

40 Series Ball Valve Flow Path Options



Special Flow Paths

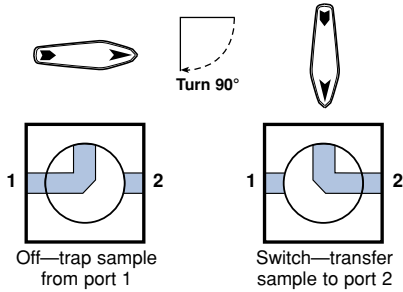
- One-piece body and capsule seat packing permit special flow paths for a variety of applications.
- Special flow paths are available in valves with standard packing and in live-loaded valves for low-temperature service.
- See the Swagelok *Instrument Ball Valves—40 Series* catalog for valve ordering numbers, materials of construction, dimensions, actuated assemblies, other options, and technical information.

2 Port Paths



L Flow Path

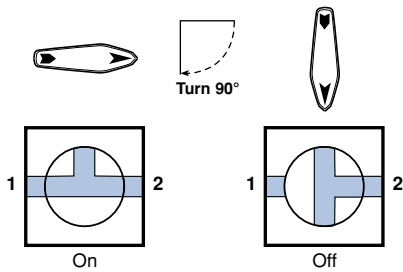
Angle porting can transfer a sample from port 1 to port 2. Cross-port flow may occur in 44 and 45 series valves. To specify a smaller orifice, see the Swagelok *Instrument Ball Valves—40 Series* catalog.



Valve Series	Orifice in. (mm)	Pressure Rating psig (bar)	Flow Path Designator
41	0.040 (1.0)	2500 (172)	L
42	0.047 (1.2)		
43	0.062 (1.6)		
44	0.125 (3.2)	1500 (103)	
45	0.281 (7.1)		

HL Flow Path

Tee porting is used for in-line, on-off service when fluid must not be trapped in the stem cavity. System fluid can be evacuated through port 2 when the valve is in the off position.



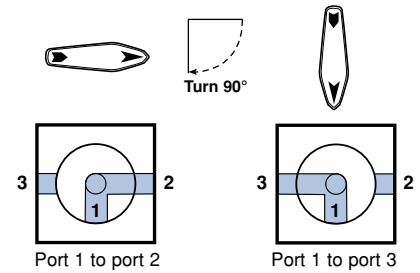
Valve Series	Orifice in. (mm)	Pressure Rating psig (bar)	Flow Path Designator
41	0.093 (2.4)	2500 (172)	HL
42	0.125 (3.2)		
43	0.187 (4.8)		
44	0.281 (7.1)	1500 (103)	
45	0.406 (10.3)		

3 Port Paths



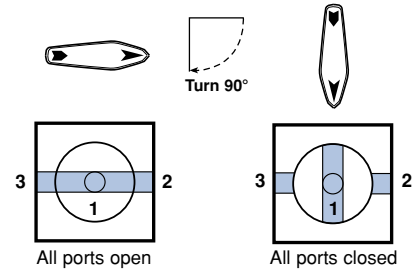
L Flow Path

Angle porting allows switching of port 1 to port 2 or port 1 to port 3 when the handle is rotated 90°. There is no off position.

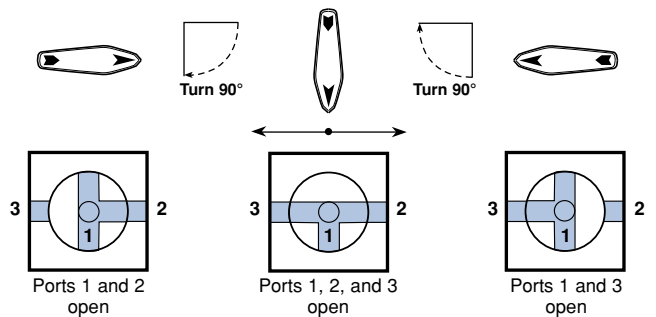


H Flow Path

Tee porting with a leg to the bottom port (port 1) allows ports 1, 2, and 3 to be open or closed at the same time.



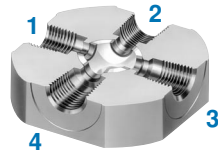
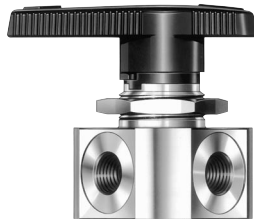
HL Flow Path



Tee porting with a leg to the bottom port (port 1) enables selection of ports 1 and 2; 1 and 3; or 1, 2, and 3. There is no off position.

