for screwdriver**: for adjustment inside insturment or limited access

**4. Improved Adjustment Mechanism**: for robust and precise tuning




## Needle Valves SKU

| Product Description | AFP SKU | Competitor SKU |
|---|---|---|
| Flow Metering Valve, 1/16" fine adjustment, Viton, SS300, short nut, 10 µm frit, clear, lubricated, std configuration | FMV-16FA-VISS-00001 | ZBNV1 |
| Flow Metering Valve, 1/16" fine adjustment, Viton, Dursan® coated, short nut, 10 µm frit, clear, lubricated | FMV-16FA-VIDU-00001 | N/A |

# High-Performance Analytical Fittings

### Mini Electrical Actuator

- 316L Stainless Steel Wetted Parts Construction
- New Stackable Tees And Crosses
- Interchangeability
- No Dead Volume Effect
- Leak Tested
- No Clamp Ring Required For Mounting Tees And Crosses
- No Tubing Deformation

For several decades, fittings have been the same. Fittings are critical components of any analytical system. The level of sealing, dead volume or mechanical characteristics could vary dramatically based on manufacture process, even if externally they look the same. But don't get fooled; there are serious differences between them. Nothing looks more like a fitting than another fitting! Differences reside in details.

### Standard Fittings

Here we are off ering a line of fittings that have, by design, improved characteristics. Internal finish, ferrule design, thread finish are some of the characteristic that have been improved. Practical details, like stackable crosses and tees, eliminate the need of mounting clamps and allow space saving. Low torque column end fittings and unions make 1/8" OD and 1/4" OD size tubing assembly much easier and better.

Available in several materials and custom designs to fit OEM needs.

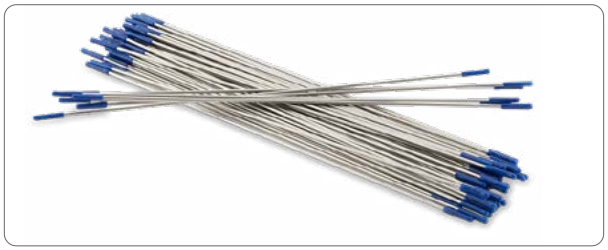
### Pre-Cut Tubing

AFP has released its own line of pre-cut tubing for gas chromatography. These tubes are made from the highest-quality alloys such as SS-316L, Hastelloy C-22 to ensure maximum performance and corrosion resistance.

Why use pre-cut tubing? To save time upon assembly since it is always perfectly cut square, without burrs or contamination, and already passivated.

Internal coating options like SilcoNert 2000® for optimum inertness and corrosion resistance especially for $H_2S$ application.

We offer a wide range of ID, OD and straight lengths.



| 1/16" OD | 1/8" OD | Lengths |
|---|---|---|
| 0.005" ID | 0.085" ID | 5 cm |
| 0.010" ID | | 10 cm |
| 0.020" ID | | 20 cm |
| 0.030" ID | | 30 cm |
| 0.040" ID | | 50 cm |
| | | 100 cm |

