

VALVE

VT

TECK

## CHARACTERIZED BALL VALVE

**CALIFLO**<sup>®</sup>

Patented 6, 910, 673



**The Widest Range of  
Cv's Available 0.3 - 734**

- ▶ Chilled Water
- ▶ Hot Water
- ▶ 15# Low Pressure Steam
- ▶ Mixing or Diverting



## Characterized Flow Control

After years of research and flow testing, Valve Teck developed the Califlo® multiple Cv orifice for applications that require precise “maximum” Cv control. After additional investment and significant cycle testing, Valve Teck has pioneered the first brass body ball valve with stainless v-ball, for precise “minimum” Cv control.

Flow tests confirm the combination of a Califlo orifice with characterized v-ball valve achieves a deep equal percentage flow curve for unmatched temperature control stability. The advanced flow curve of the characterized v-ball exceeds the best performance of any globe valve on the market today.

### Typical Applications

- ▶ HVAC
- ▶ District Energy
- ▶ Zone Control
- ▶ Pressure Control
- ▶ Flow Control
- ▶ Low Pressure Stream
- ▶ AHU / Air Handlers

Sizes 1/2”-2”



Sizes 2 1/2”-3”



## Calibrated Flow

The Califlo® orifice is a flow control device that is used in conjunction with the Series 23/24 characterized NPT ball valve assemblies. The Califlo orifice reduces the maximum allowable inherent valve Cv to better match the desired HVAC system Cv for advanced temperature control.

The maximum Cv flow is controlled by the calibrated flow opening which is extended for improved laminar flow into the valve body. The Califlo orifices are constructed of brass and contain a precise “calibrated” opening consisting of different diameters to allow for multiple number of Cv’s per valve size. The Califlo orifice allows flexibility to obtain the exact control that is necessary for HVAC applications.



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## Blow-Out Proof Califlo® Orifice

When installed into the valve body, the external straight threads of the orifice interlock with the tapered threads within the valve body creating a secure locking mechanism.



## Triple Stem Seal

The bottom entry valve shaft is “blowout-proof” and will not allow the removal of the stem while the valve is under pressure. The PTFE teflon stem bearing prevents debris from entering the shaft area and maintains low run torque. The double EPDM o-rings act as the secondary seal, eliminating stem leakage and ensuring a long maintenance free service life. The EPDM o-rings self compensates with wear for high cycle applications. The third stem seal is an adjustable packing gland that keeps constant compression on a PTFE packing ring.

## Adjustable Packing Gland

The adjustable packing gland functions like a traditional valve packing gland. Metric standard sockets can be fitted over the brass hex head gland. A quarter turn of the gland, puts additional force on the PTFE v-cup packing to compress the PTFE packing and seal around the stem, for 100% field adjustability of the stem seal.



## Bubble Tight Close Off

2-way and 3-way ball valves achieve 100% bubble tight close off and zero leakage through the ball (ANSI Class VI / 6). All valves are tested to the air under water MSS SP-110-2010 specification to ensure leak free service.

## Field Retrofittable Cv Control

The Califlo® insert can be easily removed and replaced with another insert that will yield a different maximum valve coefficient without having to change out the complete valve assembly.

## 3-Way Bypass Equal Percentage Flow

Testing confirms with the Califlo® orifice located in the common “AB” outlet port of the valve, the 3-way ball valve is able to achieve true equal percentage flow in the bypass mode. The Califlo® orifice solves the bypass high pressure drop requirements by reducing the bypass Cv to an average of less than 80% of the through flow.



## Optional Union Connections

Forged brass unions are cemented into the valve body and soldered into the piping arrangement for a leak free connection. EPDM gaskets provide a positive seal between the union body and the tailpiece.

- ▶ Maximum Working Pressure: 400 psi
- ▶ Service: Water, Glycol

## Pressure / Temperature

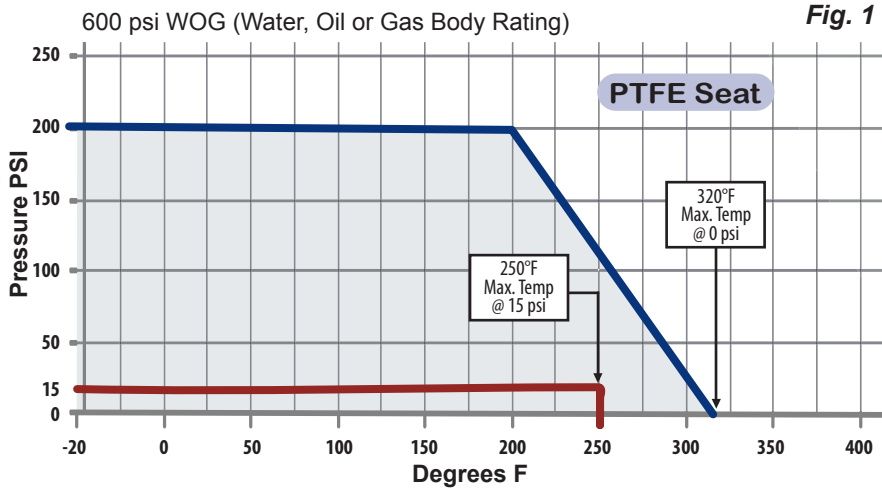


Fig. 1

Water Service Fig. 2

TEMP °F	PSI
-20°	200
0°	200
50°	200
100°	200
150°	200
200°	200
250°	120
300°	40
320°	0

Steam Service Fig. 3

Steam / PSI	TEMP F°
0	212°
10	239°
15	250°

## Equal Percentage Flow

For control stability in temperature control applications, valves must provide an equal percentage flow characteristic that in turn produces linear heat output. The characterized v-ball valve is a perfect choice for valve applications that require linear heat output.

The inherit flow characteristic of a valve describes the relationship between “flow capacity” of the valve and “percentage of opening”, with a constant pressure drop. The characterized v-ball was tested at 10° increments with a 1 psi drop and the data was plotted with percent of maximum flow, versus percent of valve opening.

The test data in figure 4, shows the inherit flow curve the characterized v-ball valve exhibits is an equal percentage flow characteristic. With equal increments of the stem travel, at a constant pressure drop, an equal percentage change in existing flow occurs.

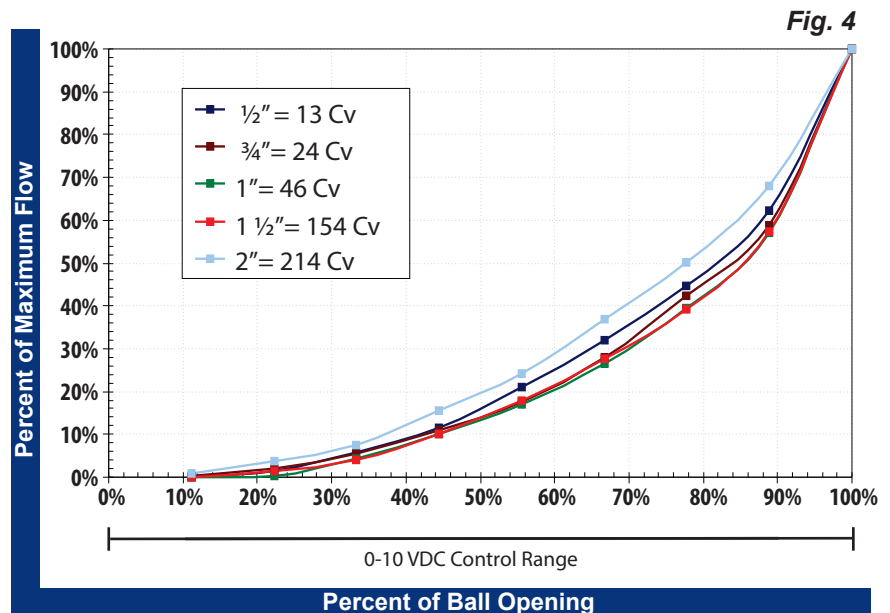


Fig. 4

## Full Scale Rotational Response

The characterized v-ball and Califlo® orifice combination exhibits excellent “full scale rotational response”. The test data shows the v-ball control valve has constant flow over the entire 90° control range of a 0-10 VDC input controller. With the Califlo insert, the full operating range is used because the desired Cv meets the actual Cv, resulting in system life span being increased and energy consumption reduced. Better valve control and valve sizing prevents “Hunting” of the control loop in which the system is constantly adjusting itself to maintain the predetermined set-point. See Figure 4

## High Rangeability

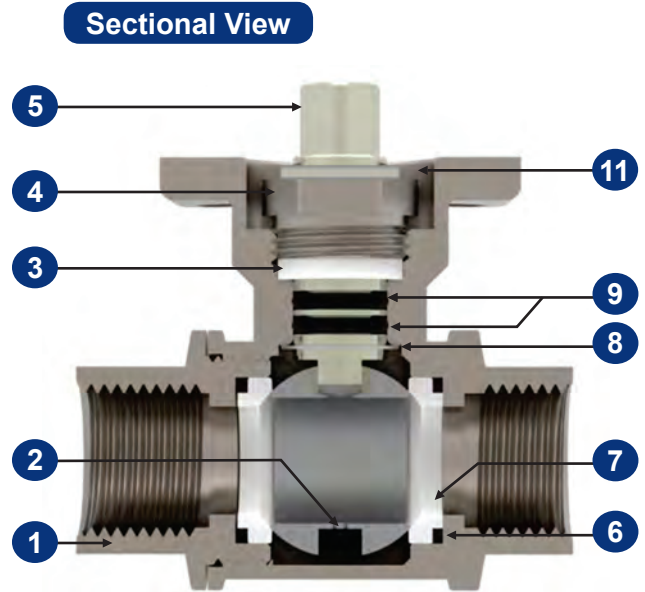
The term “rangeability” is defined as the “ratio of maximum controllable flow to minimum controllable flow”. Valve rangeability is based on controllable flow of the valve and indicates if the valve is practical to throttle continuously. The Califlo insert controls the maximum controllable flow. The characterized v-ball controls the minimum controllable flow. The combination of Califlo orifice and characterized v-ball has the highest rangeability of any temperature control valve.

