Gas Chromatography

USER'S INSTRUCTIONS:

ELDV / MDVG Diaphragm Valve Procedure for ELDV-series

Note: This procedure is showing a 10 ports valve but it is the same steps for a 6 ports valve

This valve has been assembled and tested in a clean environment with high purity gases and instruments. Strict procedures are followed to make sure to deliver a product with the highest level of performance. Please follow carefully the installation and operation instructions. This will make sure you get the maximum performance out of your system. If you have any questions, please don't hesitate to contact Analytical Flow Products.

WARNING

Please read and understand the instructions related to this product. These are the installation procedure and the AN-04 application notes. Failure to do so may result in human injury, death and equipment damage.

Preliminary Notice

- Keep the valve in its original sealed bag until you are ready to install it.
- Keep the relief pins installed until you are ready to operate the valve.
- When unpacking the valve, take all the necessary precautions to avoid the introduction of any particles in to any valve ports.

Introduction of particles will ruin the valves performances and operation, and void the warranty.

Note: Never install tubing that has been cut with any type of mechanical tube cutter; for example, electrical file or hand rotary tube cutter. Always use clean pre-cut tubes in critical part of your system.

- Use the supplied hardware to install and operate the valve. Do not use third party ferrules. This may affect the high level of sealing integrity of your system.
- Read and understand the valve specification sheet and adjust the valve operating parameters accordingly.
- If your valve has purging ports, make sure to never pressurize it. Keep the gas flowing into the valve purge at Atmospheric pressure.
- Wear appropriate gloves to manipulate ferrules and tubing ends. Failure to do so will have a negative impact on some Detector's response like fid, ecd and some mass spectrometers due to surface contamination. Use clean tools at all time.
- Make sure that particle size filter will be less or equal to 10 µm. Use an appropriate gas particle filter for actuation, sample and carrier.

Note: Particles pollution, bad tubing cutting procedures and bad manipulation procedures are the major causes of valve failure.

Note: Never readjust the belleville stack adjusting screw. This screw is located in the middle of the bottom cap. Turning this screw will necessitate valve retunning procedures.

AFP®
Schivo Group

Part #1

Valve mounting collar

Your valve is supplied with a universal mounting collar. This means that this collar could be installed using Valco® mounting holes footprint. This allows for a rapid and hassle-free system performance upgrade, the collar could also be installed with AFP® standard holes. This gives the flexibility to the users to install the collar by using top or bottom mounting method. All the required screws are supplied. See Figure 1 for thread sizes and mounting details.

When all tubing routing is done and tubing is properly purged to evacuate any contaminants, unpack the valve from its sealed packing. Insert the base of the valve into the mounting collar and tighten the collar side screw to hold the valve assembly in place. Do not overtighten; just try to rotate the valve in the mounting collar with your hand while tightening the collar side screw. Stop tightening when the valve is firmly positioned in the collar.

Note: If your production procedure does not permit you to wait until clean and particle free gas is ready to flow into the valve before you install it, unpack and install the valve with valve ports closed with appropriate AFP plugs. Keep particles out of the system at all time. Do not use tape to seal the valve's ports. Glue or a piece of tape may contaminate the valve.

