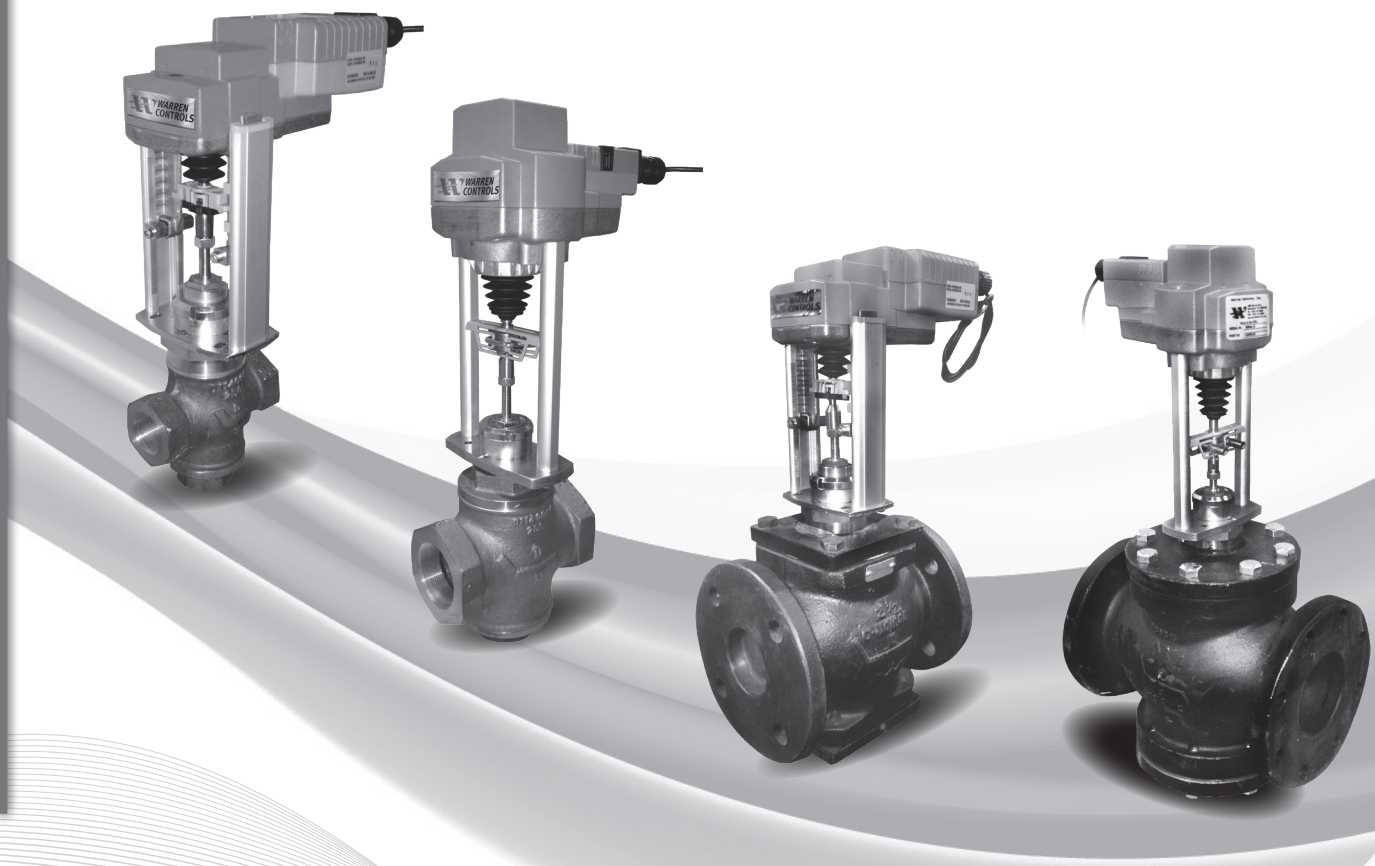
HVAC/BAC

ELECTRIC

Control Valve Products for

HVAC / BAC

(Heating, Ventilation, and Air Conditioning / Building Automation Control)



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WARREN CONTROLS

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DEPENDABLE, RUGGED, PRECISION CONTROL VALVES AND ACCESSORIES

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Control Valve Products for HVAC/BAC

Specifying and buying a control valve begins with an understanding of the control and piping systems to which it will be connected. The Warren Controls staff has attempted to make the ordering process "user friendly" by placing products into well-defined categories and tabulating information like pipe size, body and trim materials, and flow capacity factors (Cv), followed by an assortment of actuators … a lot of information, in a logical format, intended to make your work as easy as possible.

Customer Service
Technical Support

(800) 922-0085 or (610) 317-0800
Mon-Fri: 8:30 AM - 5:00 PM EST

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SELECTING A CONTROL VALVE

An introduction to control valve selection

Warren Controls offers control valve configurations to meet the needs of nearly any building automation control system. A configuration is a valve body assembly, complete with an actuator that can open and close the valve, or modulate the valve plug to control flow. Stem operating forces are dependent upon packing friction, the size of the seat opening, or area of imbalance, and the differential pressure against which the valve must operate or close. For each configuration, the tables include information about capacity (Cv), materials of construction, body end connections and shut-off capability (differential pressure). Actuator selections include a variety of electric operators. Each configuration is identified by a valve body code plus an actuator code. Contact us if you need to explore additional possibilities.

Fluid flow into, or through a load can be controlled in two ways. The first is by installing a two-way valve inline (in series) with the load; the second is by using a three-way valve to bypass part, or all of the flow around the load.

TWO-WAY VALVES are available in three styles: single-seat (unbalanced), single-seat cylinder balanced, and double-seat. Single-seat (unbalanced) and single-seat cylinder balanced valves have a single plug and one seat opening. Double-seat valves have two plugs on a common shaft, and two seat openings for parallel flow inside the body. Each style has specific advantages. The single-seat (unbalanced) valve, having one seat opening with a single unbalanced moveable plug, is capable of tight shut-off. A disadvantage is that large valves, or valves closing against high differential pressures require large powerful actuators. The single-seat cylinder balanced valve, having one seat opening with a single balanced moveable plug, is also capable of tight shut-off. An advantage is that the balanced plug design allows for smaller less powerful actuators to be used. All Warren single-seat valves, both unbalanced and cylinder balanced, are capable of seat closure in accordance with both ANSI B16.104 (1976) Class III (0.1% of full Cv) and Class IV (.01% of full Cv). Shut-off differential pressures may be less if Class IV seat closure is required.

DOUBLE-SEAT BALANCED VALVES direct flow upward through one seat and downward through the other, so differential pressure produces an upward force on one plug, and a downward force on the other. Since both plugs are on a common shaft, the two forces oppose each other and the actuator only has to overcome the difference between the two. Large, double-seat valves can be operated by relatively small, inexpensive actuators. A disadvantage is since both plugs are on a common shaft, tight shut-off is not always possible due to the differing rates of thermal expansion between the plugs and the valve body. Seat closure is ANSI B16.104 (1976) CLASS III (0.1% of full Cv) for fluid temperatures to 72ºF. For fluid temperatures above 72ºF the seat closure drops to CLASS II (0.5% of full Cv). Double seated valves are recommended when tight shut-off is not required. All of these factors were considered in preparing catalog tables, and the differential pressures against which a selected valve can close appear on the same line with the valve/actuator configuration codes.

THREE-WAY VALVES for bypass control are available in two styles. Diverting valves are installed in the load device's inlet piping, and direct flow either through, or around the load. This is sometimes referred to as "diverging" control. Warren Controls diverting valves use cylindrical plugs, which are relatively insensitive to differential pressure, so actuators tend to be smaller than those on mixing valves of similar sizes.

Of the 3-way valves Warren Controls offers, the diverting is a bit more costly design than the mixing style and does not offer fine modulating control at extreme ends of stroke like a mixing valve can achieve. Further, the diverting style is limited to 50 PSI differential pressure and can only achieve ANSI Class II leakage (0.5% of full rated flow). For these reasons, unless it is predetermined via piping that the bypass application take place on the inlet side of the load, the 3-way mixing valve is always the better choice for bypass

MIXING VALVES are installed in the load device's outlet piping, and accept flow either from the load, and/or from the bypass line, combining the two flowing streams in their discharge piping. They can also be used to mix fluids coming from separate sources, such as adding cool water to temper a hot water stream. These valves are recommended for modulating control, and can achieve seat closure similar to a single-seat valve against either inlet stream.

When the calculated valve size is smaller than the system pipe size, pipe reducers can be used. If the difference is more than two pipe sizes, control will be improved by locating the reducer at least ten (10) of the smaller pipe diameters away from the valve inlet, in a straight run of pipe. This allows induced turbulence to subside before the fluid enters the control valve.

The inherent (constant pressure) flow characteristics of these globe valves are determined by the machined shapes of their plugs. Equal percentage trim, most frequently specified for control valves, has several advantages over other trim styles. Flow area increases slowly as the plug begins to move out of the seat, and the rate of increase gets larger as movement continues. At low flow rates, change occurs slowly, adding stability to the control scheme. Much larger incremental increases in flow area, beyond the 50% point in stem travel, can help to compensate for typical decreases in available pumping pressure, and increased piping and heat exchanger friction losses at higher flow rates.

The widely acclaimed ValveWorks® sizing and selection software can be used to determine correct Cv, actuator size and to ensure special conditions such as cavitation, flashing and choked flow are known about, with the ability to 'tune' your application to make these conditions disappear. Refer to the Warren Controls website www.warrencontrols.com to receive your free copy. Alternately for the less adventurous, contact your local representative and they will be glad to manage your application for you inside ValveWorks®, providing comprehensive performance reports for up to four process conditions, full construction details and flow curves for each valve of your project. Over 90% of all problems related to control valves after commissioning are generally related to issues that could have been identified and resolved with a program like ValveWorks®!

CONTROL VALVE DETAILS

CONTROL VALVE APPLICATION:

The Warren Controls HVAC / BAC Series modulating globe style control valves provide excellent throttling characteristics and typically have an ideal installed rangeability of 50:1 with the range of pneumatic and electric actuators that we offer. We recommend accurate sizing and selection through the use of ValveWorks® for the best results or alternately through the MAX capacity flow tables on pages 6-7 to gain an assessment on maximum capacity when a valve is 100% open.

In this market segment, the Warren Controls brand and HVAC / BAC series has been widely recognized for many years now as the premier brand of control valves with its heavy duty construction and robust actuation offering many years of problem free operation. Most of the applications in this market require very slow and infrequent but precise movements from the actuator. Warren Controls offers a wide range of quality, long-life actuators to choose from with these characteristics in mind.

The electric actuators have up to 300 parts of resolution of movement with respect to the control signal. However, the electric actuators operate at relatively slow speeds, usually in the range of 40 to 120 seconds to fully stroke the valve, making them well suited to the applications in this market. Further there are choices to make for fail mode and close off force.

CONTROL VALVE PACKING:

Warren Controls offers two types of packing glands around the valve stems of the HVAC - BAC series control valves.

EPDM LIP PACKING (STANDARD):

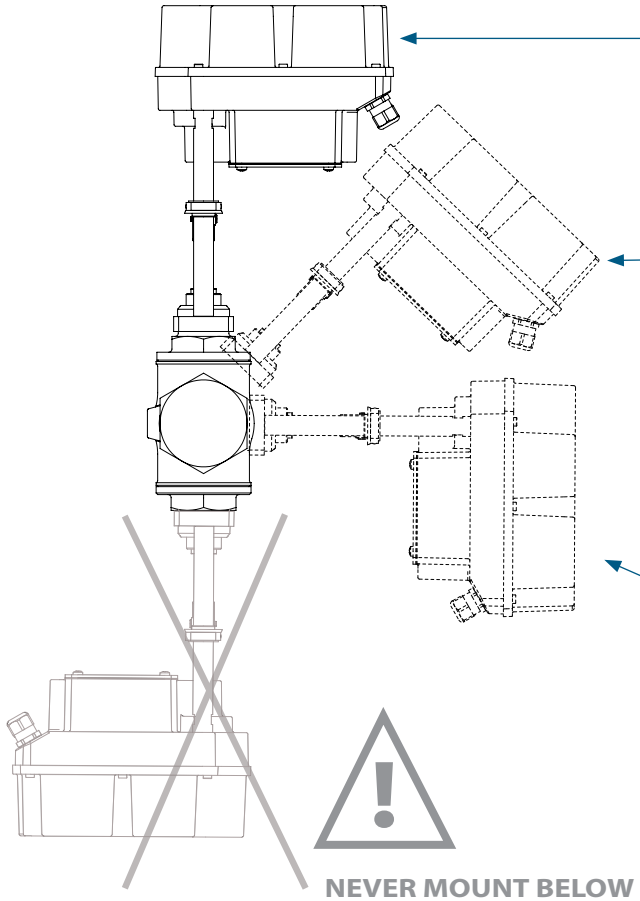
This proven design is particularly well suited to common water and water/glycol and low pressure steam applications common in HVAC and Building Automation Controls. This ethylene propylene compound is suitable for water or water glycol applications from 32°F to 350°F. Many chiller applications are driving temperatures even lower approaching the lower limits for Teflon V-Rings. Also, heated water systems are frequently improperly filtered for dissolved solids. In such systems mineral deposits tend to form on valve stems. Teflon V-Rings over time are no match for the abrasive action of the deposits on a sliding valve stem. The EPDM Lip packing has a higher surface contact area and does a better job keeping the stem clean in these dissolved solid fluids.

TEFLON V-RING (OPTIONAL):

This proven design has been a Warren Controls standard for many years and is generally impervious to a wide range of process fluids from 40°F to 400°F. The v-rings do an excellent job of providing a solid seal while allowing for low stem friction. The packing set includes a stainless steel spring for a preset load on the packing gland. This packing arrangement is self-adjusting.

For the best possible packing life in Water Applications follow the Warren Controls Water Quality Guidelines.

▶ Control Valve Orientation



VERTICAL ABOVE PIPING

This is the recommended position for mounting as it is the best position to ensure the service life of the equipment; however this is where it will encounter the most heat and sound vibrations.

45º FROM VERTICAL ABOVE PIPING ON EITHER SIDE

You may mount in this position to try to reduce the heat in high temperature applications; however this will reduce the life of the packing.

90º TO PIPING HORIZONTAL ON EITHER SIDE

This orientation provides the best temperature relief w/ higher fluid temperatures but places the greatest strain on the valve packing, reducing packing life.

WATER QUALITY GUIDELINES

FLUID QUALITY AND SERVICE LIFE GUIDE LINES

The purpose of these guidelines is to avoid valve and water systems problems caused by poor water quality in HVAC systems. While all cooling and heating systems are susceptible to problems, closed chilled water systems, including those containing brine or glycol, are especially prone to system and valve problems. To achieve the satisfactory operation and maximum life of your Warren Controls valve, it is important that the following recommendations are adhered to and that a water treatment, filtration and control specialist be consulted before the system start-up.

WATER QUALITY RECOMMENDED PARAMETERS

Chilled Water, Closed Loops, and Hot Water Systems up to 212ºF (100ºC).

	8.0	<	**pH**	<	10.3
			Conductivity	<	3000 MMHS
			Iron	<	0.5 ppm
			Cooper	<	.05 ppm
Chilled Systems →	100 ppm	<	**Molybdenum** *(Mild Steel Corrosion Inhibitor)*	<	150 ppm
Hot Systems →	200 ppm	<	**Molybdenum** *(Mild Steel Corrosion Inhibitor)*	<	250 ppm
	400 ppm	<	**Nitrite** *(Mild Steel Corrosion Inhibitor)*	<	1000 ppm
			Azole *(Yellow Metal Inhibitor)*	>	5 ppm free and available
			Bacteria	<	1000 cells/ml (when system is cool)

Water hardness should be less than 100 ppm of hard water ions (Ca++, Mg++), where 17.1 ppm = 1 Grain Hardness. Additionally, levels of chloride and sulfate should remain less than 25 ppm. When water hardness is at unacceptable levels, a water softener expert should be consulted.

WATER AND GLYCOL SOLUTIONS

The commonly used heat transfer glycol fluids are, either ethylene glycol or propylene glycol. Glycol concentrations of <25% often do not provide sufficient corrosion inhibiting properties and at levels <20% can actually provide a food source for bacteria. As bacteria consume the food and die off, a highly acidic condition can result. The recommended concentration for popular glycol based solutions is 25% to 60%.

CAUTION

1. The use of hydranzine can result in the formation of ammonia and must be controlled to prevent stress corrosion and embrittlement, which can lead to fracture of some brass alloys.
2. If there is a known, or suspected, presence of oil in the water in a system it is highly recommended to use valves with stainless steel trim. Valves with stainless steel trim contains Teflon packing and Fluoraz seals that should not be affected by the presence of oil. Valves with bronze trim contain ethylene propylene packing and seals that could swell in the presence of oil and cause valve sticking problems.
3. Systems should be designed using common, standard, good practices as outlined by ASME. Cautioon should be taken as to turbulence in flow caused b the elbows or other equipment as this can affect performance.
4. Valves are to be installed by skilled personnel and in strict accordance with the installation instructions and local regulations.
5. Observe all safety practices when working with systems. Never service a valve in use.

