

Multiport Ball Valves

Featuring Patent-Pending
HEAT-THRU™ Technology



MADE IN
THE U.S.A.



Description

ANCORP's **Multiport Ball Valve** is a high vacuum valve designed for 3-, 4-, or 5-way flow in demanding semi-conductor and coating processes. Its modular design and configurable components enable a variety of flow patterns through the valve.

The Multiport Ball Valve consists of a cube-shaped valve body, a fully stabilized valve stem with Extended Life (XL) technology, a fully ported ball, and end caps (body ports), all machined from corrosion-resistant 316L stainless steel. It is available in two models — the **Multiport Ball Valve** and the **Multiport Ball Valve with HEAT-THRU™ Technology** — and in 3-, 4-, or 5-way configurations. Flanged body ports or blank end caps are installed on the sides or bottom of the valve body to create the desired flow paths, and an L-port, T-port, or other ported ball rotates within the valve to switch flow between body ports.

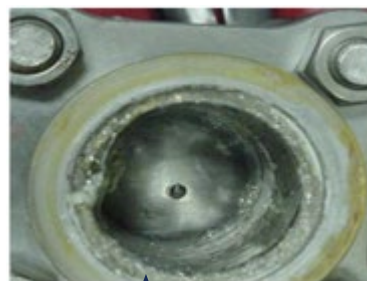
FKM or FFKM O-Rings seal the valve stem and end caps from atmosphere, while PTFE seats cold flow around the ball, creating a seal to prevent internal leaking between ports. The PTFE sealing surfaces are protected from direct deposition or contact with process matter, maintaining a clean, dynamic seal to prevent failure due to contamination.

Features & Benefits

- **Built on Extended Life (XL) technology** – stabilized stem seal blocks atmospheric intrusion and delivers high cycle life with reliable high-temperature performance (FFKM O-Rings)
- **Patent-pending HEAT-THRU™ Technology** – proprietary thermally conductive grease and components drive heat to the ball while minimizing loss through the stem and actuator
- **Machined from solid bar stock** – fully dense body conducts heat evenly and eliminates casting voids that cause cold spots and virtual leaks
- **Fully ported ball** – unrestricted flow path maximizes conductance and reduces particle build-up
- **Evac holes in ball and blank end caps** – vent trapped volumes to the vacuum, preventing virtual leaks
- **Recessed fasteners and flat surfaces** – maximize surface area contact with the heater jacket for efficient heat transfer
- **Faster servicing** – stem housing swaps out in the field
- **Conforms to ISO 5211** – mounts to most modern valve actuators
- **NAMUR VDI/VDE 3845 compliant stem detail** – compatible with most modern valve position indicators

Process Challenges

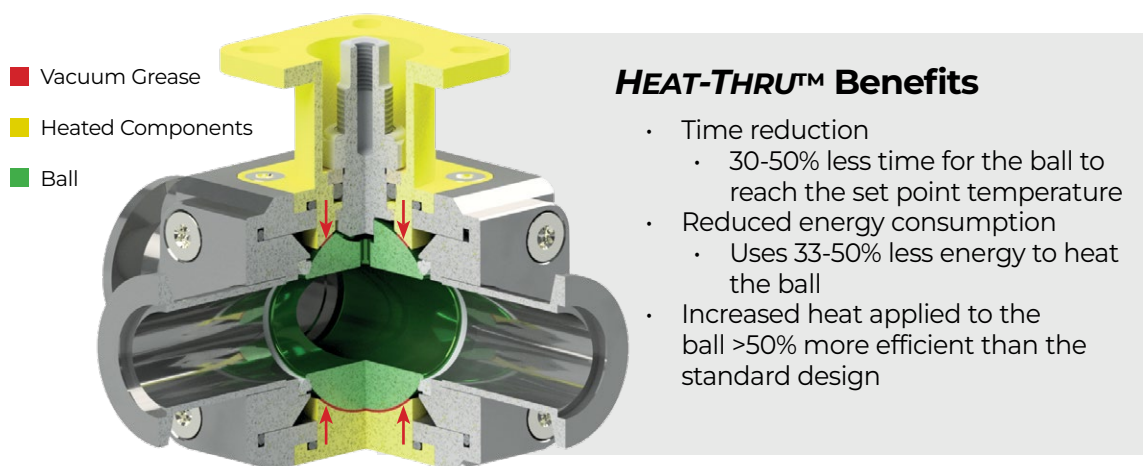
In semiconductor fabs, subfab foreline and exhaust lines carry process byproducts away from the tool, with ball valves routing and isolating flow along these lines. To keep the byproducts in vapor phase, these systems require continuous external heating, often with specialized heater jackets. At cooler points along the line, particularly at valve junctions, the vapor condenses and deposits on the interior surfaces. Accumulated deposition clogs the flow path and can cause the ball to seize, driving unplanned maintenance and costly downtime on tools that run continuously.



