Valves

[For volume applications, Geeplus can supply custom solenoid valves based on our extensive range of actuator products. A few of these devices are offered as standard products; the majority of valve designs are custom designed to suit specific applications.]

Pinch Valves

[Geeplus Pinch Valves develop high clamping force to ensure reliable closure in critical applications using the toughest of tubing materials.] Holding power in the energised position is minimized for lowest power consumption and heat dissipation.

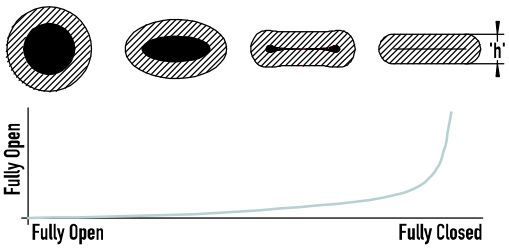
Linear valve construction is suited to tubing size up to 8-9mm. Rotary construction can effectively close tubing with o.d. up to 15mm or larger.

Standard valves are on-off type, proportional control valves can be developed to suit special requirements.

Pinch Valve Operation

A pinch valve works by squeezing together the walls of a flexible tube until the walls are fully sealed against one another, and flow of liquid through the tubing is stopped.

The force characteristic of pinch operation is illustrated below. As the tube is progressively squeezed harder, flow is reduced. The initial forces to partially reduce flow are fairly small. The forces required to fully shut off flow in the tube increases sharply as full closure is approached.



Normally Open (NO) Valves

NO valves allow fluid to flow in the de-energized condition, and close off the flow when energized. A light spring assists opening, this is normally assisted by the recovery of the tubing material. A second decoupling spring allows the solenoid to close fully when energized; this spring then imparts closing force to the pinch element. It is important that the solenoid is able to fully close to be able to minimize the holding power required.

The closing force for NO valves is given at a specified pinch height where thick-walled tubing is used. A spacer (thickness 't') should be fitted between the solenoid and valve body to ensure closing force is developed at an appropriate point. The sum of the pinch height and spacer thickness 't' should be approximately equal to the height 'h' at which the tubing is fully closed (see drawing in section on pinch valve operation on page 52).

It is the decoupling spring that allows the solenoid to close fully and allows holding power to be minimized. The valve is normally energised with a high-power pulse (10% duty curve) to pull-in and fully compress the tubing and decoupling spring. After a short time (typically 50ms), power can be reduced to the 100% rated value or lower. The valve can hold in the closed position with minimal power consumption and heat generation.

Normally Closed (NC) Valves

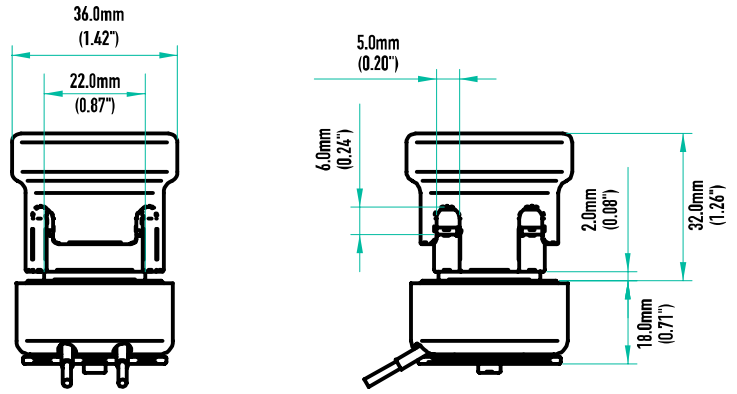
In the case of the normally closed pinch valve, the valve is held closed in the de-energized condition by the return spring. When energized, the solenoid acts against the spring to compress the spring and release clamping pressure on the tubing used.

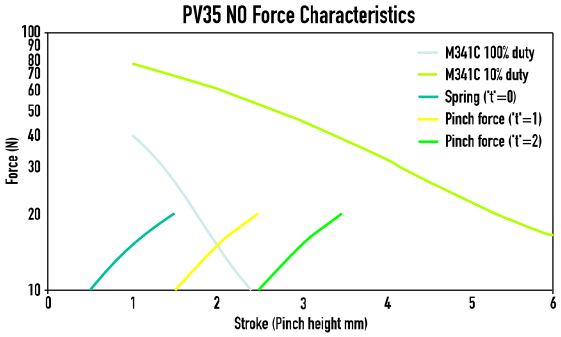
The holding force of Geeplus's Push-Pull Solenoid design allows the solenoid to hold back high spring forces with low input power. With strong springs, a high 'pick' current is required to compress the spring from the fully closed position.