▶ Maximum Water Capacities (GPM)

SINGLE SEAT UNBALANCED & CYLINDER BALANCED VALVES

Valve Size (IN)	Available Sizing Pressure Differential - DP (PSI)															MAX DP
	1	2	4	6	8	10	15	20	25	30	40	50	60	80	100	
1/2	4.9	7	10	12	14	15	19	22	25	27	31	35	38	44	49	100 PSI for SS Trim 40 PSI for Bronze Trim
3/4	7.2	10	14	18	20	23	28	32	36	39	46	51	56	64	72	
1	10	14	20	24	28	32	39	45	50	55	63	71	77	89	100	
1-1/4	22.2	31	44	54	63	70	86	99	111	122	140	157	172	199	222	
1-1/2	24	34	48	59	68	76	93	107	120	131	152	170	186	215	240	
2	40	57	80	98	113	126	155	179	200	219	253	283	310	358	400	
2-1/2	65	92	130	159	184	206	252	291	325	356	411	460	503	581	650	
3	90	127	180	220	255	285	349	402	450	493	569	636	697	805	900	
4	170	240	340	416	481	538	658	760	850	931	1075	1202	1317	1521	1700	
5	280	396	560	686	792	885	1084	1252	1400	1534	1771	1980	2169	2504	2800	
6	360	509	720	882	1018	1138	1394	1610	1800	1972	2277	2546	2789	3220	3600	
8	450	636	900	1102	1273	1423	1743	2012	2250	2465	2846	3182	3486	4025	4500	

↑ Also Equal to CV of Valve

DOUBLE SEAT VALVES

Valve Size (IN)	Available Sizing Pressure Differential - DP (PSI)															MAX DP
	1	2	4	6	8	10	15	20	25	30	40	50	60	80	100	
1-1/2	30	42	60	73	85	95	116	134	150	164	190	212	232	268	300	100 PSI for SS Trim 40 PSI for Bronze Trim
2	42	59	84	103	119	133	163	188	210	230	266	297	325	376	420	
2-1/2	70	99	140	171	198	221	271	313	350	383	443	495	542	626	700	
3	100	141	200	245	283	316	387	447	500	548	632	707	775	894	1000	
4	200	283	400	490	566	632	775	894	1000	1095	1265	1414	1549	1789	2000	
5	260	368	520	637	735	822	1007	1163	1300	1424	1644	1838	2014	2326	2600	
6	350	495	700	857	990	1107	1356	1565	1750	1917	2214	2475	2711	3130	3500	
8	680	962	1360	1666	1923	2150	2634	3041	3400	3725	4301	4808	5267	6082	6800	
10	960	1358	1920	2352	2715	3036	3718	4293	4800	5258	6072	6788	7436	8587	9600	

↑ Also Equal to CV of Valve

▶ Maximum Water Capacities (GPM)

3-WAY MIXING VALVES

Valve Size (IN)	Available Sizing Pressure Differential - DP (PSI)															MAX DP
	1	2	4	6	8	10	15	20	25	30	40	50	60	80	100	
1/2	6.3	9	13	15	18	20	24	28	32	35	40	45	49	56	63	100 PSI for SS Trim 40 PSI for Bronze Trim
3/4	8.2	12	16	20	23	26	32	37	41	45	52	58	64	73	82	
1	10	14	20	24	28	32	39	45	50	55	63	71	77	89	100	
1-1/4	18.5	26	37	45	52	59	72	83	93	101	117	131	143	165	185	
1-1/2	20	28	40	49	57	63	77	89	100	110	126	141	155	179	200	
2	40	57	80	98	113	126	155	179	200	219	253	283	310	358	400	
2-1/2	69	98	138	169	195	218	267	309	345	378	436	488	534	617	690	
3	86	122	172	211	243	272	333	385	430	471	544	608	666	769	860	
4	156	221	312	382	441	493	604	698	780	854	987	1103	1208	1395	1560	
5	270	382	540	661	764	854	1046	1207	1350	1479	1708	1909	2091	2415	2700	
6	347	491	694	850	981	1097	1344	1552	1735	1901	2195	2454	2688	3104	3470	
8	450	636	900	1102	1273	1423	1743	2012	2250	2465	2846	3182	3486	4025	4500	

↑ Also Equal to CV of Valve

3-WAY DIVERTING VALVES

Valve Size (IN)	Available Sizing Pressure Differential - DP (PSI)															MAX DP
	1	2	4	6	8	10	15	20	25	30	40	50	60	80	100	
1	12	17	24	29	34	38	46	54	60	66	76	85	93	107	120	100 PSI for SS Trim 40 PSI for Bronze Trim
1-1/2	22	31	44	54	62	70	85	98	110	120	139	156	170	197	220	
2	40	57	80	98	113	126	155	179	200	219	253	283	310	358	400	
2-1/2	68	96	136	167	192	215	263	304	340	372	430	481	527	608	680	
3	85	120	170	208	240	269	329	380	425	466	538	601	658	760	850	
4	160	226	320	392	453	506	620	716	800	876	1012	1131	1239	1431	1600	
5	195	276	390	478	552	617	755	872	975	1068	1233	1379	1510	1744	1950	
6	270	382	540	661	764	854	1046	1207	1350	1479	1708	1909	2091	2415	2700	
8	425	601	850	1041	1202	1344	1646	1901	2125	2328	2688	3005	3292	3801	4250	

↑ Also Equal to CV of Valve

▶ Maximum Steam Capacities (Lb's/Hr)

SINGLE SEAT UNBALANCED & CYLINDER BALANCED VALVES

Valve Size (IN)	Inlet Pressure - PSIG															MAX DP
	2		5				10					15				
	Available Sizing Pressure Differential - DP (PSI)															
	1	2	1	2	3	5	2	4	6	8	10	2	5	10	15	
1/2	61	84	67	92	109	134	103	140	164	180	192	113	169	218	241	
3/4	90	123	98	134	161	196	152	206	242	266	284	167	250	322	356	
1	125	173	135	187	222	275	211	286	335	370	394	232	348	448	494	
1-1/4	280	379	300	415	493	609	465	630	739	815	868	515	772	994	1097	
1-1/2	300	409	325	449	537	650	505	685	802	885	943	557	835	1075	1187	
2	500	684	545	744	900	1100	844	1144	1341	1478	1576	928	1391	1790	1977	
2-1/2	810	1111	890	1220	1450	1775	1375	1864	2185	2409	2567	1508	2261	2909	3213	
3	1122	1545	1220	1675	2000	2460	1903	2580	3024	3333	3553	2089	3132	4030	4450	
4	2125	2929	2300	3200	3775	4650	3575	4847	5681	6262	6675	3940	5908	7602	8394	
5	3525	4780	3779	5225	6225	7700	5915	8019	9399	10361	11045	6500	9746	12541	13848	
6	4500	6150	4879	6700	8000	9900	7615	10324	12101	13339	14219	8350	12520	16110	17789	
8	5600	7700	6100	8400	10000	12370	9515	12900	15120	16667	17767	10444	15660	20150	22250	
	25					50					75					
	Available Sizing Pressure Differential - DP (PSI)															
	2	5	10	15	20	5	10	15	20	32.5	10	20	25	35	45	
1/2	131	199	263	299	319	257	349	410	454	513	418	557	604	669	707	
3/4	193	293	388	441	471	377	512	602	665	753	614	818	887	983	1039	
1	268	408	538	613	654	524	712	837	925	1047	853	1137	1232	1365	1443	
1-1/4	594	903	1193	1358	1448	1164	1582	1858	2054	2326	1892	2521	2733	3029	3201	
1-1/2	643	978	1292	1470	1568	1258	1710	2009	2220	2513	2048	2729	2958	3278	3465	100 PSI for SS Trim
2	1072	1630	2154	2451	2614	2098	2852	3350	3703	4192	3415	4551	4933	5467	5778	
2-1/2	1742	2649	3500	3982	4248	3410	4635	5444	6018	6813	5550	7396	8017	8884	9390	40 PSI for Bronze Trim
3	2413	3669	4848	5516	5884	4722	6419	7539	8334	9434	7682	10238	11097	12297	12997	
4	4550	6919	9141	10401	11095	8920	12125	14242	15742	17821	14500	19324	20946	23211	24533	
5	7500	11405	15068	17145	18289	14685	19962	23446	25917	29339	23900	31851	34524	38259	40437	
6	9650	14675	19388	22060	23531	18890	25678	30160	33338	37740	30700	40913	44347	49144	51942	
8	12067	18350	24244	27585	29425	23600	32080	37680	41650	47150	38400	51175	55470	61470	64970	
	100					125					150					
	Available Sizing Pressure Differential - DP (PSI)															
	10	20	30	45	57.5	15	25	40	55	70	20	40	55	70	82.5	
1/2	477	645	753	854	901	633	787	938	1032	1088	780	1032	1150	1227	1228	
3/4	701	948	1106	1256	1325	930	1156	1378	1517	1599	1147	1518	1691	1804	1806	
1	973	1316	1536	1743	1839	1292	1606	1914	2107	2222	1593	2108	2348	2506	2508	
1-1/4	2160	2920	3409	3869	4082	2865	3561	4245	4673	4927	3533	4676	5208	5558	5563	
1-1/2	2337	3160	3689	4186	4417	3100	3853	4593	5056	5331	3822	5059	5634	6013	6018	
2	3892	5262	6143	6971	7356	5165	6420	7653	8424	8882	6368	8428	9388	10018	10027	
2-1/2	6328	8556	9988	11334	11959	8395	10435	12439	13692	14436	10357	13708	15268	16294	16308	
3	8765	11851	13835	15698	16565	11627	14452	17228	18963	19993	14340	18980	21140	25560	22580	
4	16550	22377	26123	29641	31278	21959	27295	32537	35814	37760	27080	35842	39921	42603	42641	
5	27250	36844	43012	48805	51500	36136	44917	53543	58937	62138	44600	59031	65749	70166	70228	
6	35062	47406	55343	62797	66264	46464	57755	68847	75781	79898	57350	75907	84545	90224	90304	
8	43785	59200	69112	78420	82750	58125	72250	86125	94800	99950	71700	94900	105700	112800	112900	

Valve Capacities are Valid for Line Sized Applications

FLOW TABLES: STEAM

▶ Maximum Steam Capacities (Lb's/Hr)

DOUBLE SEAT VALVES

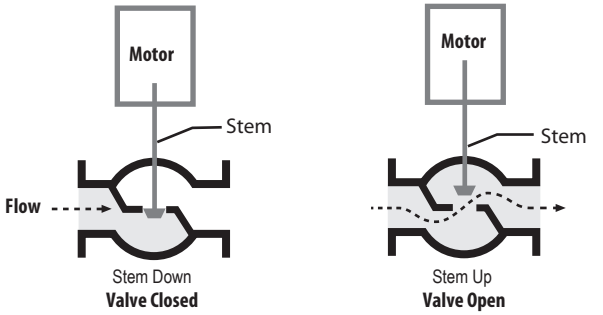
Valve Size (IN)	Inlet Pressure - PSIG															MAX DP
	2		5				10					15				
	Available Sizing Pressure Differential - DP (PSI)															
	1	2	1	2	3	5	2	4	6	8	10	2	5	10	15	
1-1/2	379	519	411	566	675	825	634	859	1007	1110	1183	696	1044	1343	1482	
2	530	726	575	792	945	1154	888	1204	1411	1555	1657	975	1462	1881	2076	
2-1/2	883	1211	958	1321	1575	1924	1481	2007	2353	2594	2763	1625	2437	3135	3461	
3	1262	1730	1370	1888	2251	2750	2116	2868	3361	3705	3947	2321	3482	4479	4944	
4	2523	3459	2740	3776	4502	5500	4224	5725	6709	7397	7880	4636	6954	8946	9875	
5	3279	4495	3561	4908	5852	7150	5494	7447	8727	9621	10250	6491	9735	12524	13825	
6	4413	6050	4792	6604	7874	9620	7397	10026	11750	12953	13800	8123	12182	15672	17300	
8	8581	11765	9309	12829	15296	18688	14383	19495	22847	25187	26833	15783	23671	30452	33615	
10	12115	16610	13150	18123	21608	26400	20315	27535	32270	35575	37900	22286	33425	43000	47466	
	25					50					75					
	Available Sizing Pressure Differential - DP (PSI)															
	2	5	10	15	20	5	10	15	20	32.5	10	20	25	35	45	
1-1/2	804	1222	1615	1838	1961	1573	2138	2510	2775	3140	2558	3407	3691	4090	4326	
2	1126	1712	2263	2575	2748	2204	2995	3517	3888	4400	3583	4773	5171	5730	6060	
2-1/2	1877	2853	3770	4291	4579	3675	4993	5863	6481	7335	5974	7959	8622	9555	10105	100 PSI for SS Trim
3	2681	4077	5386	6131	6542	5248	7131	8373	9256	10475	8537	11373	12321	13654	14440	
4	5355	8142	10757	12243	13065	10481	14241	16721	18486	20920	17057	22722	24616	27279	28850	40 PSI for Bronze Trim
5	6968	10594	13997	15931	17000	13627	18517	21741	24035	27200	23886	31819	34470	38200	40400	
6	9386	14271	18854	21460	22900	18371	24963	29310	32403	36670	29857	39774	43088	47750	50500	
8	18233	27722	36626	41687	44485	35696	48504	56950	62959	71250	58059	77342	83787	92853	98200	
10	25740	39135	51705	58850	62800	50375	68450	80370	88850	100550	81975	109200	118300	131100	138650	
	100					125					150					
	Available Sizing Pressure Differential - DP (PSI)															
	10	20	30	45	57.5	15	25	40	55	70	20	40	55	70	82.5	
1-1/2	2918	3942	4602	5221	5511	3873	4816	5739	6315	6660	4776	6328	7042	7519	7780	
2	4088	5521	6446	7312	7719	5423	6744	8037	8844	9327	6685	8858	9856	10525	10890	
2-1/2	6818	9210	10752	12197	12875	9042	11244	13399	14744	15550	11150	14773	16439	17554	18163	
3	9738	13155	15357	17421	18390	12918	16064	19142	21064	22215	15930	21107	23487	25080	25950	
4	19434	26252	30648	34767	36700	25818	32105	38258	42099	44400	31799	42132	46883	50064	51800	
5	25323	34206	39934	45301	47820	33580	41759	49761	54758	57750	41376	54821	61002	65141	67400	
6	34087	46044	53755	60980	64370	45210	56221	66994	73721	77750	55741	73854	82181	87757	90800	
8	66193	89414	104387	118416	125000	87803	109187	130111	143176	151000	108290	143478	159656	170488	176400	
10	93500	126300	147450	167267	176567	124000	154200	183750	202200	213250	152950	202650	225500	240800	249150	

Valve Capacities are Valid for Line Sized Applications

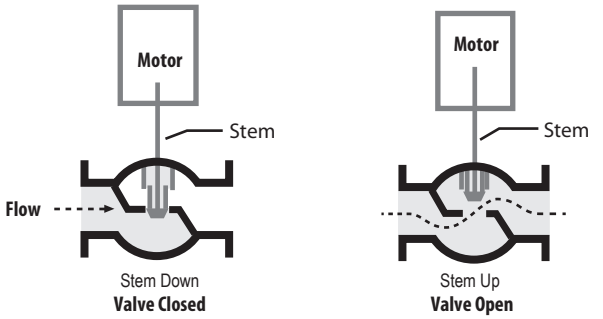
FLOW PATHS EXPLAINED

How Each Valve Type Works

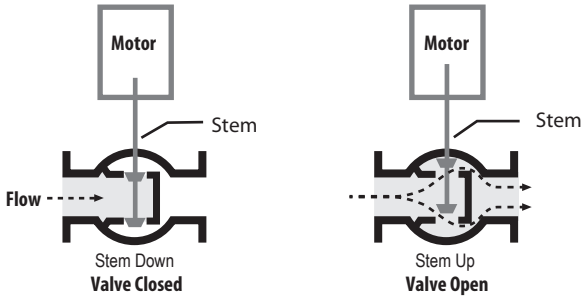
TYPE 20 *Single-Seated Valves*



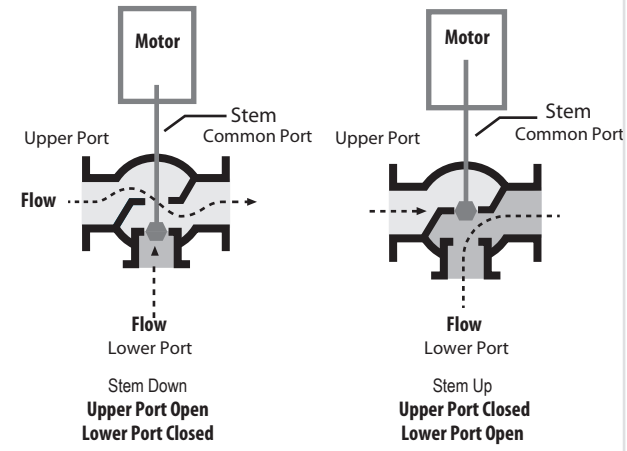
TYPE 23 *Single-Seated Cylinder Balanced Valves*



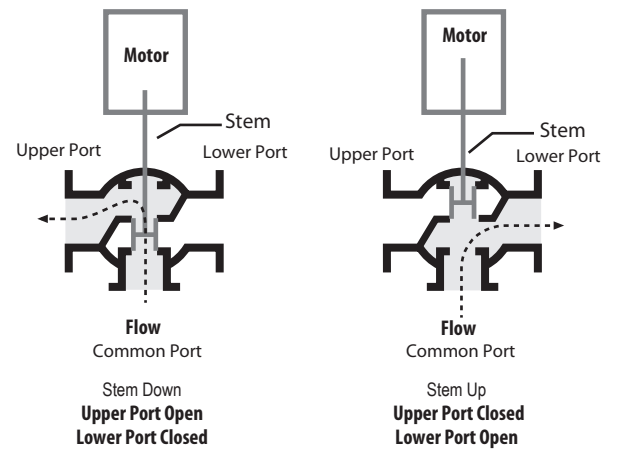
TYPE 22 *Double-Seated Valves*



TYPE 30 *3-Way Mixing Valves*



TYPE 32 *3-Way Diverting Valves*



▶ IDENTIFYING A CONTROL VALVE CONFIGURATION

A **CONFIGURATION** is a control valve formed by the combination of a valve and actuator. Configurations are tabulated by valve capacity (Cv), pipe size, end connection, trim material, actuator size, control characteristic, and shut-off capability (differential pressure).
To order a control valve configuration, locate the line that best meets your application, and specify the appropriate valve code and actuator code. See the example on this page.

VA2005AC-E024

Identifies an ANSI 250, NPT threaded bronze valve body assembly with stainless steel trim and a flow capacity rating (Cv) of 7.2. With Electric Actuator Fail Last Position.

Note: You may also specify on an order available control signals and/or control actions other than the factory settings.

