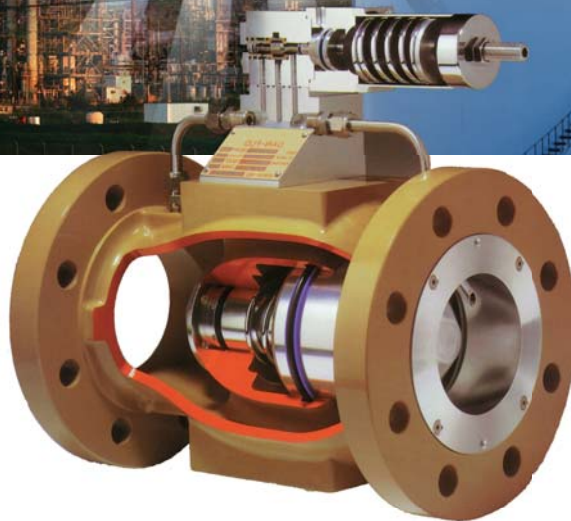


# M&J VALVE




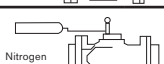
AN SPX BRAND

## The DANFLO Family of Control Valves



**SPX**<sup>®</sup>

# 400 SERIES

NOTE: CAVITATION AND LOW-NOISE TRIM AVAILABLE	BODY STYLE 41 Pilot Operated	<b>Size (IN)</b>	2	3	4	6	8	10	12	16	
		<b>Size (MM)</b>	50	75	100	150	200	250	300	350	400
		<b>Cv (1)</b>	120	330	480	1200	1900	3100	4200	4200	7630
		(1) The Volume of water in GPM at 60°F that will flow with 1 psi pressure drop across the valve.									
	BODY STYLE 42	<b>Model N. &amp; Pressure Ranges</b>	<b>Control Function</b>	<b>Simplified Schematic</b>		<b>Principal Application</b>					
		<b>10</b> ANSI 150-1500	Pressure Reducing			Pressure control in process streams and pipelines. Over-pressure protection of meters, manifold systems, etc.					
		<b>20</b> ANSI 150-1500	Back Pressure/ Pressure Relief			Hold back pressure for pump, meter, etc. Pressure relief and control of line-pressure surges.					
		<b>35</b> ANSI 150-1500	Minimum Differential Pressure			Pump ΔP and ΔP by-pass control; also strainers, filters. Vapor-pressure control (LPG and similar products)					
		<b>40</b> ANSI 150-1500	Surge Relief (Nitrogen Loaded)			Protect pipeline, pumps, and other devices from transient surge overpressures.					

## 400 SERIES

A 400 Series DANFLO valve, in its simplest form, consists of a dynamically balanced-plug assembly that slides back and forth easily and rapidly to open, close, and throttle.

- Pressure in the plug cavity closes the valve.
- With no pressure in the cavity, the valve opens.

Pressures are applied through three ports: upstream, downstream, and to the plug cavity “behind the plug.” Downstream port provides for venting plug-cavity pressures rapidly to speed up valve response. The port leads to the point of lowest internal pressure in the valve.

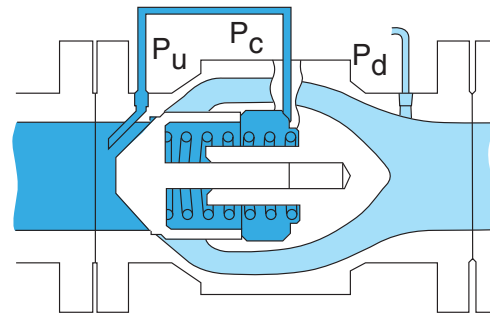
For convenience, the ports (and related pressures) are identified:

- $P_u$  = Upstream
- $P_d$  = Downstream
- $P_c$  = Cavity

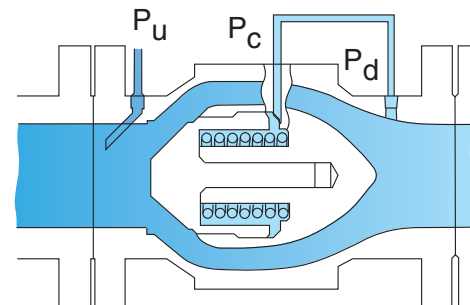
## TYPICAL VALVE ACTION

$P_c$  is connected to  $P_u$ . This equalizes pressures on upstream and downstream and faces of the plug. The internal-spring force closes the valve.