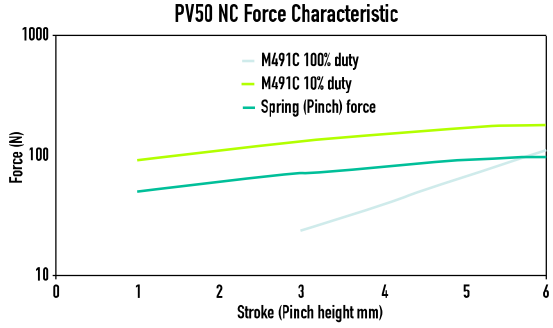
The forces developed in NC valves are sufficient to seal 'hard' grades of PVC tubing, or reinforced rubber tubing. Weaker springs can be fitted to reduce power requirement and force where softer tubing materials are used.

Geeplus pinch valves incorporate simple but effective tubing clamps which both retain the tubing in position when the valve is in the open position, and help assure correct alignment of the tubing for consistent and reliable operation.

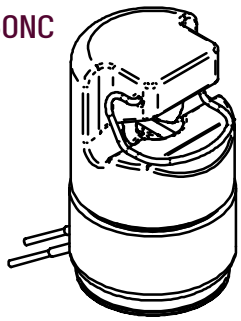
PV35NO

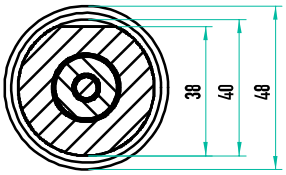




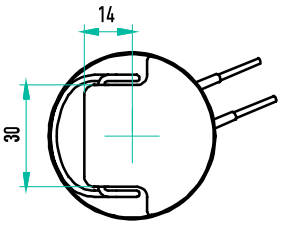


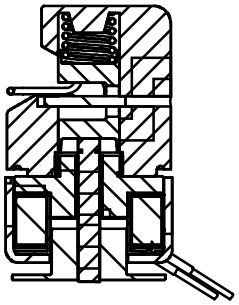
PV50NC



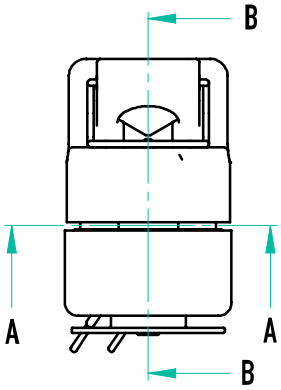


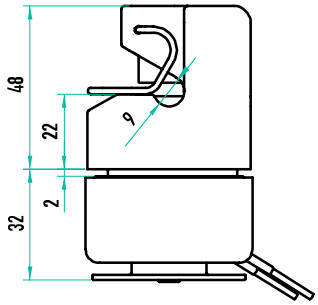
SECTION A-A





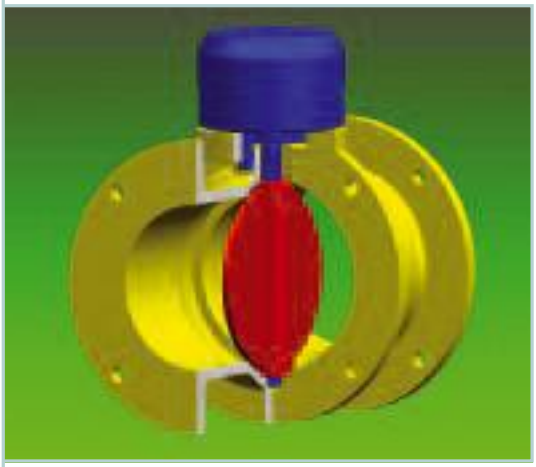
SECTION B-B





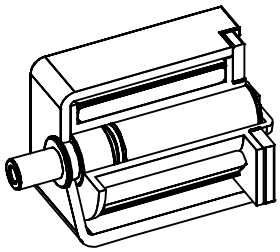
Disc Valves

[Disc valves are suited to high volume flows with a low pressure differential across the valve. The valve disc is pivoted about it's mid-point so pressure acts equally, either side of the disc axis, to allow control of high volume flows with a minimum of torque.
A small amount of leakage in the closed condition is inherent to most disc valve designs, as sealing normally depends on close fitting of the disc and seat areas.
Disc valves can be designed either as open/closed designs, or as diverter valves. Variable position valves for proportional control can be built using rotary voice coil actuators, or stepping motors rather than solenoids as the actuator device.]

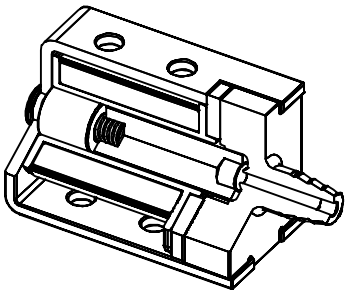


Poppet Valves

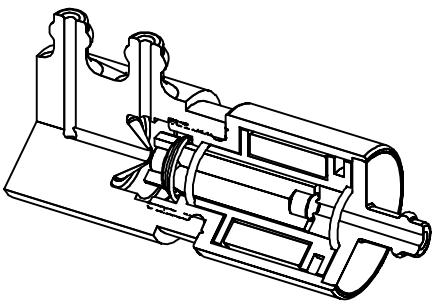
[Poppet valves utilize a rubber pad fitted to the end of the plunger to seal over ports in the valve body. These are normally simple 'on-off' type valves that can be of NO (Normally Open in de-energized condition) or NC (Normally Closed) construction. Poppet valves can also be made as changeover types as shown in the section view. Poppet valves can be made from many different types of solenoids, and can be very simple and inexpensive.]