## Materials of Construction

Part	Description	Materials	
		1/2" - 2"	2 1/2" - 3"
1	Body / Nut End	Brass Nickel Plated	Bronze
2	Ball	304 Stainless (V-Port)	304 Stainless (Full Port)
3	Packing	PTFE	PTFE
4	Gland	Brass Nickel Plated	Brass
5	Stem	304 Stainless	304 Stainless
6	Seat Backing	EPDM	EPDM
7	Seat	PTFE	PTFE
8	Stem Seal	PTFE	PTFE
9	O-Rings	EPDM	EPDM
10	Califlo® Orifice	Brass	Brass
11	E-Clip	Steel 65Mn	Steel 65Mn

## Valve Performance

- ▶ ISO extended mounting platform for high cycle automation and added clearance for insulation
- ▶ Double O-ring stem seal gives long maintenance-free service life and eliminates stem leakage
- ▶ PTFE seats and seals for maximum temperature of 320°F @ 0 psi
- ▶ Blow-out proof stem prevents removal of stem when valve is in service.
- ▶ Adjustable packing gland rides on PTFE packing and acts as a third stem seal that can be adjusted without removing actuator.
- ▶ Two-way valve body rated 600 WOG 1/2"-3"
- ▶ Three-way valve body rated 600 WOG 1/2"-1 1/4", 400 WOG 1 1/2"-2"
- ▶ Life cycle tested over 500,000 cycles (2 year warranty)

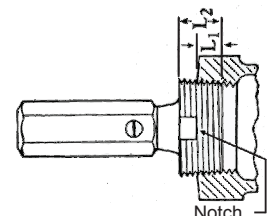


### Exploded View



▶ **Califlo® Complies with ANSI B2.1 American National Standard Taper Pipe Threads**  
The external taper thread engagement is measured using a plug gauge.

L1 - Normal engagement by hand between external and internal threads  
L2 - Length of effective external threads



# Two Way Water Capacity Table

Table in Gallons Per Minute, (GPM=C<sub>v</sub>x√pΔ)

Cv	Size in	Pressure Drop Across Valve (psi)									
		1	2	3	4	5	6	7	8	9	10
0.3	½"	0.3	0.4	0.5	0.6	0.7	0.7	0.8	0.8	0.9	0.9
0.6	½"	0.6	0.8	1	1.2	1.3	1.5	1.6	1.7	1.8	1.9
1	½"	1	1.4	1.7	2	2.2	2.4	2.6	2.8	3	3.2
2	½"	2	2.8	3.5	4	4.5	4.9	5.3	5.7	6	6.3
3	½"	3	4.2	5.2	6	6.7	7.3	7.9	8.5	9	9.5
4	½"	4	5.7	6.9	8	8.9	9.8	10.6	11.3	12	12.6
5	½"	5	7.1	8.7	10	11.2	12.2	13.2	14.1	15	15.8
6	½"	6	8.5	10.4	12	13.4	14.7	15.9	17	18	19
9	½"	9	12.7	15.6	18	20.1	22	23.8	25.5	27	28.5
13	½"	13	18.4	22.5	26	29.1	31.8	34.4	36.8	39	41.1
0.6	¾"	0.6	0.8	1	1.2	1.3	1.5	1.6	1.7	1.8	1.9
1.3	¾"	1.3	1.8	2.3	2.6	2.9	3.2	3.4	3.7	3.9	4.1
2.1	¾"	2.1	3	3.6	4.2	4.7	5.1	5.6	5.9	6.3	6.6
5	¾"	5	7.1	8.7	10	11.2	12.2	13.2	14.1	15	15.8
8.7	¾"	8.7	12.3	15.1	17.4	19.5	21.3	23	24.6	26.1	27.5
9.9	¾"	9.9	14	17.1	19.8	22.1	24.2	26.2	28	29.7	31.3
13.9	¾"	13.9	19.7	24.1	27.8	31.1	34	36.8	39.3	41.7	44
24	¾"	24	34	42	48	54	59	63	68	72	76
5	1"	5	7	9	10	11	12	13	14	15	16
8	1"	8	11	14	16	18	20	21	23	24	25
14	1"	14	20	24	28	31	34	37	40	42	44
21	1"	21	30	36	42	47	51	56	59	63	66
32	1"	32	45	55	64	72	78	85	91	96	101
46	1"	46	65	80	92	103	113	122	130	138	145
8	1¼"	8	11	14	16	18	20	21	23	24	25
11	1¼"	11	16	19	22	25	27	29	31	33	35
19	1¼"	19	27	33	38	42	47	50	54	57	60
23	1¼"	23	33	40	46	51	56	61	65	69	73
35	1¼"	35	49	61	70	78	86	93	99	105	111
105	1¼"	105	148	182	210	235	257	278	297	315	332
20	1½"	20	28	35	40	45	49	53	57	60	63
30	1½"	30	42	52	60	67	73	79	85	90	95
35	1½"	35	49	61	70	78	86	93	99	105	111
47	1½"	47	66	81	94	105	115	124	133	141	149
102	1½"	102	144	177	204	228	250	270	288	306	323
154	1½"	154	218	267	308	344	377	407	436	462	487
20	2"	20	28	35	40	45	49	53	57	60	63
30	2"	30	42	52	60	67	73	79	85	90	95
35	2"	35	49	61	70	78	86	93	99	105	111
40	2"	40	57	69	80	89	98	106	113	120	126
50	2"	50	71	87	100	112	122	132	141	150	158
60	2"	60	85	104	120	134	147	159	170	180	190
65	2"	65	92	113	130	145	159	172	184	195	206
70	2"	70	99	121	140	157	171	185	198	210	221
80	2"	80	113	139	160	179	196	212	226	240	253
214	2"	214	303	371	428	479	524	566	605	642	677
60	2½"	60	85	104	120	134	147	159	170	180	190
75	2½"	75	106	130	150	168	184	198	212	225	237
110	2½"	110	156	191	220	246	269	291	311	330	348
140	2½"	140	198	242	280	313	343	370	396	420	443
165	2½"	165	233	286	330	369	404	437	467	495	522
503	2½"	503	711	871	1006	1125	1232	1331	1423	1509	1591
70	3"	70	99	121	140	157	171	185	198	210	221
100	3"	100	141	173	200	224	245	265	283	300	316
150	3"	150	212	260	300	335	367	397	424	450	474
200	3"	200	283	346	400	447	490	529	566	600	632
260	3"	260	368	450	520	581	637	688	735	780	822
734	3"	734	1038	1271	1468	1641	1798	1942	2076	2202	2321

NOTE: 1) Full Port Cv is Represented by Shaded Area.

# Assembly Number

Series	Config	Size	Flow	Body/Ball	Actuator	Controls	Accessories
<b>BV</b>	<b>2</b>	<b>1X</b>	<b>2</b>	<b>B</b>	<b>23</b>	<b>O</b>	
1	2	3	4	5	6	7	8

**1. Series**  
BV = BV Characterized V-Ball

**2. Configuration**  
2 = 2-way  
L = 3-way L-Port  
T = 3-way T-Port

**3. Size**

1	1/2"	--- B, C, D, E, F, G, H, I, X
2	3/4"	--- A, B, C, X
3	1"	--- A, B, C, X
4	1 1/4"	--- A, B, C, X
5	1 1/2"	--- A, B, C, X
6	2"	--- A, B, C, X
7	2 1/2"	--- C, D, E, X
8	3"	--- C, D, E, X

**4. Flow Type**  
2 = Full Port  
L = Califlo® Multiple CV Orifice

**5. Construction (Body/Ball)**  
B = Brass Nickel Plated Body  
304 Stainless Ball and Stem

**6. Actuator**  
23 = Non-Spring 24 VAC Voltage  
24 = Spring Return 24 VAC/DC Voltage

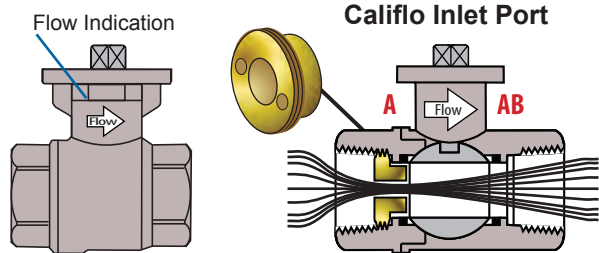
**7. Controls**  
O = On/Off - Floating  
E = Modulating 0-10 VDC input/output

**8. Accessories**  
A = Auxiliary Switch 2-SPDT  
V = 120 VAC Voltage (Series 24 Only)  
F = Floating Control (Series 24 Only)  
C = Stacon Connections  
U = Unions

**Note 1:** Please Specify T-Port Mixing or T-Port Diverting Three-way.  
**Note 2:** Minimum cable length 3 ft.

## Flow Configuration

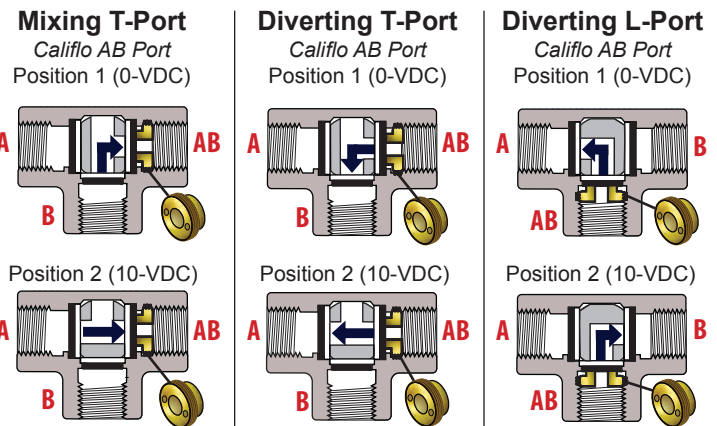
- ▶ **2-way non-spring return** modulating assemblies will be set up closed at 0 VDC and fail in last position on loss of power.
- ▶ **2-way spring return** modulating assemblies will be set up open at 0 VDC and will fail open (Unless specified closed)



## Flow Configuration

All configurations are bi-directional close off. The mixing and diverting T-Port valves through port is equal percentage and the bypass port is linear and yields 80% of the flow of port A.

