

## Flowrite™ 599 Series

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### 1/2 to 2-Inch Valve (2-Way & 3-Way) and Actuator Assembly Selection

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#### Description

This Technical Bulletin will aid in selecting a 1/2-inch to 2-inch Flowrite 599 Series valve and actuator assembly. Begin with the graph of water capacity and the chart of ANSI Class IV close-off pressures to select a valve and actuator according to specifications.

Use Tables 1 through 15 to identify two-way valve and actuator product numbers. Use Tables 16 through 18 to identify three-way valve and actuator product numbers. These tables show all the possible combinations of the 1/2-inch to 2-inch Flowrite 599 Series valves and compatible actuators that can be ordered as complete valve assemblies from the factory.

The dimensions of all 1/2-inch to 2-inch valves and the service envelope required for each actuator are included in Table 19 through Table 21.

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#### How to Use the Selection Graphs

Use Figure 1, the Water Capacity graph, to select a valve. Locate the specified flow rate on the vertical axis. Follow across on the horizontal line to the point of intersection with the specified pressure drop. Choose the valve size from the heavy diagonal lines across the graph.

Use Figure 2, the Close-Off Pressure graph, to select an actuator. First locate the graph for the valve action and actuator power source specified. Locate the bar that represents the valve line size. The top of the bar indicates the maximum close-off pressure for tight close-off ANSI Class IV. Use the legend at the bottom of the graph to identify the actuator.

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#### How To Use The Valve Tables

Tables have been organized to help select a valve and actuator combination using additional specifications.

Moving from left to right, identify the valve needed. Continue to the right to match the valve to a desired actuator.

A valve and actuator assembly part number is determined by combining the actuator prefix code with the suffix of the valve product number.

#### NOTES:

No valve will combine with all actuators.

The symbol “—” indicates a combination is not available.

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## Selection Example

### Specification

Select a two-way normally-open valve and pneumatic actuator assembly that will deliver 20 gpm (5 m<sup>3</sup>/h) chilled water with linear flow characteristic with no more than 5 psi (35 kPa) pressure drop across the fully-open valve. The valve must have standard packing and a internal thread-to-internal thread (IT×IT) connection.

The valve shall be operated by a standard 8-inch pneumatic actuator and must close off tightly against a pump head pressure of 50 psi (300 kPa).

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### Valve Sizing

Use Figure 1, the water capacity graph, to begin valve sizing.

1. Locate 20 gpm (5 m<sup>3</sup>/h) on the vertical axis to find the required flow.
  2. Read across the horizontal axis to find 5 psi (35 kPa), the maximum allowable pressure drop across the open valve.
  3. Select a 1-inch (25 mm), 10 Cv (8.6 Kvs) line size valve, because the point of intersection falls between the 3/4 inch and 1-inch line sizes.
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### Actuator Selection

Use Figure 2, the close-off pressure graph, to choose an actuator.

1. Locate the graph for pneumatic actuators for NO valves in the lower right side of the figure.
  2. Locate the bar for 1-inch valves. The gray-shaded bar represents an 8-inch pneumatic actuator.
  3. Notice that the 8-inch pneumatic actuator has the sufficient force to provide tight close-off (ANSI C IV) against more than 50 psi (300 kPa) differential. For a 1-inch valve, select an 8-inch, standard pneumatic actuator, with a 20 mm stroke.
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### Product Number Selection

Use *Table 1, Two-Way, Normally Open (NO), Equal Percentage Valves, Bronze Trim, Standard Packing*. Begin at the left and select the specifications necessary.

1. Select a standard packed valve, with an F×F connection according to the above specifications.
2. Select the 1-inch line size determined from the sizing example above. The valve part number is 599-03167.
3. Read across table to the 8-inch Standard Pneumatic actuator.  
The actuator part number is 599-01050.  
The actuator code number is 277.
4. Read down the column to determine the valve and actuator assembly product number is 277-03167.

**NOTE:** The valve and actuator can be ordered separately by using the part numbers from Steps 2 and 3.

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### References

*Two-Way Valves, 1/2 to 2-inch Bronze Body, ANSI 250 Technical Instructions* (155-184).

*Three-Way Valves 1/2 to 2-inch Bronze Body Technical Instructions* (155-185).

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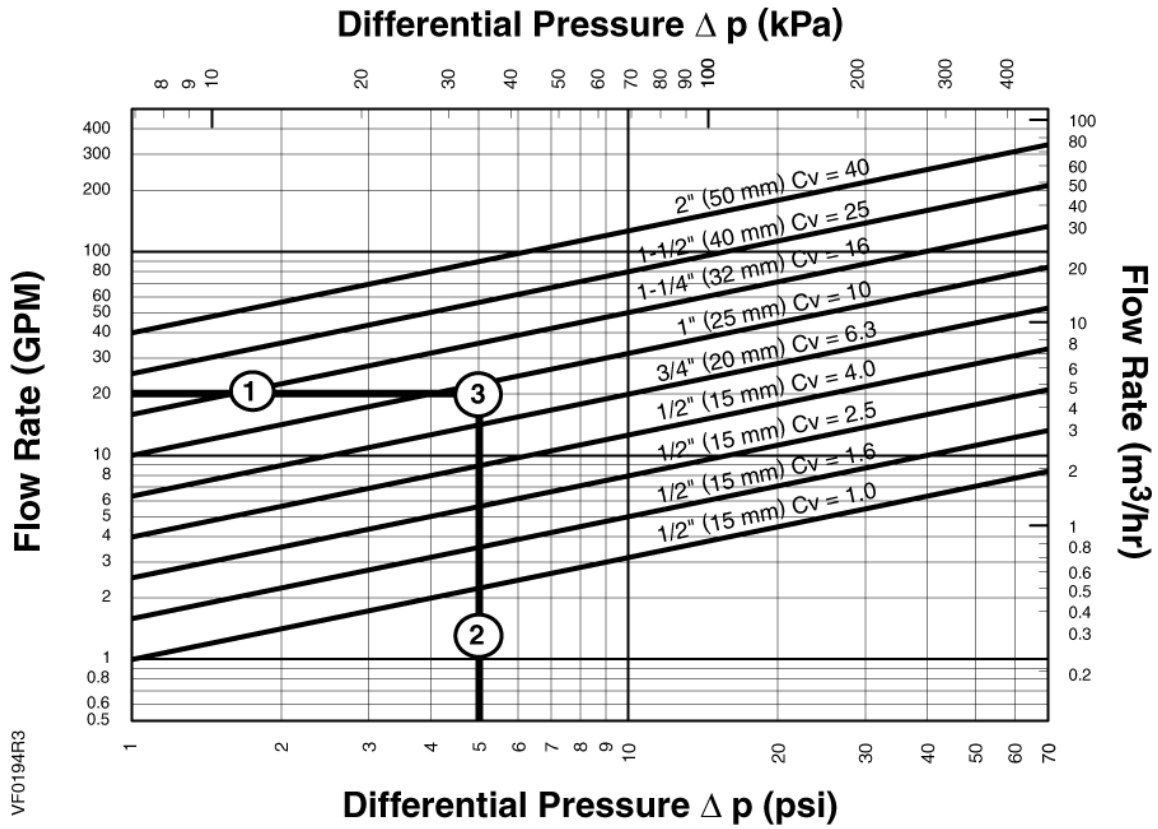


Figure 1. Water Capacity Graph.

