

Pinch Valves





Pinch Valve Data

Pinch valves facilitate opening and closing the flow of liquid through a tube without any contact between the liquid and the valve itself.

The tube is pinched between a fixed and a moving bar (pinch elements), as these are closed together the tube is pinched closed until flow is shut off.

Pinch Valve Types

Pinch Valves are described by 3 types, Normally Open (NO), Normally Closed (NC), and Changerover (CO).

A Normally Open Valve permits flow in the de-energised condition (without Power). When power is applied, a solenoid actuator closes the pinch elements to squeeze the tube closed and shut off flow.

A Normally Closed Valve incorporates a spring which closes the pinch elements to shut off flow in the de-energised condition. When power is applied, a solenoid actuator opens the pinch elements to allow flow through the tubing.

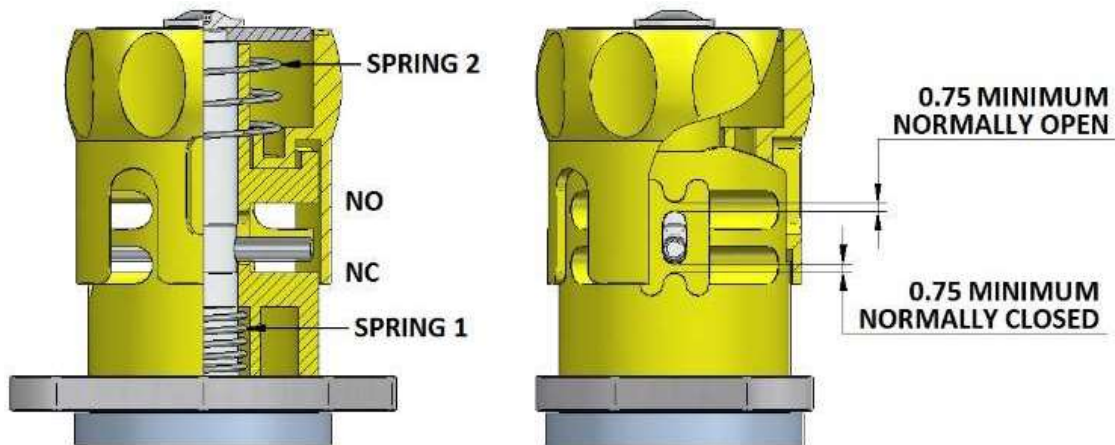
A changeover valve incorporates two channels, one of which is open, and the other closed in the de-energised condition. The individual channels of a changeover valve may be described as NO or NC type.



Operating Parameters

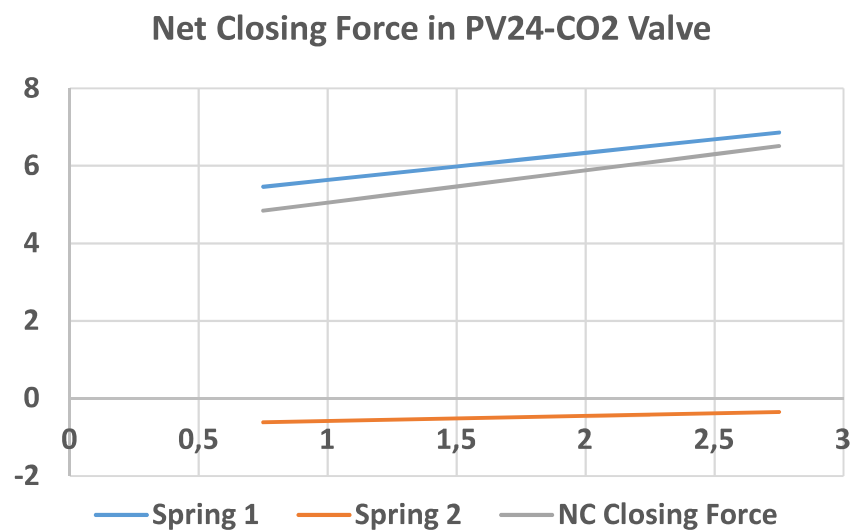
NC Closing Force

In an NC valve (or NC channel of a changeover valve), the force closing the tube is provided by a spring, or a combination of springs.



In the PV24-CO2 changeover valve, the spring configuration looks as above. The lower spring 'Spring 1' pulls down the pinch bar assembly and provides the closing force. The upper spring 'Spring 2' holds down the tube clamp to

retain tubes in place, however it also pushes upon the pinch bar assembly, reducing the overall pinch force. The combined effect of the two springs looks like the attached graph. This Net force is the value given in specifications



The drawing also shows the minimum opening heights of the pinch area in NC and NO positions. These heights will determine what minimum wall-thickness of tubing can be used with the valve. In the case shown, the pinch elements will close up to a nominal height of 0.75mm, this should be sufficient to close a tube having 0.5mm or greater wall thickness.