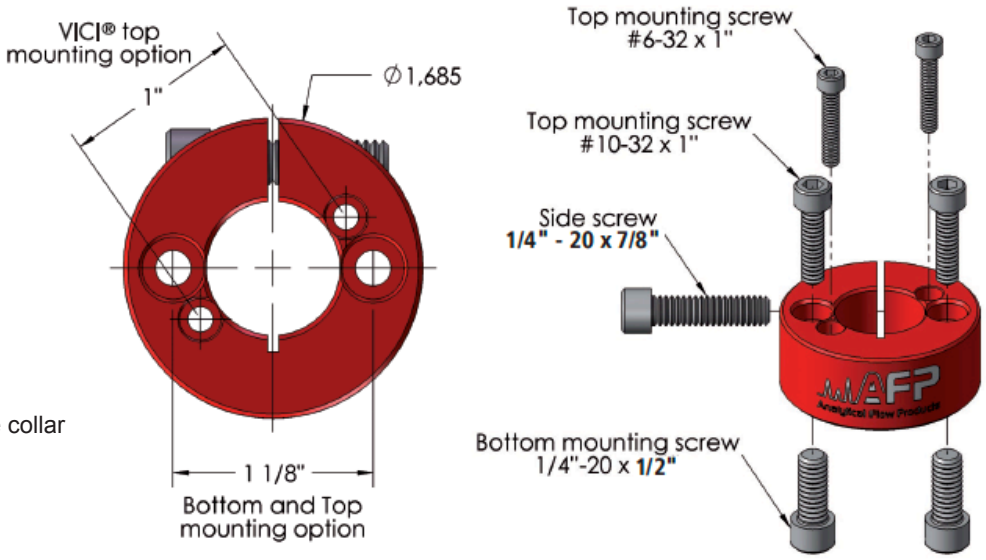


FIGURE 1: Valve collar mounting details

WARNING

This application note AN-04 must be read and understood to use your valve safely.