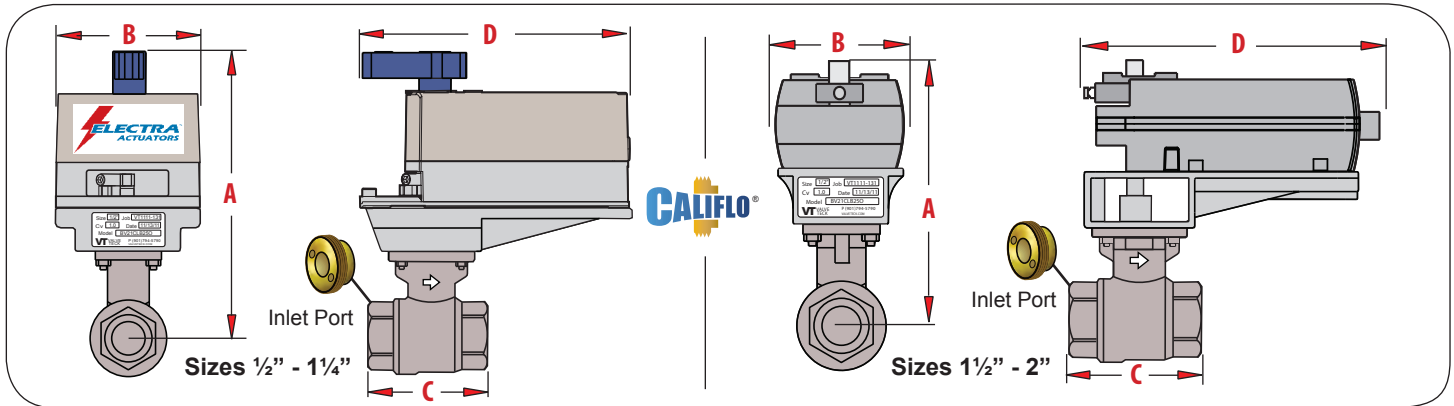
- ▶ **T-Port Default**  
**Non-Spring:** Assemblies are set up B to AB Open at 0 VDC and will fail in last position, on loss of power.  
**Spring:** Assemblies are set up B to AB Open at 0 VDC and will fail B to AB Open, on loss of power.
- ▶ **L-Port Default**  
**Non-Spring:** Assemblies are set up AB to A open at 0 VDC and will fail in last position, on loss of power.  
**Spring:** Assemblies are set up AB to A Open at 0 VDC and fail AB and A Open, on loss of power.



## Gold Seal Warranty

The BV Series 23 / 24 Characterized V-Ball Valve with Electra® Actuator is warranted from defects in material and workmanship, under normal use and service for a period of (2) years from date of purchase. (see our complete terms and conditions)

# Series 23 / Non-Spring



Standard Assembly: 1/2" - 2" Brass Nickel Plated Body with 304 Stainless Ball, 24 VAC Power Supply

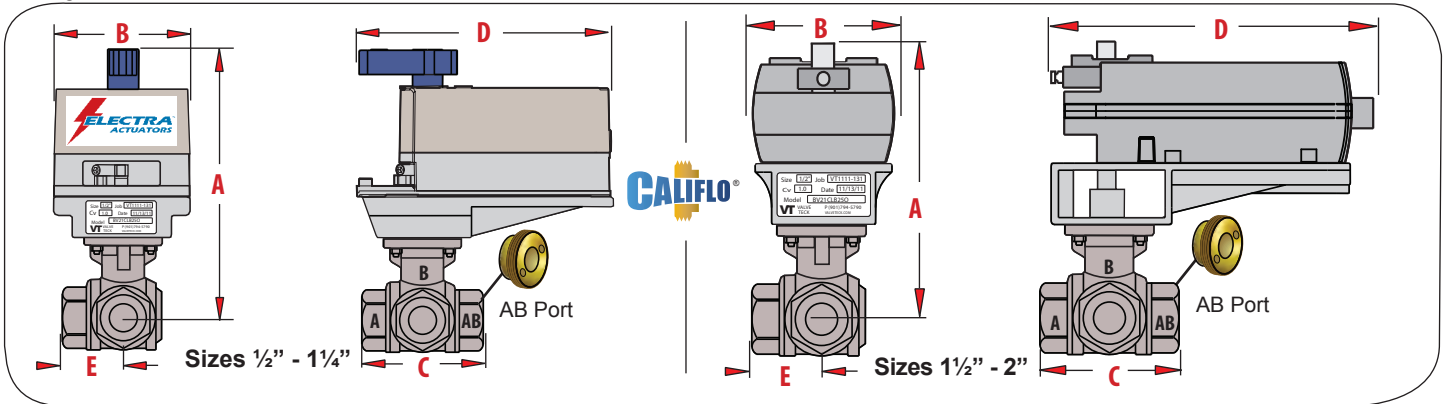
Cv	Size In	Close off psi	WT. (lb)	On/Off Model	Modulating Model	VA Rating		Speed 90° (sec.)	23 Series Operator		Dimensional Data (in) mm = in X 25.4			
						On/Off	Mod.		On/Off	Mod.	A	B	C	D
0.3	1/2"	200	4	BV21ALB23O	BV21ALB23E	2.0	3.0	90	XT-44-F1	XT-44-M1	7.13"	2.75"	2.70"	5.50"
0.6	1/2"	200	4	BV21BLB23O	BV21BLB23E	2.0	3.0	90	XT-44-F1	XT-44-M1				
1.0	1/2"	200	4	BV21CLB23O	BV21CLB23E	2.0	3.0	90	XT-44-F1	XT-44-M1				
2.0	1/2"	200	4	BV21DLB23O	BV21DLB23E	2.0	3.0	90	XT-44-F1	XT-44-M1				
3.0	1/2"	200	4	BV21ELB23O	BV21ELB23E	2.0	3.0	90	XT-44-F1	XT-44-M1				
4.0	1/2"	200	4	BV21FLB23O	BV21FLB23E	2.0	3.0	90	XT-44-F1	XT-44-M1				
5.0	1/2"	200	4	BV21GLB23O	BV21GLB23E	2.0	3.0	90	XT-44-F1	XT-44-M1				
6.0	1/2"	200	4	BV21HLB23O	BV21HLB23E	2.0	3.0	90	XT-44-F1	XT-44-M1				
9.0	1/2"	200	4	BV21ILB23O	BV21ILB23E	2.0	3.0	90	XT-44-F1	XT-44-M1				
13	1/2"	200	4	BV21X2B23O	BV21X2B23E	2.0	3.0	90	XT-44-F1	XT-44-M1				
0.6	3/4"	200	4	BV22ALB23O	BV22ALB23E	2.0	3.0	90	XT-44-F1	XT-44-M1				
1.3	3/4"	200	4	BV22BLB23O	BV22BLB23E	2.0	3.0	90	XT-44-F1	XT-44-M1				
2.1	3/4"	200	4	BV22CLB23O	BV22CLB23E	2.0	3.0	90	XT-44-F1	XT-44-M1				
5.0	3/4"	200	4	BV22DLB23O	BV22DLB23E	2.0	3.0	90	XT-44-F1	XT-44-M1				
8.7	3/4"	200	4	BV22ELB23O	BV22ELB23E	2.0	3.0	90	XT-44-F1	XT-44-M1				
9.9	3/4"	200	4	BV22FLB23O	BV22FLB23E	2.0	3.0	90	XT-44-F1	XT-44-M1				
13.9	3/4"	200	4	BV22GLB23O	BV22GLB23E	2.0	3.0	90	XT-44-F1	XT-44-M1				
24	3/4"	200	4	BV22X2B23O	BV22X2B23E	2.0	3.0	90	XT-44-F1	XT-44-M1				
5.0	1"	200	5	BV23ALB23O	BV23ALB23E	2.0	3.0	90	XT-44-F1	XT-44-M1				
8.0	1"	200	5	BV23BLB23O	BV23BLB23E	2.0	3.0	90	XT-44-F1	XT-44-M1				
14	1"	200	5	BV23CLB23O	BV23CLB23E	2.0	3.0	90	XT-44-F1	XT-44-M1				
21	1"	200	5	BV23DLB23O	BV23DLB23E	2.0	3.0	90	XT-44-F1	XT-44-M1				
32	1"	200	5	BV23ELB23O	BV23ELB23E	2.0	3.0	90	XT-44-F1	XT-44-M1				
46	1"	200	5	BV23X2B23O	BV23X2B23E	2.0	3.0	90	XT-44-F1	XT-44-M1				
8.0	1 1/4"	200	6	BV24BLB23O	BV24BLB23E	2.3	3.3	125	XT-88-F1	XT-88-M1				
11	1 1/4"	200	6	BV24CLB23O	BV24CLB23E	2.3	3.3	125	XT-88-F1	XT-88-M1				
19	1 1/4"	200	6	BV24DLB23O	BV24DLB23E	2.3	3.3	125	XT-88-F1	XT-88-M1				
23	1 1/4"	200	6	BV24ELB23O	BV24ELB23E	2.3	3.3	125	XT-88-F1	XT-88-M1				
35	1 1/4"	200	6	BV24FLB23O	BV24FLB23E	2.3	3.3	125	XT-88-F1	XT-88-M1				
105	1 1/4"	200	6	BV24X2B23O	BV24X2B23E	2.3	3.3	125	XT-88-F1	XT-88-M1				
20	1 1/2"	200	9	BV25BLB23O	BV25BLB23E	3.0	5.0	125	XT-132-F1	XT-132-M1				
30	1 1/2"	200	9	BV25CLB23O	BV25CLB23E	3.0	5.0	125	XT-132-F1	XT-132-M1				
35	1 1/2"	200	9	BV25DLB23O	BV25DLB23E	3.0	5.0	125	XT-132-F1	XT-132-M1				
47	1 1/2"	200	9	BV25ELB23O	BV25ELB23E	3.0	5.0	125	XT-132-F1	XT-132-M1				
102	1 1/2"	200	9	BV25FLB23O	BV25FLB23E	3.0	5.0	125	XT-132-F1	XT-132-M1				
154	1 1/2"	200	9	BV25X2B23O	BV25X2B23E	3.0	5.0	125	XT-132-F1	XT-132-M1				
20	2"	200	11	BV26BLB23O	BV26BLB23E	3.0	5.0	125	XT-132-F1	XT-132-M1				
30	2"	200	11	BV26CLB23O	BV26CLB23E	3.0	5.0	125	XT-132-F1	XT-132-M1				
35	2"	200	11	BV26DLB23O	BV26DLB23E	3.0	5.0	125	XT-132-F1	XT-132-M1				
40	2"	200	11	BV26ELB23O	BV26ELB23E	3.0	5.0	125	XT-132-F1	XT-132-M1				
50	2"	200	11	BV26FLB23O	BV26FLB23E	3.0	5.0	125	XT-132-F1	XT-132-M1				
60	2"	200	11	BV26GLB23O	BV26GLB23E	3.0	5.0	125	XT-132-F1	XT-132-M1				
65	2"	200	11	BV26HLB23O	BV26HLB23E	3.0	5.0	125	XT-132-F1	XT-132-M1				
70	2"	200	11	BV26ILB23O	BV26ILB23E	3.0	5.0	125	XT-132-F1	XT-132-M1				
80	2"	200	11	BV26JLB23O	BV26JLB23E	3.0	5.0	125	XT-132-F1	XT-132-M1				
150	2"	200	11	BV26LLB23O	BV26LLB23E	3.0	5.0	125	XT-132-F1	XT-132-M1				
214	2"	200	11	BV26X2B23O	BV26X2B23E	3.0	5.0	125	XT-132-F1	XT-132-M1				

NOTE: 1) Full Port Cv is Represented by Shaded Area.