Fail Last Position — ACTUATOR CODE **E024**

Cv	Size (IN)	Thd NPT	Trim	Valve Code	SHUT-OFF (PSID) CL III	SHUT-OFF (PSID) CL IV	Max Timing (SEC) Motor
4.9	0.5	250	S/S	VA2004AC	400	400	90
7.2	0.75	250	S/S	**VA2005AC**	400	400	90
10	1	250	S/S	VA2006AC	283	247	90
22.2	1.25	250	S/S	VA2007AC	120	96	90
24	1.5	250	S/S	VA2008AC	120	96	90
40	2	250	S/S	VA2009AC	70	52	90

NEW ELECTRIC ACTUATORS

Actuator Code	Travel Inches	Force (Lbs)	Failure Mode
E024	0.875	337	Last Position
E025	0.875	337	Fail safe
E026	1.25	450	Fail safe
E029	1.5	1011	Last Position
E031	1.5	1011	Fail safe

DISCONTINUED ELECTRIC MOTOR ACTUATORS

MP361 CP9302 AV330	MP371 CP9302 AV330	MP381 CP9302 AV330	MP361 CP9302 AV352	MP371 CP9302 AV352	MP381 CP9302 AV352	VM-1500	VM-1500 w/VMS-25	VM-5000	VM-5000 w/VMS-25
		E002				E017			
E000	E001						E016		
			E006	E007			E016		
					E008			E019	
									E018

For **120V Applications** refer to Warren Controls ARIA and ILEA Industrial Valve Products

▶ DETERMINING BODY MATERIAL CONFIGURATION

Matching the valve's body material and end connection to existing piping or specifications is the best choice. Otherwise, to determine what body material and end connection you need, you must first know the pressure and temperature of the medium entering your valve. For most flowing media you will need an approximate idea of the temperature. For saturated steam you can use the steam table below to determine the temperature. Once you know the pressure and temperature, you can use the body pressure-temperature rating table, (below, to determine what body material and end connection you need.

EXAMPLE 1: You need a 2-1/2 inch single-seated valve. You have saturated steam entering your valve at 50 PSIG. From the steam table you see the steam has a temperature of 297.7°F. From the valve configuration sheets you know that a 2-1/2 inch single-seated valve is available with an iron body with a 125 flange or an iron body with a 250 flange. Scanning the pressure-temperature rating table, you see that the pressure rating for an iron body with a 125 flange at 297.7°F is not listed but a pressure rating is listed at 300°F. At 300°F the pressure rating is 140 PSIG. Since 300°F exceeds the actual temperature of 297.7°F and the 125 PSIG rating at 300°F exceeds the actual pressure of 50 PSIG, an iron body with a 125 flange is ok.

EXAMPLE 2: You need a 6 inch double-seated valve. You have 200 PSIG water entering your valve at 175°F. From the valve configuration sheets you know that a 6 inch double seated valve is available with an iron body with a 125 flange or an iron body with a 250 flange. Scanning the pressure-temperature rating table, you see that the pressure rating for an iron body with a 125 flange at 175°F is 170 PSIG. Since this pressure rating is less than the actual pressure of 200 PSIG, an iron body with a 125 flange is not ok. Scanning the pressure-temperature rating table again, you see that the pressure rating for an iron body with a 250 flange at 175°F is 385 PSIG. Since this 385 PSIG rating is greater than the actual pressure of 200 PSIG, an iron body with a 250 flange is ok.

Saturated Steam Temperature

Pressure (PSIG)	Temp (°F)
0	212.0
2	218.5
4	224.4
6	229.8
8	234.6
10	239.0
15	249.7
20	258.8
25	266.8
30	274.0
35	280.6
40	286.7
45	292.4
50	297.7
55	302.6
60	307.3
65	311.8
70	316.0
75	320.0
80	323.9
85	327.6
90	331.1
95	334.6
100	337.9
105	341.1
110	344.1
115	347.1
120	350.0

Body Pressure-Temperature Ratings (PSIG)

Temp (°F)	Brz Body Thd	St Stl Body Thd	Iron Body 125 Flg	Iron Body Thd/250 Flg
+20 to 100	400	720	175	400
150	400	670	175	400
175	392	645	170	385
200	385	620	165	370
225	375	605	155	355
250	365	590	150	340
275	350	575	145	325
300	335	560	140	310
350	300	537	125	280

SINGLE SEATED BRONZE AND STAINLESS STEEL- 1/2" - 2"

VA2007AC-E025

VA2009AC-E029

NOTES:
1) Inlet Pressure cannot exceed Body Pressure-Temperature Rating.
2) Shut-off pressures listed are with respect to stated ANSI Leakage Classes.
3) Flowing PSID for water service should be no greater than 2/3 of Inlet Pressure unless verified for absence of cavitation with Warren Valve Sizing Program.

CRN REGISTERED

▶ APPLICATION:

Control of Saturated Steam; Water; Water & Glycol Solutions. Seat Leakage Class ANSI III & IV.

▶ VALVE CONSTRUCTION:

Body:	ANSI B16.15 Bronze 250lb.Threaded (NPT), or Stainless Steel (CF8M) 300 lb. Threaded (NPT)
Trim:	EQ%, 316 Series Stainless Steel
Stem:	316 Stainless Steel
Bonnet:	Brass / Bronze or 316 Stainless Steel
Packing:	EPDM Lip Packing (+20 to 350ºF) Standard (EPDM is **not** suitable for use with oils, hydrocarbons, or acids.) PTFE V-Ring, (+60 to 350ºF) Optional, must be specified on order
Agency Approval:	CRN # CSA - OC18997 (Bronze Body Only)

▶ TRIM LIMITS (Flowing Differential Pressure):

S/S Trim:	Liquid or Steam 100 PSID

▶ ACTUATOR SPECIFICATIONS:

Control Signal:	2-10 Vdc (4-20 mAdc with 500 ohm resistor Kit KR500-supplied with motor)
Control Action, Loss of Signal:	Increasing Signal Opens Valve, Loss of Signal Closes Valve (Default Setting) Reversible with Switch. Can be specified when ordering.
Feedback Signal:	2-10 Vdc
Power Supply:	24 VAC/DC
Loss of Power:	**E024 &E029** (FAIL LAST POSITION) **E031** (E029 w/ VMS-50 BCM, FAIL SAFE TO LOSS OF SIGNAL POSITION) **E025 &E026** (ELECTRONIC FAIL SAFE) Fail Closed (Default Setting) Reversible with Switch. Can be specified when ordering.
Power Consumption	
Running:	**E024** 2W; **E025** 3W; **E026** 5W; **E029** 6W; **E031** Battery Charging 12.84W; Battery charged 7.2W
Holding:	**E024** 1.5W; **E025** 2W; **E026** 2W; **E029** 1.5W; **E031** Battery Charging 8.34W; Battery charged 2.7W
Transformer sizing:	**E024** 4VA; **E025** 7VA; **E026** 9.5VA; **E029** 11VA;
(24VAC Class 2)	**E031** N/A;
Switching Power Supply	**E031** 24Vdc 2.0A
Timing:	See Configuration Tables
Manual Override:	Hex crank (supplied with actuator)
Construction:	Aluminum Die Cast and Plastic Housing
Locations:	NEMA Type 2 / IP54, UL enclosure type 2
Temperature Limits:	+32ºF to 122ºF Ambient
Mounting:	Vertical above centerline of valve
Safety Agency Listing:	CE , cULus

▶ VMS-50 BCM (BACK-UP CONTROL MODULE) SPECIFICATIONS:

Required for Fail Safe Operation with fail last position (Actuators E024 & E029)
(One VMS-50BCM can operate one, two or three actuators at a time)
The E031 includes a VMS-50 BCM. The VMS-50 BCM does not include a VMS-50 PS.

Fail Direction:	Fail Safe to Loss of Signal Position
Power Requirement:	24 Vdc 2.0 A from Separate External Switching Power Supply
Power Output:	24 Vdc 48W Total
Construction:	Battery w/Circuit Board & Transformer in the Nema 4x Enclosure
Mounting:	Wall Mount
Dimensions:	8.75" (W) x 6.97" (H) x 5.19" (D) (See page 34)
Safety Agency Listing:	Not Listed

▶ VMS-50 PS (SWITCHING POWER SUPPLY) SPECIFICATIONS:

Required to supply 24Vdc power to the VMS-50 BCM Back-up Control Module
The VMS-50 BCM does not include a VMS-50 PS.

Input:	115 VAC 50/60 Hz 1.5A
Power Output:	24 Vdc 2.0 A
Input Connector:	Three Pin Input Plug
Construction:	Molded Plastic
Dimensions:	4.31" (L) x 2.16" (W) x 1.62" (H)
Safety Agency Listing:	UL Listed

Note: If the building already has a 24 Vdc circuit rated at or above 2.0 Amps that is available for use with the VMS-50 BCM, then the VMS-50 PS is not required.

SINGLE SEATED BRONZE AND STAINLESS STEEL - 1/2" - 2"

▸ ACTUATOR & VALVE CONFIGURATIONS: Select Valve & Actuator Code in Tables:

Fail Last Position — ACTUATOR CODE E024

Cv	Size (IN)	Thd NPT Bronze	Thd NPT ST STL	Trim	Bronze Valve Code	Stainless Steel Valve Code	SHUT-OFF (PSID) CL III	SHUT-OFF (PSID) CL IV	Max Timing (SEC) Motor
4.9	0.5	250	300	S/S	VA2004AC	VA2004EC	400	400	90
7.2	0.75	250	300	S/S	VA2005AC	VA2005EC	400	400	90
10	1	250	300	S/S	VA2006AC	VA2006EC	283	247	90
22.2	1.25	250	300	S/S	VA2007AC	VA2007EC	120	96	90
24	1.5	250	300	S/S	VA2008AC	VA2008EC	120	96	90
40	2	250	300	S/S	VA2009AC	VA2009EC	70	52	90

Fail Safe — ACTUATOR CODE E025

Cv	Size (IN)	Thd NPT Bronze	Thd NPT ST STL	Trim	Bronze Valve Code	Stainless Steel Valve Code	SHUT-OFF (PSID) CL III	SHUT-OFF (PSID) CL IV	Max Timing (SEC) Motor	Max Timing (SEC) Fail Safe
4.9	0.5	250	300	S/S	VA2004AC	VA2004EC	400	400	90	35
7.2	0.75	250	300	S/S	VA2005AC	VA2005EC	400	400	90	35
10	1	250	300	S/S	VA2006AC	VA2006EC	283	247	90	35
22.2	1.25	250	300	S/S	VA2007AC	VA2007EC	120	96	90	35
24	1.5	250	300	S/S	VA2008AC	VA2008EC	120	96	90	35
40	2	250	300	S/S	VA2009AC	VA2009EC	70	52	90	35

Fail Safe — ACTUATOR CODE E026

Cv	Size (IN)	Thd NPT Bronze	Thd NPT ST STL	Trim	Bronze Valve Code	Stainless Steel Valve Code	SHUT-OFF (PSID) CL III	SHUT-OFF (PSID) CL IV	Max Timing (SEC) Motor	Max Timing (SEC) Fail Safe
10	1	250	300	S/S	VA2006AC	VA2006EC	395	360	90	35
22.2	1.25	250	300	S/S	VA2007AC	VA2007EC	171	147	90	35
24	1.5	250	300	S/S	VA2008AC	VA2008EC	171	147	90	35
40	2	250	300	S/S	VA2009AC	VA2009EC	102	83	90	35

Fail Last Position/ Fail Safe — ACTUATOR CODE E029/E031

Cv	Size (IN)	Thd NPT Bronze	Thd NPT ST STL	Trim	Bronze Valve Code	Stainless Steel Valve Code	Fail Last Position (Actuator Code)	Fail Safe w/VMS50 (Actuator Code)	SHUT-OFF (PSID) CL III	SHUT-OFF (PSID) CL IV	Max Timing (SEC) Motor
22.2	1.25	250	300	S/S	VA2007AC	VA2007EC	E029	E031	400	400	90
24	1.5	250	300	S/S	VA2008AC	VA2008EC	E029	E031	400	400	90
40	2	250	300	S/S	VA2009AC	VA2009EC	E029	E031	260	242	90

ACTUATED ASSEMBLY BODY PRESSURE TEMPERATURE RATINGS

TEMP.	BRONZE 250 THD	ST STL 300 THD
+20 to 100º F	400	720
150º F	400	670
350º F	300	537

Ratings are PSIG
250 THD pressure boundary meets ANSI B16.15
300 THD pressure boundary meets ANSI B16.34

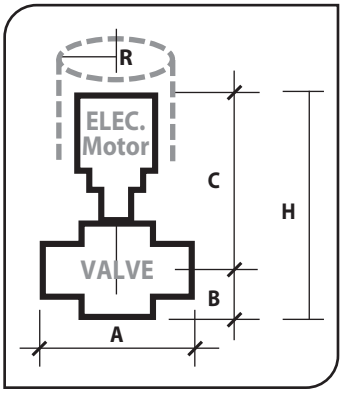
WEIGHTS

ITEM	WEIGHT (LBS)	
VALVE SIZE (IN)	BRONZE	ST STL
1/2, 3/4, 1	8-1/2	8
1-1/4 & 1-1/2	14-1/2	15-1/2
2	18-1/2	19
ACTUATOR	**LBS**	
E024	4	
E025	4-1/2	
E026	8-1/2	
E029/E031	8-1/2	
BCM	**LBS**	
VMS-50	4-1/2	

Actual shipping weights may vary.

▸ Dimensions (IN):

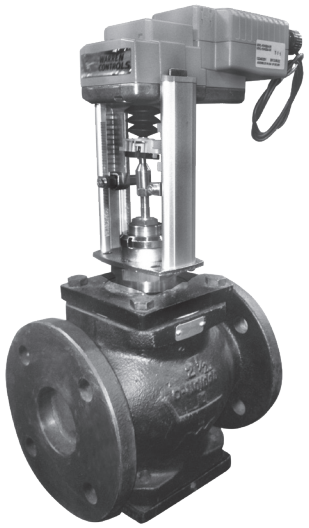
Component		Dimension by Valve Size (IN)							
Variable		1/2 & 3/4		1		1-1/4 & 1-1/2		2	
		250THD	300THD	250THD	300THD	250THD	300THD	250THD	300THD
A	—	4-7/8	5	4-7/8	5	5-3/4	6-1/8	6-1/2	6-1/2
B	—	2-3/4	3	2-3/4	3	3-1/4	3-1/2	3-5/8	3-7/8
C	E024	11-1/8	11-1/8	11-1/8	11-1/8	11-3/4	11-3/4	12	12
C	E025	11-7/8	11-7/8	11-7/8	11-7/8	12-1/2	12-1/2	12-3/4	12-3/4
C	E026/ E029/E031	N/A	N/A	15-3/8	15-3/8	16	16	16-1/4	16-1/4
H	E024	13-7/8	14-1/8	13-7/8	14-1/8	15	15-1/4	15-5/8	15-7/8
H	E025	14-5/8	14-7/8	14-5/8	14-7/8	15-3/4	16	16-3/8	16-5/8
H	E026/ E029/E031	N/A	N/A	18-1/8	18-3/8	19-1/4	19-1/2	19-7/8	20-1/8
R*	E024/E029/E031	7-1/2	7-1/2	7-1/2	7-1/2	7-1/2	7-1/2	7-1/2	7-1/2
R*	E025/E026	8-3/4	8-3/4	8-3/4	8-3/4	8-3/4	8-3/4	8-3/4	8-3/4



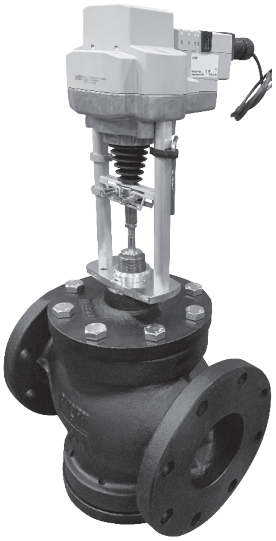
Allow 6 inch clearance above actuator for removal / service.

*Center line of Valve to Outside Actuator

SINGLE SEATED IRON - 2 1/2" - 4"



VA2010CC-E025



VA2013CC-E029

NOTES:
1) Inlet Pressure cannot exceed Body Pressure-Temperature Rating.
2) Shut-off pressures listed are with respect to stated ANSI Leakage Classes.
3) Flowing PSID for water service should be no greater than 2/3 of Inlet Pressure unless verified for absence of cavitation with Warren Valve Sizing Program.

CRN REGISTERED

▶ APPLICATION:

Control of Saturated Steam; Water; Water & Glycol Solutions to 60%. Seat Leakage Class ANSI III & IV.

▶ VALVE CONSTRUCTION:

Body:	ANSI B16.1 Iron 125lb. Flange or 250lb. Flange
Trim:	EQ%, Bronze or 300 Series Stainless Steel
Stem:	316 Stainless Steel
Bonnet:	Brass
Packing:	EPDM Lip Packing (+20 to 350ºF) Standard (EPDM is **not** suitable for use with oils, hydrocarbons, or acids.) PTFE V-Ring, (+60 to 350ºF) Optional, must be specified on order
Agency Approval:	CRN # CSA - OC20496 (Excludes 250# Type 22/32)

▶ TRIM LIMITS (Flowing Differential Pressure):

Brz Trim:	Liquid or Steam to 40 PSID
S/S Trim:	Liquid or Steam 100 PSID

▶ ACTUATOR SPECIFICATIONS:

Control Signal:	2-10 Vdc (4-20 mAdc with 500 ohm resistor Kit KR500-supplied with motor)
Control Action, Loss of Signal:	Increasing Signal Opens Valve, Loss of Signal Closes Valve (Default Setting) Reversible with Switch. Can be specified when ordering.
Feedback Signal:	2-10 Vdc
Power Supply:	24 VAC/DC
Loss of Power:	**E029** (FAIL LAST POSITION) **E031** (E029 w/ VMS-50 BCM, FAIL SAFE TO LOSS OF SIGNAL POSITION) **E026** (ELECTRONIC FAIL SAFE) Fail Closed (Default Setting) Reversible with Switch. Can be specified when ordering.
Power Consumption	
Running:	**E026** 5W; **E029** 6W; **E031** Battery charging 12.84W; Battery charged 7.2W
Holding:	**E026** 2W; **E029** 1.5W; **E031** Battery charging 8.34W; Battery charged 2.7W;
Transformer sizing:	**E026** 9.5VA; **E029** 11VA;
(24VAC Class 2)	**E031** N/A
Switching Power Supply	**E031** 24Vdc 2.0A
Timing:	See Configuration Tables
Manual Override:	Hex crank (supplied with actuator)
Construction:	Aluminum Die Cast and Plastic Housing
Locations:	NEMA Type 2 / IP54, UL enclosure type 2
Temperature Limits:	+32ºF to 122ºF Ambient
Mounting:	Vertical above centerline of valve
Safety Agency Listing:	CE , cULus

▶ VMS-50 BCM (BACK-UP CONTROL MODULE) SPECIFICATIONS:

Required for Fail Safe Operation with fail last position (Actuators E024 & E029)
(One VMS-50BCM can operate one, two or three actuators at a time)
The E031 includes a VMS-50 BCM. The VMS-50 BCM does not include a VMS-50 PS.