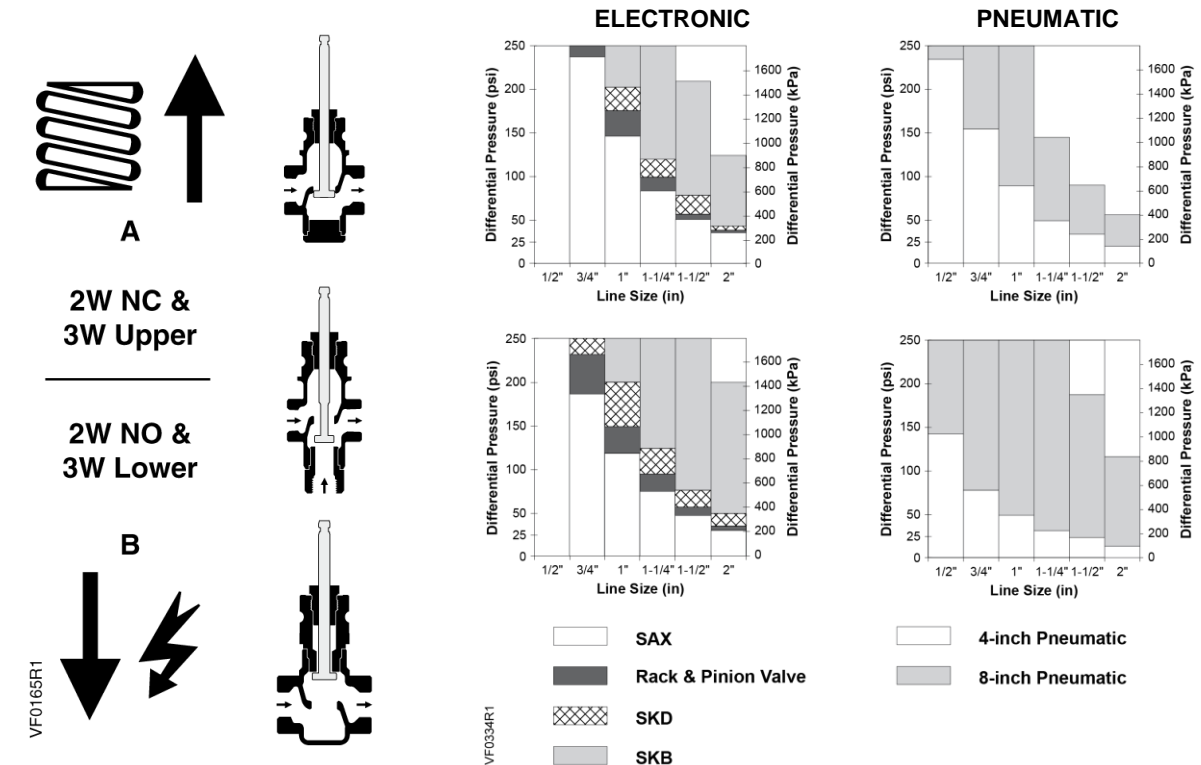


Figure 2. Close-off Pressures.

**Table 1. Two-Way, Normally Open (NO), Equal Percentage Valves, Bronze Trim, Standard Packing.**

Connection *	Flow Rate		Valve Size		Stroke	Pneumatic Actuators				
						Description	4-inch		8-inch Standard Temp.	
	Actuator P/N	3-8 psi (21-55 kPa)	Without Positioner	With Positioner						
		Cv	Kvs	In		mm	Valve P/N	155-183P25	155-161P25	
						599-01081	599-01050	599-01051 & 599-00426		
							Actuator Code			
							268	277	283	
ITxIT	1	0.9	0.5	15	20	599-03162	268-03162	277-03162	283-03162	
	1.6	1.4	0.5	15	20	599-03163	268-03163	277-03163	283-03163	
	2.5	2.2	0.5	15	20	599-03164	268-03164	277-03164	283-03164	
	4	3.4	0.5	15	20	599-03165	268-03165	277-03165	283-03165	
	6.3	5.4	0.75	20	20	599-03166	268-03166	277-03166	283-03166	
	10	8.6	1	25	20	599-03167	268-03167	277-03167	283-03167	
	16	14	1.25	32	20	599-03168	268-03168	277-03168	283-03168	
	25	22	1.5	40	20	599-03169	268-03169	277-03169	283-03169	
	40	34	2	50	20	599-03170	268-03170	277-03170	283-03170	

\* IT = Internal Thread NPT

**Table 2. Two-Way, Normally Open (NO), Equal Percentage Valves, Bronze Trim, Standard Packing.**

Connection *	Flow Rate		Valve Size		Stroke	Electro-Mechanical – 24 Vac				
						Description	Non-Spring Return		Spring Return	
	Technical Instructions	Floating	0 to 10 Vdc, 4 to 20 mA	2-Position			0 to 10 Vdc			
		Cv	Kvs	In		mm	Valve P/N	SAX81.03U	SAX61.03U	599-03611
								Actuator Code		
							373	371	299	298
ITxIT	1	0.9	0.5	15	20	599-03162	373-03162	371-03162	299-03162	298-03162
	1.6	1.4	0.5	15	20	599-03163	373-03163	371-03163	299-03163	298-03163
	2.5	2.2	0.5	15	20	599-03164	373-03164	371-03164	299-03164	298-03164
	4	3.4	0.5	15	20	599-03165	373-03165	371-03165	299-03165	298-03165
	6.3	5.4	0.75	20	20	599-03166	373-03166	371-03166	299-03166	298-03166
	10	8.6	1	25	20	599-03167	373-03167	371-03167	299-03167	298-03167
	16	14	1.25	32	20	599-03168	373-03168	371-03168	299-03168	298-03168
	25	22	1.5	40	20	599-03169	373-03169	371-03169	299-03169	298-03169
	40	34	2	50	20	599-03170	373-03170	371-03170	299-03170	298-03170