*Other options available

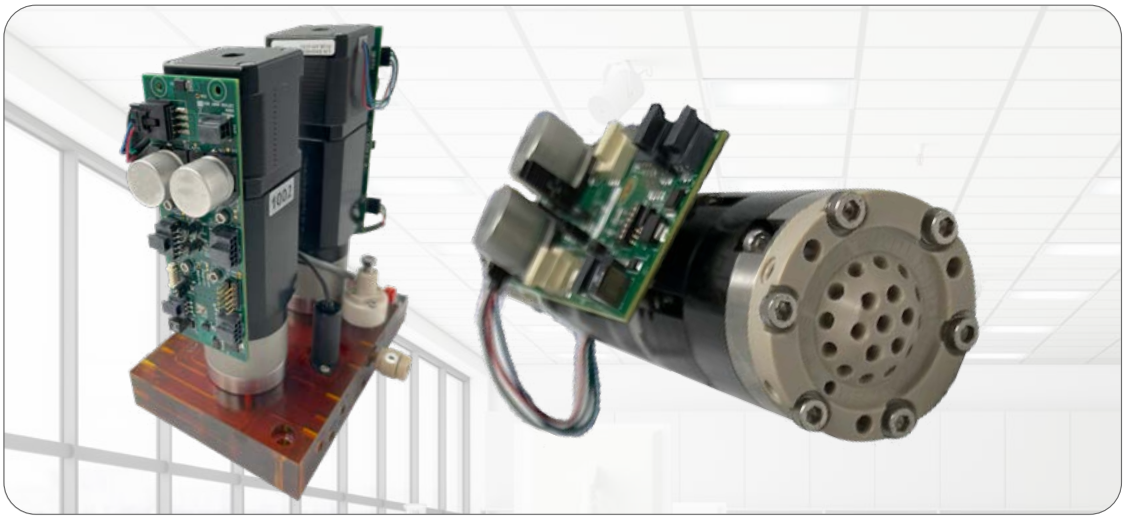
## Coiltube

**We are also able to provide you the same quality seamless tube in coil. If you require any special length cut, just let us know and we will make you a quote.**

TABLE OF CONTENTS



# Liquid Handling



## Intelligent Electronic Rotary Valves

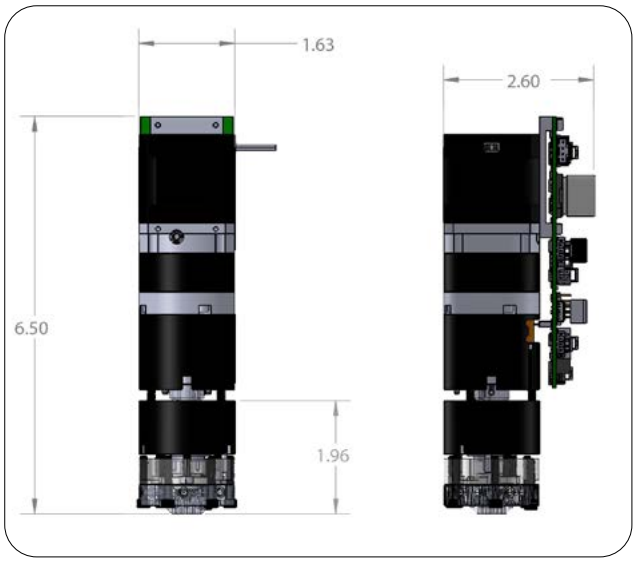
The industry's first intelligent electronic rotary valve, the "IERV," improves your system design with integrated sensors, predictive features, and a smarter design.

| Rotary Shear Valves | IERV™ LP | IERV™ MP |
|---|---|---|
| Pressure Rating | 0–110 psi (0–7 bar) | 0–6,000 psi (0–414 bar) |
| 2-position, 4-port | X | |
| 2-position, 6-port | X | X |
| 2-position, 10-port | X | X |
| 4-position, 5-port | X | |
| 4-position, 4-port | X | |
| 6-position, 7-port | X | X |
| 10-position, 11-port | X | |
| 12-position, 13-port | X | |
| 14-position, 15-port | X | |
| 16-position, 17-port | X | |
| 18-position, 19-port | X | |
| 20-position, 21-port | | |
| 23-position, 24-port | X | |
| 30-position, 31-port | X | |
| Custom Configurations | X | X |

*25,000 psi valve in development
*Please inquire for industry cross-reference "drop-in"

| Rotary Shear Valves | IERV™ LP | IERV™ MP |
|---|---|---|
| Wetted Materials | PEEK, UHMWPE, Ceramic<br>*Custom Materials Available* | Stainless Steel w/PEEK, Both PEEK<br>*Custom Materials Available* |
| Port-to-Port Volume* | 0.25–50.9 µL | 0.28–0.50 µL |
| Flow Passage Diameters | 0.010-0.060 in \| 0.25-1.5 mm | 0.004–0.012 in \| 0.10–0.30 mm |
| Operating Temperature | 0–60 °C | 0–60 °C |
| Connections | 1/4-28, 6-40 Manifold Integrated | 10–32, M4 |
| Replacement Components | IERV Kit, Stators, Rotor seals | IERV Kit, Stators, Rotor seals |
| Position Capability | Multilocation with random access within TIR of 0.0012 in | |
| Optional Driver Board | Yes | Yes |
| Stop-to-Stop Actuation Speed | 100–250 ms | 100–250 ms |
| ParLINK™ Software | X | X |
| Communication Protocols Available | CAN-bus, RS-232, IC2 (flow), GPIO, ANALOG, Dedicated Pressure Sensor connection. | |
| 64-Unit Tandem Addressing | X | X |
| Micro stepping | X | X |
| Multi Direction +/- | X | X |
| Best Position Teaching | X | X |
| Backlash Calc & Removal | X | X |
| Predictive Seal Loss Monitoring | X | X |
| Torque Sensing & Monitoring | X | X |
| Pressure Sensing | X | |
| Pressure SPC Monitoring | X | |
| Ports Leak Decay Test | X | |
| Flow Sensing | X | |
| Flow SPC Monitoring | X | |
| Reverse Voltage Protection | X | X |
| Short Circuit Protection | X | X |