Fail Direction:	Fail Safe to Loss of Signal Position
Power Requirement:	24 Vdc 2.0 A from Separate External Switching Power Supply
Power Output:	24 Vdc 48W Total
Construction:	Battery w/Circuit Board & Transformer in the Nema 4x Enclosure
Mounting:	Wall Mount
Dimensions:	8.75" (W) x 6.97" (H) x 5.19" (D) (See page 34)
Safety Agency Listing:	Not Listed

▶ VMS-50 PS (SWITCHING POWER SUPPLY) SPECIFICATIONS:

Required to supply 24Vdc power to the VMS-50 BCM Back-up Control Module
The VMS-50 BCM does not include a VMS-50 PS.

Input:	115 VAC 50/60 Hz 1.5A
Power Output:	24 Vdc 2.0 A
Input Connector:	Three Pin Input Plug
Construction:	Molded Plastic
Dimensions:	4.31" (L) x 2.16" (W) x 1.62" (H)
Safety Agency Listing:	UL Listed

Note: If the building already has a 24 Vdc circuit rated at or above 2.0 Amps that is available for use with the VMS-50 BCM, then the VMS-50 PS is not required.

▸ ACTUATOR & VALVE CONFIGURATIONS: Select Valve & Actuator Code in Tables:

Fail Safe — ACTUATOR CODE E026

Cv	Size (IN)	FLNG	Trim	Valve Code	SHUT-OFF (PSID)		Max Timing (SEC)	
					CL III	CL IV	Motor	Fail Safe
65	2.5	125	BRZ	VA2010CA	71	55	90	35
65	2.5	125	S/S	VA2010CC	71	55	90	35
65	2.5	250	BRZ	VA2010DA	71	55	90	35
65	2.5	250	S/S	VA2010DC	71	55	90	35
90	3	125	BRZ	VA2011CA	47	34	90	35
90	3	125	S/S	VA2011CC	47	34	90	35
90	3	250	BRZ	VA2011DA	47	34	90	35
90	3	250	S/S	VA2011DC	47	34	90	35

Fail Last Position/ Fail Safe — ACTUATOR CODE E029/E031

Cv	Size (IN)	FLNG	Trim	Valve Code	Fail Last Position (Actuator Code)	Fail Safe w/VMS50 (Actuator Code)	SHUT-OFF (PSID)		Max Timing (SEC)
							CL III	CL IV	Motor
65	2.5	125	BRZ	VA2010CA	E029	E031	175	170	90
65	2.5	125	S/S	VA2010CC	E029	E031	175	170	90
65	2.5	250	BRZ	VA2010DA	E029	E031	186	170	90
65	2.5	250	S/S	VA2010DC	E029	E031	186	170	90
90	3	125	BRZ	VA2011CA	E029	E031	127	113	90
90	3	125	S/S	VA2011CC	E029	E031	127	113	90
90	3	250	BRZ	VA2011DA	E029	E031	127	113	90
90	3	250	S/S	VA2011DC	E029	E031	127	113	90
170	4	125	BRZ	VA2013CA	E029	E031	69	59	90
170	4	125	S/S	VA2013CC	E029	E031	69	59	90
170	4	250	BRZ	VA2013DA	E029	E031	69	59	90
170	4	250	S/S	VA2013DC	E029	E031	69	59	90

ACTUATED ASSEMBLY BODY PRESSURE TEMPERATURE RATINGS

TEMP.	125 FLG	250 FLG
+20 to 150º F	175	400
350º F	125	280

Ratings are PSIG
Pressure boundary meets ANSI B16.1

WEIGHTS

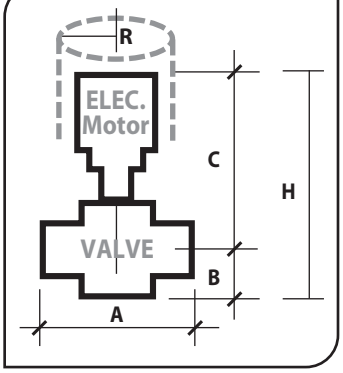
ITEM	WEIGHT (LBS)	
VALVE SIZE (IN)	125 FLG	250 FLG
2-1/2	55	64
3	72	77
4	119	131
ACTUATOR	LBS	
E026	8-1/2	
E029/E031	8-1/2	
BCM	LBS	
VMS-50	4-1/2	

Actual shipping weights may vary.

▸ Dimensions (IN):

Component		Dimension by Valve Size (IN)		
Variable		2-1/2	3	4
A	125 FLG	9	10	13
A	250 FLG	9-5/8	10-3/4	13-5/8
B		4-3/4	5-3/8	6-3/8
C	E026/E029/E031	17-3/4	18-5/8	19-5/8
H	E026/E029/E031	22-1/2	24	26
R*	E026	8-3/4	8-3/4	-
R*	E029/E031	7-1/2	7-1/2	7-1/2

*Center line of Valve to Outside Actuator



Allow 6 inch clearance above actuator for removal / service.

SINGLE SEATED CYLINDER BALANCED IRON - 2 1/2" - 6"

VA2310DC-E025

VA2315CA-E029

NOTES:
1) Inlet Pressure cannot exceed Body Pressure-Temperature Rating.
2) Shut-off pressures listed are with respect to stated ANSI Leakage Classes.
3) Flowing PSID for water service should be no greater than 2/3 of Inlet Pressure unless verified for absence of cavitation with Warren Valve Sizing Program.

CRN REGISTERED

▶ APPLICATION:

Control of Saturated Steam; Water; Water & Glycol Solutions to 60%. Seat Leakage Class ANSI III & IV.

▶ VALVE CONSTRUCTION:

Body:	ANSI B16.1 Iron 125lb. Flange or 250lb. Flange
Trim:	EQ%, Bronze or 300 Series Stainless Steel
Cylinder Seal:	EPDM (BRZ Trim) O-Ring Aflas VP101-80 (300 SS Trim) O-Ring
Stem:	316 Stainless Steel
Bonnet:	Brass
Packing:	EPDM Lip Packing (+20 to 350ºF) Standard (EPDM is **not** suitable for use with oils, hydrocarbons, or acids.) PTFE V-Ring, (+60 to 350ºF) Optional, must be specified on order
Agency Approvals:	CRN # CSA - OC20496 (Excludes 250# Type 22/32)

▶ TRIM LIMITS (Flowing Differential Pressure):

Brz Trim:	Liquid or Steam to 40 PSID
S/S Trim:	Liquid or Steam 100 PSID

▶ ACTUATOR SPECIFICATIONS:

Control Signal:	2-10 Vdc (4-20 mAdc with 500 ohm resistor Kit KR500-supplied with motor)
Control Action, Loss of Signal:	Increasing Signal Opens Valve, Loss of Signal Closes Valve (Default Setting) Reversible with Switch. Can be specified when ordering.
Feedback Signal:	2-10 Vdc
Power Supply:	24 VAC/DC
Loss of Power:	**E024 &E029** (FAIL LAST POSITION) **E031** (E029 w/ VMS-50 BCM, FAIL SAFE TO LOSS OF SIGNAL POSITION) **E025 &E026** (ELECTRONIC FAIL SAFE) Fail Closed (Default Setting) Reversible with Switch. Can be specified when ordering.
Power Consumption	
Running:	**E024** 2W; **E025** 3W; **E026** 5W; **E029** 6W; **E031** Battery Charging 12.84W; Battery charged 7.2W
Holding:	**E024** 1.5W; **E025** 2W; **E026** 2W; **E029** 1.5W; **E031** Battery Charging 8.34W; Battery charged 2.7W
Transformer sizing:	**E024** 4VA; **E025** 7VA; **E026** 9.5VA; **E029** 11VA;
(24VAC Class 2)	**E031** N/A
Switching Power Supply	**E031** 24Vdc 2.0A;
Timing:	See Configuration Tables
Manual Override:	Hex crank (supplied with actuator)
Construction:	Aluminum Die Cast and Plastic Housing
Locations:	NEMA Type 2 / IP54, UL enclosure type 2
Temperature Limits:	+32ºF to 122ºF Ambient
Mounting:	Vertical above centerline of valve
Safety Agency Listing:	CE , cULus

▶ VMS-50 BCM (BACK-UP CONTROL MODULE) SPECIFICATIONS:

Required for Fail Safe Operation with fail last position (Actuators E024 & E029)
(One VMS-50BCM can operate one, two or three actuators at a time)
The E031 includes a VMS-50 BCM. The VMS-50 BCM does not include a VMS-50 PS.

Fail Direction:	Fail Safe to Loss of Signal Position
Power Requirement:	24 Vdc 2.0 A from Separate External Switching Power Supply
Power Output:	24 Vdc 48W Total
Construction:	Battery w/Circuit Board & Transformer in the Nema 4x Enclosure
Mounting:	Wall Mount
Dimensions:	8.75" (W) x 6.97" (H) x 5.19" (D) (See page 34)
Safety Agency Listing:	Not Listed

▶ VMS-50 PS (SWITCHING POWER SUPPLY) SPECIFICATIONS:

Required to supply 24Vdc power to the VMS-50 BCM Back-up Control Module
The VMS-50 BCM does not include a VMS-50 PS.

Input:	115 VAC 50/60 Hz 1.5A
Power Output:	24 Vdc 2.0 A
Input Connector:	Three Pin Input Plug
Construction:	Molded Plastic
Dimensions:	4.31" (L) x 2.16" (W) x 1.62" (H)
Safety Agency Listing:	UL Listed

Note: If the building already has a 24 Vdc circuit rated at or above 2.0 Amps that is available for use with the VMS-50 BCM, then the VMS-50 PS is not required.

SINGLE SEATED CYLINDER BALANCED IRON - 2 1/2" - 6"

▶ ACTUATOR & VALVE CONFIGURATIONS: Select Valve & Actuator Code in Tables:

Fail Last Position — ACTUATOR CODE E024

Cv	Size (IN)	FLNG	Trim	Valve Code	SHUT-OFF (PSID)		Max Timing (SEC)
					CL III	CL IV	Motor
65	2.5	125	BRZ	VA2310CA	175	175	90
65	2.5	125	S/S	VA2310CC	175	175	90
65	2.5	250	BRZ	VA2310DA	358	226	90
65	2.5	250	S/S	VA2310DC	358	226	90
90	3	125	BRZ	VA2311CA	175	140	90
90	3	125	S/S	VA2311CC	175	140	90
90	3	250	BRZ	VA2311DA	275	140	90
90	3	250	S/S	VA2311DC	275	140	90

Fail Safe — ACTUATOR CODE E025

Cv	Size (IN)	FLNG	Trim	Valve Code	SHUT-OFF (PSID)		Max Timing (SEC)	
					CL III	CL IV	Motor	Fail Safe
65	2.5	125	BRZ	VA2310CA	175	175	90	35
65	2.5	125	S/S	VA2310CC	175	175	90	35
65	2.5	250	BRZ	VA2310DA	358	226	90	35
65	2.5	250	S/S	VA2310DC	358	226	90	35
90	3	125	BRZ	VA2311CA	175	140	90	35
90	3	125	S/S	VA2311CC	175	140	90	35
90	3	250	BRZ	VA2311DA	275	140	90	35
90	3	250	S/S	VA2311DC	275	140	90	35

Fail Safe — ACTUATOR CODE E026

Cv	Size (IN)	FLNG	Trim	Valve Code	SHUT-OFF (PSID)		Max Timing (SEC)	
					CL III	CL IV	Motor	Fail Safe
65	2.5	125	BRZ	VA2310CA	175	175	90	35
65	2.5	125	S/S	VA2310CC	175	175	90	35
65	2.5	250	BRZ	VA2310DA	400	400	90	35
65	2.5	250	S/S	VA2310DC	400	400	90	35
90	3	125	BRZ	VA2311CA	175	175	90	35
90	3	125	S/S	VA2311CC	175	175	90	35
90	3	250	BRZ	VA2311DA	400	300	90	35
90	3	250	S/S	VA2311DC	400	300	90	35
170	4	125	BRZ	VA2313CA	175	141	90	35
170	4	125	S/S	VA2313CC	175	141	90	35
170	4	250	BRZ	VA2313DA	281	141	90	35
170	4	250	S/S	VA2313DC	281	141	90	35
280	5	125	BRZ	VA2314CA	175	46	90	35
280	5	125	S/S	VA2314CC	175	46	90	35
280	5	250	BRZ	VA2314DA	187	46	90	35
280	5	250	S/S	VA2314DC	187	46	90	35

SINGLE SEATED CYLINDER BALANCED IRON - 2 1/2" - 6"

ACTUATED ASSEMBLY BODY PRESSURE TEMPERATURE RATINGS

TEMP.	150 THD (PSIG)	250 THD (PSIG)
+20 to 150° F	175	400
350° F	125	280

Ratings are PSIG
Pressure boundary meets ANSI B16.1

WEIGHTS

ITEM	WEIGHT (LBS)	
VALVE SIZE (IN)	125 FLG	250 FLG
2-1/2	55	66
3	75	80
4	127	139
5	149	181
6	197	256
ACTUATOR	LBS	
E024	4	
E025	4-1/2	
E026	8-1/2	
E029/E031	8-1/2	
BCM	LBS	
VMS-50	4-1/2	

Actual shipping weights may vary.

CYLINDER SEAL TEMPERATURE LIMITS

+20 to 300° F (BRZ Trim)
+20 to 350° F (300 S/S Trim)

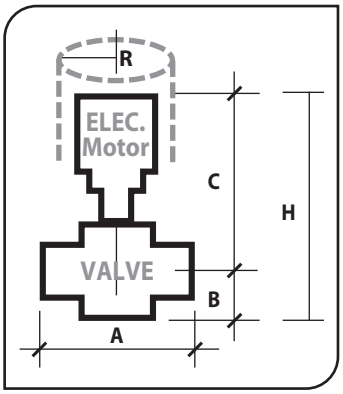
▸ ACTUATOR & VALVE CONFIGURATIONS: Select Valve & Actuator Code in Tables:

Fail Last Position/ Fail Safe — ACTUATOR CODE E029/E031

Cv	Size (IN)	FLNG	Trim	Valve Code	Fail Last Position (Actuator Code)	Fail Safe w/VMS50 (Actuator Code)	SHUT-OFF (PSID)		Max Timing (SEC)
							CL III	CL IV	Motor
170	4	125	BRZ	VA2313CA	E029	E031	175	175	90
170	4	125	S/S	VA2313CC	E029	E031	175	175	90
170	4	250	BRZ	VA2313DA	E029	E031	400	400	90
170	4	250	S/S	VA2313DC	E029	E031	400	400	90
280	5	125	BRZ	VA2314CA	E029	E031	175	175	90
280	5	125	S/S	VA2314CC	E029	E031	175	175	90
280	5	250	BRZ	VA2314DA	E029	E031	400	400	90
280	5	250	S/S	VA2314DC	E029	E031	400	400	90
360	6	125	BRZ	VA2315CA	E029	E031	175	175	90
360	6	125	S/S	VA2315CC	E029	E031	175	175	90
360	6	250	BRZ	VA2315DA	E029	E031	400	400	90
360	6	250	S/S	VA2315DC	E029	E031	400	400	90

▸ Dimensions (IN):

Component		Dimension by Valve Size (IN)				
Variable		2-1/2	3	4	5	6
A	125 FLG	9	10	13	15-3/4	17-3/4
A	250 FLG	9-5/8	10-3/4	13-5/8	16-5/8	18-5/8
B		4-3/4	5-3/8	6-3/8	5-3/4	6-1/2
C	E024	14	14-7/8	-	-	-
C	E025	14-3/4	15-5/8	-	-	-
C	E026/E029/E031	18-1/4	19-1/8	20-1/4	20-3/4	21-3/8
H	E024	18-3/4	20-1/4	-	-	-
H	E025	19-1/2	21	-	-	-
H	E026/E029/E031	23	24-1/2	26-5/8	26	27-7/8
R*	E024/E029/E031	7-1/2	7-1/2	7-1/2	7-1/2	7-1/2
R*	E025/E026	8-3/4	8-3/4	8-3/4	8-3/4	-



Allow 6 inch clearance above actuator for removal / service.

*Center line of Valve to Outside Actuator

DOUBLE SEATED BALANCED IRON - 1 1/2" - 2"

▶ APPLICATION:

Control of Saturated Steam; Water; Water & Glycol Solutions to 60%. Seat Leakage ANSI Class III (fluid temperature 72ºF or below) or Class II (fluid temperature above 72ºF).