\* IT = Internal Thread NPT

**Table 3. Two-Way, Normally Open (NO), Equal Percentage Valves, Bronze Trim, Standard Packing.**

Connection *		Flow Rate		Valve Size		Stroke	Electro-Hydraulic – 24 Vac					
							Description	NSR	Spring Return	NSR	Spring Return	
								Floating		0 to 10V 4 to 20 mA		
							Technical Instructions	155-181P25		155-180P25		155-163P25
							Actuator P/N	SKD82.50U	SKD82.51U	SKD60U	SKD62U	SKB62U
Valve P/N	Actuator Code											
Cv	Kvs	In	mm	Valve P/N	275	276	267	274	291			
ITxIT	1	0.9	0.5	15	20	599-03162	275-03162	276-03162	267-03162	274-03162	—	
	1.6	1.4	0.5	15	20	599-03163	275-03163	276-03163	267-03163	274-03163	—	
	2.5	2.2	0.5	15	20	599-03164	275-03164	276-03164	267-03164	274-03164	—	
	4	3.4	0.5	15	20	599-03165	275-03165	276-03165	267-03165	274-03165	—	
	6.3	5.4	0.75	20	20	599-03166	275-03166	276-03166	267-03166	274-03166	—	
	10	8.6	1	25	20	599-03167	275-03167	276-03167	267-03167	274-03167	291-03167	
	16	14	1.25	32	20	599-03168	275-03168	276-03168	267-03168	274-03168	291-03168	
	25	22	1.5	40	20	599-03169	275-03169	276-03169	267-03169	274-03169	291-03169	
	40	34	2	50	20	599-03170	275-03170	276-03170	267-03170	274-03170	291-03170	

\* IT = Internal Thread NPT

**Table 4. Two-Way, Normally Open (NO), Equal Percentage Valves, Stainless Steel Trim, Standard Packing.**

Connection *		Flow Rate		Valve Size		Stroke	Description	Pneumatic Actuators		
								4-inch	8-inch- Standard Temp.	
							Technical Instructions	3-8 psi (21-55 kPa)	Without Positioner	With Positioner
								155-183P25	155-161P25	155-162P25
							Actuator P/N	599-01081	599-01050	599-01051 & 599-00426
Valve P/N	Actuator Code									
Cv	Kvs	In	mm	Valve P/N	268	277	283			
ITxIT	1	0.9	0.5	15	20	599-03108	268-03108	277-03108	283-03108	
	1.6	1.4	0.5	15	20	599-03109	268-03109	277-03109	283-03109	
	2.5	2.2	0.5	15	20	599-03110	268-03110	277-03110	283-03110	
	4	3.4	0.5	15	20	599-03111	268-03111	277-03111	283-03111	
	6.3	5.4	0.75	20	20	599-03112	268-03112	277-03112	283-03112	
	10	8.6	1	25	20	599-03113	268-03113	277-03113	283-03113	
	16	14	1.25	32	20	599-03114	268-03114	277-03114	283-03114	
	25	22	1.5	40	20	599-03115	268-03115	277-03115	283-03115	
	40	34	2	50	20	599-03116	268-03116	277-03116	283-03116	

\* IT = Internal Thread NPT

**Table 5. Two-Way, Normally Open (NO), Equal Percentage Valves, Stainless Steel Trim, Standard Packing.**

Connection *	Flow Rate		Valve Size		Stroke	Electro-Mechanical – 24 Vac				
						Description	Non-Spring Return		Spring Return	
	Technical Instructions	Floating	0 to 10 Vdc, 4 to 20 mA	2-Position			0 to 10 Vdc			
	Actuator P/N	SAX81.03U	SAX61.03U	599-03611		599-03609				
	Valve P/N	Actuator Code								
Cv	Kvs	In	mm	373	371	299	298			
ITxIT	1	0.9	0.5	15	20	599-03108	373-03108	371-03108	299-03108	298-03108
	1.6	1.4	0.5	15	20	599-03109	373-03109	371-03109	299-03109	298-03109
	2.5	2.2	0.5	15	20	599-03110	373-03110	371-03110	299-03110	298-03110
	4	3.4	0.5	15	20	599-03111	373-03111	371-03111	299-03111	298-03111
	6.3	5.4	0.75	20	20	599-03112	373-03112	371-03112	299-03112	298-03112
	10	8.6	1	25	20	599-03113	373-03113	371-03113	299-03113	298-03113
	16	14	1.25	32	20	599-03114	373-03114	371-03114	299-03114	298-03114
	25	22	1.5	40	20	599-03115	373-03115	371-03115	299-03115	298-03115
	40	34	2	50	20	599-03116	373-03116	371-03116	299-03116	298-03116

\* IT = Internal Thread NPT

**Table 6. Two-Way, Normally Open (NO), Equal Percentage Valves, Stainless Steel Trim, Standard Packing.**

Connection *	Flow Rate		Valve Size		Stroke	Electro-Hydraulic – 24 Vac					
						Description	NSR	Spring Return	NSR	Spring Return	
	Technical Instructions	Floating		0-10V 4-20 mA							
	Actuator P/N	SKD82.50U	SKD82.51U	SKD60U		SKD62U	SKB62U				
	Valve P/N	Actuator Code									
Cv	Kvs	In	mm	275	276	267	274	291			
ITxIT	1	0.9	0.5	15	20	599-03108	275-03108	276-03108	267-03108	274-03108	—
	1.6	1.4	0.5	15	20	599-03109	275-03109	276-03109	267-03109	274-03109	—
	2.5	2.2	0.5	15	20	599-03110	275-03110	276-03110	267-03110	274-03110	—
	4	3.4	0.5	15	20	599-03111	275-03111	276-03111	267-03111	274-03111	—
	6.3	5.4	0.75	20	20	599-03112	275-03112	276-03112	267-03112	274-03112	—
	10	8.6	1	25	20	599-03113	275-03113	276-03113	267-03113	274-03113	291-03113
	16	14	1.25	32	20	599-03114	275-03114	276-03114	267-03114	274-03114	291-03114
	25	22	1.5	40	20	599-03115	275-03115	276-03115	267-03115	274-03115	291-03115
	40	34	2	50	20	599-03116	275-03116	276-03116	267-03116	274-03116	291-03116