NO Closing Force

In the NO valve (or NO channel of a changeover valve), the closing force is provided by a solenoid. The force developed by a solenoid tends to increase exponentially as the gap between pole-pieces reduces towards zero. This exponential increase can be a problem when using fragile tubing materials.

Tube Closing Force

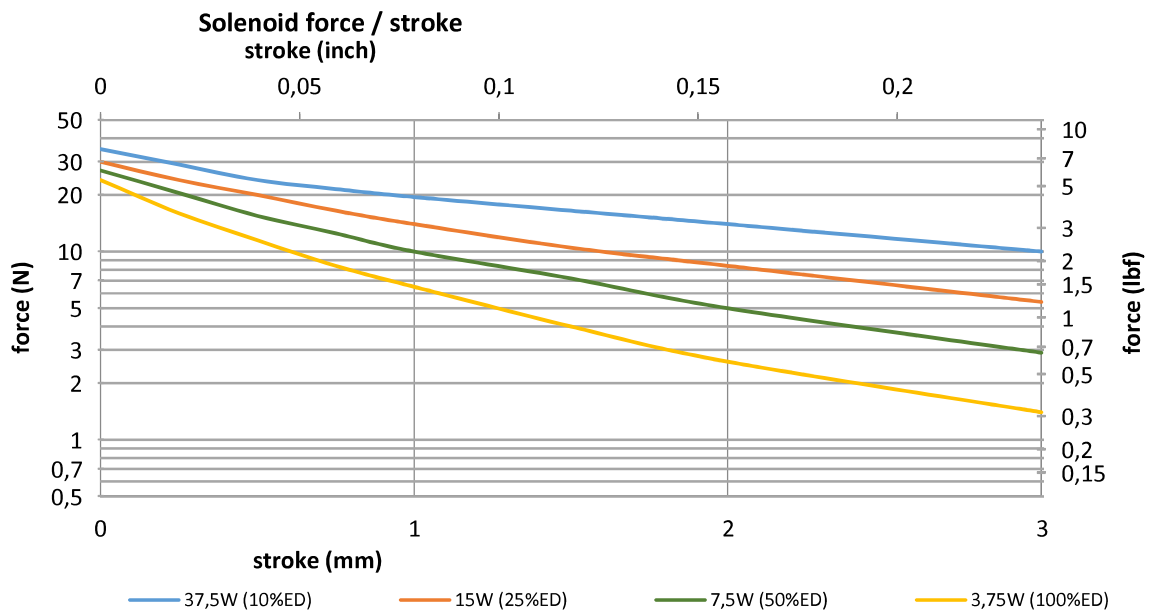
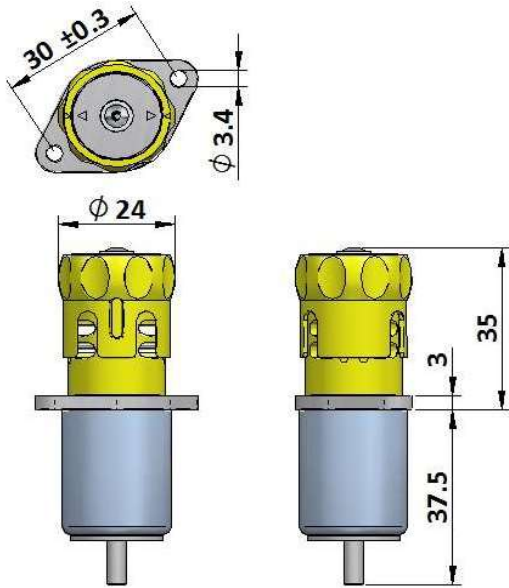
The force required to close a given tube will be affected by tubing material, dimensions, environmental (some tubing materials harden at low temperature and become harder to close) and pressure conditions of the controlled liquid. Applying excessive pressure to the tubing can lead to high operating power requirement, and can damage the tubing leading to premature failure.

For optimum behaviour the force required should be determined by testing with the tubing to be used in the application under worst case conditions. With worst case conditions, the tube should be clamped between a pair of pinch elements similar to the valve to be used, and pressure applied to the pinch elements is increased until flow of liquid ceases.