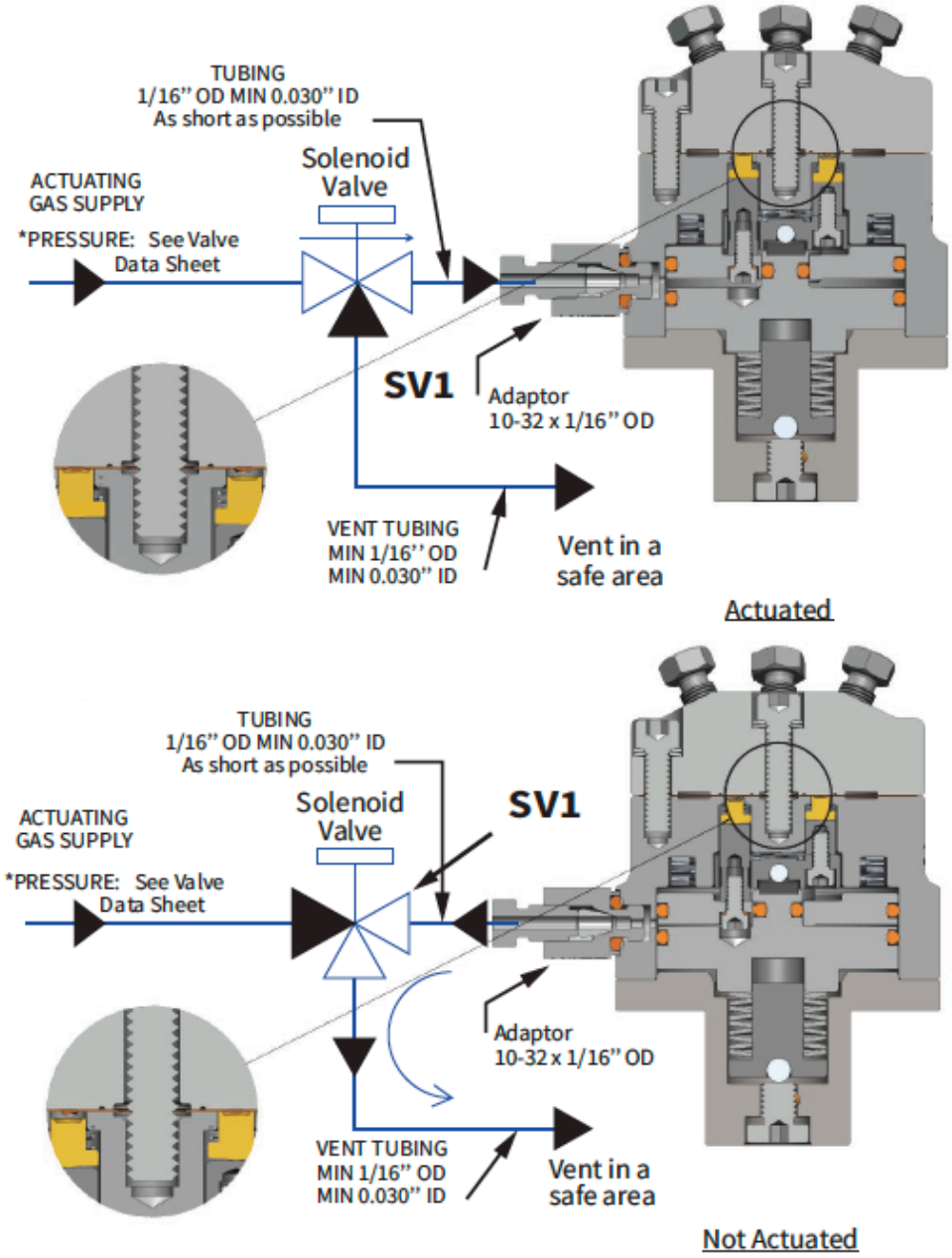
Part #2

Connnecting the actuating port

Please see Figure 2 for the typical schematic. Screw the #10-32 to 1/16'' adaptor into the actuation port of the valve. Connect the actuation tubing between the outlet of a 3-way solenoid valve and the 1/16'' port of the #10-32 adaptor. The length of this tube must be as short as possible. This is to make sure that the switching speed of the valve is not negatively affected. The switching speed of the valve is limited by this tubing length.

Adjust the actuation pressure as per valve specification sheet. The type of gas to use for actuation is dependent of the application. Please see application note AN-04: ''Getting Full Benefit From The Purging Feature Of The ELDV/MDVG GC Diaphragm Valve''.

Note: See the specification sheet include with your valve for the right actuation This application note AN-04 must be read and understood in order pressure. This pressure may differ based on valve configuration.



SV1: 3-way miniature electric solenoid valve.

FIGURE 2: Typical actuation tubing set up

Part #3

Removing the relief pins from cylinder body

Another unique feature is that the valves are delivered with relief pins. These pins remove the pressure done by the plungers on the diaphragm by pulling them down. The first aim of this feature is to allow an easy replacement of the diaphragm. Since all plungers are down, it is easy to match the diaphragm process groove with the cylinder body recess.

The second purpose of these relief pins is to allow long term valve storage or instrument shut down. This way, valve performances will be the same many months after its delivery, or when the instrument is ready to be re-started. Please see diaphragm replacement procedure for more information.

Once actuation tubing has been set up and pressure has been adjusted as per valve specification sheet, actuate the valve and remove the relief pins (i.e. allow actuating gas to flow in it). You may need to increase the pressure a little to ease hand removal of the pins. Remember, make sure to properly readjust the actuating operating pressure after removing the pins, if you had to change it.

Keep these pins in a safe place. You may want to re-use them for valve maintenance. It is a good practice to re-install the relief pins in all the valves of a system before shipping the unit to your customer.

Part #4

Re-installing the relief pins into cylinder body

Actuate the valve by pressurizing the actuator (on position); when the actuator is pressurized, insert the relief pins into their respective holes as shown in figure 3.You may need to slightly increase the actuation pressure to ease the pins in. When the pins are properly inserted, depressurize the actuator (off position). This step make sure all plungers are down, making it easier to install the diaphragm and properly align it.