# Series 23 / Non-Spring



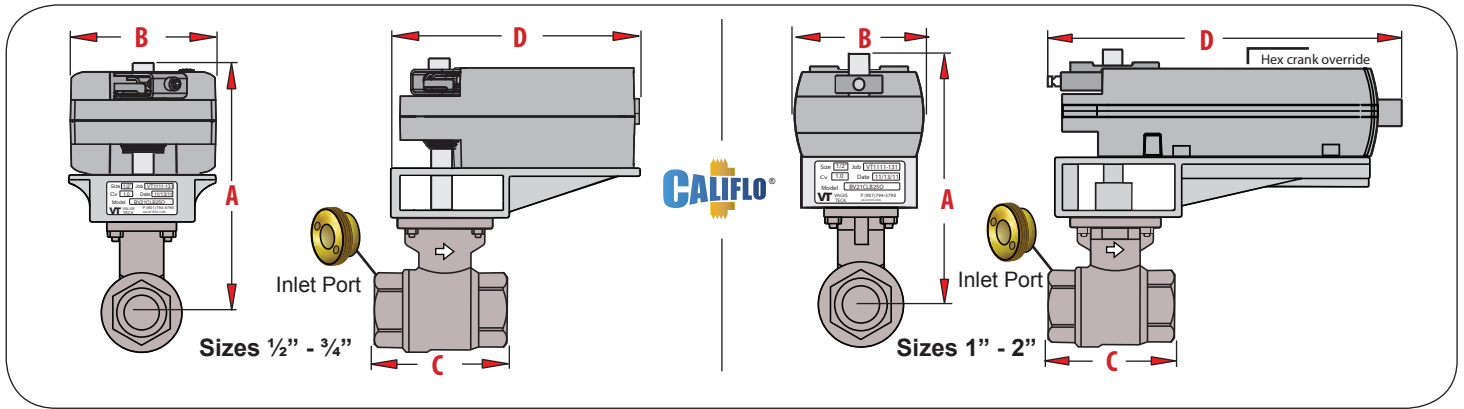
Standard Assembly: 1/2" - 2" Brass Nickel Plated Body with 304 Stainless Ball, 24 VAC Power Supply

Cv	Size In	Close off psi	WT. (lb)	On/Off Model	Modulating Model	VA Rating		Speed 90° (sec.)	23 Series Operator		Dimensional Data (in) mm = in X 25.4				
						On/Off	Mod.		On/Off	Mod.	A	B	C	D	E
0.35	1/2"	200	4	BVT1ALB23O	BVT1ALB23E	2.0	3.0	90	XT-44-F1	XT-44-M1	7.25"	2.75"	2.93"	5.50"	1.46"
0.5	1/2"	200	4	BVT1BLB23O	BVT1BLB23E	2.0	3.0	90	XT-44-F1	XT-44-M1					
0.7	1/2"	200	4	BVT1CLB23O	BVT1CLB23E	2.0	3.0	90	XT-44-F1	XT-44-M1					
1.8	1/2"	200	4	BVT1DLB23O	BVT1DLB23E	2.0	3.0	90	XT-44-F1	XT-44-M1					
2.6	1/2"	200	4	BVT1ELB23O	BVT1ELB23E	2.0	3.0	90	XT-44-F1	XT-44-M1					
3.5	1/2"	200	4	BVT1FLB23O	BVT1FLB23E	2.0	3.0	90	XT-44-F1	XT-44-M1					
4.1	1/2"	200	4	BVT1GLB23O	BVT1GLB23E	2.0	3.0	90	XT-44-F1	XT-44-M1					
5.0	1/2"	200	4	BVT1HLB23O	BVT1HLB23E	2.0	3.0	90	XT-44-F1	XT-44-M1					
8.6	1/2"	200	4	BVT1ILB23O	BVT1ILB23E	2.0	3.0	90	XT-44-F1	XT-44-M1					
13	1/2"	200	4	BVT1X2B23O	BVT1X2B23E	2.0	3.0	90	XT-44-F1	XT-44-M1					
0.7	3/4"	200	5	BVT2ALB23O	BVT2ALB23E	2.0	3.0	90	XT-44-F1	XT-44-M1	7.5"	2.75"	3.31"	5.50"	1.66"
1.8	3/4"	200	5	BVT2BLB23O	BVT2BLB23E	2.0	3.0	90	XT-44-F1	XT-44-M1					
4.1	3/4"	200	5	BVT2CLB23O	BVT2CLB23E	2.0	3.0	90	XT-44-F1	XT-44-M1					
8.0	3/4"	200	5	BVT2DLB23O	BVT2DLB23E	2.0	3.0	90	XT-44-F1	XT-44-M1					
9.5	3/4"	200	5	BVT2ELB23O	BVT2ELB23E	2.0	3.0	90	XT-44-F1	XT-44-M1					
11.1	3/4"	200	5	BVT2FLB23O	BVT2FLB23E	2.0	3.0	90	XT-44-F1	XT-44-M1					
23	3/4"	200	5	BVT2X2B23O	BVT2X2B23E	2.0	3.0	90	XT-44-F1	XT-44-M1					
4.2	1"	200	8	BVT3ALB23O	BVT3ALB23E	2.0	3.0	90	XT-44-F1	XT-44-M1	7.75"	2.75"	3.78"	5.50"	1.89"
6.4	1"	200	8	BVT3BLB23O	BVT3BLB23E	2.0	3.0	90	XT-44-F1	XT-44-M1					
9.7	1"	200	8	BVT3CLB23O	BVT3CLB23E	2.0	3.0	90	XT-44-F1	XT-44-M1					
14.3	1"	200	8	BVT3DLB23O	BVT3DLB23E	2.0	3.0	90	XT-44-F1	XT-44-M1					
25.5	1"	200	8	BVT3ELB23O	BVT3ELB23E	2.0	3.0	90	XT-44-F1	XT-44-M1					
40	1"	200	8	BVT3X2B23O	BVT3X2B23E	2.0	3.0	90	XT-44-F1	XT-44-M1					
6.2	1 1/4"	200	12	BVT4ALB23O	BVT4ALB23E	2.3	3.3	125	XT-88-F1	XT-88-M1	8.00"	2.75"	4.45"	5.50"	2.22"
8.3	1 1/4"	200	12	BVT4CLB23O	BVT4CLB23E	2.3	3.3	125	XT-88-F1	XT-88-M1					
13.8	1 1/4"	200	12	BVT4DLB23O	BVT4DLB23E	2.3	3.3	125	XT-88-F1	XT-88-M1					
20	1 1/4"	200	12	BVT4ELB23O	BVT4ELB23E	2.3	3.3	125	XT-88-F1	XT-88-M1					
25	1 1/4"	200	12	BVT4FLB23O	BVT4FLB23E	2.3	3.3	125	XT-88-F1	XT-88-M1					
31	1 1/4"	200	12	BVT4GLB23O	BVT4GLB23E	2.3	3.3	125	XT-88-F1	XT-88-M1					
85	1 1/4"	200	12	BVT4X2B23O	BVT4X2B23E	2.3	3.3	125	XT-88-F1	XT-88-M1					
15.4	1 1/2"	200	13	BVT5BLB23O	BVT5BLB23E	3.0	5.0	125	XT-132-F1	XT-132-M1	8.50"	3.25"	4.86"	8.38"	2.43"
21.4	1 1/2"	200	13	BVT5CLB23O	BVT5CLB23E	3.0	5.0	125	XT-132-F1	XT-132-M1					
28	1 1/2"	200	13	BVT5DLB23O	BVT5DLB23E	3.0	5.0	125	XT-132-F1	XT-132-M1					
36.8	1 1/2"	200	13	BVT5ELB23O	BVT5ELB23E	3.0	5.0	125	XT-132-F1	XT-132-M1					
71.5	1 1/2"	200	13	BVT5FLB23O	BVT5FLB23E	3.0	5.0	125	XT-132-F1	XT-132-M1					
88	1 1/2"	200	13	BVT5X2B23O	BVT5X2B23E	3.0	5.0	125	XT-132-F1	XT-132-M1					
27.4	2"	200	18	BVT6BLB23O	BVT6BLB23E	3.0	5.0	125	XT-132-F1	XT-132-M1	8.50"	3.25"	5.02"	8.38"	2.51"
33.6	2"	200	18	BVT6CLB23O	BVT6CLB23E	3.0	5.0	125	XT-132-F1	XT-132-M1					
35.4	2"	200	18	BVT6DLB23O	BVT6DLB23E	3.0	5.0	125	XT-132-F1	XT-132-M1					
40	2"	200	18	BVT6ELB23O	BVT6ELB23E	3.0	5.0	125	XT-132-F1	XT-132-M1					
44	2"	200	18	BVT6FLB23O	BVT6FLB23E	3.0	5.0	125	XT-132-F1	XT-132-M1					
59	2"	200	18	BVT6GLB23O	BVT6GLB23E	3.0	5.0	125	XT-132-F1	XT-132-M1					
75.4	2"	200	18	BVT6HLB23O	BVT6HLB23E	3.0	5.0	125	XT-132-F1	XT-132-M1					
88	2"	200	18	BVT6X2B23O	BVT6X2B23E	3.0	5.0	125	XT-132-F1	XT-132-M1					

NOTES: 1) Full Port Cv is Represented by Shaded Area. 2) Califlo insert located inlet (AB)



# Series 24 / Spring Return



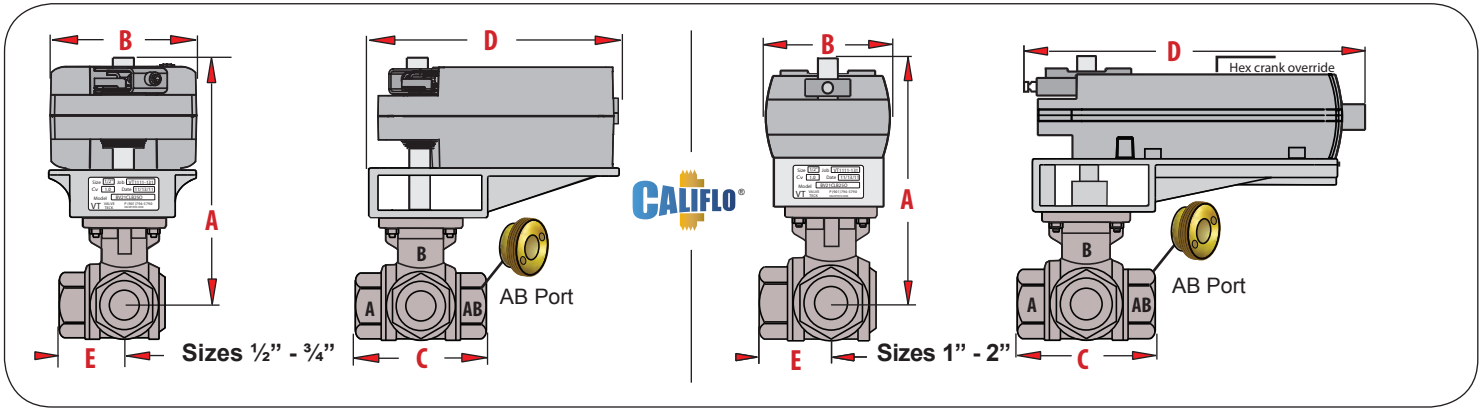
Standard Assembly: 1/2" - 2" Brass Nickel Plated Body with 304 Stainless Ball, 24 VAC/DC Power Supply