By connecting  $P_c$  to  $P_d$  the plug cavity is vented. Upstream line pressure overcomes the spring force, and the plug is forced open.



Ports  $P_u$  and  $P_c$  connected. Upstream pressure is equalized across the valve. Spring pressure forces plug to seat VALVE CLOSED.



Ports  $P_c$  and  $P_u$  connected. A differential pressure exists across the plug. Upstream pressure greater than mechanical spring pressure moves the plug downstream – away from the seat – VALVE OPEN

# 400 SERIES

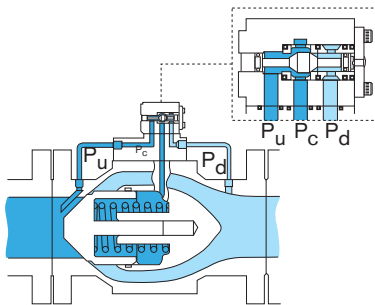
## PILOT OPERATION 400 SERIES – BODY STYLE 41

The pilot connects  $P_c$  to either  $P_u$  or  $P_d$  to close or open the valve. The connection is made in the pilot by an internal poppet that shuttles back and forth depending on whether force from the pressure provided by a “sense line” is larger or smaller than pilot spring force. (Differential-pressure pilots are also available.)

An easy way to remember how the pilot works is that the valve, after the initial start-up sequence, will normally be closed if the spring “points” upstream (back-pressure or relief operation), normally open if “pointed” downstream (pressure-reducing service).

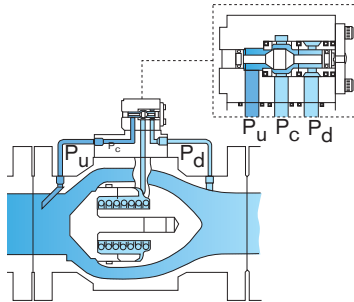
Use of the pilot is therefore:

- “Point” the spring so the valve is normally open or closed, as desired.
- Connect the “sense line” upstream or downstream to “sense” the pressure you want to actuate the pilot.

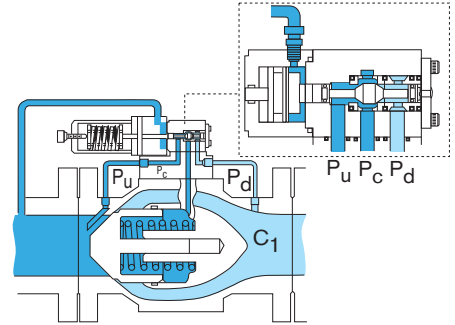


Poppet right  
Pressure is equalized across the plug, Plug moves left – VALVE IS CLOSED.

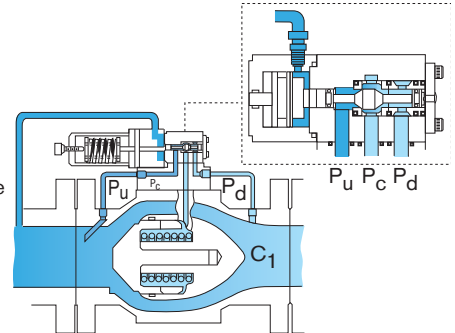
Poppet left  
Pressure differential is created  
Plug moves right – VALVE IS OPEN.



Pressure drop in pilot chamber  
Mechanical spring pressure is greater  
Poppet moves right  
Valve plug left  
VALVE IS CLOSED.