Chlorosilane polymer buildup

Multiport Ball Valve Powered by *HEAT-THRU™* Technology

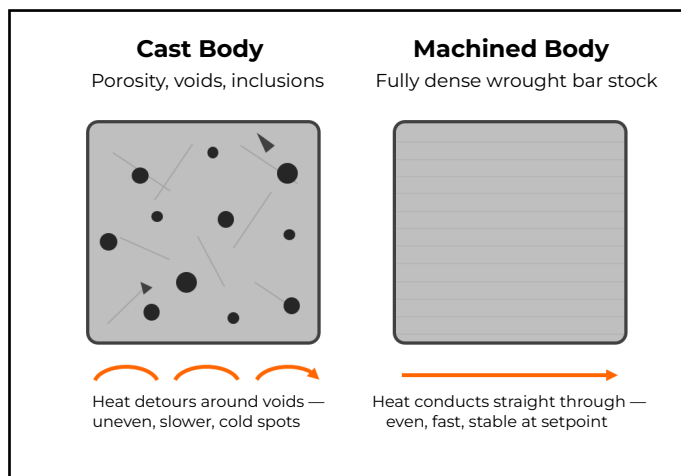
Engineered to eliminate the cold spot commonly found in ball valves installed on major OEM abatement tools, ANCORP's Multiport Ball Valve with patent-pending *HEAT-THRU™* Technology improves heat transfer from the external heating system into the fully ported ball. Specialized internal components, combined with a proprietary thermally conductive vacuum grease, create an efficient thermal pathway through the valve body while minimizing heat loss through the stem and actuator. By heating the ball quickly and uniformly, *HEAT-THRU™* Technology helps prevent process byproduct condensation inside the valve, keeping the flow path clear and reducing maintenance and unplanned downtime.



Our *HEAT-THRU™* Technology excels in subfab applications such as abatement and deposition, where efficient heating is critical to reducing condensation inside the valve. FKM and FFKM O-rings, rated for temperatures of 150°C and 180°C respectively, ensure compatibility with high-temperature processes.

Why Machined Valves?

ANCORP machines its valve bodies from solid 316L bar stock rather than casting them — a difference that directly affects thermal performance. Cast bodies contain microscopic porosity, shrinkage voids, and inclusions left behind by the casting process; because gas-filled voids are poor conductors, heat moves through a cast body unevenly and slowly. Wrought bar stock is fully dense and homogeneous, so heat conducts through it evenly and more predictably. The valve reaches temperature faster, holds heat more consistently, and more efficiently eliminates the cold spots where byproducts condense. The same void-free structure removes a common source of virtual leaks and outgassing, supporting faster pumpdown and lower base pressure.



Multiport Ball Valve

The corrosion-resistant, fast-actuating design of ANCORP's Multiport Ball Valve makes it ideal for diverting, switching, combining, or splitting flow around reactors, traps, scrubbers, and exhaust lines on vacuum coating, etch, and abatement tools.

Its fully ported ball and minimally wetted internals resist particulate buildup and contamination in harsh or dirty downstream environments. A single 3-, 4-, or 5-way Multiport Ball Valve can replace multiple 2-way valves and fittings on vacuum lines and manifolds, simplifying the assembly.

The Multiport Ball Valve is the optimal solution for flow-switching on non-heated lines, such as general routing, isolation, and diverting. In lines where reducing condensation of process byproducts is critical, the Heat-Thru model adds thermal performance to the same modular platform.



Specifications

Materials

- Body, ball, stem, and end caps: machined from solid 316L stainless steel
- Standard Seal: Fluoroelastomer (FKM)
- Seats: PTFE
- Lubricant: Dow Corning®/DuPont Molykote High Vacuum Grease
 - *HEAT-THRU™* Model: Proprietary vacuum grease optimized for heat conduction

Vacuum & Temperature Ratings

- Vacuum Rating: 1×10^{-8} Torr
- Helium Leak Rate: $< 1 \times 10^{-9}$ std. cc/s
- Fluoroelastomer (FKM) seal: -26°C to 150°C (-15°F to 302°F)
 - FFKM Seal: 180°C max

Pneumatic Actuators

- Actuator Operating Pressure: 80 - 120 psig
- Actuator Temperature Range:
 - Moist Air: 0°C to 150°C (32°F to 302°F)
 - Dry Air: -20°C to 150°C (-4°F to 302°F)
- Spring return actuators and double-acting actuators are available
- 1/8 NPT air line hook-up
- Visual and electrical position indicators available
- Solenoids available for 120VAC, 240VAC or 24VDC versions

Custom Options

- Contact us for custom options including centerlines, vacuum grease, or O-rings.