*The volume in an orifice from an inlet port to the common port in the valve




**Best Position Teaching:** Uses flow during factory calibration to set port positions

**Backlash Calc & Removal:** Eliminates wear from extra movements

**Predictive Seal Loss Monitoring:** Ensure your valves do not wear out

**Torque Sensing & Monitoring :** Used for predictive maintenance and to detect other potential problems

**Pressure Sensing + SPC Monitoring:** Protect the system and avoid expensive clogs and bursts

**Flow Sensing + SPC Monitoring:** Ensure system performance every run

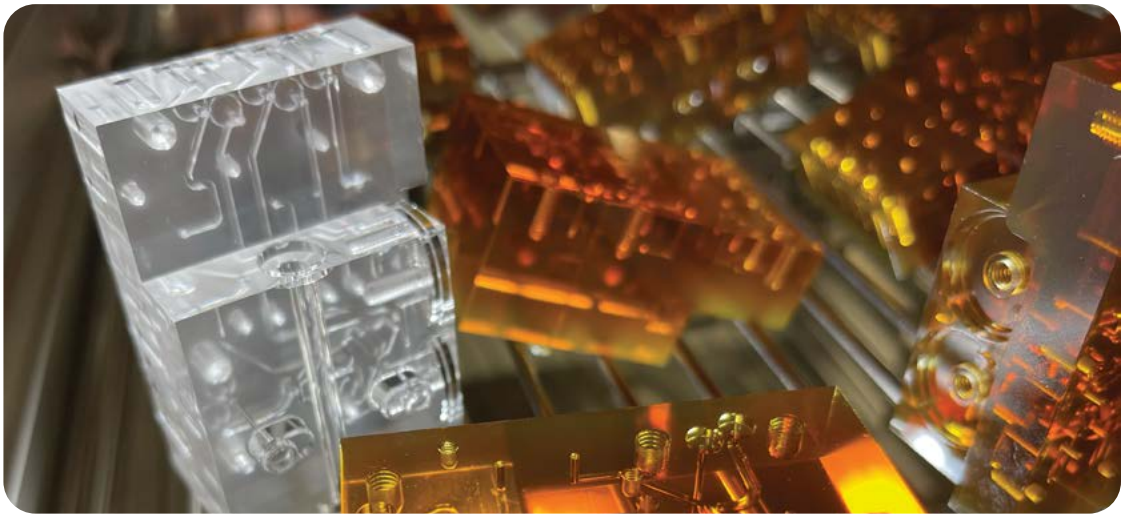
## APPLICATIONS

- Genomics
- Proteomics
- DNA Sequencing
- Diagnostics
- Microfluidics

TABLE OF CONTENTS



# Manifold Technology



## A Proven Source for Thermally Bonded Manifolds with 35+ Years of Experience

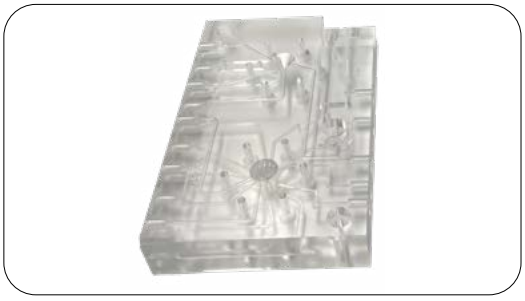
A diffusion bonded manifold is a type of manifold used in various industries, such as aerospace, automotive, and medical applications. It is created through a process called diffusion bonding, also known as solid-state welding or diffusion welding.

Diffusion bonding involves joining two or more components together without the use of additional filler material. The process typically involves applying heat and pressure to the mating surfaces of the components, causing atomic diffusion to occur at the interface. This diffusion results in the creation of strong bonds between the components, effectively joining them into a single piece.

In the case of a diffusion bonded manifold, multiple channels or passages are formed within the manifold structure. These channels are designed to facilitate the flow of fluids, gases, or other substances through the manifold. The diffusion bonding process ensures a high-integrity bond between the manifold components, resulting in leak-free operation and enhanced structural integrity.