Cv	Size In	Close off psi	WT. (lb)	On/Off Model	Modulating Model	VA Rating		Speed 90° (sec.) Run / Spring	24 Series Operator		Dimensional Data (in) mm = in X 25.4			
						On/Off	Mod.		On/Off	Mod.	A	B	C	D
0.3	1/2"	200	6	BV21ALB24O	BV21ALB24E	6.5	4.5	30/15	XTS-20-Q1	XTS-20-M1	7.13"	2.75"	2.70"	4.75"
0.6	1/2"	200	6	BV21BLB24O	BV21BLB24E	6.5	4.5	30/15	XTS-20-Q1	XTS-20-M1				
1.0	1/2"	200	6	BV21CLB24O	BV21CLB24E	6.5	4.5	30/15	XTS-20-Q1	XTS-20-M1				
2.0	1/2"	200	6	BV21DLB24O	BV21DLB24E	6.5	4.5	30/15	XTS-20-Q1	XTS-20-M1				
3.0	1/2"	200	6	BV21ELB24O	BV21ELB24E	6.5	4.5	30/15	XTS-20-Q1	XTS-20-M1				
4.0	1/2"	200	6	BV21FLB24O	BV21FLB24E	6.5	4.5	30/15	XTS-20-Q1	XTS-20-M1				
5.0	1/2"	200	6	BV21GLB24O	BV21GLB24E	6.5	4.5	30/15	XTS-20-Q1	XTS-20-M1				
6.0	1/2"	200	6	BV21HLB24O	BV21HLB24E	6.5	4.5	30/15	XTS-20-Q1	XTS-20-M1				
9.0	1/2"	200	6	BV21ILB24O	BV21ILB24E	6.5	4.5	30/15	XTS-20-Q1	XTS-20-M1				
13	1/2"	200	6	BV21X2B24O	BV21X2B24E	6.5	4.5	30/15	XTS-20-Q1	XTS-20-M1				
0.6	3/4"	200	6	BV22ALB24O	BV22ALB24E	6.5	4.5	30/15	XTS-20-Q1	XTS-20-M1	7.50"	2.75"	3.07"	4.75"
1.3	3/4"	200	6	BV22BLB24O	BV22BLB24E	6.5	4.5	30/15	XTS-20-Q1	XTS-20-M1				
2.1	3/4"	200	6	BV22CLB24O	BV22CLB24E	6.5	4.5	30/15	XTS-20-Q1	XTS-20-M1				
5.0	3/4"	200	6	BV22DLB24O	BV22DLB24E	6.5	4.5	30/15	XTS-20-Q1	XTS-20-M1				
8.7	3/4"	200	6	BV22ELB24O	BV22ELB24E	6.5	4.5	30/15	XTS-20-Q1	XTS-20-M1				
9.9	3/4"	200	6	BV22FLB24O	BV22FLB24E	6.5	4.5	30/15	XTS-20-Q1	XTS-20-M1				
13.9	3/4"	200	6	BV22GLB24O	BV22GLB24E	6.5	4.5	30/15	XTS-20-Q1	XTS-20-M1				
24	3/4"	200	6	BV22X2B24O	BV22X2B24E	6.5	4.5	30/15	XTS-20-Q1	XTS-20-M1				
5.0	1"	200	7	BV23ALB24O	BV23ALB24E	5.0	5.0	90/15	XTS-62-Q1	XTS-62-M1	7.50"	3.25"	3.60"	8.38"
8.0	1"	200	7	BV23BLB24O	BV23BLB24E	5.0	5.0	90/15	XTS-62-Q1	XTS-62-M1				
14	1"	200	7	BV23CLB24O	BV23CLB24E	5.0	5.0	90/15	XTS-62-Q1	XTS-62-M1				
21	1"	200	7	BV23DLB24O	BV23DLB24E	5.0	5.0	90/15	XTS-62-Q1	XTS-62-M1				
32	1"	200	7	BV23ELB24O	BV23ELB24E	5.0	5.0	90/15	XTS-62-Q1	XTS-62-M1				
46	1"	200	7	BV23X2B24O	BV23X2B24E	5.0	5.0	90/15	XTS-62-Q1	XTS-62-M1				
8.0	1 1/4"	200	8	BV24ALB24O	BV24ALB24E	5.0	5.0	90/15	XTS-62-Q1	XTS-62-M1	7.75"	3.25"	3.94"	8.38"
11	1 1/4"	200	8	BV24CLB24O	BV24CLB24E	5.0	5.0	90/15	XTS-62-Q1	XTS-62-M1				
19	1 1/4"	200	8	BV24DLB24O	BV24DLB24E	5.0	5.0	90/15	XTS-62-Q1	XTS-62-M1				
23	1 1/4"	200	8	BV24ELB24O	BV24ELB24E	5.0	5.0	90/15	XTS-62-Q1	XTS-62-M1				
35	1 1/4"	200	8	BV24FLB24O	BV24FLB24E	5.0	5.0	90/15	XTS-62-Q1	XTS-62-M1				
105	1 1/4"	200	8	BV24X2B24O	BV24X2B24E	5.0	5.0	90/15	XTS-62-Q1	XTS-62-M1				
20	1 1/2"	200	12	BV25BLB24O	BV25BLB24E	8.0	9.0	90/15	XTS-160-Q1	XTS-160-M1	8.75"	4.00"	4.37"	12.50"
30	1 1/2"	200	12	BV25CLB24O	BV25CLB24E	8.0	9.0	90/15	XTS-160-Q1	XTS-160-M1				
35	1 1/2"	200	12	BV25DLB24O	BV25DLB24E	8.0	9.0	90/15	XTS-160-Q1	XTS-160-M1				
47	1 1/2"	200	12	BV25ELB24O	BV25ELB24E	8.0	9.0	90/15	XTS-160-Q1	XTS-160-M1				
102	1 1/2"	200	12	BV25FLB24O	BV25FLB24E	8.0	9.0	90/15	XTS-160-Q1	XTS-160-M1				
154	1 1/2"	200	12	BV25X2B24O	BV25X2B24E	8.0	9.0	90/15	XTS-160-Q1	XTS-160-M1				
20	2"	200	14	BV26BLB24O	BV26BLB24E	8.0	9.0	90/15	XTS-160-Q1	XTS-160-M1	8.88"	4.00"	4.93"	12.50"
30	2"	200	14	BV26CLB24O	BV26CLB24E	8.0	9.0	90/15	XTS-160-Q1	XTS-160-M1				
35	2"	200	14	BV26DLB24O	BV26DLB24E	8.0	9.0	90/15	XTS-160-Q1	XTS-160-M1				
40	2"	200	14	BV26ELB24O	BV26ELB24E	8.0	9.0	90/15	XTS-160-Q1	XTS-160-M1				
50	2"	200	14	BV26FLB24O	BV26FLB24E	8.0	9.0	90/15	XTS-160-Q1	XTS-160-M1				
60	2"	200	14	BV26GLB24O	BV26GLB24E	8.0	9.0	90/15	XTS-160-Q1	XTS-160-M1				
65	2"	200	14	BV26HLB24O	BV26HLB24E	8.0	9.0	90/15	XTS-160-Q1	XTS-160-M1				
70	2"	200	14	BV26ILB24O	BV26ILB24E	8.0	9.0	90/15	XTS-160-Q1	XTS-160-M1				
80	2"	200	14	BV26JLB24O	BV26JLB24E	8.0	9.0	90/15	XTS-160-Q1	XTS-160-M1				
150	2"	200	14	BV26LLB24O	BV26LLB24E	8.0	9.0	90/15	XTS-160-Q1	XTS-160-M1				
214	2"	200	14	BV26X2B24O	BV26X2B24E	8.0	9.0	90/15	XTS-160-Q1	XTS-160-M1				

NOTE: 1) Full Port Cv is Represented by Shaded Area.



# Series 24 / Spring Return



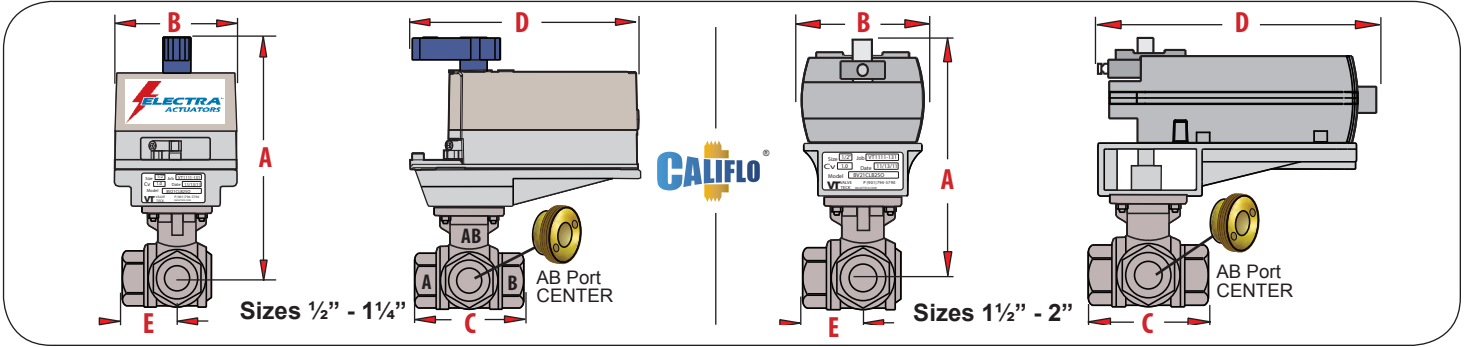
**Standard Assembly:** 1/2" - 2" Brass Nickel Plated Body with 304 Stainless Ball, 24 VAC/DC Power Supply