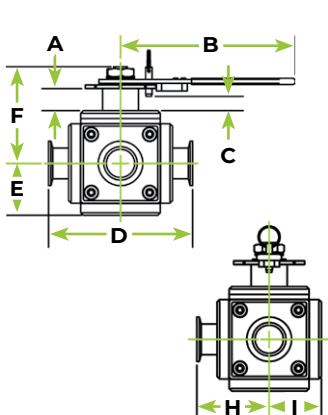


Figure 1

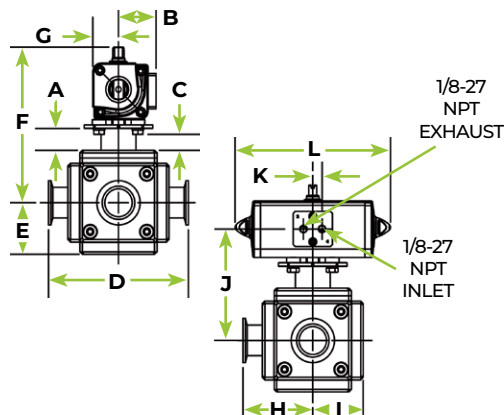


Figure 2

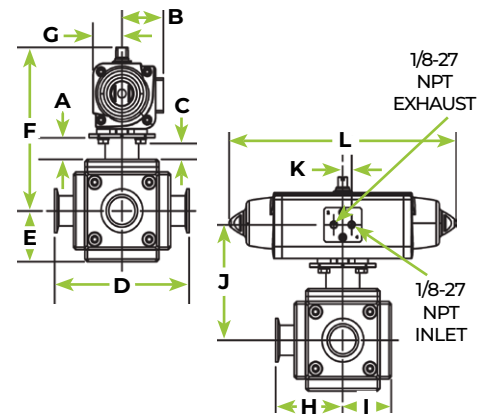


Figure 3

Size (in)	Actuation	Fig.	Flange	A (in)	B (in)	C (in)	D (in)	E (in)	F (in)	G (in)	H (in)	I (in)	J (in)	K (in)	L (in)
1.0	Manual	1	KF25	0.8	6.1	0.5	5.12	1.3	2.9	-	2.56	1.3	-	0.5	-
1.0	Double-Acting	2	KF25	1.0	1.6	0.75	5.12	1.3	5.7	1.1	2.56	1.3	3.8	0.5	6.9
1.0	Spring Return	3	KF25	1.0	1.6	0.75	5.12	1.3	5.7	1.1	2.56	1.3	3.8	0.5	9.2
1.5	Manual	1	KF40*	1.1	8.5	0.7	7.01	2.53	4.7	-	3.51	2.53	-	0.5	-
1.5	Double-Acting	2	KF40*	1.1	1.9	0.8	7.01	2.53	7.6	1.3	3.51	2.53	5.5	0.5	7.8
1.5	Spring Return	3	KF40*	1.1	2.2	0.8	7.01	2.53	8.1	1.5	3.51	2.53	5.8	0.5	7.8

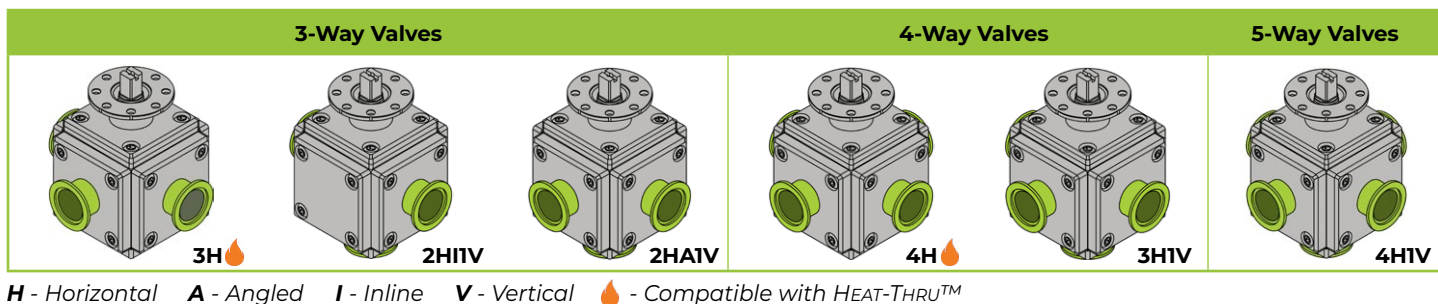
* Also available with KF50.