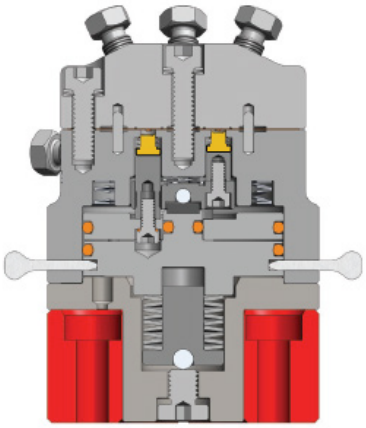


FIGURE 3: Relief pins installed on the valve

Part #5

Connnecting the purging ports

The purging feature of this valve is a very powerful one. It allows a very higher sensitive application to be done with complete elimination of atmospheric interferences. It eliminates diffusion and permeation related problems. Safe operation and vacuum sampling or GC/MS interface are easier to implement with success. See Figure 4 for typical installation to supply a purge gas to the valve.

The purging gas is normally supplied to the valve through a simple flow orifice. This orifice can be made of a short piece of 1/16'' OD tubing. The tube is generally pinched with the help of pliers in order to let around 5 sccm of gas flow through it. The flow could be measured with a bubble flow meter or any appropriate and accurate gas flow measuring device. The measuring flow device used to tune the orifice must have his outlet vent at atmospheric pressure. This is to make sure that there is flow of purge gas into the valve. The purge gas source and type are dependent of the application. Most of the time, the purge gas is the same as the carrier gas. So, the gas is teed off of the carrier gas inlet, and then the flow orifice is tuned at the carrier gas pressure level.

In most applications, the carrier could and should be used for actuating and purging gas. This is a good strategy mainly if the carrier gas is high purity helium and the detector has a high sensitivity, like helium ionization detector. Very little flow is required to actuate the valve. See application note AN-04 for more information about using the purging feature. See also the warning notice to avoid a hazardous situation. If your system is made of several valves with purge, the best is to connect them in parallel. However, if carrier gas supply is a problem, you may connect the valve purging network in series. If you do so, don't connect more than 5 valve purges in series. This is to make sure that internal valve purging system will not become pressurized.

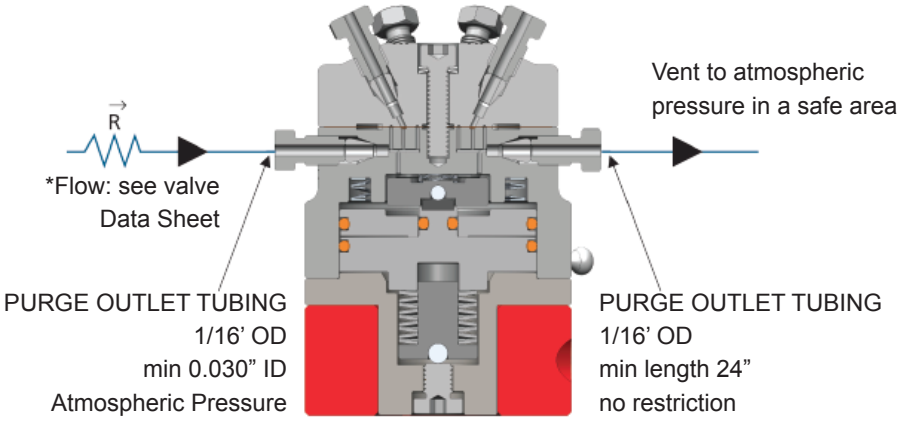


FIGURE 4: Typical purge tubing set-up

WARNING

This application note AN-04 must be read and understood to use your valve safely.

Part #6

Diaphragm replacement procedure

The diaphragm replacement procedure is the same for the six and ten ports valve.

Note: A visual inspection is necessary and recommended while the valve head and the diaphragm are removed from the valve body. If there is any trace of contaminent on the valve head wetted surface it must be cleaned using solvent that are suitable for your application.

STEP 1

Actuate the valve by pressurizing the actuator (ON position). When the actuator is pressurized, insert the relief pins into their respective holes as shown in figure 5. You may need to slightly increase the actuation pressure to ease the pins in. When the pins are properly inserted, depressurize the actuator (OFF position). This step is to assure that all the plungers are down, making it easier to install the diaphragm and properly align it.