\* IT = Internal Thread NPT

**Table 7. Two-Way, Normally Open (NO), Linear Valves, Stainless Steel Trim.**

Packing Connection *	Flow Rate		Valve Size		Stroke	Pneumatic Actuators						
						Description	4-Inch		8-Inch			
							3-8 psi (21-55 kPa)	Standard	Hi-Temp	Standard	Hi-Temp	
						Technical Instructions	155-183P25				155-161P25	
Actuator P/N	599-01081	599-01050	599-01051	599-01050 and 599-00426	599-01051 and 599-00426	Actuator Code						
Valve P/N						268	277	278	283	284		
Standard	ITxIT	1	0.9	0.5	15	20	599-03000	268-03000	277-03000	—	283-03000	—
		1.6	1.4	0.5	15	20	599-03001	268-03001	277-03001	—	283-03001	—
		2.5	2.2	0.5	15	20	599-03002	268-03002	277-03002	—	283-03002	—
		4	3.4	0.5	15	20	599-03003	268-03003	277-03003	—	283-03003	—
		6.3	5.4	0.75	20	20	599-03004	268-03004	277-03004	—	283-03004	—
		10	8.6	1	25	20	599-03005	268-03005	277-03005	—	283-03005	—
		16	14	1.25	32	20	599-03006	268-03006	277-03006	—	283-03006	—
		25	22	1.5	40	20	599-03007	268-03007	277-03007	—	283-03007	—
		40	34	2	50	20	599-03008	268-03008	277-03008	—	283-03008	—
		Hi-Temp	ITxIT	1	0.9	0.5	15	20	599-03054	268-03054	277-03054	278-03054
1.6	1.4			0.5	15	20	599-03055	268-03055	277-03055	278-03055	283-03055	284-03055
2.5	2.2			0.5	15	20	599-03056	268-03056	277-03056	278-03056	283-03056	284-03056
4	3.4			0.5	15	20	599-03057	268-03057	277-03057	278-03057	283-03057	284-03057
6.3	5.4			0.75	20	20	599-03058	268-03058	277-03058	278-03058	283-03058	284-03058
10	8.6			1	25	20	599-03059	268-03059	277-03059	278-03059	283-03059	284-03059
16	14			1.25	32	20	599-03060	268-03060	277-03060	278-03060	283-03060	284-03060
25	22			1.5	40	20	599-03061	268-03061	277-03061	278-03061	283-03061	284-03061
40	34			2	50	20	599-03062	268-03062	277-03062	278-03062	283-03062	284-03062

\* IT = Internal Thread NPT

**Table 8. Two-Way, Normally Open (NO), Linear Valves, Stainless Steel Trim.**

Packing Connection *	Flow Rate		Valve Size		Stroke	Electro-Mechanical Actuators 24 Vac					
						Description	Non-Spring Return		Spring Return		
							Floating	0 to 10 Vdc, 4 to 20 mA	2-Position	0 to 10 Vdc	
						Technical Instructions	155-507	155-506	155-541P25		
Actuator P/N	SAX81.03U	SAX61.03U	599-03611	599-03609	Actuator Code						
Valve P/N					373	371	299	298			
Standard	ITxIT	1	0.9	0.5	15	20	599-03000	373-03000	371-03000	299-03000	298-03000
		1.6	1.4	0.5	15	20	599-03001	373-03001	371-03001	299-03001	298-03001
		2.5	2.2	0.5	15	20	599-03002	373-03002	371-03002	299-03002	298-03002
		4	3.4	0.5	15	20	599-03003	373-03003	371-03003	299-03003	298-03003
		6.3	5.4	0.75	20	20	599-03004	373-03004	371-03004	299-03004	298-03004
		10	8.6	1	25	20	599-03005	373-03005	371-03005	299-03005	298-03005
		16	14	1.25	32	20	599-03006	373-03006	371-03006	299-03006	298-03006
		25	22	1.5	40	20	599-03007	373-03007	371-03007	299-03007	298-03007
		40	34	2	50	20	599-03008	373-03008	371-03008	299-03008	298-03008
		Hi-Temp	ITxIT	1	0.9	0.5	15	20	599-03054	—	—
1.6	1.4			0.5	15	20	599-03055	—	—	—	—
2.5	2.2			0.5	15	20	599-03056	—	—	—	—
4	3.4			0.5	15	20	599-03057	—	—	—	—
6.3	5.4			0.75	20	20	599-03058	—	—	—	—
10	8.6			1	25	20	599-03059	—	—	—	—
16	14			1.25	32	20	599-03060	—	—	—	—
25	22			1.5	40	20	599-03061	—	—	—	—
40	34			2	50	20	599-03062	—	—	—	—

\* IT = Internal Thread NPT

**Table 9. Two-Way, Normally Open (NO), Linear Valves, Stainless Steel Trim.**

Packing	Connection *	Flow Rate		Valve Size		Stroke	Electro-Hydraulic Actuators 24 Vac					
							Description	NSR	Spring Return	NSR	Spring Return	
		Cv		Kvs	In		mm	Floating		0-10 Vdc, 4-20 mA		
		Technical Instructions		155-181P25			155-180P25		155-163P25			
		Actuator P/N		SKD82.50U	SKD82.51U		SKD60U	SKD62U	SKB62U			
Valve P/N		Actuator Code										
		275	276	267	274	291						
Standard	IT x IT	1	0.9	0.5	15	20	599-03000	275-03000	276-03000	267-03000	274-03000	—
		1.6	1.4	0.5	15	20	599-03001	275-03001	276-03001	267-03001	274-03001	—
		2.5	2.2	0.5	15	20	599-03002	275-03002	276-03002	267-03002	274-03002	—
		4	3.4	0.5	15	20	599-03003	275-03003	27036-003	267-03003	274-03003	—
		6.3	5.4	0.75	20	20	599-03004	275-03004	276-03004	267-03004	274-03004	—
		10	8.6	1	25	20	599-03005	275-03005	276-03005	267-03005	274-03005	291-03005
		16	14	1.25	32	20	599-03006	275-03006	276-03006	267-03006	274-03006	291-03006
		25	22	1.5	40	20	599-03007	275-03007	276-03007	267-03007	274-03007	291-03007
		40	34	2	50	20	599-03008	275-03008	276-03008	267-03008	274-03008	291-03008
		Hi-Temp	IT x IT	1	0.9	0.5	15	20	599-03054	275-03054	276-03054	267-03054
1.6	1.4			0.5	15	20	599-03055	275-03055	276-03055	267-03055	274-03055	—
2.5	2.2			0.5	15	20	599-03056	275-03056	276-03056	267-03056	274-03056	—
4	3.4			0.5	15	20	599-03057	275-03057	276-03057	267-03057	274-03057	—
6.3	5.4			0.75	20	20	599-03058	275-03058	276-03058	267-03058	274-03058	—
10	8.6			1	25	20	599-03059	275-03059	276-03059	267-03059	274-03059	291-03059
16	14			1.25	32	20	599-03060	275-03060	276-03060	267-03060	274-03060	291-03060
25	22			1.5	40	20	599-03061	275-03061	276-03061	267-03061	274-03061	291-03061
40	34			2	50	20	599-03062	275-03062	276-03062	267-03062	274-03062	291-03062