Cv	Size In	Close off psi	WT. (lb)	On/Off Model	Modulating Model	VA Rating		Speed 90° (sec.) Run / Spring	24 Series Operator		Dimensional Data (in) mm = in X 25.4				
						On/Off	Mod.		On/Off	Mod.	A	B	C	D	E
0.35	1/2"	200	6	BVT1ALB24O	BVT1ALB24E	6.5	4.5	30/15	XTS-20-Q1	XTS-20-M1	6.00"	2.75"	2.93"	4.75"	1.46"
0.5	1/2"	200	6	BVT1BLB24O	BVT1BLB24E	6.5	4.5	30/15	XTS-20-Q1	XTS-20-M1					
0.7	1/2"	200	6	BVT1CLB24O	BVT1CLB24E	6.5	4.5	30/15	XTS-20-Q1	XTS-20-M1					
1.8	1/2"	200	6	BVT1DLB24O	BVT1DLB24E	6.5	4.5	30/15	XTS-20-Q1	XTS-20-M1					
2.6	1/2"	200	6	BVT1ELB24O	BVT1ELB24E	6.5	4.5	30/15	XTS-20-Q1	XTS-20-M1					
3.5	1/2"	200	6	BVT1FLB24O	BVT1FLB24E	6.5	4.5	30/15	XTS-20-Q1	XTS-20-M1					
4.1	1/2"	200	6	BVT1GLB24O	BVT1GLB24E	6.5	4.5	30/15	XTS-20-Q1	XTS-20-M1					
5.0	1/2"	200	6	BVT1HLB24O	BVT1HLB24E	6.5	4.5	30/15	XTS-20-Q1	XTS-20-M1					
8.6	1/2"	200	6	BVT1ILB24O	BVT1ILB24E	6.5	4.5	30/15	XTS-20-Q1	XTS-20-M1					
13	1/2"	200	6	BVT1X2B24O	BVT1X2B24E	6.5	4.5	30/15	XTS-20-Q1	XTS-20-M1					
0.7	3/4"	200	7	BVT2ALB24O	BVT2ALB24E	6.5	4.5	30/15	XTS-20-Q1	XTS-20-M1	6.25"	2.75"	3.31"	4.75"	1.66"
1.8	3/4"	200	7	BVT2BLB24O	BVT2BLB24E	6.5	4.5	30/15	XTS-20-Q1	XTS-20-M1					
4.1	3/4"	200	7	BVT2CLB24O	BVT2CLB24E	6.5	4.5	30/15	XTS-20-Q1	XTS-20-M1					
8.0	3/4"	200	7	BVT2DLB24O	BVT2DLB24E	6.5	4.5	30/15	XTS-20-Q1	XTS-20-M1					
9.5	3/4"	200	7	BVT2ELB24O	BVT2ELB24E	6.5	4.5	30/15	XTS-20-Q1	XTS-20-M1					
11.1	3/4"	200	7	BVT2FLB24O	BVT2FLB24E	6.5	4.5	30/15	XTS-20-Q1	XTS-20-M1					
23	3/4"	200	7	BVT2X2B24O	BVT2X2B24E	6.5	4.5	30/15	XTS-20-Q1	XTS-20-M1					
4.2	1"	200	10	BVT3ALB24O	BVT3ALB24E	5.0	5.0	90/15	XTS-62-Q1	XTS-62-M1	6.50"	3.25"	3.78"	8.38"	1.89"
6.4	1"	200	10	BVT3BLB24O	BVT3BLB24E	5.0	5.0	90/15	XTS-62-Q1	XTS-62-M1					
9.7	1"	200	10	BVT3CLB24O	BVT3CLB24E	5.0	5.0	90/15	XTS-62-Q1	XTS-62-M1					
14.3	1"	200	10	BVT3DLB24O	BVT3DLB24E	5.0	5.0	90/15	XTS-62-Q1	XTS-62-M1					
25.5	1"	200	10	BVT3ELB24O	BVT3ELB24E	5.0	5.0	90/15	XTS-62-Q1	XTS-62-M1					
40	1"	200	10	BVT3X2B24O	BVT3X2B24E	5.0	5.0	90/15	XTS-62-Q1	XTS-62-M1					
6.2	1 1/4"	200	13	BVT4BLB24O	BVT4BLB24E	5.0	5.0	90/15	XTS-62-Q1	XTS-62-M1					
8.3	1 1/4"	200	13	BVT4CLB24O	BVT4CLB24E	5.0	5.0	90/15	XTS-62-Q1	XTS-62-M1					
13.8	1 1/4"	200	13	BVT4DLB24O	BVT4DLB24E	5.0	5.0	90/15	XTS-62-Q1	XTS-62-M1					
20	1 1/4"	200	13	BVT4ELB24O	BVT4ELB24E	5.0	5.0	90/15	XTS-62-Q1	XTS-62-M1					
25	1 1/4"	200	13	BVT4FLB24O	BVT4FLB24E	5.0	5.0	90/15	XTS-62-Q1	XTS-62-M1					
31	1 1/4"	200	13	BVT4GLB24O	BVT4GLB24E	5.0	5.0	90/15	XTS-62-Q1	XTS-62-M1					
85	1 1/4"	200	13	BVT4X2B24O	BVT4X2B24E	5.0	5.0	90/15	XTS-62-Q1	XTS-62-M1					
15.4	1 1/2"	200	14	BVT5BLB24O	BVT5BLB24E	8.0	9.0	90/15	XTS-160-Q1	XTS-160-M1	8.00"	4.00"	4.86"	12.50"	2.43"
21.4	1 1/2"	200	14	BVT5CLB24O	BVT5CLB24E	8.0	9.0	90/15	XTS-160-Q1	XTS-160-M1					
28	1 1/2"	200	14	BVT5DLB24O	BVT5DLB24E	8.0	9.0	90/15	XTS-160-Q1	XTS-160-M1					
36.8	1 1/2"	200	14	BVT5ELB24O	BVT5ELB24E	8.0	9.0	90/15	XTS-160-Q1	XTS-160-M1					
71.5	1 1/2"	200	14	BVT5FLB24O	BVT5FLB24E	8.0	9.0	90/15	XTS-160-Q1	XTS-160-M1					
88	1 1/2"	200	14	BVT5X2B24O	BVT5X2B24E	8.0	9.0	90/15	XTS-160-Q1	XTS-160-M1					
27.4	2"	200	25	BVT6BLB24O	BVT6BLB24E	8.0	9.0	90/15	XTS-160-Q1	XTS-160-M1					
33.6	2"	200	25	BVT6CLB24O	BVT6CLB24E	8.0	9.0	90/15	XTS-160-Q1	XTS-160-M1					
35.4	2"	200	25	BVT6DLB24O	BVT6DLB24E	8.0	9.0	90/15	XTS-160-Q1	XTS-160-M1					
40	2"	200	25	BVT6ELB24O	BVT6ELB24E	8.0	9.0	90/15	XTS-160-Q1	XTS-160-M1					
44	2"	200	25	BVT6FLB24O	BVT6FLB24E	8.0	9.0	90/15	XTS-160-Q1	XTS-160-M1					
59	2"	200	25	BVT6GLB24O	BVT6GLB24E	8.0	9.0	90/15	XTS-160-Q1	XTS-160-M1					
75.4	2"	200	25	BVT6HLB24O	BVT6HLB24E	8.0	9.0	90/15	XTS-160-Q1	XTS-160-M1					
88	2"	200	25	BVT6X2B24O	BVT6X2B24E	8.0	9.0	90/15	XTS-160-Q1	XTS-160-M1					

NOTES: 1) Full Port Cv is Represented by Shaded Area. 2) Califlo insert located inlet (AB)



# Series 23 / Non-Spring



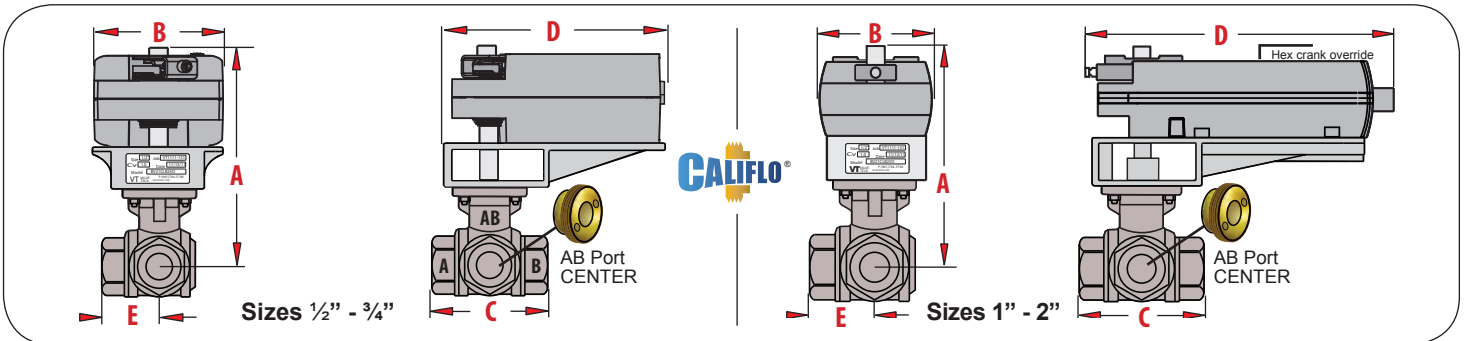
Standard Assembly: 1/2" - 2" Brass Nickel Plated Body with 304 Stainless Ball, 24 VAC Power Supply

Cv	Size In	Close off psi	WT. (lb)	On/Off Model	Modulating Model	VA Rating		Speed 90° (sec.)	23 Series Operator		Dimensional Data (in) mm = in X 25.4				
						On/Off	Mod.		On/Off	Mod.	A	B	C	D	E
0.35	1/2"	200	4	BVL1ALB23O	BVL1ALB23E	2.0	3.0	90	XT-44-F1	XT-44-M1	7.25"	2.75"	2.93"	5.50"	1.46"
0.5	1/2"	200	4	BVL1BLB23O	BVL1BLB23E	2.0	3.0	90	XT-44-F1	XT-44-M1					
0.7	1/2"	200	4	BVL1CLB23O	BVL1CLB23E	2.0	3.0	90	XT-44-F1	XT-44-M1					
1.6	1/2"	200	4	BVL1DLB23O	BVL1DLB23E	2.0	3.0	90	XT-44-F1	XT-44-M1					
2.3	1/2"	200	4	BVL1ELB23O	BVL1ELB23E	2.0	3.0	90	XT-44-F1	XT-44-M1					
2.6	1/2"	200	4	BVL1FLB23O	BVL1FLB23E	2.0	3.0	90	XT-44-F1	XT-44-M1					
3.2	1/2"	200	4	BVL1GLB23O	BVL1GLB23E	2.0	3.0	90	XT-44-F1	XT-44-M1					
4.2	1/2"	200	4	BVL1HLB23O	BVL1HLB23E	2.0	3.0	90	XT-44-F1	XT-44-M1					
4.4	1/2"	200	4	BVL1ILB23O	BVL1ILB23E	2.0	3.0	90	XT-44-F1	XT-44-M1					
7.9	1/2"	200	4	BVL1X2B23O	BVL1X2B23E	2.0	3.0	90	XT-44-F1	XT-44-M1					
11	3/4"	200	5	BVL2X2B23O	BVL2X2B23E	2.0	3.0	90	XT-44-F1	XT-44-M1	7.50"	2.75"	3.31"	5.50"	1.66"
17	1"	200	8	BVL3X2B23O	BVL3X2B23E	2.0	3.0	90	XT-44-F1	XT-44-M1	7.75"	2.75"	3.78"	5.50"	1.89"
29	1 1/4"	200	12	BVL4X2B23O	BVL4X2B23E	2.3	3.3	125	XT-88-F1	XT-88-M1	8.00"	2.75"	4.45"	5.50"	2.22"
38	1 1/2"	200	13	BVL5X2B23O	BVL5X2B23E	3.0	5.0	125	XT-132-F1	XT-132-M1	8.50"	3.25"	4.86"	8.38"	2.43"
40	2"	200	18	BVL6X2B23O	BVL6X2B23E	3.0	5.0	125	XT-132-F1	XT-132-M1	8.50"	3.25"	5.02"	8.38"	2.51"

