gevasol fluid and motion control | BEYOND STANDARD

P377.U001b

General user manual for P377 & P447

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Document Versions

Rev.	Change	Date
a	Creation	27.01.2023
b	Added details concerning valve assembly & assembly tools	11.10.2024

1. Valve integration

- An insufficient deburring and/or a too rough surface (>Ra0.8) of the cavity may damage the o'ring during the assembly process and thus, create internal or external leaks.
- Please refer to the footprint on your catalog drawing

2. Valve assembly

The visual control of the cleanliness and the state of the o'ring before assembly greatly reduces the risk of external leakage.

2.1. Cartridge valve

Exert a movement of combined pressure and oscillating rotation on the body of the valve, to ease the introduction of the o'ring whilst under radial compression. The aim is to create a dynamic movement which reduces friction and also avoids any damage caused by the o'ring becoming trapped.

The 2 screws have to be tightened only after the complete insertion of the valve in its cavity.

2.2. Subbase Valve

Check that the orifices for the passage of the fluid between the valves and the support surface correspond.

2.3. Body M5 Valve

The body M5 must be screwed into his cavity till mechanical stop to prevent leakage.

3. Assembly aides (lubricant)

Cartridge Valve

The use of a lubricant which is compatible with the type of elastomer and the fluids used is possible.

The application of a lubricating product on the o'ring must be localized and sparing to avoid internal pollution of the valve (increased risk of an accumulation of particulate).

If the use of oil or grease is prohibited, a compatible volatile liquid (see below table) allows for a temporary specific lubrication, which leaves no residue when dry.

Elastomer Compatible volatile liquid	
Material	Volatile liquid
NBR	Ethanol (pure - 100%)
FPM/FKM	Isopropanol
EPDM	Ethanol (pure - 100%) or Isopropanol
FFPM/FFKM	Ethanol (pure - 100%) or Isopropanol

4. Assembly Tools

4.1. Cartridge valve

No specific tool is needed.

- The M3x6mm screws are only used to maintain the valve is in its cavity and in no case to ease or help in its introduction. The tightening of the screws must only be carried out after the complete introduction of the valve into its cavity.
- The use of a hammer or other object to introduce the valve axially by force should be strictly avoided.

4.2. Subbase valve

A screwdriver or Allen key is required for subbase screws.

4.3. Body M5 valve

A 15 mm open-end spanner is required for final screwing of the M5 body.

5. Tightening of the screws – recommended torque

Type	Screw	Torque
Cartridge	M3x6mm Steel Screw	0.45Nm
Subbase type P & Subbase type F	M3x18mm Steel Screw => 0.45Nm	0.45Nm
Body 10-32 UNF-2A & Body M5	No specific screw	2.2Nm
Body type E & Body type F & Body type M	M3x16mm Steel Screw => 0.45Nm	0.45Nm
Body type F with barbs	M3x20mm Steel Screw	0.45Nm

6. Fluid filtering

The stroke or the movement of the mobile parts of a proportional valve is on the order of <0.001 to ~0.3mm, means that this valve is sensitive to pollution which generally gets stuck between the seat and the sealing element. Even an effective rinsing (removal of the pollution) will not restore the same leak integrity as prior to the pollution, as an imprint will always remain on the elastomeric sealing surfaces.
That's the reason why a filter may be integrated in the valve.

The filtration level advised depending on the orifice size is :

- <= ø0.5mm : 5µm filter included in entry port of the valve (standard)
- >0.5mm : 10µm filter (optional)

If the manifold on which the valve (without integrated filter) is assembled is not cleaned and maintained clean at the required level, the customer filter will only be partially effective.
The filter material must be compatible with the fluids used.

In any case :

- If there is a risk that the fluid may flow back on itself, it is also advisable to place a filter downstream of the valve.
- The active surface of the filter must be fixed in such a way that pressure decay is kept to a minimum.
- Otherwise, the filter will limit the flow and the valve will not be able to meet the flow specifications given.

7. Driving / Electrical control of the valve

The electrical signal may be one of 3 types :

7.1. Current driving [A]

In a coil the electromagnetic force is directly proportional to the current passing through it.

The current drive is therefore, the most favorable method because the influence of the coil's resistance variation due to the temperature (self-heating of the energized coil, variable room temperature) on the voltage will not affect the electromagnetic force.

According to the law of ohm :

$$U(V) = R(\Omega) \times I\ (A)$$

With a constant current, the flow rate will be stable as long as the entry pressure and the exit pressure are stable.

To ensure an optimal usage of the valve, do not limit the voltage to its nominal value (shown in our specifications @ T=20°C), but foresee a factor of almost 1.5x of the nominal voltage (depending on the nominal power).

7.2. Voltage driving [V]

In this case, you should size the electric circuit to be able to supply a maximum voltage equivalent to almost 1.5x of the nominal voltage (depending on the nominal power).

7.3. With a PWM (voltage pulse-width modulation),

The frequency should be f >= 3kHz to minimize the « noise » audible to the naked ear and above all not to create any noise on the flow signal.

The explanation of the voltage drive is valid in this case.

8. Duty cycle

- The duty cycle (ED) is defined as a maximum percentage of time at which the valve can be powered before deterioration.

The power supply relates to nominal values defined in the technical specifications.

This duty cycle (ED) is valid on the whole temperature range defined in the technical specifications.

- A valve at 100% ED can be continuously powered.
- A valve at 50% ED can only be powered at 50% of a time defined in the technical specifications.

This maximum duration will be defined in the technical specifications.

9. Identification

- Part number

- Nominal current
- Nominal resistance
- Maximum pressure
- Serial Number
- QR code

10. Standard Trouble shooting

10.1. No Flow

- Check the power supply (voltage/current limit).
- Check the connector (good insertion).
- Check the wire (not damaged).

10.2. Low flow

- Inlet partially obstructed Check if there are no particles in the inlet.
- Outlet partially obstructed Check if there are no particles in the outlet.
- Courant insufficient Check the power supply (voltage/current limit).

10.3. External leakage

- Check assembly to the manifold.
- Check the tightening torque of the screw.
- Check cleanliness of the O-ring.

10.4. Internal leakage

- Check assembly to the manifold.
- Check the tightening torque of the screw.
- Check cleanliness of the O-ring.