\* IT = Internal Thread NPT

**Table 10. Two-Way, Normally Closed (NC), Equal Percentage Valves, Standard Packing.**

Packing	Connection *	Flow Rate		Valve Size		Stroke	Type	Pneumatic			
							Description	4-Inch	8-Inch- Standard Temp.		
		Cv		Kvs	In		mm	10-15 psi	Without Positioner	With Positioner	
		Technical Instructions		155-183P25			155-161P25				
		Actuator P/N		599-01083	599-01050		599-01050 & 599-00426				
Valve P/N		Actuator Code									
		270	277	283							
Brass	IT x IT	1	0.9	0.5	15	20	599-03180	270-03180	277-03180	283-03180	
		1.6	1.4	0.5	15	20	599-03181	270-03181	277-03181	283-03181	
		2.5	2.2	0.5	15	20	599-03182	270-03182	277-03182	283-03182	
		4	3.4	0.5	15	20	599-03183	270-03183	277-03183	283-03183	
		6.3	5.4	0.75	20	20	599-03184	270-03184	277-03184	283-03184	
		10	8.6	1	25	20	599-03185	270-03185	277-03185	283-03185	
		16	14	1.25	32	20	599-03186	270-03186	277-03186	283-03186	
		25	22	1.5	40	20	599-03187	270-03187	277-03187	283-03187	
		40	34	2	50	20	599-03188	270-03188	277-03188	283-03188	
		Stainless Steel	IT x IT	1	0.9	0.5	15	20	599-03126	270-03126	277-03126
1.6	1.4			0.5	15	20	599-03127	270-03127	277-03127	283-03127	
2.5	2.2			0.5	15	20	599-03128	270-03128	277-03128	283-03128	
4	3.4			0.5	15	20	599-03129	270-03129	277-03129	283-03129	
6.3	5.4			0.75	20	20	599-03130	270-03130	277-03130	283-03130	
10	8.6			1	25	20	599-03131	270-03131	277-03131	283-03131	
16	14			1.25	32	20	599-03132	270-03132	277-03132	283-03132	
25	22			1.5	40	20	599-03133	270-03133	277-03133	283-03133	
40	34			2	50	20	599-03134	270-03134	277-03134	283-03134	

\* IT = Internal Thread NPT



**Table 11. Two-Way, Normally Closed (NC), Equal Percentage Valves, Standard Packing.**

Connection *		Flow Rate		Valve Size		Stroke	Type	Electro-Mechanical-24 Vac			
							Description	Non-Spring Return		Spring Return	
								Floating	0 to 10 Vdc, 4 to 20 mA	2-Position	0 to 10 Vdc
							Technical Instructions	155-507	155-506	155-541P25	
Actuator P/N	SAX81.03U	SAX61.03U	599-03611	599-03609							
Valve P/N	Actuator Code										
	373	371	299	298							
Brass	ITxIT	1	0.9	0.5	15	20	599-03180	373-03180	371-03180	299-03180	298-03180
		1.6	1.4	0.5	15	20	599-03181	373-03181	371-03181	299-03181	298-03181
		2.5	2.2	0.5	15	20	599-03182	373-03182	371-03182	299-03182	298-03182
		4	3.4	0.5	15	20	599-03183	373-03183	371-03183	299-03183	298-03183
		6.3	5.4	0.75	20	20	599-03184	373-03184	371-03184	299-03184	298-03184
		10	8.6	1	25	20	599-03185	373-03185	371-03185	299-03185	298-03185
		16	14	1.25	32	20	599-03186	373-03186	371-03186	299-03186	298-03186
		25	22	1.5	40	20	599-03187	373-03187	371-03187	299-03187	298-03187
Stainless Steel	ITxIT	40	34	2	50	20	599-03188	373-03188	371-03188	299-03188	298-03188
		1	0.9	0.5	15	20	599-03126	373-03126	371-03126	299-03126	298-03126
		1.6	1.4	0.5	15	20	599-03127	373-03127	371-03127	299-03127	298-03127
		2.5	2.2	0.5	15	20	599-03128	373-03128	371-03128	299-03128	298-03128
		4	3.4	0.5	15	20	599-03129	373-03129	371-03129	299-03129	298-03129
		6.3	5.4	0.75	20	20	599-03130	373-03130	371-03130	299-03130	298-03130
		10	8.6	1	25	20	599-03131	373-03131	371-03131	299-03131	298-03131
		16	14	1.25	32	20	599-03132	373-03132	371-03132	299-03132	298-03132
25	22	1.5	40	20	599-03133	373-03133	371-03133	299-03133	298-03133		
40	34	2	50	20	599-03134	373-03134	371-03134	299-03134	298-03134		

\* IT = Internal Thread NPT

**Table 12. Two-Way, Normally Closed (NC), Equal Percentage Valves, Brass and Stainless Steel Trim, Standard Packing.**

Connection *		Flow Rate		Valve Size		Stroke	Electro-Hydraulic Actuators – 24 Vac					
							Description	NSR	Spring Return	NSR	Spring Return	
								Floating		0 to 10 Vdc, 4 to 20 mA		
							Technical Instructions	155-181P25		155-180P25		155-163P25
Actuator P/N	SKD82.50U	SKD82.51U	SKD60U	SKD62U	SKB62U							
Valve P/N	Actuator Code											
	275	276	267	274	291							
Brass	ITxIT	1	0.9	0.5	15	20	599-03180	275-03180	276-03180	267-03180	274-03180	—
		1.6	1.4	0.5	15	20	599-03181	275-03181	276-03181	267-03181	274-03181	—
		2.5	2.2	0.5	15	20	599-03182	275-03182	276-03182	267-03182	274-03182	—
		4	3.4	0.5	15	20	599-03183	275-03183	276-03183	267-03183	274-03183	—
		6.3	5.4	0.75	20	20	599-03184	275-03184	276-03184	267-03184	274-03184	—
		10	8.6	1	25	20	599-03185	275-03185	276-03185	267-03185	274-03185	291-03185
		16	14	1.25	32	20	599-03186	275-03186	276-03186	267-03186	274-03186	291-03186
		25	22	1.5	40	20	599-03187	275-03187	276-03187	267-03187	274-03187	291-03187
Stainless Steel	ITxIT	40	34	2	50	20	599-03188	275-03188	276-03188	267-03188	274-03188	291-03188
		1	0.9	0.5	15	20	599-03126	275-03126	276-03126	267-03126	274-03126	—
		1.6	1.4	0.5	15	20	599-03127	275-03127	276-03127	267-03127	274-03127	—
		2.5	2.2	0.5	15	20	599-03128	275-03128	276-03128	267-03128	274-03128	—
		4	3.4	0.5	15	20	599-03129	275-03129	276-03129	267-03129	274-03129	—
		6.3	5.4	0.75	20	20	599-03130	275-03130	276-03130	267-03130	274-03130	—
		10	8.6	1	25	20	599-03131	275-03131	276-03131	267-03131	274-03131	291-03131
		16	14	1.25	32	20	599-03132	275-03132	276-03132	267-03132	274-03132	291-03132
25	22	1.5	40	20	599-03133	275-03133	276-03133	267-03133	274-03133	291-03133		
40	34	2	50	20	599-03134	275-03134	276-03134	267-03134	274-03134	291-03134		