NOTES: 1) Full Port Cv is Represented by Shaded Area. 2) Califlo insert located inlet (AB)



# Series 24 / Spring Return

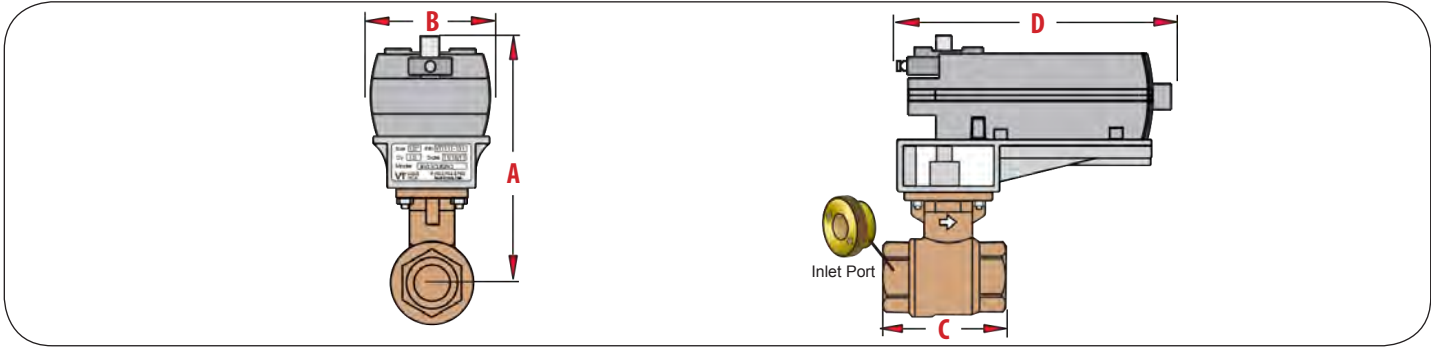


Standard Assembly: 1/2" - 2" Brass Nickel Plated Body with 304 Stainless Ball, 24 VAC/DC Power Supply

Cv	Size In	Close off psi	WT. (lb)	On/Off Model	Modulating Model	VA Rating		Speed 90° (sec.) Run / Spring	24 Series Operator		Dimensional Data (in) mm = in X 25.4				
						On/Off	Mod.		On/Off	Mod.	A	B	C	D	E
0.35	1/2"	200	6	BVL1ALB24O	BVL1ALB24E	6.5	4.5	30/15	XTS-20-Q1	XTS-20-M1	6.00"	2.75"	2.93"	4.75"	1.46"
0.5	1/2"	200	6	BVL1BLB24O	BVL1BLB24E	6.5	4.5	30/15	XTS-20-Q1	XTS-20-M1					
0.7	1/2"	200	6	BVL1CLB24O	BVL1CLB24E	6.5	4.5	30/15	XTS-20-Q1	XTS-20-M1					
1.6	1/2"	200	6	BVL1DLB24O	BVL1DLB24E	6.5	4.5	30/15	XTS-20-Q1	XTS-20-M1					
2.3	1/2"	200	6	BVL1ELB24O	BVL1ELB24E	6.5	4.5	30/15	XTS-20-Q1	XTS-20-M1					
2.6	1/2"	200	6	BVL1FLB24O	BVL1FLB24E	6.5	4.5	30/15	XTS-20-Q1	XTS-20-M1					
3.2	1/2"	200	6	BVL1GLB24O	BVL1GLB24E	6.5	4.5	30/15	XTS-20-Q1	XTS-20-M1					
4.2	1/2"	200	6	BVL1HLB24O	BVL1HLB24E	6.5	4.5	30/15	XTS-20-Q1	XTS-20-M1					
4.4	1/2"	200	6	BVL1ILB24O	BVL1ILB24E	6.5	4.5	30/15	XTS-20-Q1	XTS-20-M1					
7.9	1/2"	200	6	BVL1X2B24O	BVL1X2B24E	6.5	4.5	30/15	XTS-20-Q1	XTS-20-M1					
11	3/4"	200	7	BVL2X2B24O	BVL2X2B24E	6.5	4.5	30/15	XTS-20-Q1	XTS-20-M1	6.25"	2.75"	3.31"	4.75"	1.66"
17	1"	200	10	BVL3X2B24O	BVL3X2B24E	5.0	5.0	90/15	XTS-62-Q1	XTS-62-M1	6.50"	3.25"	3.78"	8.38"	1.89"
29	1 1/4"	200	13	BVL4X2B24O	BVL4X2B24E	5.0	5.0	90/15	XTS-62-Q1	XTS-62-M1	6.63"	3.25"	4.45"	8.38"	2.22"
38	1 1/2"	200	14	BVL5X2B24O	BVL5X2B24E	8.0	9.0	90/15	XTS-160-Q1	XTS-160-M1	8.00"	4.00"	4.86"	12.50"	2.43"
40	2"	200	25	BVL6X2B24O	BVL6X2B24E	8.0	9.0	90/15	XTS-160-Q1	XTS-160-M1	8.00"	4.00"	5.02"	12.50"	2.51"

NOTES: 1) Full Port Cv is Represented by Shaded Area. 2) Califlo insert located inlet (AB)

# Series 23 / Non-Spring (2½" - 3")

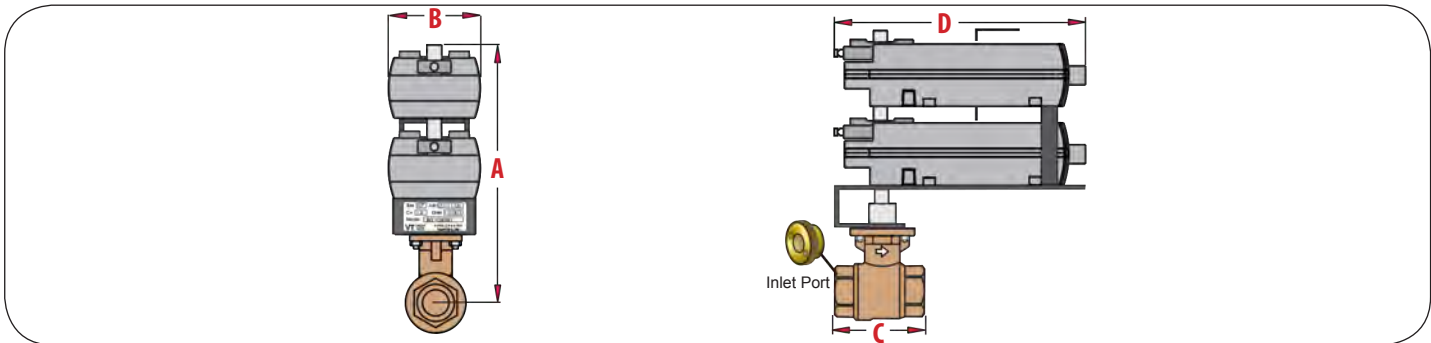


Standard Assembly: 2½" - 3" Bronze Body with 304 Stainless Ball, 24 VAC Power Supply

Cv	Size In	Close off psi	WT. (lb)	On/Off Model	Modulating Model	VA Rating		Speed 90° (sec.)	23 Series Operator		Dimensional Data (in) mm = in X 25.4			
						On/Off	Mod.		On/Off	Mod.	A	B	C	D
60	2½"	200	17	BV27CLB23O	BV27CLB23E	7.0	8.0	125	XT-310-F1	XT-310-M1	9.50"	4.00"	6.50"	12.50"
75	2½"	200	17	BV27DLB23O	BV27DLB23E	7.0	8.0	125	XT-310-F1	XT-310-M1				
110	2½"	200	17	BV27ELB23O	BV27ELB23E	7.0	8.0	125	XT-310-F1	XT-310-M1				
140	2½"	200	17	BV27FLB23O	BV27FLB23E	7.0	8.0	125	XT-310-F1	XT-310-M1				
165	2½"	200	17	BV27GLB23O	BV27GLB23E	7.0	8.0	125	XT-310-F1	XT-310-M1				
503	2½"	200	17	BV27X2B23O	BV27X2B23E	7.0	8.0	125	XT-310-F1	XT-310-M1	9.88"	4.00"	7.40"	12.50"
70	3"	200	21	BV28CLB23O	BV28CLB23E	7.0	8.0	125	XT-310-F1	XT-310-M1				
100	3"	200	21	BV28DLB23O	BV28DLB23E	7.0	8.0	125	XT-310-F1	XT-310-M1				
150	3"	200	21	BV28ELB23O	BV28ELB23E	7.0	8.0	125	XT-310-F1	XT-310-M1				
200	3"	200	21	BV28FLB23O	BV28FLB23E	7.0	8.0	125	XT-310-F1	XT-310-M1				
260	3"	200	21	BV28GLB23O	BV28GLB23E	7.0	8.0	125	XT-310-F1	XT-310-M1				
734	3"	200	21	BV28X2B23O	BV28X2B23E	7.0	8.0	125	XT-310-F1	XT-310-M1				

NOTE: 1) Full Port Cv is Represented by Shaded Area.