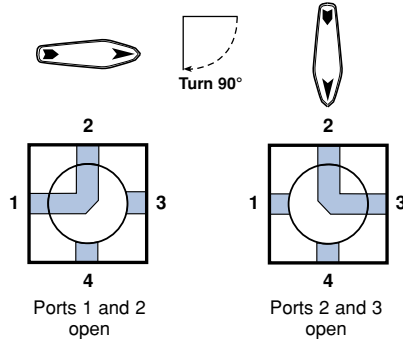
Valve Series	Orifice in. (mm)	Pressure Rating psig (bar)	Flow Path Designators
41X	0.093 (2.4)	2500 (172)	L = angle H = tee (all ports open or closed) HL = tee (no off position)
42X	0.125 (3.2)		
43X	0.187 (4.8)		
44X	0.281 (7.1)	1500 (103)	
45X	0.406 (10.3)		

4 Port Paths



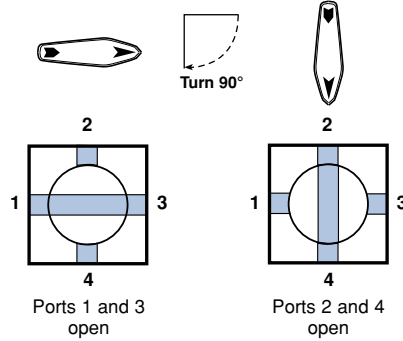
L Flow Path

Angle porting provided with four ports and 360° handle rotation; two adjacent ports are connected and the other two are closed.

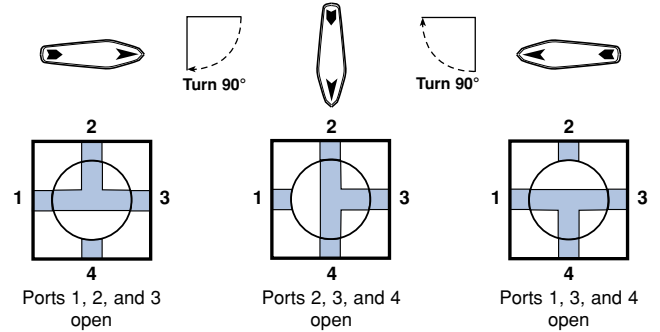


H Flow Path

Straight-pattern porting can switch two streams on and off alternately or transfer a sample from ports 1 and 3 to ports 2 and 4. Cross-port flow may occur in 45 series valves. To specify a smaller orifice, see the Swagelok Instrument Ball Valves—40 Series catalog.



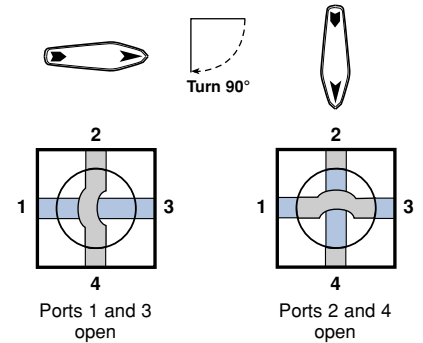
HL Flow Path



Tee porting provided with four ports and 360° rotation of the handle; three adjacent ports can be connected at the same time and the remaining port is off.

HH Flow Path

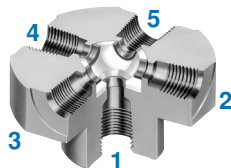
Crossover ports allow continuous flow through ports 1 and 3 and continuous flow through ports 2 and 4. Cross-port flow may occur in 45 series valves. To specify a smaller orifice, see the Swagelok Instrument Ball Valves—40 Series catalog.



Valve Series	Orifice in. (mm)	Pressure Rating psig (bar)	Flow Path Designators
43Y	0.062 (1.6)	2500 (172)	L = angle H = straight
45Y	0.281 (7.1) ^①	1500 (103)	HL = tee HH = crossover

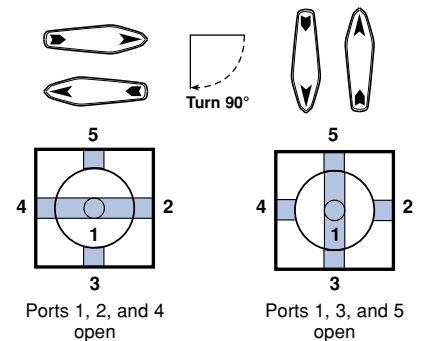
^① HH flow path valve orifice is 0.161 in. (4.1 mm).

5 Port Paths



H Flow Path

Tee porting in the ball with a leg to the bottom port (port 1) allows selection of ports 2 and 4 or 3 and 5 with 360° handle rotation.