\* IT = Internal Thread NPT

**Table 13. Two-Way, Normally Closed (NC), Linear Valves.**

Packing	Connection *	Flow Rate		Valve Size		Stroke	Type	Pneumatic Actuator				
							Description	4-Inch		8-Inch		
		10-15 psi (69-103 kPa)	Standard	Hi-Temp	Standard			Hi-Temp	W/Positioner			
		Technical Instructions	155-183P25									
Actuator P/N	599-01083	599-01050	599-01051	599-01050 & 599-00426	599-01051 & 599-00426							
Valve P/N	Actuator Code					270	277	278	283	284		
Standard	ITxIT	1	0.9	0.5	15	20	599-03018	270-03018	277-03018	—	283-03018	—
		1.6	1.4	0.5	15	20	599-03019	270-03019	277-03019	—	283-03019	—
		2.5	2.2	0.5	15	20	599-03020	270-03020	277-03020	—	283-03020	—
		4	3.4	0.5	15	20	599-03021	270-03021	277-03021	—	283-03021	—
		6.3	5.4	0.75	20	20	599-03022	270-03022	277-03022	—	283-03022	—
		10	8.6	1	25	20	599-03023	270-03023	277-03023	—	283-03023	—
		16	14	1.25	32	20	599-03024	270-03024	277-03024	—	283-03024	—
		25	22	1.5	40	20	599-03025	270-03025	277-03025	—	283-03025	—
		40	34	2	50	20	599-03026	270-03026	277-03026	—	283-03026	—
		Hi-Temp	ITxIT	1	0.9	0.5	15	20	599-03072	270-03072	277-03072	278-03072
1.6	1.4			0.5	15	20	599-03073	270-03073	277-03073	278-03073	283-03073	284-03073
2.5	2.2			0.5	15	20	599-03074	270-03074	277-03074	278-03074	283-03074	284-03074
4	3.4			0.5	15	20	599-03075	270-03075	277-03075	278-03075	283-03075	284-03075
6.3	5.4			0.75	20	20	599-03076	270-03076	277-03076	278-03076	283-03076	283-03076
10	8.6			1	25	20	599-03077	270-03077	277-03077	278-03077	283-03077	284-03077
16	14			1.25	32	20	599-03078	270-03078	277-03078	278-03078	283-03078	284-03078
25	22			1.5	40	20	599-03079	270-03079	277-03079	278-03079	283-03079	284-03079
40	34			2	50	20	599-03080	270-03080	277-03080	278-03080	283-03080	284-03080

\* IT = Internal Thread NPT

**Table 14. Two-Way, Normally Closed (NC), Linear Valves, Stainless Steel Trim.**

Packing	Connection *	Flow Rate		Valve Size		Stroke	Electro-Mechanical Actuators 24 Vac				
							Description	Non-Spring Return		Spring Return	
		Floating	0 to 10 Vdc, 4 to 20mA	2-Position	0 to 10 Vdc						
		Technical Instructions	155-507	155-506	155-541P25						
Actuator P/N	SAX81.03U	SAX61.03U	599-03611	599-03609							
Valve P/N	Actuator Code				373	371	299	298			
Standard	ITxIT	1	0.9	0.5	15	20	599-03018	373-03018	371-03018	299-03018	298-03018
		1.6	1.4	0.5	15	20	599-03019	373-03019	371-03019	299-03019	298-03019
		2.5	2.2	0.5	15	20	599-03020	373-03020	371-03020	299-03020	298-03020
		4	3.4	0.5	15	20	599-03021	373-03021	371-03021	299-03021	298-03021
		6.3	5.4	0.75	20	20	599-03022	373-03022	371-03022	299-03022	298-03022
		10	8.6	1	25	20	599-03023	373-03023	371-03023	299-03023	298-03023
		16	14	1.25	32	20	599-03024	373-03024	371-03024	299-03024	298-03024
		25	22	1.5	40	20	599-03025	373-03025	371-03025	299-03025	298-03025
		40	34	2	50	20	599-03026	373-03026	371-03026	299-03026	298-03026
		Hi-Temp	ITxIT	1	0.9	0.5	15	20	599-03072	—	—
1.6	1.4			0.5	15	20	599-03073	—	—	—	—
2.5	2.2			0.5	15	20	599-03074	—	—	—	—
4	3.4			0.5	15	20	599-03075	—	—	—	—
6.3	5.4			0.75	20	20	599-03076	—	—	—	—
10	8.6			1	25	20	599-03077	—	—	—	—
16	14			1.25	32	20	599-03078	—	—	—	—
25	22			1.5	40	20	599-03079	—	—	—	—
40	34			2	50	20	599-03080	—	—	—	—

\* IT = Internal Thread NPT

**Table 15. Two-Way, Normally Closed (NC), Linear Valves, Stainless Steel Trim.**

Packing	Connection *	Flow Rate		Valve Size		Stroke	Electro-Hydraulic Actuators -24 Vac					
							Description	NSR	Spring Return	NSR	Spring Return	
		Technical Instructions	Floating		0 to 10 Vdc, 4 to 20mA							
			155-181P25		155-180P25		155-163P25					
			Actuator P/N	SKD82.50U	SKD82.51U		SKD60U	SKD62U	SKB62U			
Valve P/N	Actuator Code											
	275	276	267	274	291							
Standard	IT x IT	1	0.9	0.5	15	20	599-03018	275-03018	276-03018	267-03018	274-03018	—
		1.6	1.4	0.5	15	20	599-03019	275-03019	276-03019	267-03019	274-03019	—
		2.5	2.2	0.5	15	20	599-03020	275-03020	276-03020	267-03020	274-03020	—
		4	3.4	0.5	15	20	599-03021	275-03021	276-03021	267-03021	274-03021	—
		6.3	5.4	0.75	20	20	599-03022	275-03022	276-03022	267-03022	274-03022	—
		10	8.6	1	25	20	599-03023	275-03023	276-03023	267-03023	274-03023	291-03023
		16	14	1.25	32	20	599-03024	275-03024	276-03024	267-03024	274-03024	291-03024
		25	22	1.5	40	20	599-03025	275-03025	276-03025	267-03025	274-03025	290-03025
Hi-Temp	IT x IT	40	34	2	50	20	599-03026	275-03026	276-03026	267-03026	274-03026	291-03026
		1	0.9	0.5	15	20	599-03072	275-03072	276-03072	267-03072	274-03072	—
		1.6	1.4	0.5	15	20	599-03073	275-03073	276-03073	267-03073	274-03073	—
		2.5	2.2	0.5	15	20	599-03074	275-03074	276-03074	267-03074	274-03074	—
		4	3.4	0.5	15	20	599-03075	275-03075	276-03075	267-03075	274-03075	—
		6.3	5.4	0.75	20	20	599-03076	275-03076	276-03076	267-03076	274-03076	—
		10	8.6	1	25	20	599-03077	275-03077	276-03077	267-03077	274-03077	291-03077
		16	14	1.25	32	20	599-03078	275-03078	276-03078	267-03078	274-03078	291-03078
25	22	1.5	40	20	599-03079	275-03079	276-03079	267-03079	274-03079	291-03079		
40	34	2	50	20	599-03080	275-03080	276-03080	267-03080	274-03080	291-03080		