Normally Open (NO) construction. When de-energized a spring holds the valve open, when energised the seal is pulled in by the magnetic field against the valve seat to stop flow.



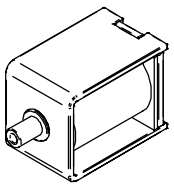
Normally Closed (NC) construction. In the de-energized condition a spring pushes the valve seal against the seat to stop flow. When energized the magnetic field draws the plunger and seal away from the seat to allow flow.

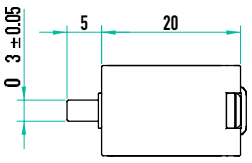


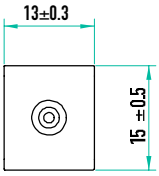
Changeover (CO), combines the functions of the other two types. The valve has 3 ports; a common port is connected to a NO and a NC port, flow is diverted from the NO to the NC port when energized.

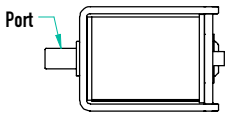
T0V0520-XXV

Valve Orifice (mm)		1.2
Max Pressure		
Seal Material		
Power Rating @ 20°C (W)		1.5
Mass (*g)		18
Voltage	Coil Resistance @ 20°C (Ω)	Current (mA)
6	24	250
12	96	125
24	384	63



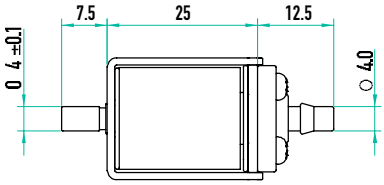


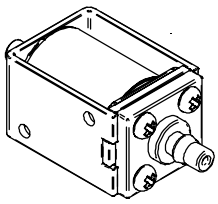


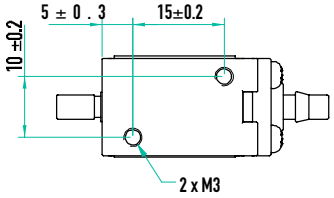


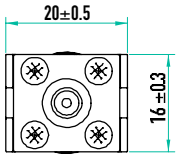
T0V0625-XXV

Valve Orifice (mm)		1.6
Max Pressure		
Seal Material		
Power Rating @ 20°C (W)		2.1
Mass (*g)		43
Voltage	Coil Resistance @ 20°C (Ω)	Current (mA)
6	17	349
12	69	174
24	274	88



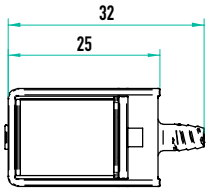


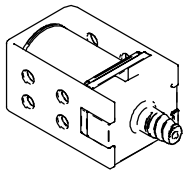




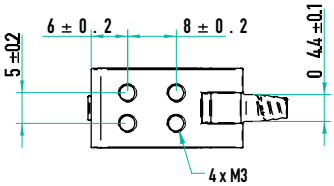
DTV0525-XXV

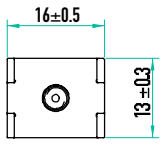
Valve Orifice (mm)		1.2
Max Pressure		
Seal Material		
Power Rating @ 20°C (W)		1.2
Mass (*g)		30
Voltage	Coil Resistance @ 20°C (Ω)	Current (mA)
6	30	200
12	120	100
24	480	50





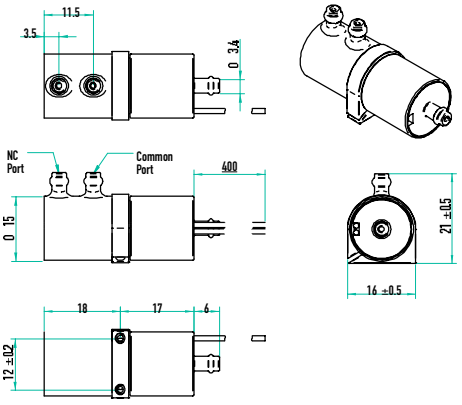
Leadwires UL1430, AWG28, 400mm





DTT1515-XXV

Valve Orifice (mm)		
Max Pressure		
Seal Material		
Power Rating @ 20ºC (W)		
Mass (*g)		
Voltage	Coil Resistance @ 20ºC	Current (mA)
6		
12		
24		



Diaphragm Valves

[Diaphragm valves are well suited to proportional flow or pressure control with good isolation of the controlled fluid from the actuation section of the valve. The sealing portion of the valve is in the form of an elastomeric membrane that can be made as a disposable or sterilisable component if necessary.

The valve itself has no sliding parts so friction and hysteresis are negligible.]