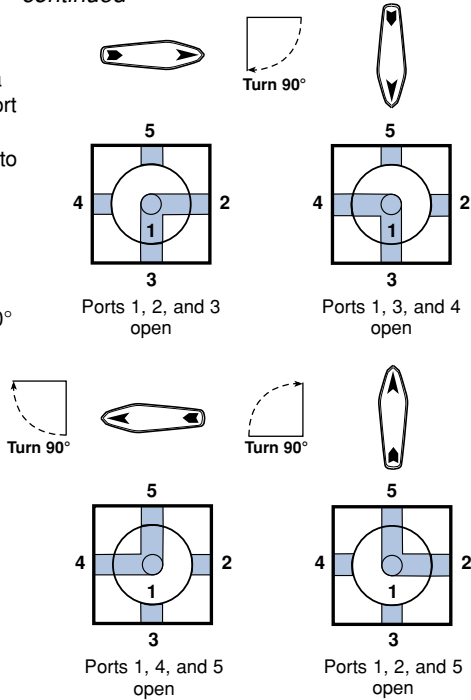
Valve Series	Orifice in. (mm)	Pressure Rating psig (bar)	Flow Path Designators
43Z	0.062 (1.6)	2500 (172)	L = angle H = tee (2 ports close)
45Z	0.281 (7.1)	1500 (103)	HL = tee (1 port closes)

More 5-Port Paths, next page

5-Port Paths *continued*

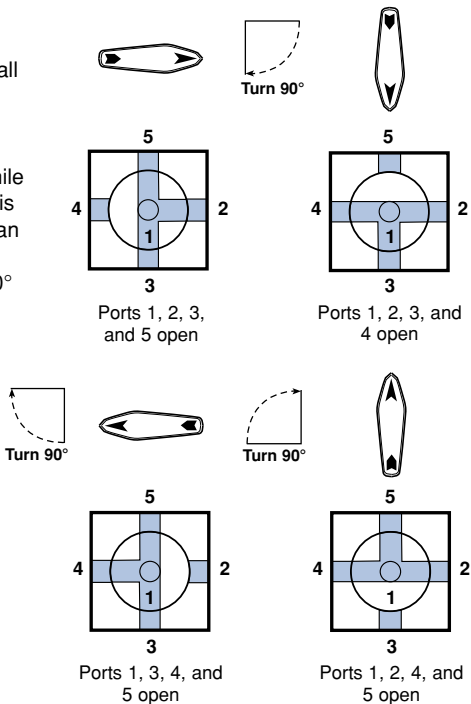
L Flow Path

Angle porting with a leg to the bottom port (port 1) allows two adjacent side ports to be open and the remaining two side ports to be closed. Switching can be done in 90° increments with 360° handle rotation.



HL Flow Path

Tee porting in the ball with a leg to the bottom port (port 1) permits three side ports to be open while the fourth side port is closed. Switching can be done in 90° increments with 360° handle rotation.



Testing

Every 40 series ball valve is adjusted for factory testing at 1000 psig (69 bar) with nitrogen or at its maximum rated pressure if less than 1000 psig (69 bar). Seat tests have a maximum allowable leak rate of 0.1 std cm³/min.

Ordering Information

Valves with Standard Packing

To order a 40 series ball valve with standard packing and an optional flow path:

1. Select an ordering number from the Swagelok *Instrument Ball Valves—40 Series* catalog.

2. Insert a flow path designator.

Examples: SS-41LS2	2-port
SS-42XHS4	3-port
SS-43YHF2	4-port
SS-43ZHF2	5-port

Live-Loaded Valves

To order a live-loaded 40 series ball valve for low-temperature service (see the Swagelok *Live-Loaded 40 Series Ball Valves* catalog) with an optional flow path:

1. Select an ordering number from the *Instrument Ball Valves—40 Series* catalog.

2. Add **T** for PFA or **E** for UHMWPE packing material.

Examples: SS-41TS2	2-port
SS-42XTS4	3-port
SS-43YTF2	4-port
SS-43ZTF2	5-port

3. Insert a flow path designator.

Examples: SS-41TLS2	2-port
SS-42XTHS4	3-port
SS-43YTHF2	4-port
SS-43ZTHF2	5-port

Important Information About Packed Valves

- Packing adjustment may be required during the valve's service life. **Warning: Failure to periodically inspect and maintain valve packing may result in leakage.** Service instructions are shipped with each 40 series ball valve.
- Swagelok ball valves are designed to be used in a fully open or fully closed position.
- Valves that have not been cycled for a period of time may have a higher initial actuation torque.
- 43 series ball valves require an adapter to adjust the packing bolt. Ordering number: **MS-WK-43**
For all other 40 series ball valves, packing adjustments can be made with standard wrenches.

Safe Product Selection

When selecting a product, the total system design must be considered to ensure safe, trouble-free performance. **Function, material compatibility, adequate ratings, proper installation, operation, and maintenance are the responsibilities of the system designer and user.**

Caution: Do not mix or interchange parts with those of other manufacturers.