▶ VALVE CONSTRUCTION:

Body:	ANSI B16.15 Iron 250lb.Threaded (NPT)
Trim:	EQ%, 300 Series Stainless Steel
Stem:	316 Stainless Steel
Bonnet:	Brass
Packing:	EPDM Lip Packing (+20 to 350ºF) Standard (EPDM is **not** suitable for use with oils, hydrocarbons, or acids.) PTFE V-Ring, (+60 to 350ºF) Optional, must be specified on order
Agency Approvals:	None

▶ TRIM LIMITS (Flowing Differential Pressure):

S/S Trim:	Liquid or Steam 100 PSID

▶ ACTUATOR SPECIFICATIONS:

Control Signal:	2-10 Vdc (4-20 mAdc with 500 ohm resistor Kit KR500-supplied with motor)
Control Action, Loss of Signal:	Increasing Signal Opens Valve, Loss of Signal Closes Valve (Default Setting) Reversible with Switch. Can be specified when ordering.
Feedback Signal:	2-10 Vdc
Power Supply:	24 VAC/DC
Loss of Power:	**E024** (FAIL LAST POSITION) **E025** (ELECTRONIC FAIL SAFE) Fail Closed (Default Setting) Reversible with Switch. Can be specified when ordering.
Power Consumption	
Running:	**E024** 2W; **E025** 3W;
Holding:	**E024** 1.5W; **E025** 2W;
Transformer sizing: (24VAC Class 2)	**E024** 4VA; **E025** 7VA;
Timing:	See Configuration Tables
Manual Override:	Hex crank (supplied with actuator)
Construction:	Aluminum Die Cast and Plastic Housing
Locations:	NEMA Type 2 / IP54, UL enclosure type 2
Temperature Limits:	+32ºF to 122ºF Ambient
Mounting:	Vertical above centerline of valve
Safety Agency Listing:	CE , cULus

▶ VMS-50 BCM (BACK-UP CONTROL MODULE) SPECIFICATIONS:

Required for Fail Safe Operation with fail last position (Actuators E024 & E029)
(One VMS-50BCM can operate one, two or three actuators at a time)
The E031 includes a VMS-50 BCM. The VMS-50 BCM does not include a VMS-50 PS.

Fail Direction:	Fail Safe to Loss of Signal Position
Power Requirement:	24 Vdc 2.0 A from Separate External Switching Power Supply
Power Output:	24 Vdc 48W Total
Construction:	Battery w/Circuit Board & Transformer in the Nema 4x Enclosure
Mounting:	Wall Mount
Dimensions:	8.75" (W) x 6.97" (H) x 5.19" (D) (See page 34)
Safety Agency Listing:	Not Listed

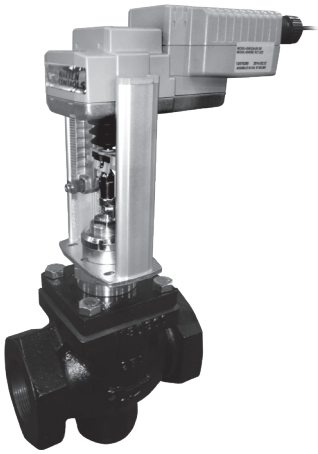
▶ VMS-50 PS (SWITCHING POWER SUPPLY) SPECIFICATIONS:

Required to supply 24Vdc power to the VMS-50 BCM Back-up Control Module
The VMS-50 BCM does not include a VMS-50 PS.

Input:	115 VAC 50/60 Hz 1.5A
Power Output:	24 Vdc 2.0 A
Input Connector:	Three Pin Input Plug
Construction:	Molded Plastic
Dimensions:	4.31" (L) x 2.16" (W) x 1.62" (H)
Safety Agency Listing:	UL Listed

Note: If the building already has a 24 Vdc circuit rated at or above 2.0 Amps that is available for use with the VMS-50 BCM, then the VMS-50 PS is not required.

VA2208BC-E024



VA2209BC-E025

NOTES:
1) Inlet Pressure cannot exceed Body Pressure-Temperature Rating.
2) Shut-off pressures listed are with respect to stated ANSI Leakage Classes.
3) Flowing PSID for water service should be no greater than 2/3 of Inlet Pressure unless verified for absence of cavitation with Warren Valve Sizing Program.

DOUBLE SEATED BALANCED IRON - 1 1/2" - 2"

ACTUATED ASSEMBLY BODY PRESSURE TEMPERATURE RATINGS

TEMP.	250 THD (RATINGS ARE PSIG)
+20 to 150° F	400
350° F	280

Ratings are PSIG

Pressure boundary meets ANSI B16.15

WEIGHTS

ITEM	WEIGHT
VALVE SIZE (IN)	**LBS**
1-1/2	19
2	18-1/2
ACTUATOR	**LBS**
E024	4
E025	4-1/2
BCM	**LBS**
VMS-50	4-1/2

Actual shipping weights may vary.

▸ ACTUATOR & VALVE CONFIGURATIONS: Select Valve & Actuator Code in Tables:

Fail Last Position — ACTUATOR CODE E024

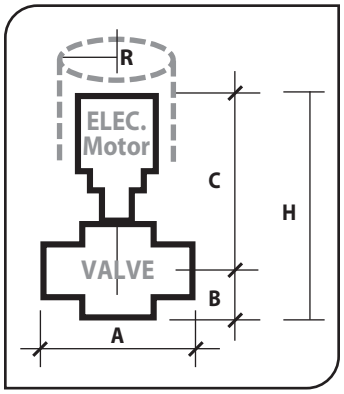
Cv	Size (IN)	Thd NPT	Trim	Valve Code	SHUT-OFF (PSID) Fluid Temp Above 72°F	SHUT-OFF (PSID) Fluid Temp 72°F or Below	Max Timing (SEC)
					CL II	CL III	Motor
30	1.5	250	S/S	VA2208BC	400	400	90
42	2	250	S/S	VA2209BC	400	400	90

Fail Safe — ACTUATOR CODE E025

Cv	Size (IN)	Thd NPT	Trim	Valve Code	SHUT-OFF (PSID) Fluid Temp Above 72°F	SHUT-OFF (PSID) Fluid Temp 72°F or Below	Max Timing (SEC)	
					CL II	CL III	Motor	Fail Safe
30	1.5	250	S/S	VA2208BC	400	400	90	35
42	2	250	S/S	VA2209BC	400	400	90	35

▸ Dimensions (IN):

Component		Dimension by Valve Size (IN)	
Variable		1-1/2	2
A	250THD	7-3/8	7-3/8
B		3-7/8	3-7/8
C	E024	12-3/4	12-3/4
C	E025	13-1/2	13-1/2
H	E024	16-5/8	16-5/8
H	E025	17-3/8	17-3/8
R*	E024	7-1/2	7-1/2
R*	E025	8-3/4	8-3/4



Allow 6 inch clearance above actuator for removal / service.

*Center line of Valve to Outside Actuator

DOUBLE SEATED BALANCED IRON - 2 1/2" - 10"

▶ APPLICATION:

Control of Saturated Steam; Water; Water & Glycol Solutions to 60%. Seat Leakage ANSI Class III (fluid temperature 72ºF or below) or Class II (fluid temperature above 72ºF).

▶ VALVE CONSTRUCTION:

Body:	ANSI B16.1 Iron 125lb. Flange or 250lb. Flange
Trim:	EQ%, Bronze or 300 Series Stainless Steel
Stem:	316 Stainless Steel
Bonnet:	Brass
Packing:	EPDM Lip Packing (+20 to 350ºF) Standard (EPDM is **not** suitable for use with oils, hydrocarbons, or acids.) PTFE V-Ring, (+60 to 350ºF) Optional, must be specified on order
Agency Approval:	CRN # CSA - OC20496 (Excludes 250# Type 22/32)

▶ TRIM LIMITS (Flowing Differential Pressure):

Brz Trim:	Liquid or Steam to 40 PSID
S/S Trim:	Liquid or Steam 100 PSID

▶ ACTUATOR SPECIFICATIONS:

Control Signal:	2-10 Vdc (4-20 mAdc with 500 ohm resistor Kit KR500-supplied with motor)
Control Action, Loss of Signal:	Increasing Signal Opens Valve, Loss of Signal Closes Valve (Default Setting) Reversible with Switch. Can be specified when ordering.
Feedback Signal:	2-10 Vdc
Power Supply:	24 VAC/DC
Loss of Power:	**E024** & **E029** (FAIL LAST POSITION) **E031** (E029 w/ VMS-50 BCM, FAIL SAFE TO LOSS OF SIGNAL POSITION) **E025 & E026** (ELECTRONIC FAIL SAFE) Fail Closed (Default Setting) Reversible with Switch. Can be specified when ordering.
Power Consumption	
Running:	**E024** 2W; **E025** 3W; **E026** 5W; **E029** 6W; **E031** Battery Charging 12.84W; Battery charged 7.2W
Holding:	**E024** 1.5W; **E025** 2W; **E026** 2W; **E029** 1.5W; **E031** Battery Charging 8.34W; Battery charged 2.7W
Transformer sizing:	**E024** 4VA; **E025** 7VA; **E026** 9.5VA; **E029** 11VA;
(24VAC Class 2)	**E031** N/A
Switching Power Supply	**E031** 24Vdc 2.0A
Timing:	See Configuration Tables
Manual Override:	Hex crank (supplied with actuator)
Construction:	Aluminum Die Cast and Plastic Housing
Locations:	NEMA Type 2 / IP54, UL enclosure type 2
Temperature Limits:	+32ºF to 122ºF Ambient
Mounting:	Vertical above centerline of valve
Safety Agency Listing:	CE , cULus

▶ VMS-50 BCM (BACK-UP CONTROL MODULE) SPECIFICATIONS:

Required for Fail Safe Operation with fail last position (Actuators E024 & E029)
(One VMS-50BCM can operate one, two or three actuators at a time)
The E031 includes a VMS-50 BCM. The VMS-50 BCM does not include a VMS-50 PS.

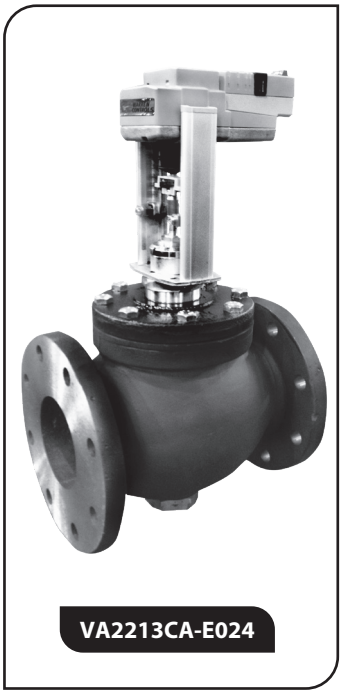
Fail Direction:	Fail Safe to Loss of Signal Position
Power Requirement:	24 Vdc 2.0 A from Separate External Switching Power Supply
Power Output:	24 Vdc 48W Total
Construction:	Battery w/Circuit Board & Transformer in the Nema 4x Enclosure
Mounting:	Wall Mount
Dimensions:	8.75" (W) x 6.97" (H) x 5.19" (D) (See page 34)
Safety Agency Listing:	Not Listed

▶ VMS-50 PS (SWITCHING POWER SUPPLY) SPECIFICATIONS:

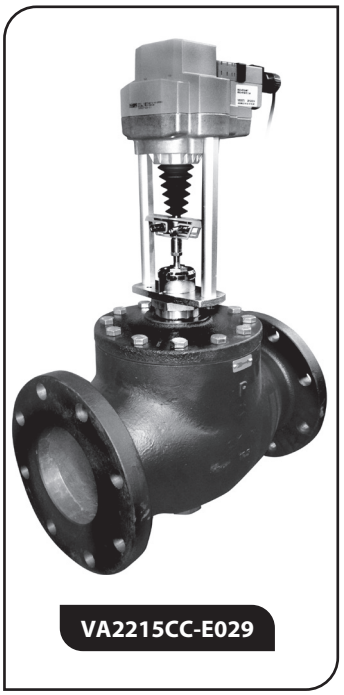
Required to supply 24Vdc power to the VMS-50 BCM Back-up Control Module
The VMS-50 BCM does not include a VMS-50 PS.

Input:	115 VAC 50/60 Hz 1.5A
Power Output:	24 Vdc 2.0 A
Input Connector:	Three Pin Input Plug
Construction:	Molded Plastic
Dimensions:	4.31" (L) x 2.16" (W) x 1.62" (H)
Safety Agency Listing:	UL Listed

Note: If the building already has a 24 Vdc circuit rated at or above 2.0 Amps that is available for use with the VMS-50 BCM, then the VMS-50 PS is not required.



VA2213CA-E024



VA2215CC-E029

NOTES:
1) Inlet Pressure cannot exceed Body Pressure-Temperature Rating.
2) Shut-off pressures listed are with respect to stated ANSI Leakage Classes.
3) Flowing PSID for water service should be no greater than 2/3 of Inlet Pressure unless verified for absence of cavitation with Warren Valve Sizing Program.

CRN REGISTERED

DOUBLE SEATED BALANCED IRON - 2 1/2" - 10"

▶ ACTUATOR & VALVE CONFIGURATIONS: Select Valve & Actuator Code in Tables:

Fail Last Position — ACTUATOR CODE E024

Cv	Size (IN)	FLNG	Trim	Valve Code	SHUT-OFF (PSID) Fluid Temp Above 72ºF CL II	SHUT-OFF (PSID) Fluid Temp 72ºF or Below CL III	Max Timing (SEC) Motor
70	2.5	125	BRZ	VA2210CA	175	175	90
70	2.5	125	S/S	VA2210CC	175	175	90
70	2.5	250	BRZ	VA2210DA	400	400	90
70	2.5	250	S/S	VA2210DC	400	400	90
100	3	125	BRZ	VA2211CA	175	175	90
100	3	125	S/S	VA2211CC	175	175	90
100	3	250	BRZ	VA2211DA	400	400	90
100	3	250	S/S	VA2211DC	400	400	90
200	4	125	BRZ	VA2213CA	175	175	90
200	4	125	S/S	VA2213CC	175	175	90
200	4	250	BRZ	VA2213DA	223	223	90
200	4	250	S/S	VA2213DC	223	223	90

Fail Safe — ACTUATOR CODE E025

Cv	Size (IN)	FLNG	Trim	Valve Code	SHUT-OFF (PSID) Fluid Temp Above 72ºF CL II	SHUT-OFF (PSID) Fluid Temp 72ºF or Below CL III	Max Timing (SEC) Motor	Max Timing (SEC) Fail Safe
70	2.5	125	BRZ	VA2210CA	175	175	90	35
70	2.5	125	S/S	VA2210CC	175	175	90	35
70	2.5	250	BRZ	VA2210DA	400	400	90	35
70	2.5	250	S/S	VA2210DC	400	400	90	35
100	3	125	BRZ	VA2211CA	175	175	90	35
100	3	125	S/S	VA2211CC	175	175	90	35
100	3	250	BRZ	VA2211DA	400	400	90	35
100	3	250	S/S	VA2211DC	400	400	90	35
200	4	125	BRZ	VA2213CA	175	175	90	35
200	4	125	S/S	VA2213CC	175	175	90	35
200	4	250	BRZ	VA2213DA	223	223	90	35
200	4	250	S/S	VA2213DC	223	223	90	35

Fail Safe — ACTUATOR CODE E026

Cv	Size (IN)	FLNG	Trim	Valve Code	SHUT-OFF (PSID) Fluid Temp Above 72ºF CL II	SHUT-OFF (PSID) Fluid Temp 72ºF or Below CL III	Max Timing (SEC) Motor	Max Timing (SEC) Fail Safe
200	4	125	BRZ	VA2213CA	175	175	90	35
200	4	125	S/S	VA2213CC	175	175	90	35
200	4	250	BRZ	VA2213DA	400	400	90	35
200	4	250	S/S	VA2213DC	400	400	90	35
260	5	125	BRZ	VA2214CA	175	175	90	35
260	5	125	S/S	VA2214CC	175	175	90	35
260	5	250	BRZ	VA2214DA	287	287	90	35
260	5	250	S/S	VA2214DC	287	287	90	35
350	6	125	BRZ	VA2215CA	175	175	90	35
350	6	125	S/S	VA2215CC	175	175	90	35
350	6	250	BRZ	VA2215DA	197	197	90	35
350	6	250	S/S	VA2215DC	197	197	90	35

DOUBLE SEATED BALANCED IRON - 2 1/2" - 10"

Fail Last Position/ Fail Safe — ACTUATOR CODE E029/E031

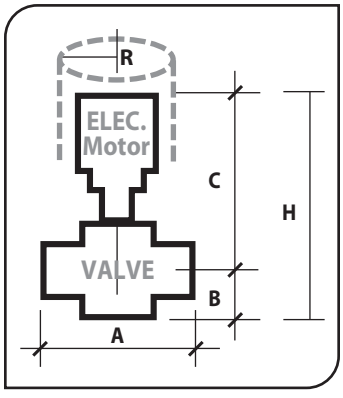
Cv	Size (IN)	FLNG	Trim	Valve Code	Fail Last Position (Actuator Code)	Fail Safe w/VMS50 (Actuator Code)	SHUT-OFF (PSID) Fluid Temp Above 72ºF CL II	SHUT-OFF (PSID) Fluid Temp 72ºF or Below CL III	Max Timing (SEC) Motor
350	6	125	BRZ	VA2215CA	E029	E031	175	175	90
350	6	125	S/S	VA2215CC	E029	E031	175	175	90
350	6	250	BRZ	VA2215DA	E029	E031	400	400	90
350	6	250	S/S	VA2215DC	E029	E031	400	400	90
680	8	125	BRZ	VA2217CA	E029	E031	175	175	90
680	8	125	S/S	VA2217CC	E029	E031	175	175	90
680	8	250	BRZ	VA2217DA	E029	E031	400	400	90
680	8	250	S/S	VA2217DC	E029	E031	400	400	90
960	10	125	BRZ	VA2219CE	E029	E031	175	175	90
960	10	125	S/S	VA2219CG	E029	E031	175	175	90
960	10	250	BRZ	VA2219DE	E029	E031	392	392	90
960	10	250	S/S	VA2219DG	E029	E031	392	392	90

▸ Dimensions (IN):

Component		Dimension by Valve Size (IN)						
Variable		2-1/2	3	4	5	6	8	10
A	125 FLG	7-3/4	9	11-3/8	12	14-1/8	16-1/4	20
A	250 FLG	8-3/8	9-3/4	12	12-7/8	14-1/2	16-1/4	21-3/8
B		4-1/8	4-3/8	5	6-7/8	7-5/8	8-7/8	10-7/8
C	E024	13-1/8	13-3/8	14-7/8	-	-	-	-
C	E025	13-7/8	14-1/8	15-5/8	-	-	-	-
C	E026/E029/E031	-	-	19-1/8	20-1/8	21	22-1/8	23-3/4
	E024	17-1/4	17-3/4	19-7/8	-	-	-	-
H	E025	18	18-1/2	20-5/8	-	-	-	-
H	E026/E029/E031	-	-	24-1/8	27	28-5/8	31	34-1/2
R*	E024/E029/E031	7-1/2	7-1/2	7-1/2	7-1/2	7-1/2	7-1/2	7-1/2
R*	E025/E026	8-3/4	8-3/4	8-3/4	8-3/4	8-3/4	8-3/4	8-3/4

Allow 6 inch clearance above actuator for removal / service.