\* IT = Internal Thread NPT

**Table 16. Three-Way, Normally Closed (NC), Equal Percentage Valves, Normally Open, Linear, Standard Packing.**

Trim & Connection *		Flow Rate		Valve Size		Stroke	Pneumatic					
							Description	4-Inch			8-inch- Standard Temp.	
								3-8 psi (21-55 kPa)	5-10 psi (34-69 kPa)	10-15 psi (69-103 kPa)	Without Positioner	With Positioner
							Technical Instructions	155-183P25			155-161P25	
							Actuator P/N	599-01081	599-01082	599-01083	599-01050	599-01050 & 599-00426
Valve P/N	Actuator Code											
	Cv	Kvs	In	mm		268	269	270	277	283		
Bronze Trim - ITxIT	1	0.9	0.5	15	20	599-03198	268-03198	269-03198	270-03198	277-03198	283-03198	
	1.6	1.4	0.5	15	20	599-03199	268-03199	269-03199	270-03199	277-03199	283-03199	
	2.5	2.2	0.5	15	20	599-03200	268-03200	269-03200	270-03200	277-03200	283-03200	
	4	3.4	0.5	15	20	599-03201	268-03201	269-03201	270-03201	277-03201	283-03201	
	6.3	5.4	0.75	20	20	599-03202	268-03202	269-03202	270-03202	277-03202	283-03202	
	10	8.6	1	25	20	599-03203	268-03203	269-03203	270-03203	277-03203	283-03203	
	16	14	1.25	32	20	599-03204	268-03204	269-03204	270-03204	277-03204	283-03204	
	25	22	1.5	40	20	599-03205	268-03205	269-03205	270-03205	277-03205	283-03205	
40	34	2	50	20	599-03206	268-03206	269-03206	270-03206	277-03206	283-03206		
SS Trim - ITxIT	1	0.9	0.5	15	20	599-03144	268-03144	269-03144	270-03144	277-03144	283-03144	
	1.6	1.4	0.5	15	20	599-03145	268-03145	269-03145	270-03145	277-03145	283-03145	
	2.5	2.2	0.5	15	20	599-03146	268-03146	269-03146	270-03146	277-03146	283-03146	
	4	3.4	0.5	15	20	599-03147	268-03147	269-03147	270-03147	277-03147	283-03147	
	6.3	5.4	0.75	20	20	599-03148	268-03148	269-03148	270-03148	277-03148	283-03148	
	10	8.6	1	25	20	599-03149	268-03149	269-03149	270-03149	277-03149	283-03149	
	16	14	1.25	32	20	599-03150	268-03150	269-03150	270-03150	277-03150	283-03150	
	25	22	1.5	40	20	599-03151	268-03151	269-03151	270-03151	277-03151	283-03151	
40	34	2	50	20	599-03152	268-03152	269-03152	270-03152	277-03152	283-03152		

\* IT = Internal Thread NPT

**Table 17. Three-Way Normally Closed (NC), Linear Valves, Stainless Steel, Standard Packing.**

Connection *	Flow Rate		Valve Size		Stroke	Electro-Mechanical Actuators 24 Vac				
						Description	Non-Spring Return		Spring Return	
							Floating	0-10 Vdc, 4-20mA	2-Position	0-10 Vdc
						Technical Instructions	155-507	155-506	155-541P25	
						Actuator P/N	SAX81.03U	SAX61.03U	599-03611	599-03609
Valve P/N	Actuator Code									
	373	371	299	298						
Bronze Trim ITxIT	1	0.9	0.5	15	20	599-03198	373-03198	371-03198	299-03198	298-03198
	1.6	1.4	0.5	15	20	599-03199	373-03199	371-03199	299-03199	298-03199
	2.5	2.2	0.5	15	20	599-03200	373-03200	371-03200	299-03200	298-03200
	4	3.4	0.5	15	20	599-03201	373-03201	371-03201	299-03201	298-03201
	6.3	5.4	0.75	20	20	599-03202	373-03202	371-03202	299-03202	298-03202
	10	8.6	1	25	20	599-03203	373-03203	371-03203	299-03203	298-03203
	16	14	1.25	32	20	599-03204	373-03204	371-03204	299-03204	298-03204
	25	22	1.5	40	20	599-03205	373-03205	371-03205	299-03205	298-03205
	40	34	2	50	20	599-03206	373-03206	371-03206	299-03206	298-03206
SS Trim - ITxIT	1	0.9	0.5	15	20	599-03144	373-03144	371-03144	299-03144	298-03144
	1.6	1.4	0.5	15	20	599-03145	373-03145	371-03145	299-03145	298-03145
	2.5	2.2	0.5	15	20	599-03146	373-03146	371-03146	299-03146	298-03146
	4	3.4	0.5	15	20	599-03147	373-03147	371-03147	299-03147	298-03147
	6.3	5.4	0.75	20	20	599-03148	373-03148	371-03148	299-03148	298-03148
	10	8.6	1	25	20	599-03149	373-03149	371-03149	299-03149	298-03149
	16	14	1.25	32	20	599-03150	373-03150	371-03150	299-03150	298-03150
	25	22	1.5	40	20	599-03151	373-03151	371-03151	299-03151	298-03151
	40	34	2	50	20	599-03152	373-03152	371-03152	299-03152	298-03152