Diffusion bonding offers several advantages for manifold fabrication. It allows the creation of complex manifold geometries with precise channel configurations, ensuring optimal fluid or gas flow. The absence of additional filler material eliminates potential points of weakness or contamination, enhancing the reliability and performance of the manifold. Additionally, diffusion bonding enables the joining of dissimilar materials, expanding the range of applications for these manifolds.

Overall, diffusion bonded manifolds are highly reliable, durable, and efficient components used in various industries where precise fluid or gas distribution is required.



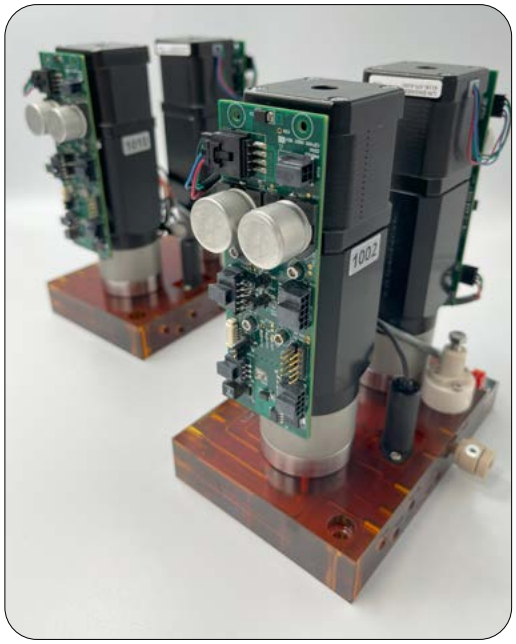
| Manifold Technology | Diffusion Bonding | Solvent Bonding | Adhesive Bonding | Thermal Bonding | Cross Drilled | 3D Printing |
|---|---|---|---|---|---|---|
| Manifold construction | Multilayer | Multilayer | Multilayer | Multilayer | Single layer | Typical 3-dimensional design |
| Process description | Time temp. Pressure molecularly bonded layers | Chemical solvent bonded layers | Adhesive bonded layers | Thermal energy to weld layers together. | Drilled from outside of part to connect all flow paths. | 3d printing |
| Typical materials | Acrylic (PMMA) Ultem® (PEI) Polycarbonate (PC) Polyvinyl Chloride (PVC) | Acrylic (PMMA) Ultem (PEI) Polyvinyl Chloride (PVC) Polysulfone (PSU) ABS | Most engineering plastics except fluoropolymers and polyolefins | Acrylic (PMMA), ultem (PEI) polypropylene (PP), Kynar® (PVDF) Polyfluoroalkoxy (PFA), Polycarbonate (PC) ABS, Polyethylene (PE), Polysulfone (PSU) | All machinable plastics | Liquid resin, liquid photopolymer cure with UV light, FDM, FFF |
| Typical flow path width/ drill hole diameter | > 0.008" (0.2 mm) < 0.118" (3 mm) | > 0.079" (2 mm) | > 0.079" (2 mm) | > 0.015" (0.38 mm) | > 0.018" (0.45 mm) dole | Minimum size 0.020" Wide 0.020" High |
| Flow path configurations | 3-D profiled & straight | 3-D curved straight | 3-D curved straight | 3-D curved straight | Straight (drilled) | Any |
| Flow path cross section | Square, round, "D" shape* | Square, round, "D" shape* | Square, round, "D" shape* | Square, round, "D" shape* | Round | D shape, square, round |

### What is our design and development partnership process?

Together, we can create a manifold assembly that will exceed your expectations. Let our experience become an extension of your design team.

### What can be added to the Manifold?

- Chambers
- Specific volumes
- Pressure-controlled diaphragm valves
- Solenoid valves
- Sensors- pressure + flow
- Heaters and peltiers
- Optical clarity (for lasers, cameras, etc.)
- IERV Rotary valves, pressure relief valves
- Regulators
- Bubble detection
- Sub-assembly pressure, electrical, and leak testing



### APPLICATIONS

- Diagnostics
  - *Point of care*
  - *Lab Instruments*
- Genomics
- Proteomics
- Microfluidics
- DNA Sequencing

AFP
Schivo Group

**AFP**
2659, boul. du Parc-Technologique
Québec (Québec)
G1P 4S5 Canada

+1.418.266.1247
sales@afplifesciences.com
https://afplifesciences.com/

CAT_003_03

SHOP NOW

**Visit our website at afplifesciences.com**

Restart