Pressure rise  
Pressure in the sensing unit is greater than the mechanical spring force  
Poppet moves left  
Valve plug moves right  
VALVE IS OPEN

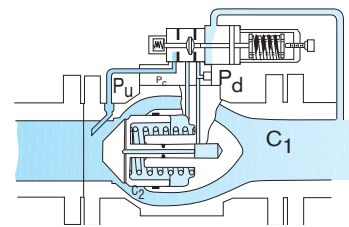
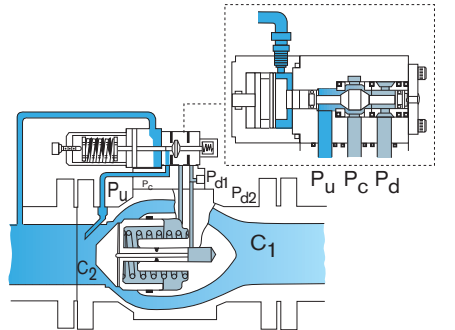


Velocity is higher and pressure is lower at point  $C_2$  than it is at point  $C_1$ . In regulating service, plug chamber is exhausted to point  $C_2$  for faster response to changing pressure.

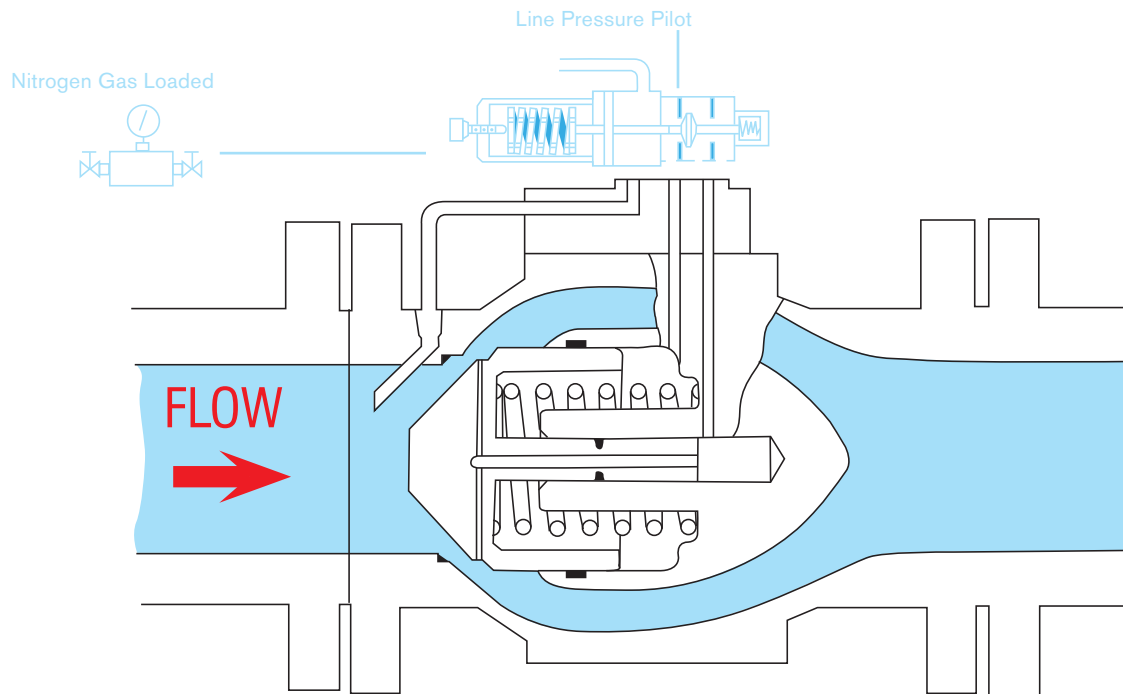
**IMPORTANT NOTE:**  
Reversing the direction on the DAN-FLO pilot sensing unit reverses the direction of valve plug response.

In pressure reducing/regulating conditions operational characteristics are reversed  
A drop in pressure downstream

Poppet moves left  
Valve plug moves right  
VALVES IS OPEN



# The versatile, efficient, cost-effective DANFLO Control Valve



Two basic designs with balanced, guided plug assemblies

**400 SERIES (Illustrated above) For use with pilots and controllers MODELS 10, 20, 35 & 40**

**SPX**<sup>®</sup>  
WHERE IDEAS MEET INDUSTRY

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