STEP 2

Unscrew first the three screws mounted on the outer edge of the valve head and then unscrew the middle screw.

Note: The screw mounted in the middle of the valve head is longer than the other ones. It must be re-installed at the same place.

STEP 3

Actuate the Carefully lift up the valve head.

Note: Don't touch the valve head surface with your fingers.

STEP 4

With the help of a small and clean plastic tweezer remove the used diaphragm.

STEP 5

Remove the new diaphragm from the lint free bag. With the help of a small and clean plastic tweezer install the diaphragm in place. Make sure that the diaphragm groove is aligned with the recess in the cylinder body. The diaphragm could be placed only in one position due to the special position of the dowel pins.

Note: Manipulate the diaphragm only by its edge. Don't touch the process area with your fingers or dirty tools. This will affect the detector baseline and/or contaminate the column.

STEP 6

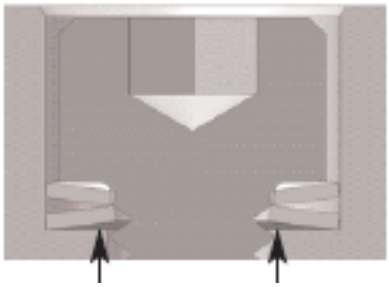
Re-install the valve head on the cylinder body by aligning the cylinder dowel pins with valve head corresponding holes and gently depose the valve head on the diaphragm. Make sure that the counter bore on the valve head and that the screws are aligned with the threads in the cylinder body.

Note: If you feel any resistance, you may not be aligned properly.

STEP 7

Re-install the four mounting screws by beginning with the longer one that must be installed in the center hole of the valve head. Tighten this screw to 5 lb-in (0.6 N-m) using a proper torquing tool supplied in our tool kit (TK-01) and then continue with the 3 other ones.

Note: Make sure to have two compression washers per screw installed in the proper position.



STEP 8

Tighten first the center screw to exactly 20 lb-in (2.3 N-m) using a proper torquing tool and then, continue with the 3 other ones.

STEP 9

Re-pressurize the actuator and remove the relief pins.

STEP 10

Depressurize the actuator.

STEP 11

The valve is now ready to be used.

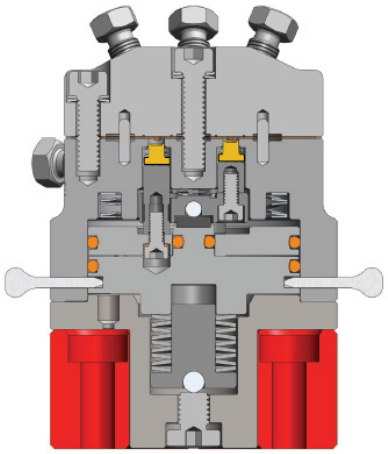


FIGURE 5

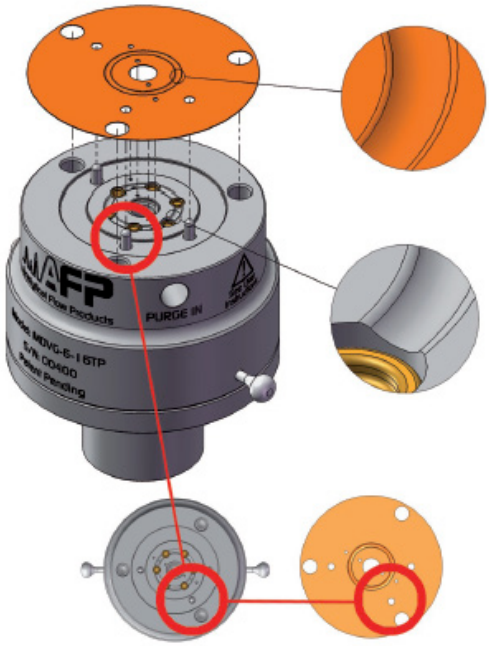


FIGURE 6

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