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TECHNICAL DATA SHEET THREE-WAY BALL VALVES			TDS 0016
Issued by HR	Issued date 09/04/2009	Rev.2	Rev date 02/01/2019

Although the vast majority of ball valves are simple 2-port valves, there is a market for multi-port valves too. In certain types of industrial application they offer advantages over the straight 2-port products:

- A single 3-way valve can replace a tee and two 2-way valves, saving space and cost
- In certain cases 3-way valves can offer a safety advantage. For example, if there is danger in closing off both pump discharge valves at once, the use of a 3-way can automatically insure that one port or the other is always open.

3-way ball valves come in two different families – 2-seat designs and 4-seat designs. The mechanical function, the cost, and the market for the two types are quite different. 2-seat three-ways are not greatly more costly than ordinary 2-ways, and have enough applications to be of interest to distributors as a stocking item. The RuB s74 and s75 (which see below) are both 2-seat three-way ball valves. But there is a market for 4-seat valves too. These come in a wide variety of configurations, none of which have enough demand to interest a stocking distributor. The market for 4-seat valves is OEM customers, who will design a particular 4-seat into their product, and reorder the same item repeatedly for years.

3-way ball valves do have some special limitations, of which you should be aware.

- They normally have poor Cv's, even when they are full port.
- Like all ball valves, the best sealing is done by the downstream seat. If pressure is to be stopped by an upstream seat, the maximum delta P will be substantially lower (less than half) the rating of the valve. This point is illustrated on sheet 4.



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2-seat, Side port, L-port ball

This is the commonest 3-way ball valve (in fact it is the only style offered by Watts, Nibco and Apollo). The RuB s74 is this type.

Examples of application:

DIVERTING FLOW TO ONE OR THE OTHER OF TWO TANKS	
<p>DIVERSION top view</p> <p>0 DEG POSITION HANDLE FULL CLOCKWISE</p> <p>90 DEG POSITION HANDLE FULL COUNTER-CLOCKWISE</p>	<p>Ball turns 90 degrees to switch from feeding the left tank to feeding the right tank. At 45 degrees it feeds them both.</p> <p>There is no "off" position. This is desirable in applications where the media is coming from a positive displacement pump. If the pump were accidentally dead-ended, the pump or the plumbing may burst.</p>
MIXING TWO DIFFERENT FLOWS	
<p>MIXING top view</p>	<p>The same valve as above, but used differently.</p> <p>Flows enter from the right and left, and are mixed. The valve can be modulated to maintain a desired mixture - for example, hot and cold water could be mixed to control outlet temperature.</p>

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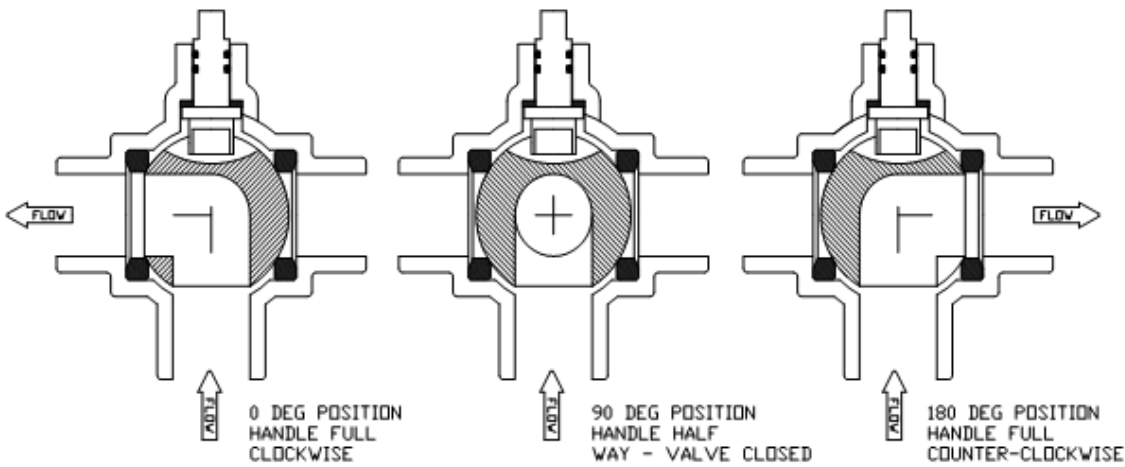
2-seat, Bottom port, L-port ball

This is the second commonest 3-way ball valve. The RuB s75 is this type.