*Center line of Valve to Outside Actuator



ACTUATED ASSEMBLY BODY PRESSURE TEMPERATURE RATINGS

TEMP.	125 FLG (PSIG)	250 FLG (PSIG)
+20 to 150º F	175	400
350º F	125	280

Ratings are PSIG
Pressure boundary meets ANSI B16.1

WEIGHTS

ITEM	WEIGHT (LBS)	
VALVE SIZE (IN)	125 FLG	250 FLG
2-1/2	32	42
3	42	54
4	77	96
5	124	162
6	169	220
8	290	380
10	CF	CF
ACTUATOR	LBS	
E024	3-1/2	
E025	4-1/2	
E026	8-1/2	
E029/E031	8-1/2	
BCM	LBS	
VMS-50	4-1/2	

Actual shipping weights may vary.
CF = Consut Factory

3-WAY MIXING BRONZE AND STAINLESS STEEL- 1/2" - 2"

VA3014CC-E026

VA3009AC-E029

NOTES:
1) Inlet Pressure cannot exceed Body Pressure-Temperature Rating.
2) Shut-off pressures listed are with respect to stated ANSI Leakage Classes.
3) Flowing PSID for water service should be no greater than 2/3 of Inlet Pressure unless verified for absence of cavitation with Warren Valve Sizing Program.

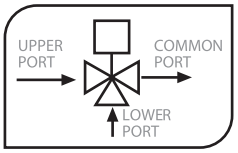
CRN REGISTERED

▶ APPLICATION:

Control of Water; Water & Glycol Solutions to 60%.
Valves mix two flows together (Converging) Seat Leakage Class ANSI III & IV.

▶ VALVE CONSTRUCTION:

Body:	ANSI B16.15 Bronze 250lb.Threaded (NPT) or Stainless Steel (CF8M) 300 lb. threaded (NPT)
Trim:	Linear, 316 Series Stainless Steel
Stem:	316 Stainless Steel
Bonnet:	Brass / Bronze or 316 Stainless Steel
Packing:	EPDM Lip Packing (+20 to 350ºF) Standard (EPDM is **not** suitable for use with oils, hydrocarbons, or acids.) PTFE V-Ring, (+60 to 350ºF) Optional, must be specified on order
Agency Approval:	CRN # CSA - OC18997 (Bronze Body Only)



▶ TRIM LIMITS (Flowing Differential Pressure):

S/S Trim:	Liquid to 100 PSID

▶ ACTUATOR SPECIFICATIONS:

Control Signal:	2-10 Vdc (4-20 mAdc with 500 ohm resistor Kit KR500-supplied with motor)
Control Action, Loss of Signal:	Increasing Signal Opens Lower Port/ Closes Upper Port, Loss of Signal Closes Lower Port/ Opens Upper Port (Default Setting) Reversible with Switch. Can be specified when ordering.
Feedback Signal:	2-10 Vdc
Power Supply:	24 VAC/DC
Loss of Power:	**E024 & E029** (FAIL LAST POSITION) **E031** (E029 w/ VMS-50 BCM, FAIL SAFE TO LOSS OF SIGNAL POSITION) **E025 & E026** (ELECTRONIC FAIL SAFE) Fail Lower Port Closed/ Upper Port Open (Default Setting) Reversible with Switch. Can be specified when ordering.
Power Consumption	
Running:	**E024** 2W; **E025** 3W; **E026** 5W; **E029** 6W; **E031** Battery Charging 12.84W; Battery charged 7.2W
Holding:	**E024** 1.5W; **E025** 2W; **E026** 2W; **E029** 1.5W; **E031** Battery Charging 8.34W; Battery charged 2.7W
Transformer sizing: (24VAC Class 2)	**E024** 4VA; **E025** 7VA; **E026** 9.5VA; **E029** 11VA; **E031** N/A
Switching Power Supply	**E031** 24Vdc 2.0A
Timing:	See Configuration Tables
Manual Override:	Hex crank (supplied with actuator)
Construction:	Aluminum Die Cast and Plastic Housing
Locations:	NEMA Type 2 / IP54, UL enclosure type 2
Temperature Limits:	+32ºF to 122ºF Ambient
Mounting:	Vertical above centerline of valve
Safety Agency Listing:	CE , cULus

▶ VMS-50 BCM (BACK-UP CONTROL MODULE) SPECIFICATIONS:

Required for Fail Safe Operation with fail last position (Actuators E024 & E029)
(One VMS-50BCM can operate one, two or three actuators at a time)
The E031 includes a VMS-50 BCM. The VMS-50 BCM does not include a VMS-50 PS.

Fail Direction:	Fail Safe to Loss of Signal Position
Power Requirement:	24 Vdc 2.0 A from Separate External Switching Power Supply
Power Output:	24 Vdc 48W Total
Construction:	Battery w/Circuit Board & Transformer in the Nema 4x Enclosure
Mounting:	Wall Mount
Dimensions:	8.75" (W) x 6.97" (H) x 5.19" (D) (See page 34)
Safety Agency Listing:	Not Listed

▶ VMS-50 PS (SWITCHING POWER SUPPLY) SPECIFICATIONS:

Required to supply 24Vdc power to the VMS-50 BCM Back-up Control Module
The VMS-50 BCM does not include a VMS-50 PS.

Input:	115 VAC 50/60 Hz 1.5A
Power Output:	24 Vdc 2.0 A
Input Connector:	Three Pin Input Plug
Construction:	Molded Plastic
Dimensions:	4.31" (L) x 2.16" (W) x 1.62" (H)
Safety Agency Listing:	UL Listed

Note: If the building already has a 24 Vdc circuit rated at or above 2.0 Amps that is available for use with the VMS-50 BCM, then the VMS-50 PS is not required.

3-WAY MIXING BRONZE AND STAINLESS STEEL - 1/2" - 2"

▸ ACTUATOR & VALVE CONFIGURATIONS: Select Valve & Actuator Code in Tables:

Fail Last Position — ACTUATOR CODE E024

Cv	Size (IN)	Thd NPT Bronze	Thd NPT ST STL	Trim	Bronze Valve Code	Stainless Steel Valve Code	SHUT-OFF (PSID) CL III	SHUT-OFF (PSID) CL IV	Max Timing (SEC) Motor
6.3	0.5	250	300	S/S	VA3004AC	VA3004EC	238	203	90
8.2	0.75	250	300	S/S	VA3005AC	VA3005EC	238	203	90
10	1	250	300	S/S	VA3006AC	VA3006EC	238	203	90
18.5	1.25	250	300	S/S	VA3007AC	VA3007EC	100	76	90
20	1.5	250	300	S/S	VA3008AC	VA3008EC	100	76	90
40	2	250	300	S/S	VA3009AC	VA3009EC	58	39	90

Fail Safe — ACTUATOR CODE E025

Cv	Size (IN)	Thd NPT Bronze	Thd NPT ST STL	Trim	Bronze Valve Code	Stainless Steel Valve Code	SHUT-OFF (PSID) CL III	SHUT-OFF (PSID) CL IV	Max Timing (SEC) Motor	Max Timing (SEC) Fail Safe
6.3	0.5	250	300	S/S	VA3004AC	VA3004EC	238	203	90	35
8.2	0.75	250	300	S/S	VA3005AC	VA3005EC	238	203	90	35
10	1	250	300	S/S	VA3006AC	VA3006EC	238	203	90	35
18.5	1.25	250	300	S/S	VA3007AC	VA3007EC	100	76	90	35
20	1.5	250	300	S/S	VA3008AC	VA3008EC	100	76	90	35
40	2	250	300	S/S	VA3009AC	VA3009EC	58	39	90	35

Fail Safe — ACTUATOR CODE E026

Cv	Size (IN)	Thd NPT Bronze	Thd NPT ST STL	Trim	Bronze Valve Code	Stainless Steel Valve Code	SHUT-OFF (PSID) CL III	SHUT-OFF (PSID) CL IV	Max Timing (SEC) Motor	Max Timing (SEC) Fail Safe
10	1	250	300	S/S	VA3006AC	VA3006EC	351	315	90	35
18.5	1.25	250	300	S/S	VA3007AC	VA3007EC	151	127	90	35
20	1.5	250	300	S/S	VA3008AC	VA3008EC	151	127	90	35
40	2	250	300	S/S	VA3009AC	VA3009EC	90	71	90	35

Fail Last Position/ Fail Safe — ACTUATOR CODE E029/E031

Cv	Size (IN)	Thd NPT Bronze	Thd NPT ST STL	Trim	Bronze Valve Code	Stainless Steel Valve Code	Fail Last Position (Actuator Code)	Fail Safe w/VMS50 (Actuator Code)	SHUT-OFF (PSID) CL III	SHUT-OFF (PSID) CL IV	Max Timing (SEC) Motor
18.5	1.25	250	300	S/S	VA3007AC	VA3007EC	E029	E031	400	381	90
20	1.5	250	300	S/S	VA3008AC	VA3008EC	E029	E031	400	381	90
40	2	250	300	S/S	VA3009AC	VA3009EC	E029	E031	248	229	90

ACTUATED ASSEMBLY BODY PRESSURE TEMPERATURE RATINGS

TEMP.	BRONZE 250 THD	ST STL 300 THD
+20 to 100° F	400	720
150° F	400	670
350° F	300	537

Ratings are PSIG
250 THD pressure boundary meets ANSI B16.15
300 THD pressure boundary meets ANSI B16.34

WEIGHTS

ITEM	WEIGHT (LBS)	
VALVE SIZE (IN)	BRONZE	ST STL
1/2, 3/4, 1	9	8
1-1/4 & 1-1/2	15-1/2	15
2	20	18-1/2
ACTUATOR	**LBS**	
E024	4	
E025	4-1/2	
E026	8-1/2	
E029/E031	8-1/2	
BCM	**LBS**	
VMS-50	4-1/2	

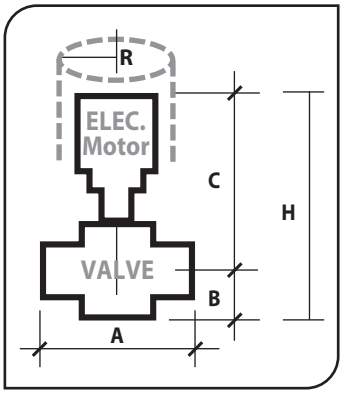
Actual shipping weights may vary.

▸ Dimensions (IN):

Component	Variable	Dimension by Valve Size (IN) 1/2 & 3/4	1	1-1/4	1-1/2	2
A	250THD	4-7/8	4-7/8	5-3/4	5-3/4	6-1/2
A	300THD	5	5	6-1/8	6-1/8	6-1/2
B	250THD	2-23/32	2-23/32	3-13/16	3-13/16	4
B	300THD	2-23/32	2-23/32	3-3/8	3-3/8	3-3/4
C	E024	11-1/2	11-1/2	12-1/8	12-1/8	12-3/8
C	E025	12-1/8	12-1/8	12-3/4	12-3/4	13
C	E026/E029/E031	-	15-3/8	16	16	16-1/4
H	E024 250THD	14-7/32	14-7/32	15-15/16	15-15/16	16-3/8
H	E025 250THD	14-27/32	14-27/32	15-9/16	15-9/16	17
H	E026/E029/E031 250THD	-	18-3/32	18-13/16	18-13/16	20-1/4
H	E024 300THD	13-27/32	13-27/32	15-1/8	15-1/8	15-3/4
H	E025 300THD	14-19/32	14-19/32	15-7/8	15-7/8	16-1/2
H	E026/E029/E031 300THD	18-3/32	18-3/32	19-3/8	19-3/8	20
R*	E024/E029/E031	7-1/2	7-1/2	7-1/2	7-1/2	7-1/2
R*	E025/E026	8-3/4	8-3/4	8-3/4	8-3/4	8-3/4

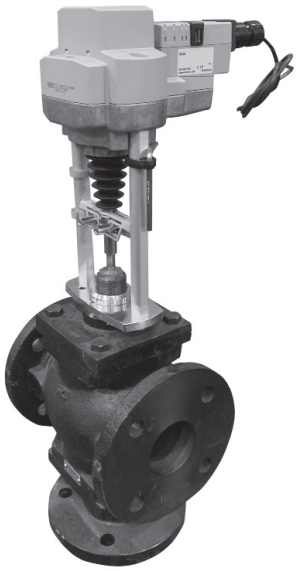
Allow 6 inch clearance above actuator for removal / service.

*Center line of Valve to Outside Actuator



3-WAY MIXING IRON - 2 1/2" - 6"

VA3010CC-E026



VA3010CC-E029

NOTES:
1) Inlet Pressure cannot exceed Body Pressure-Temperature Rating.
2) Shut-off pressures listed are with respect to stated ANSI Leakage Classes.
3) Flowing PSID for water service should be no greater than 2/3 of Inlet Pressure unless verified for absence of cavitation with Warren Valve Sizing Program.

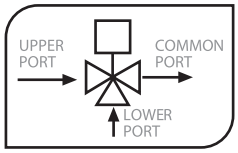
CRN REGISTERED

▶ APPLICATION:

Control of Water; Water & Glycol Solutions to 60%. Valves mix two flows together (Converging).
Seat Leakage ANSI Class III & IV.

▶ VALVE CONSTRUCTION:

Body:	ANSI B16.1 Iron 125lb. Flange or 250lb. Flange
Trim:	Linear, Bronze or 300 Series Stainless Steel
Stem:	316 Stainless Steel
Bonnet:	Brass
Packing:	EPDM Lip Packing (+20 to 350ºF) Standard (EPDM is **not** suitable for use with oils, hydrocarbons, or acids.) PTFE V-Ring, (+60 to 350ºF) Optional, must be specified on order
Agency Approval:	CRN # CSA - OC20496 (Excludes 250# Type 22/32)



▶ TRIM LIMITS (Flowing Differential Pressure):

S/S Trim:	Liquid to 100 PSID

▶ ACTUATOR SPECIFICATIONS:

Control Signal:	2-10 Vdc (4-20 mAdc with 500 ohm resistor Kit KR500-supplied with motor)
Control Action, Loss of Signal:	Increasing Signal Opens Lower Port/ Closes Upper Port, Loss of Signal Closes Lower Port/ Opens Upper Port (Default Setting) Reversible with Switch. Can be specified when ordering.
Feedback Signal:	2-10 Vdc
Power Supply:	24 VAC/DC
Loss of Power:	**E024 & E029** (FAIL LAST POSITION) **E031** (E029 w/ VMS-50 BCM, FAIL SAFE TO LOSS OF SIGNAL POSITION) **E025 & E026** (ELECTRONIC FAIL SAFE) Fail Lower Port Closed/ Upper Port Open (Default Setting) Reversible with Switch. Can be specified when ordering.
Power Consumption	
Running:	**E024** 2W; **E025** 3W; **E026** 5W; **E029** 6W; **E031** Battery Charging 12.84W; Battery charged 7.2W
Holding:	**E024** 1.5W; **E025** 2W; **E026** 2W; **E029** 1.5W; **E031** Battery Charging 8.34W; Battery charged 2.7W
Transformer sizing:	**E024** 4VA; **E025** 7VA; **E026** 9.5VA; **E029** 11VA;
(24VAC Class 2)	**E031** N/A
Switching Power Supply	**E031** 24Vdc 2.0A
Timing:	See Configuration Tables
Manual Override:	Hex crank (supplied with actuator)
Construction:	Aluminum Die Cast and Plastic Housing
Locations:	NEMA Type 2 / IP54, UL enclosure type 2
Temperature Limits:	+32ºF to 122ºF Ambient
Mounting:	Vertical above centerline of valve
Safety Agency Listing:	CE , cULus

▶ VMS-50 BCM (BACK-UP CONTROL MODULE) SPECIFICATIONS:

Required for Fail Safe Operation with fail last position (Actuators E024 & E029)
(One VMS-50BCM can operate one, two or three actuators at a time)
The E031 includes a VMS-50 BCM. The VMS-50 BCM does not include a VMS-50 PS.

Fail Direction:	Fail Safe to Loss of Signal Position
Power Requirement:	24 Vdc 2.0 A from Separate External Switching Power Supply
Power Output:	24 Vdc 48W Total
Construction:	Battery w/Circuit Board & Transformer in the Nema 4x Enclosure
Mounting:	Wall Mount
Dimensions:	8.75" (W) x 6.97" (H) x 5.19" (D) (See page 34)
Safety Agency Listing:	Not Listed

▶ VMS-50 PS (SWITCHING POWER SUPPLY) SPECIFICATIONS:

Required to supply 24Vdc power to the VMS-50 BCM Back-up Control Module
The VMS-50 BCM does not include a VMS-50 PS.

Input:	115 VAC 50/60 Hz 1.5A
Power Output:	24 Vdc 2.0 A
Input Connector:	Three Pin Input Plug
Construction:	Molded Plastic
Dimensions:	4.31" (L) x 2.16" (W) x 1.62" (H)
Safety Agency Listing:	UL Listed

Note: If the building already has a 24 Vdc circuit rated at or above 2.0 Amps that is available for use with the VMS-50 BCM, then the VMS-50 PS is not required.