\* IT= Internal Thread NPT

**Table 18. Three-Way, Normally Closed (NC), Equal Percentage Valves, Normally Open (NO), Linear, Standard Packing.**

Trim	Connection *	Flow Rate		Valve Size		Stroke	Electro-Hydraulic Actuators					
							Description	NSR	Spring Return	NSR	Spring Return	
		Cv		Kvs	In		mm	Floating		0 to 10 Vdc, 4 to 20 mA		
		Technical Instructions		155-181P25			155-180P25		155-163P25			
		Actuator P/N		SKD82.50U	SKD82.51U		SKD60U	SKD62U	SKB62U			
		Valve P/N		Actuator Code								
		275	276	267	274	291						
Bronze	ITxIT	1	0.9	0.5	15	20	599-03198	275-03198	276-03198	267-03198	274-03198	—
		1.6	1.4	0.5	15	20	599-03199	275-03199	276-03199	267-03199	274-03199	—
		2.5	2.2	0.5	15	20	599-03200	275-03200	276-03200	267-03200	274-03200	—
		4	3.4	0.5	15	20	599-03201	275-03201	276-03201	267-03201	274-03201	—
		6.3	5.4	0.75	20	20	599-03202	275-03202	276-03202	267-03202	274-03202	—
		10	8.6	1.0	25	20	599-03203	275-03203	276-03203	267-03203	274-03203	291-03203
		16	14	1.25	32	20	599-03204	275-03204	276-03204	267-03204	274-03204	291-03204
		25	22	1.5	40	20	599-03205	275-03205	276-03205	267-03205	274-03205	291-03205
Stainless Steel	ITxIT	40	34	2.0	50	20	599-03206	275-03206	276-03206	267-03206	274-03206	291-03206
		1	0.9	0.5	15	20	599-03144	275-03144	276-03144	267-03144	274-03144	—
		1.6	1.4	0.5	15	20	599-03145	275-03145	276-03145	267-03145	274-03145	—
		2.5	2.2	0.5	15	20	599-03146	275-03146	276-03146	267-03146	274-03146	—
		4	3.4	0.5	15	20	599-03147	275-03147	276-03147	267-03147	274-03147	—
		6.3	5.4	0.75	20	20	599-03148	275-03148	276-03148	267-03148	274-03148	—
		10	8.6	1.0	25	20	599-03149	275-03149	276-03149	267-03149	274-03149	291-03149
		16	14	1.25	32	20	599-03150	275-03150	276-03150	267-03150	274-03150	291-03150
25	22	1.5	40	20	599-03151	275-03151	276-03151	267-03151	274-03151	291-03151		
40	34	2.0	50	20	599-03152	275-03152	276-03152	267-03152	274-03152	291-03152		

\* IT = Internal Thread NPT

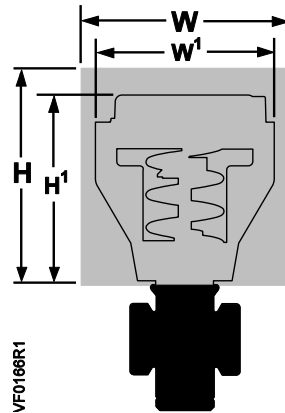


Figure 3. Actuator Dimensions. See Table 19.

Table 19. Dimensions of the Actuator and Recommended Service Envelope.  
 Dimensions in Inches (Millimeters).

Actuator	Actuator Prefix Code	Actual Height of Actuator H1	Service Height H	Actual Width or Diameter of Actuator W1	Service Width W
4-inch Pneumatic	268, 269, 270	5-3/4 (146)	14 (350)	5-1/2 (137) diameter	18 (450)
8-inch Pneumatic	277, 278, 283, 284	14-1/8 (359)	26 (660)	8-3/4 (222) diameter	21 (533)
SKB with handle closed	289, 290, 291	14-3/4 (375)	22-3/4 (578)	7 (178) width x 8-15/16 (226) depth	25 (635)
SKD	267, 274, 275, 276	11-13/16 (300)	19-3/4 (500)	5 (127) width x 6-5/8 (169) depth	14-1/2 (360)
SAX	371, 373	9-9/16 (242)	17-1/4 (442)	4-7/8 (124) width x 5-7/8 (150) depth	17-3/4 (450)
EI/Mech with linkage	298, 299	14-1/2 (368)	10 (254)	5 (127) width x 5-1/8 (121) depth	8 (203)

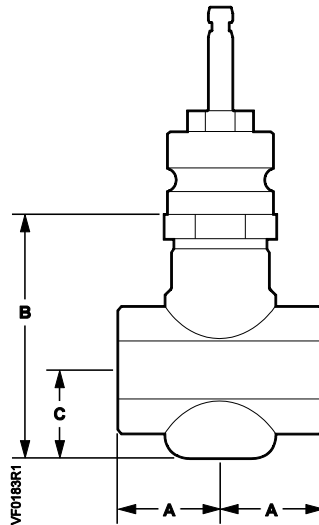


Figure 4. Two-Way Internal Thread NPT x Internal Thread NPT (ITxIT) Valves.

Table 20. Two-Way Valve Dimensions.

Valve Action	Valve Size inch (mm)	A	B	C	Weight lbs (kg)
Normally Open	1/2 (15)	1-7/16 (36)	2-15/16 (74)	1-1/4 (31)	3 (1.4)
	3/4 (20)	1-11/16 (43)	3-15/16 (99)	1-7/16 (36)	4 (1.8)
	1 (25)	2 (50)	3-3/4 (96)	1-1/4 (32)	5 (2.3)
	1-1/4 (32)	2-1/2 (62)	4-1/4 (108)	2 (51)	7 (3.2)
	1-1/2 (40)	2-9/16 (65)	4-1/4 (108)	2 (51)	9 (4.1)
	2 (50)	3-1/8 (79)	4-9/16 (116)	2-1/4 (57)	13 (5.9)
Normally Closed	1/2 (15)	1-7/16 (36)	3-13/16 (97)	2-3/16 (55)	3 (1.4)
	3/4 (20)	1-11/16 (43)	3-13/16 (97)	2-3/16 (55)	4 (1.8)
	1 (25)	2 (50)	3-13/16 (97)	2-3/16 (55)	5 (2.3)
	1-1/4 (32)	2-1/2 (62)	3-13/16 (97)	2-3/16 (55)	7 (3.2)
	1-1/2 (40)	2-9/16 (65)	3-7/8 (99)	2-1/4 (58)	8 (3.6)
	2 (50)	3-1/8 (79)	4-1/2 (114)	2-9/16 (65)	16 (7.3)



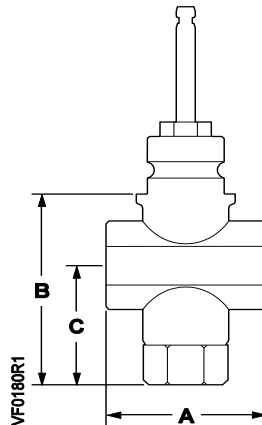


Figure 5. Three-Way Internal Thread NPT x Internal Thread NPT (ITxIT) Valves.

Table 21. Three-Way Valve Dimensions.

Valve	Valve Size Inches (mm)	Dimensions in Inches (mm)			Weight lb (kg)
		A	B	C	
3-Way	1/2 (15)	2-7/8 (72)	4-5/16 (110)	2-11/16 (68)	3 (1.4)
	3/4 (20)	3-3/8 (85)	4-5/16 (110)	2-3/4 (69)	4 (1.8)
	1 (25)	3-15/16 (100)	4-1/2 (114)	2-7/8 (72)	5 (2.3)
	1-1/4 (32)	4-15/16 (125)	4-5/8 (116)	2-15/16 (74)	7 (3.2)
	1-1/2 (40)	5-1/8 (130)	4-5/8 (117)	3 (76)	9 (4.1)
	2 (50)	6-1/4 (158)	4-3/4 (121)	3-3/16 (81)	13 (5.9)

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