# Series 24 / Spring Return (2½" - 3")



Standard Assembly: 2½" - 3" Bronze Body with 304 Stainless Ball, 24 VAC/DC Power Supply

Cv	Size In	Close off psi	WT. (lb)	On/Off Model	Modulating Model	VA Rating		Speed 90° (sec.) Run / Spring	24 Series Operator		Dimensional Data (in) mm = in X 25.4			
						On/Off	Mod.		On/Off	Mod.	A	B	C	D
60	2½"	200	23	BV27CLB24O	BV27CLB24E	16.0	18.0	90/15	2-XTS-160-Q1	2-XTS-160-D1	11.50"	4.00"	6.50"	12.50"
75	2½"	200	23	BV27DLB24O	BV27DLB24E	16.0	18.0	90/15	2-XTS-160-Q1	2-XTS-160-D1				
110	2½"	200	23	BV27ELB24O	BV27ELB24E	16.0	18.0	90/15	2-XTS-160-Q1	2-XTS-160-D1				
140	2½"	200	23	BV27FLB24O	BV27FLB24E	16.0	18.0	90/15	2-XTS-160-Q1	2-XTS-160-D1				
165	2½"	200	23	BV27GLB24O	BV27GLB24E	16.0	18.0	90/15	2-XTS-160-Q1	2-XTS-160-D1				
503	2½"	200	23	BV27X2B24O	BV27X2B24E	16.0	18.0	90/15	2-XTS-160-Q1	2-XTS-160-D1	11.88"	4.00"	7.40"	12.50"
70	3"	200	27	BV28CLB24O	BV28CLB24E	16.0	18.0	90/15	2-XTS-160-Q1	2-XTS-160-D1				
100	3"	200	27	BV28DLB24O	BV28DLB24E	16.0	18.0	90/15	2-XTS-160-Q1	2-XTS-160-D1				
150	3"	200	27	BV28ELB24O	BV28ELB24E	16.0	18.0	90/15	2-XTS-160-Q1	2-XTS-160-D1				
200	3"	200	27	BV28FLB24O	BV28FLB24E	16.0	18.0	90/15	2-XTS-160-Q1	2-XTS-160-D1				
260	3"	200	27	BV28GLB24O	BV28GLB24E	16.0	18.0	90/15	2-XTS-160-Q1	2-XTS-160-D1				
734	3"	200	27	BV28X2B24O	BV28X2B24E	16.0	18.0	90/15	2-XTS-160-Q1	2-XTS-160-D1				

NOTE: 1) Full Port Cv is Represented by Shaded Area.

# Series 23 / Non-Spring Return



XT-44 (44 in-lbs) XT-88 (88 in-lbs)		XT-132 (132 in-lbs)		XT-221 (221 in-lbs) XT-310 (310 in-lbs)	
<b>Power Supply</b>	24 VAC ±20%	<b>Power Supply</b>	24 VAC ±20%	<b>Power Supply</b>	24 VAC ±20%
<b>Power Consumption</b>	Floating / On-Off: 2.3 VA Modulating: 3.3 VA	<b>Power Consumption</b>	Floating / On-Off: 3 VA Modulating: 5 VA	<b>Power Consumption</b>	Floating / On-Off: 7 VA Modulating: 8 VA
<b>Speed</b>	XT-44: 90 sec. 90° XT-88: 125 sec. 90°	<b>Speed</b>	125 sec. 90°	<b>Speed</b>	125 sec. 90°
<b>Electrical Connection</b>	18 AWG / 3 ft. long cable	<b>Electrical Connection</b>	18 AWG / 3 ft. long cable	<b>Electrical Connection</b>	18 AWG / 3 ft. long cable
<b>Motor</b>	100% duty with electronic sensing protection	<b>Motor</b>	100% duty with electronic sensing protection	<b>Motor</b>	100% duty with electronic sensing protection
<b>Input Signal</b>	Floating / On-Off or Modulating controls	<b>Input Signal</b>	Floating / On-Off or Modulating controls	<b>Input Signal</b>	Floating / On-Off or Modulating controls
<b>Rotation Direction</b>	Valve set clockwise to close	<b>Rotation Direction</b>	Valve set clockwise to close	<b>Rotation Direction</b>	Valve set clockwise to close
<b>Agency Listing</b>	UL E35198 / NEMA 2 / IP54	<b>Agency Listing</b>	UL E35198 / NEMA 2 / IP54	<b>Agency Listing</b>	UL E35198 / NEMA 2 / IP54
<b>Manual Override</b>	Declutch type	<b>Manual Override</b>	Declutch type	<b>Manual Override</b>	Declutch type
<b>Floating / On-Off</b> 24 VAC Transformer 		<b>Floating / On-Off</b> 24 VAC Transformer 		<b>Floating / On-Off</b> 24 VAC Transformer 	
<b>Modulating</b> 24 VAC Transformer 		<b>Modulating</b> 24 VAC Transformer 		<b>Modulating</b> 24 VAC Transformer 	

# Series 24 / Spring Return

XTS-20 (20 in-lbs)		XT-62 (62 in-lbs)		XT-160 (160 in-lbs)	
<b>Power Supply</b>	24 VAC/DC ±20% 120 VAC ±15%	<b>Power Supply</b>	24 VAC ±20% / 24 VDC ±15% 120 VAC ±10%	<b>Power Supply</b>	24 VAC ±20% / 24 VDC ±10% 120 VAC ±10%
<b>Power Consumption</b>	On-Off: 6.5 VA Modulating: 4.5 VA	<b>Power Consumption</b>	On-Off: 5 VA Modulating: 5 VA	<b>Power Consumption</b>	On-Off: 8 VA Modulating: 9 VA
<b>Speed</b>	30 sec. / spring 15 sec. 90°	<b>Speed</b>	90 sec. / spring 15 sec. 90°	<b>Speed</b>	90 sec. / spring 15 sec. 90°
<b>Electrical Connection</b>	18 AWG / 3 ft. long cable	<b>Electrical Connection</b>	18 AWG / 3 ft. long cable	<b>Electrical Connection</b>	18 AWG / 3 ft. long cable
<b>Motor</b>	100% duty with electronic sensing protection	<b>Motor</b>	100% duty with electronic sensing protection	<b>Motor</b>	100% duty with electronic sensing protection
<b>Input Signal</b>	Floating, On-Off, or Modulating controls	<b>Input Signal</b>	Floating, On-Off, or Modulating controls	<b>Input Signal</b>	Floating, On-Off, or Modulating controls
<b>Rotation Direction</b>	Valve set clockwise to close	<b>Rotation Direction</b>	Valve set clockwise to close	<b>Rotation Direction</b>	Valve set clockwise to close
<b>Agency Listing</b>	UL E35198 / NEMA 1 / IP40	<b>Agency Listing</b>	UL E35198 / NEMA 2 / IP54	<b>Agency Listing</b>	UL E35198 / NEMA 2 / IP54
<b>Manual Override</b>	None	<b>Manual Override</b>	Hex Key Type	<b>Manual Override</b>	Hex Key Type
<b>On-Off</b> 24 VAC 		<b>On-Off</b> 24 VAC 		<b>On-Off</b> 24 VAC 	
<b>On-Off</b> 120 VAC 		<b>On-Off</b> 120 VAC 		<b>On-Off</b> 120 VAC 	
<b>Modulating</b> 24 VAC Transformer 		<b>Modulating</b> 24 VAC Transformer 		<b>Modulating</b> 24 VAC Transformer 	

# Specification

## Two-Way and Three-Way Valves

1. Valves ½" through 2" shall be forged brass body with nickel plating with female threaded NPT connections.
2. The ball and shaft are constructed out of stainless steel, with the stem being blow out proof design.
3. The valves seats shall be of PTFE Teflon® with an EPDM elastometer backing 100% bubble tight close off, class VI (6). Three-way valves shall have a (4)-seat design for bubble tight close off in the through port and by-pass port. Two-way and three-way valves that do not close off 100% will not be accepted.
4. Valves shall have an extended neck for insulation clearance.
5. The steam seal consisting of (2) EPDM O-rings are designed for long service life and to be maintenance free for the life of the valve. In addition to the O-rings, a PTFE packing ring with threaded adjustable packing gland shall be provided and allows for field adjustment of the packing without removing the valve from the line. The threaded adjustable packing gland will retain the packing under design pressure with the linkage removed.
6. On/Off control valves shall be sized for full port. Modulating / floating control valves shall be sized with a Califlo® "calibrated flow" orifice, that allows for accurate sizing, constructed of brass and threads into the ball valve and is blow out proof. The Califlo® insert achieves an equal percentage flow response in both 2-way and 3-way valves. 3-way ball valves bypass port is modified linear flow response which shall yield 80% of the inlet port. Valves with plastic disc held in place with snap rings are not acceptable.
7. Control valves shall have an ISO type 4 bolt flange for mounting the actuator in any orientation parallel or perpendicular to the pipe (not upside-down). A thermal air gap in the mounting kit shall separate the valve flange from the actuator and protect the actuator against extreme temperatures and condensation.
8. The mounting kit bracket and coupler shall also provide stable direct coupled mechanical connection between the valve and the actuator to prevent side loading forces from acting on the stem and packing material.
9. Two-way valve bodies ½"-2" rated for 600 WOG. Three-way valve bodies ½"- 1¼" rated for 600 WOG, 1½"-2" rated for 400 WOG.
10. 2-way and 3-way valve assemblies are rated 200 psi close off against system pressure.

## Actuators

1. Actuators shall be third party approved Underwriters Laboratories listed file number E35198 and CE compliant.
2. Actuators shall have NEMA 2 (IP54) enclosure for indoor and protected applications.
3. Actuators shall have position indicator and graduated scale on each actuator for travel confirmation.
4. The actuator shall be capable of providing the minimum torque required for 200 psi close off against system pump shut off head.
5. Each actuator shall have current limiting circuitry or microprocessor integral overload protection throughout the entire operating range in both directions to prevent damage to the actuator.
6. Each actuator shall have the ability to manually position the valve on loss of power.
7. Applications that require fail safe operation of the valve assembly shall use actuators with mechanical spring return and switchable from fail open, to fail closed in the field without actuator replacement.
8. Actuators shall function properly within a range of 85% to 120% of nameplate voltage with uniform movement of controlled device from limit to limit, when operated at rated voltage.
9. Actuator designed to be directly coupled to the valve shaft with self-centering shaft jaws that ensure maximum torque transfer without slippage. The actuator should be mounted to the valve with at least two points of attachment.
10. Optional auxiliary switches are integral inside the actuator.
11. Actuator motors shall be brushless DC motor technology type. Brushed motors are not acceptable.
12. Modulating actuators shall accept a 0-10 VDC input signal and provide a 0-10 VDC output signal to confirm valve travel. Actuators are capable of stopping at all points across the full range and starting in either direction from any point in the range.
13. All actuators shall have a minimum 3-foot cable for easy installation into a junction box.
14. Reinforced nylon gearing with steel shafts and copper alloy bearings that are pressed into the actuator enclosure that is greased for long service life.



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