▸ ACTUATOR & VALVE CONFIGURATIONS: Select Valve & Actuator Code in Tables:

Fail Last Position — ACTUATOR CODE E024

Cv	Size (IN)	FLNG	Trim	Valve Code	SHUT-OFF (PSID)		Max Timing (SEC)
					CL III	CL IV	Motor
69	2.5	125	BRZ	VA3010CA	40	24	90
69	2.5	125	S/S	VA3010CC	40	24	90
69	2.5	250	BRZ	VA3010DA	40	24	90
69	2.5	250	S/S	VA3010DC	40	24	90
86	3	125	BRZ	VA3011CA	25	12	90
86	3	125	S/S	VA3011CC	25	12	90
86	3	250	BRZ	VA3011DA	25	12	90
86	3	250	S/S	VA3011DC	25	12	90

Fail Safe — ACTUATOR CODE E025

Cv	Size (IN)	FLNG	Trim	Valve Code	SHUT-OFF (PSID)		Max Timing (SEC)	
					CL III	CL IV	Motor	Fail Safe
69	2.5	125	BRZ	VA3010CA	40	24	90	35
69	2.5	125	S/S	VA3010CC	40	24	90	35
69	2.5	250	BRZ	VA3010DA	40	24	90	35
69	2.5	250	S/S	VA3010DC	40	24	90	35
86	3	125	BRZ	VA3011CA	25	12	90	35
86	3	125	S/S	VA3011CC	25	12	90	35
86	3	250	BRZ	VA3011DA	25	12	90	35
86	3	250	S/S	VA3011DC	25	12	90	35

Fail Safe — ACTUATOR CODE E026

Cv	Size (IN)	FLNG	Trim	Valve Code	SHUT-OFF (PSID)		Max Timing (SEC)	
					CL III	CL IV	Motor	Fail Safe
69	2.5	125	BRZ	VA3010CA	62	46	90	35
69	2.5	125	S/S	VA3010CC	62	46	90	35
69	2.5	250	BRZ	VA3010DA	62	46	90	35
69	2.5	250	S/S	VA3010DC	62	46	90	35
86	3	125	BRZ	VA3011CA	41	28	90	35
86	3	125	S/S	VA3011CC	41	28	90	35
86	3	250	BRZ	VA3011DA	41	28	90	35
86	3	250	S/S	VA3011DC	41	28	90	35

Fail Last Position/ Fail Safe — ACTUATOR CODE E029/E031

Cv	Size (IN)	FLNG	Trim	Valve Code	Fail Last Position (Actuator Code)	Fail Safe w/VMS50 (Actuator Code)	SHUT-OFF (PSID)		Max Timing (SEC)
							CL III	CL IV	Motor
156	4	125	BRZ	VA3013CA	E029	E031	65	55	90
156	4	125	S/S	VA3013CC	E029	E031	65	55	90
156	4	250	BRZ	VA3013DA	E029	E031	65	55	90
156	4	250	S/S	VA3013DC	E029	E031	65	55	90
270	5	125	BRZ	VA3014CA	E029	E031	40	32	90
270	5	125	S/S	VA3014CC	E029	E031	40	32	90
270	5	250	BRZ	VA3014DA	E029	E031	40	32	90
270	5	250	S/S	VA3014DC	E029	E031	40	32	90
347	6	125	BRZ	VA3015CA	E029	E031	27	20	90
347	6	125	S/S	VA3015CC	E029	E031	27	20	90
347	6	250	BRZ	VA3015DA	E029	E031	27	20	90
347	6	250	S/S	VA3015DC	E029	E031	27	20	90

3-WAY MIXING IRON - 2 1/2" - 6"

ACTUATED ASSEMBLY BODY PRESSURE TEMPERATURE RATINGS

TEMP.	125 FLG (PSIG)	250 FLG (PSIG)
+20 to 150° F	175	400
350° F	125	280

Ratings are PSIG
Pressure boundary meets ANSI B16.1

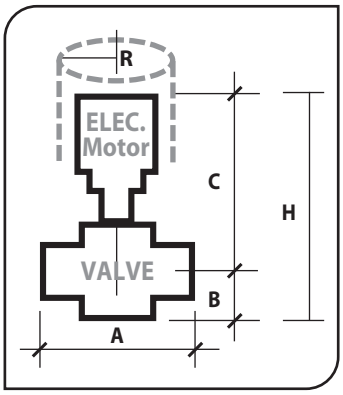
WEIGHTS

ITEM	WEIGHT (LBS)	
VALVE SIZE (IN)	125 FLG	250 FLG
2-1/2	64	73
3	83	94
4	139	157
5	157	211
6	202	283
ACTUATOR	LBS	
E024	4	
E025	4-1/2	
E026	8-1/2	
E029/E031	8-1/2	
BCM	LBS	
VMS-50	4-1/2	

Actual shipping weights may vary.

▸ Dimensions (IN):

Component	Dimension by Valve Size (IN)				
Variable	2-1/2	3	4	5	6
A 125 FLG	9	10	13	15-3/4	17-3/4
A 250 FLG	9-5/8	10-3/4	13-5/8	16-5/8	18-5/8
B 125 FLG	7-1/16	7-15/16	9-7/8	9-1/4	9-7/8
B 250 FLG	7-3/8	8-5/16	10-3/16	10-3/8	11
C E024	13-1/2	14-3/8	-	-	-
C E025	14-1/4	15-1/8	-	-	-
C E026/E029/E031	17-3/4	18-5/8	19-5/8	18-1/2	19-1/4
H E024 125 FLG	20-3/4	22-1/2	-	-	-
H E024 250 FLG	21	22-7/8	-	-	-
H E025 125 FLG	21-1/2	23-1/4	-	-	-
H E025 250 FLG	21-3/4	23-5/8	-	-	-
H E026/E029/E031 125 FLG	25	26-3/4	29-5/8	27-7/8	29-1/4
H E026/E029/E031 250 FLG	25-1/4	27-1/8	30-5/8	29	30-3/8
R* E024/E029/E031	7-1/2	7-1/2	7-1/2	7-1/2	7-1/2
R* E025/E026	8-3/4	8-3/4	8-3/4	8-3/4	8-3/4



Allow 6 inch clearance above actuator for removal / service.

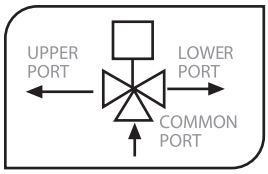
*Center line of Valve to Outside Actuator

▶ APPLICATION:

Control of Water; Water & Glycol Solutions. Valves divert one flow into two directions (Diverting).
Seat Leakage ANSI Class II.

▶ VALVE CONSTRUCTION:

Body:	Size 1, 1-1/2 & 2 inch ANSI B16.15 Bronze 250lb. Threaded (NPT)
Trim:	Linear, Bronze
Stem:	316 Stainless Steel
Bonnet:	Brass
Packing:	EPDM Lip Packing (+20 to 350ºF) Standard (EPDM is **not** suitable for use with oils, hydrocarbons, or acids.) PTFE V-Ring, (+60 to 350ºF) Optional, must be specified on order
O-Ring:	EPR +20 to 300ºF
Agency Approval:	CRN # CSA - OC18997 (Bronze Body Only)



▶ TRIM LIMITS (Flowing Differential Pressure):

Brz Trim:	Liquids to 40 PSID

▶ ACTUATOR SPECIFICATIONS:

Control Signal:	2-10 Vdc (4-20 mAdc with 500 ohm resistor Kit KR500-supplied with motor)
Control Action, Loss of Signal:	Increasing Signal Opens Lower Port/ Closes Upper Port, Loss of Signal Closes Lower Port/ Opens Upper Port (Default Setting) Reversible with Switch. Can be specified when ordering.
Feedback Signal:	2-10 Vdc
Power Supply:	24 VAC/DC
Loss of Power:	**E024** (FAIL LAST POSITION) **E025** (ELECTRONIC FAIL SAFE) Fail Lower Port Closed/ Upper Port Open (Default Setting) Reversible with Switch. Can be specified when ordering.
Power Consumption	
Running:	**E024** 2W; **E025** 3W;
Holding:	**E024** 1.5W; **E025** 2W;
Transformer Sizing: (24VAC Class 2)	**E024** 4VA; **E025** 7VA;
Timing:	See Configuration Tables
Manual Override:	Hex crank (supplied with actuator)
Construction:	Aluminum Die Cast and Plastic Housing
Locations:	NEMA Type 2 / IP54, UL enclosure type 2
Temperature Limits:	+32ºF to 122ºF Ambient
Mounting:	Vertical above centerline of valve
Safety Agency Listing:	CE , cULus

▶ VMS-50 BCM (BACK-UP CONTROL MODULE) SPECIFICATIONS:

Required for Fail Safe Operation with fail last position (Actuators E024 & E029)
(One VMS-50BCM can operate one, two or three actuators at a time)
The E031 includes a VMS-50 BCM. The VMS-50 BCM does not include a VMS-50 PS.

Fail Direction:	Fail Safe to Loss of Signal Position
Power Requirement:	24 Vdc 2.0 A from Separate External Switching Power Supply
Power Output:	24 Vdc 48W Total
Construction:	Battery w/Circuit Board & Transformer in the Nema 4x Enclosure
Mounting:	Wall Mount
Dimensions:	8.75" (W) x 6.97" (H) x 5.19" (D) (See page 34)
Safety Agency Listing:	Not Listed

▶ VMS-50 PS (SWITCHING POWER SUPPLY) SPECIFICATIONS:

Required to supply 24Vdc power to the VMS-50 BCM Back-up Control Module
The VMS-50 BCM does not include a VMS-50 PS.

Input:	115 VAC 50/60 Hz 1.5A
Power Output:	24 Vdc 2.0 A
Input Connector:	Three Pin Input Plug
Construction:	Molded Plastic
Dimensions:	4.31" (L) x 2.16" (W) x 1.62" (H)
Safety Agency Listing:	UL Listed

Note: If the building already has a 24 Vdc circuit rated at or above 2.0 Amps that is available for use with the VMS-50 BCM, then the VMS-50 PS is not required.

VA3208AA-E025

NOTES:
1) Inlet Pressure cannot exceed Body Pressure-Temperature Rating.
2) Shut-off pressures listed are with respect to stated ANSI Leakage Classes.
3) Flowing PSID for water service should be no greater than 2/3 of Inlet Pressure unless verified for absence of cavitation with Warren Valve Sizing Program.
4) The difference between the upper port and the lower port pressure must not exceed 50 PSID.

CRN REGISTERED

3-WAY DIVERTING BRONZE 1" - 2"

▸ ACTUATOR & VALVE CONFIGURATIONS: Select Valve & Actuator Code in Tables:

Fail Last Position — ACTUATOR CODE E024

Cv	Size (IN)	Thd NPT	Trim	Valve Code	SHUT-OFF (PSID) CL II	Max Timing (SEC) Motor
12	1	250	BRZ	VA3206AA	125	90
22	1.5	250	BRZ	VA3208AA	125	90
40	2	250	BRZ	VA3209AA	125	90

Fail Safe — ACTUATOR CODE E025

Cv	Size (IN)	Thd NPT	Trim	Valve Code	SHUT-OFF (PSID) CL II	Max Timing (SEC) Motor	Fail Safe
12	1	250	BRZ	VA3206AA	125	90	35
22	1.5	250	BRZ	VA3208AA	125	90	35
40	2	250	BRZ	VA3209AA	125	90	35

▸ Dimensions (IN):

Component		Dimension by Valve Size (IN)		
Variable		1	1-1/2	2
A	250THD	4-7/8	5-3/4	6-1/2
B	250THD	3-1/2	3-13/16	4
C	E024	11-1/8	11-3/4	12
C	E025	11-7/8	12-1/2	12-3/4
H	E024	14-5/8	15-9/16	16
H	E025	15-3/8	16-5/16	16-3/4
R*	E024	7-1/2	7-1/2	7-1/2
R*	E025	8-3/4	8-3/4	8-3/4

ACTUATED ASSEMBLY BODY PRESSURE TEMPERATURE RATINGS VALVES: 1"-2"

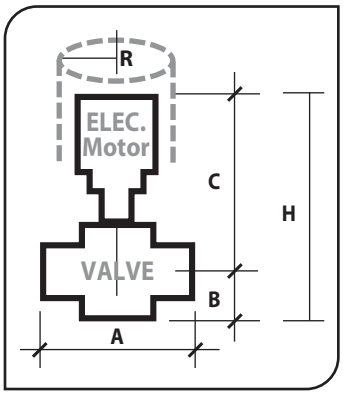
TEMP.	250 THD (RATINGS ARE PSIG)
+20 to 150° F	400
300° F	335

Ratings are PSIG
Pressure boundary meets ANSI B16.15

WEIGHTS

ITEM	WEIGHT (LBS)
VALVE SIZE (IN)	LBS
1	9
1-1/2	16-1/2
2	21
ACTUATOR	LBS
E024	4
E025	4-1/2
BCM	LBS
VMS-50	4-1/2

Actual shipping weights may vary.



Allow 6 inch clearance above actuator for removal / service.

*Center line of Valve to Outside Actuator

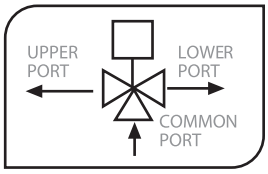
3-WAY DIVERTING IRON 2 1/2" - 6"

▶ APPLICATION:

Control of Water; Water & Glycol Solutions. Valves divert one flow into two directions (Diverting).
Seat Leakage ANSI Class II.

▶ VALVE CONSTRUCTION:

Body:	Size 2-1/2, 3, 4, 5 & 6 inch ANSI B16.1 Iron 125lb. Flange or 250lb Flange
Trim:	Linear, Bronze or 300 Series Stainless Steel
Stem:	316 Stainless Steel
Bonnet:	Brass
Packing:	EPDM Lip Packing (+20 to 350ºF) Standard (EPDM is **not** suitable for use with oils, hydrocarbons, or acids.) PTFE V-Ring, (+60 to 350ºF) Optional, must be specified on order
O-Ring:	EPR +20 to 300ºF (2-1/2 thru 5 in); +20 to 150ºF (6 in)
Agency Approval:	CRN # CSA - OC20496 (Excludes 250# Type 22/32)



▶ TRIM LIMITS (Flowing Differential Pressure):

Brz Trim:	Liquids to 40 PSID
S/S Trim:	Liquids to 100 PSID

▶ ACTUATOR SPECIFICATIONS:

Control Signal:	2-10 Vdc (4-20 mAdc with 500 ohm resistor Kit KR500-supplied with motor)
Control Action, Loss of Signal:	Increasing Signal Opens Lower Port/ Closes Upper Port, Loss of Signal Closes Lower Port/ Opens Upper Port (Default Setting) Reversible with Switch. Can be specified when ordering.
Feedback Signal:	2-10 Vdc
Power Supply:	24 VAC/DC
Loss of Power:	**E029** (FAIL LAST POSITION) **E031** (E029 w/ VMS-50 BCM, FAIL SAFE TO LOSS OF SIGNAL POSITION) **E026** (ELECTRONIC FAIL SAFE) Fail Lower Port Closed/ Upper Port Open (Default Setting) Reversible with Switch. Can be specified when ordering.
Power Consumption	
Running:	**E026** 5W; **E029** 6W; **E031** Battery Charging 12.84W; Battery charged 7.2W
Holding:	**E026** 2W; **E029** 1.5W; **E031** Battery Charging 8.34W; Battery charged 2.7W
Transformer sizing: (24VAC Class 2)	**E026** 9.5VA; **E029** 11VA; **E031** N/A
Switching Power Supply	**E031** 24 Vdc 2.0A
Timing:	See Configuration Tables
Manual Override:	Hex crank (supplied with actuator)
Construction:	Aluminum Die Cast and Plastic Housing
Locations:	NEMA Type 2 / IP54, UL enclosure type 2
Temperature Limits:	+32ºF to 122ºF Ambient
Mounting:	Vertical above centerline of valve
Safety Agency Listing:	CE , cULus

▶ VMS-50 BCM (BACK-UP CONTROL MODULE) SPECIFICATIONS:

Required for Fail Safe Operation with fail last position (Actuators E024 & E029)
(One VMS-50BCM can operate one, two or three actuators at a time)
The E031 includes a VMS-50 BCM. The VMS-50 BCM does not include a VMS-50 PS.

Fail Direction:	Fail Safe to Loss of Signal Position
Power Requirement:	24 Vdc 2.0 A from Separate External Switching Power Supply
Power Output:	24 Vdc 48W Total
Construction:	Battery w/Circuit Board & Transformer in the Nema 4x Enclosure
Mounting:	Wall Mount
Dimensions:	8.75" (W) x 6.97" (H) x 5.19" (D) (See page 34)
Safety Agency Listing:	Not Listed

▶ VMS-50 PS (SWITCHING POWER SUPPLY) SPECIFICATIONS:

Required to supply 24Vdc power to the VMS-50 BCM Back-up Control Module
The VMS-50 BCM does not include a VMS-50 PS.

Input:	115 VAC 50/60 Hz 1.5A
Power Output:	24 Vdc 2.0 A
Input Connector:	Three Pin Input Plug
Construction:	Molded Plastic
Dimensions:	4.31" (L) x 2.16" (W) x 1.62" (H)
Safety Agency Listing:	UL Listed

VA3213CA-E029

NOTES:
1) Inlet Pressure cannot exceed Body Pressure-Temperature Rating.
2) Shut-off pressures listed are with respect to stated ANSI Leakage Classes.
3) Flowing PSID for water service should be no greater than 2/3 of Inlet Pressure unless verified for absence of cavitation with Warren Valve Sizing Program.
4) The difference between the upper port and the lower port pressure must not exceed 50 PSID.

CRN REGISTERED

Note: If the building already has a 24 Vdc circuit rated at or above 2.0 Amps that is available for use with the VMS-50 BCM, then the VMS-50 PS is not required.