Customizations

Beyond its standard configurations, the Multiport Ball Valve can be engineered to fit a customer's specific process and tooling. ANCORP works directly with fabs and OEMs to adapt the valve to smoothly integrate into the existing systems.

Custom Configurations

The standard Multiport Ball Valve is offered with L-port and T-port ball configurations. Additional ball types — including vertical L-port, vertical T-port, and double L- and T-port designs — are available as custom configuration options for specialized flow-switching, diverting, and mixing operations. Body-port layout, actuation position, seal material, and vacuum grease can all be specified to suit the application.



Multiport Ball Valve for Bypass

For tools that require flow to be rerouted around a chamber or subsystem, ANCORP builds custom bypass configurations that divert flow without re-plumbing the line. A single valve replaces the multiple valves and fittings a bypass would otherwise require, reducing connections, leak paths, and footprint.



Heater Jackets

For heated applications, ANCORP can coordinate directly with a customer's heater jacket supplier or with one of our established suppliers to ensure proper fit and full thermal coverage across the valve body.



Multiport Ball Valve Configuration

The Multiport Ball Valve is available in two designs: the **Multiport Ball Valve** and the **Multiport Ball Valve with HEAT-THRU™ Technology**. The valve's modular design allows for six body port configurations and six ball configurations. Body ports or blank end caps can be configured on the sides and bottom of the valve body to make a 3, 4, or 5-way valve.

Ball types include L-port, T-port, vertical L-port, vertical T-port, double L-port, and double T-port. Body ports, ball ports, ball position, and actuation type can be specified to enable a variety of flow switching, diverting, or mixing operations between source and destination ports. Vertical port ball types are currently not compatible with our HEAT-THRU™ technology.

The position of the actuation device, whether manual or pneumatic, can be specified to avoid interference problems in tight spaces and allow for the convenient connection of air lines.

Reference Number Configurator

1	2	3	4	5	6	7	8	9	10
Series	Size	Body Port Config	Flange Type (F1 X F2 X F3 X F4 X F5)	Valve Type	Actuation Type	Actuation Device Position	Ball Port	Ball Position	Solenoid
MP	-	-	- X X X X	-	-	-	-	-	-
	100	3H	KF25	S	M	1	L	1	S3A
	150	2HAIV	KF40	HT	AA	2	T	2	S3C
		2HIIV	KF50*		AS	3	VL	3	S4A
		4H	Custom			4	VT	4	S4C
		3HIV				5	LL	5	
		4HIV					TT		

* Only 1 ½ in. body size.

2 Size

- Two sizes available: 1 in. (100) or 1 ½ in. (150).

3 Body Port Configurations

- See **Body Port Configurations** chart on pg. 5 of brochure for abbreviations.

4 Flange Type

- Flange 1 is defined as the flange with the most successive clockwise flange neighbors. If there are equivalent clockwise neighbors, naming is arbitrary. Flange 2 is the next clockwise flange from Flange 1, and so on.
- When a vertical body port is present, it will be assigned the last flange number.
- Blank end caps will be numbered such that the next unused flange number (4 or 5) will be applied to the end cap immediately clockwise from the last horizontal flange number (i.e., number the flanges, then number the end caps).
- A blank bottom cap is not numbered.

5 Valve Type

- Choose between the Multiport Ball Valve (S) and the Multiport Ball Valve with HEAT-THRU™ Technology (HT). For more information on each valve, visit pg. 2 and 3.

6 Actuation Type

- Options include manual (M), air-to-air (AA), and air-to-spring (AS).
- Pneumatic actuators (AA, AS) rotate counter-clockwise from their default, unenergized state.

7 Actuation Device Position

- The actuation device position is defined by the flange or end cap number to which either the valve handle or the actuator air inlet/cable entry is aligned.

8 Ball Port

- The primary ball port is the horizontal port with its axis perpendicular to the ball's stem slot and with the most successive clockwise port neighbors. If there are equivalent clockwise neighbors, naming is arbitrary.

9 Ball Position

- The ball position is defined by the flange or end cap number to which the primary ball port is aligned in the valve assembly's default state.

10 Solenoid

- Solenoid varies based on the actuator.
 - S3A: 3-Way 120 VAC (AS)
 - S4A: 4-Way 120 VAC (AA)
 - S3C: 3-Way 24 VDC (AS)
 - S4C: 4-Way 24 VDC (AA)