Geeplus has fixtures to measure clamping force and can carry out testing on samples of tubing to determine operating force



GEEPLUS Pinch Valve PV24-CO2-xN-yV



Data at 20°C, without heatsink

duty cycle = $\frac{\text{"on" time}}{\text{"on" time} + \text{"off" time}} \times 100\%$		100% cont.	50% or less	25% or less	10% or less	
Max. "on" time in seconds		∞	100	36	7	
watts at 20°C		3,75	7,5	15	37,5	
ampere-turns at 20°		440	623	880	1393	
type no.	resistance	number of turns	volts DC			
	$\Omega \pm 10\%$ (at 20°C)					
3V	2,3	350	3,0	4,2	6,0	9,5
6V	10	750	6,0	8,5	12	19
12V	38	1460	12	17	24	38
24V	167	3060	24	34	48	76

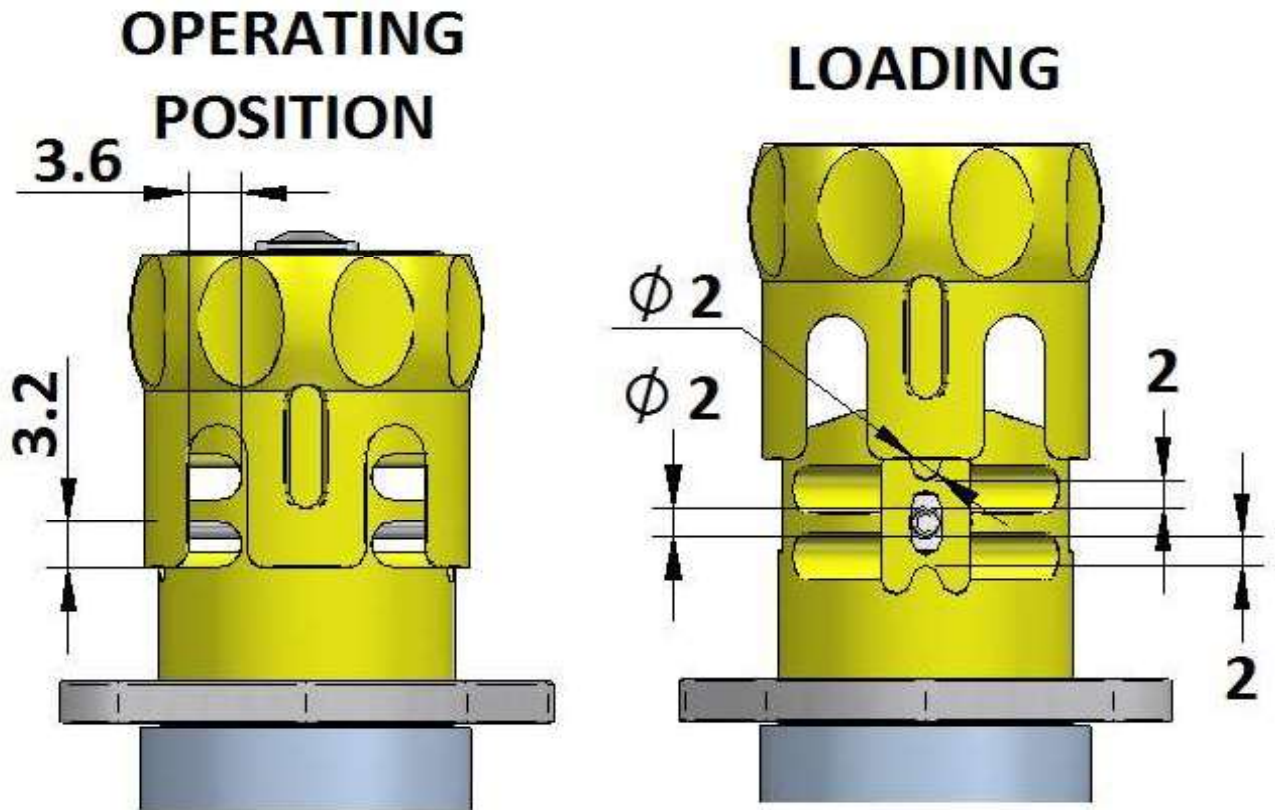
Insulation Resistance >100MΩ, 500VDC Megger
Class E (120°C) insulation class

Dielectric Strength 1000VAC, 50/60Hz, 1 minute

Geplus reserves the right to change specifications without notice

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Pinch Valve Parameters



Part Number for Pinch Valves is made up as follows

PV24-CO2-5N-6V

PV24	-	Pinch Valve & Nominal Diameter in mm
CO2	-	CO for changeover valve NC for normally closed valve NO for normally open valve
5N	-	1.....N number of channels of each type Spring force closing NC channel (shared between multiple channels)
6V	-	Nominal Operating Voltage of solenoid used (100% ED)

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