Examples of application:

DIVERTING FLOW TO ONE OR THE OTHER OF TWO TANKS, WITH OFF POSITION

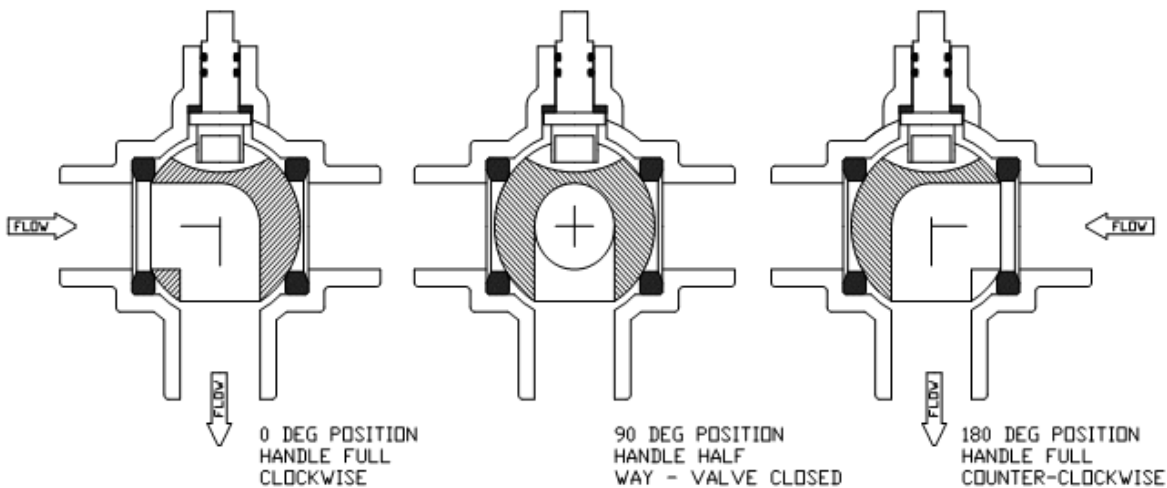
DIVERSION
side view



Ball has three positions - feed left, feed right, or off. If actuated, the actuator must provide 180 deg of rotation, and have a way to stop exactly in the middle.

DRAWING FLOW FROM ONE OR THE OTHER OF TWO DIFFERENT SOURCES

SELECTION
side view



The same valve as above, but used differently. It is impossible to draw from both sources at once. Example would be two different paint colors feeding a sprayer.

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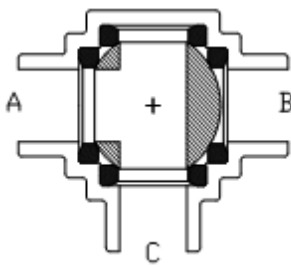
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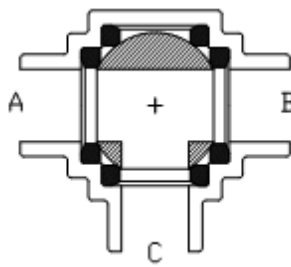
4-seat, Side port

There are many different configurations, some with 90 deg of rotation and some with 180 or 270 or 360 deg. Some have T-port balls, and others have L-port balls. None of the combinations have high sales volume, (unless we find an OEM application), but competitors like Marwin (RB) make the handle and stops capable of multiple positions in order to make many different flow patterns from the same set of parts. Neither Apollo, Nibco, nor Watts offer a brass or bronze 4-seat valve.

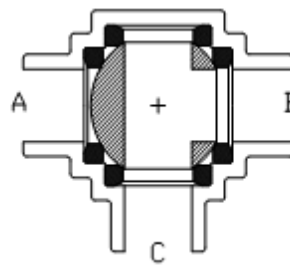
POSSIBLE POSITIONS OF BALL: (all top views)



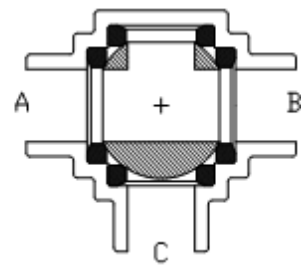
**A-C connected
connected
B closed**



A-B-C connected



**B-C connected
A closed**



**A-B
C closed**

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