3-WAY DIVERTING IRON 2 1/2" - 6"

▸ ACTUATOR & VALVE CONFIGURATIONS: Select Valve & Actuator Code in Tables:

Fail Safe — ACTUATOR CODE E026

Cv	Size (IN)	Thd NPT	Trim	Valve Code	SHUT-OFF (PSID)	Max Timing (SEC)	
					CL II	Motor	Fail Safe
68	2.5	125	BRZ	VA3210CA	125	90	35
68	2.5	125	S/S	VA3210CC	125	90	35
68	2.5	250	BRZ	VA3210DA	125	90	35
68	2.5	250	S/S	VA3210DC	125	90	35
85	3	125	BRZ	VA3211CA	125	90	35
85	3	125	S/S	VA3211CC	125	90	35
85	3	250	BRZ	VA3211DA	125	90	35
85	3	250	S/S	VA3211DC	125	90	35

Fail Last Position/ Fail Safe — ACTUATOR CODE E029/E031

Cv	Size (IN)	Thd NPT	Trim	Valve Code	Fail Last Position (Actuator Code)	Fail Safe w/VMS50 (Actuator Code)	SHUT-OFF (PSID)	Max Timing (SEC)
							CL II	Motor
160	4	125	BRZ	VA3213CA	E029	E031	125	90
160	4	125	S/S	VA3213CC	E029	E031	125	90
160	4	250	BRZ	VA3213DA	E029	E031	125	90
160	4	250	S/S	VA3213DC	E029	E031	125	90
195	5	125	BRZ	VA3214CA	E029	E031	125	90
195	5	125	S/S	VA3214CC	E029	E031	125	90
195	5	250	BRZ	VA3214DA	E029	E031	125	90
195	5	250	S/S	VA3214DC	E029	E031	125	90
270	6	125	BRZ	VA3215CA	E029	E031	125	90
270	6	125	S/S	VA3215CC	E029	E031	125	90
270	6	250	BRZ	VA3215DA	E029	E031	125	90
270	6	250	S/S	VA3215DC	E029	E031	125	90

ACTUATED ASSEMBLY BODY PRESSURE TEMPERATURE RATINGS VALVES: 2-1/2"-6"

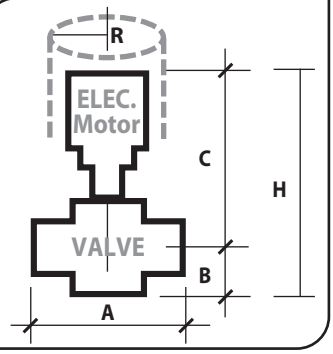
TEMP.	125 FLG (PSIG)	250 FLG (PSIG)
+20 to 150º F	175	400
300º F	140	310

Ratings are PSIG
Pressure boundary meets ANSI B16.1

WEIGHTS

VALVE SIZE (IN)	125 FLG	250 FLG
2-1/2	59	73
3	78	94
4	138	157
5	152	213
6	203	284
ACTUATOR	**LBS**	
E026	8-1/2	
E029/E031	8-1/2	
BCM	**LBS**	
VMS-50	4-1/2	

Actual shipping weights may vary.



Allow 6 inch clearance above actuator for removal / service.

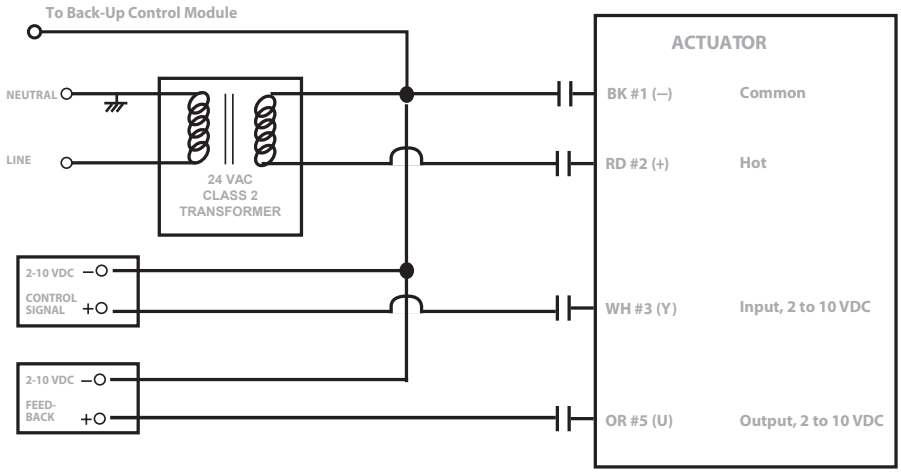
*Center line of Valve to Outside Actuator

▸ Dimensions (IN):

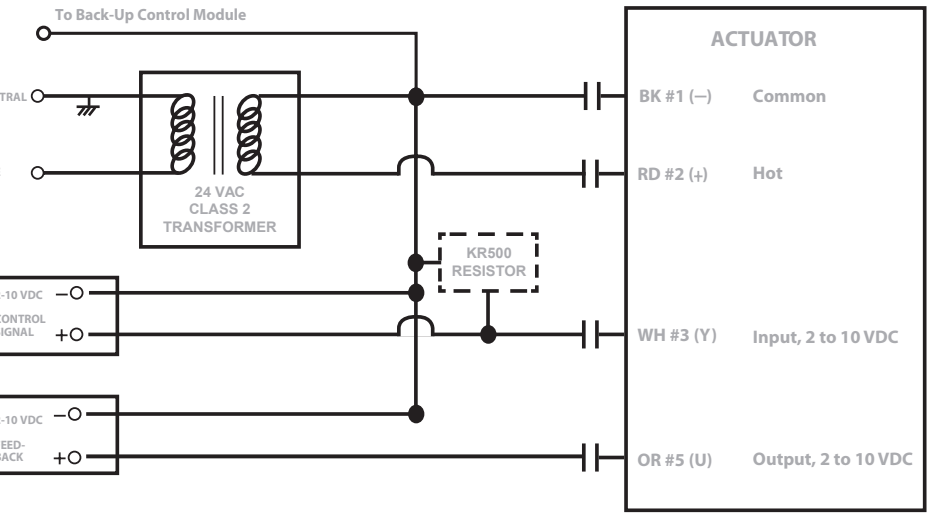
Component		Dimension by Valve Size (IN)				
Variable		2-1/2	3	4	5	6
A	125 FLG	9	10	13	12	14-1/8
A	250 FLG	9-5/8	10-3/4	13-5/8	12-7/8	14-1/2
B	125 FLG	7-1/16	7-15/16	9-7/8	10-1/2	11-1/16
B	250 FLG	7-3/8	8-5/16	10-3/16	10-15/16	11-1/2
C	E026/E029/E031	17-3/4	18-5/8	19-3/8	20	20-5/8
H	E026/E029/E031 125 FLG	25	26-3/4	29-3/8	30-5/8	31-7/8
H	E026/E029/E031 250 FLG	25-1/4	27-1/8	29-3/4	31-1/8	32-1/4
R*	E029/E031	7-1/2	7-1/2	7-1/2	7-1/2	7-1/2
R*	E026	8-3/4	8-3/4	-	-	-

For Actuators: E024, E029 & E031 **
** An E029 which includes BCM

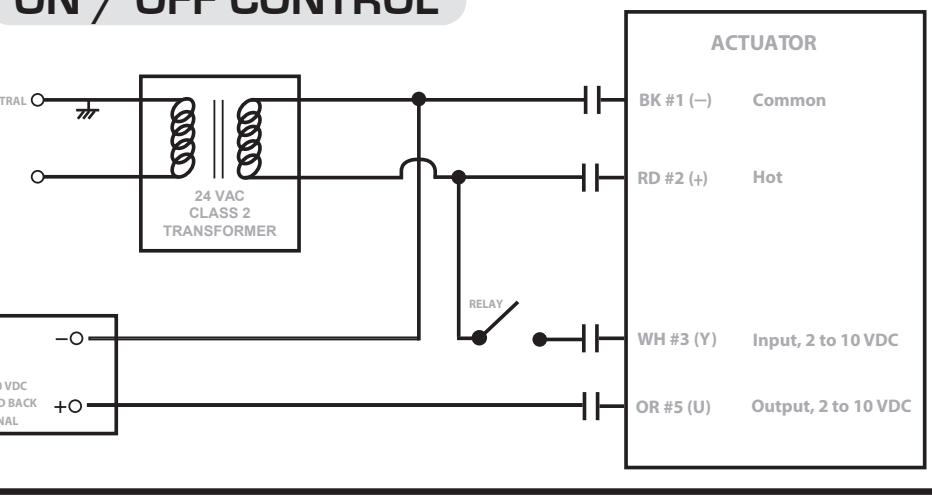
2-10 VDC



4-20 mADC



ON / OFF CONTROL

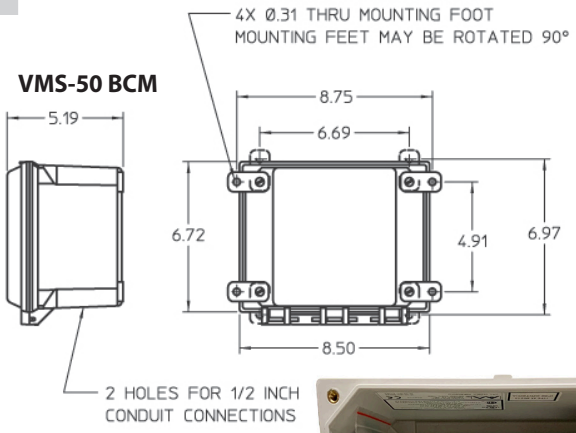


BCM *(Back-Up Control Module)* SPECIFICATIONS

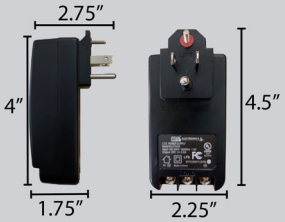
VMS-50 BCM SPECIFICATIONS

Actuator Usage:	Models E024, E029 or E031 *(NOTE: E031 is an E029 Actuator with a VMS-50-BCM. This does not include the VMS-50-PS.)*
Power Requirement:	24 Vdc 2.0 A from Separate External; Switching Power Supply
Power Output:	24 Vdc 48W Total
Number Actuators:	One, Two or Three
Construction:	Battery w/Circuit Board and Charger
Circuit Board Protection:	Fuse Littelfuse T6.3AH250VP
Enclosure Type:	NEMA 4X, IP66, UL 4X, CSA 4X
Flame Retardant:	UL 50
Construction:	UV Stabilized Fiberglass Reinforced Polyester, Polycarbonate Hinge and Closed Cell Neoprene Gasket
Connections:	Two 1/2 IN conduit with one plug
Number Batteries:	One
Initial Charge:	2-4 hours
Output Cycle Time:	6.0 Minutes from loss of power until circuit board times out
Battery Life:	Up to 5 years … Replacement battery model SP12-1.2 (12V1.4AH/T1)
Indication:	Red REPLACE BATTERY LED ON indicates Replace Battery (See REPLACE BATTERY LED Function)
Dimensions:	8.75″ (W) x 6.97″ (H) x 5.19″ (D)
Mounting:	Feet for Wall Mount (4.91″ x 8.75″ centers)
Environmental:	Operating/ Storage: Ambient +32°F to +104°F (0 to +40°C) – due to battery
Weight:	4.15 lbs (1.9 kg)
Safety Agency Listing:	Not listed

VMS-50 BCM

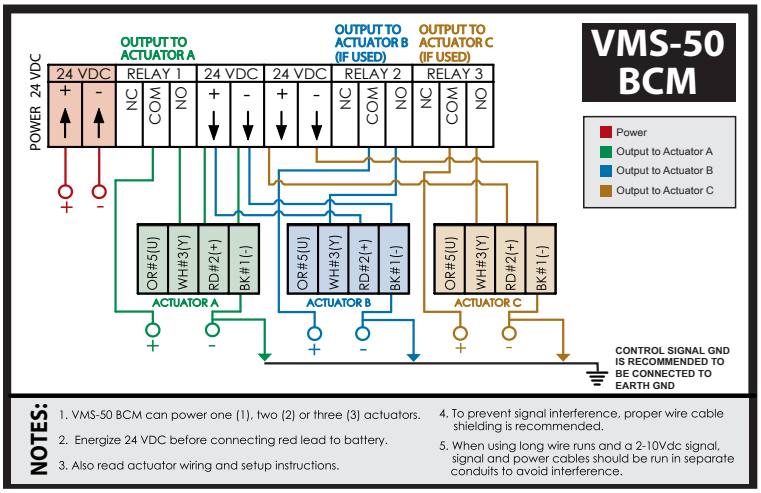


VMS-50 PS SEPARATE EXTERNAL SWITCHING POWER SUPPLY



Usage:	VMS-50 BCM (VMS-50 BCM does not include VMS-50 PS)
Input:	115 VAC 50/60 Hz 1.5A
Indication:	Red LED ON indicates Input Line Voltage Present
Output:	24 Vdc 2.0 A
Input Connector:	Three Pin Input Plug
Construction:	Molded Plastic
Dimensions:	4.31″ (L) x 2.16″ (W) x 1.62″ (H)
Environmental: *Operating/ Storage:*	Ambient +32°F to +113°F (0 to +45°C)/ -40°F to +185°F/(-40 to +85°C)
Weight:	0.5 lbs (0.2 kg)
Safety Agency Listing:	UL listed
Safety Agency Listing:	Two 1/2 IN conduit with one plug

VMS-50 WIRING DIAGRAM



VMS-50 BCM	
TERMINAL IDENTIFICATION	**CONNECTION/DESCRIPTION**
24 VDC + ←	24 Vdc (+) IN
24 VDC - ←	24 Vdc (-) IN
RELAY 1 NC	Normally Closed Relay Contact 1st Actuator
RELAY 1 COM	Common Relay Contact/Control Signal (+) 1st Actuator
RELAY 1 NO	Normally Open Relay Contact 1st Actuator
24 VDC + →	24 Vdc (+) OUT
24 VDC - →	24 Vdc (-) OUT
RELAY 2 NC	Normally Closed Relay Contact 2nd Actuator
RELAY 2 COM	Common Relay Contact/Control Signal (+) 2nd Actuator
RELAY 2 NO	Normally Open Relay Contact 2nd Actuator
RELAY 3 NC	Normally Closed Relay Contact 3rd Actuator
RELAY 3 COM	Common Relay Contact/Control Signal (+) 3nd Actuator
RELAY 3 NO	Normally Open Relay Contact 3nd Actuator

Operation:

Proportional Normal:

24 Vdc External Power Supply LOAD connected to 24 Vdc IN terminals of VMS-50 BCM. Building Power Source, 115 VAC 50/60 Hz required for VMS-50 PS , connected to 24 Vdc External Power Supply LINE. Actuator responds to modulating input signal.

Power Failure: 24 Vdc OUT from VMS-50 BCM changes from 24 Vdc from External Power Supply to 24 Vdc from battery/inverter. Relay(s) break the connection between Common and Normally Open Contact terminals forcing the actuator(s) to go to the signal failure direction for their rotation switch position (See page 13 for explanation of rotation switch position).

Loss of Signal: 24 Vdc External Power Supply connected to 24 Vdc IN terminals of VMS-50 BCM. Building Power Source, 115 VAC 50/60 Hz required for VMS-50 PS, connected to 24 Vdc External Power Supply. The control signal is broken forcing the actuator(s) to go to the signal failure direction for their rotation switch position (See page 13 for explanation of rotation switch position).

WARREN CONTROLS INC. (Hereinafter called "Seller") agrees to supply the equipment covered herein on the following terms and conditions. Additional terms and conditions not covered herein will be accepted only upon mutual agreement in writing.

ORDERS: Contracts and orders are subject to acceptance by the home office of the Seller.

FREIGHT TERMS: All Prices are FOB factory (Bethlehem, PA).

MINIMUM ORDER REQUIREMENT: All orders must have a minimum net value of $400.

PRICES AND DISCOUNTS: All prices and discounts are in accordance with the established price and discount schedules of the Seller, and are subject to change without notice.

PRICE LIST: The price list is not an offer to sell to any person who possesses it, nor to anyone else, the goods listed herein at the prices shown. All prices herein set forth supersede all prior price lists and are subject to change without notice. Warren Controls Incorporated may also, from time to time, discontinue, without notice, the sale of any of the products herein.

TAXES: The amount of any present or future sales, use, occupancy, excise, or other tax, federal, state or local, which the Seller now, or hereafter shall be legally obligated to pay, either on its own behalf or on the behalf of the purchaser or otherwise, with respect to the material covered by this order or contract, shall (unless the prices contained herein are stated expressly to include such tax) be added to such prices and paid by the purchaser. Purchaser agrees to report and pay any such tax directly on any non-exempt transaction, when Seller's invoices do not indicate such a charge.

REMITTANCES: All invoices shall be due and payable in United States currency, free of exchange, collection, or any other charges, net 30 days, or as otherwise agreed upon and set forth in writing by Seller. Past due invoices are subject to a carrying charge of 1% per month. The purchaser, if so requested, agrees to furnish Seller with all information, including financial statements, necessary to make proper credit appraisal. Refusal to supply such information may cause a quotation to be withdrawn. Quotations for extended periods are subject to change with reasonable notice.

LIABILITY: The buyer shall remain primarily liable for the purchase price and the Seller shall not be obliged to accept any term or condition of payment which will shift liability to a third person not a party to the contract of sale, whether or not such third person is the United States Government, its agents or instrumentalities.

RUSH ORDERS: Expediting is something that we at Warren Controls Incorporated endeavor to accommodate whenever possible but must be requested and promised on a case-by-case basis. Premium freight is not assumed and must be specified on the purchase order.

DISCONTINUANCES OF DELIVERIES: Should the purchaser's financial responsibility be or become unsatisfactory to the Seller, cash payment or satisfactory security at any time may be demanded by the Seller, and if not furnished to the Seller's satisfaction, the Seller may at its option discontinue deliveries and charge the purchaser for the sale value of any completed or partly completed articles manufactured pursuant to the order or contract.

PARTIAL SHIPMENTS: Seller reserves the right to make partial shipments from time to time and render invoices therefore, which shall be due and payable as provided in paragraph entitled "Remittances".

DELAYS: The Seller shall not be liable for any loss, damage, or delay occasioned by any causes beyond the Seller's control, including, but not limited to governmental actions or orders, embargoes, strikes, differences with workers, fires, floods, accidents, or transportation delays. IN NO EVENT SHALL SELLER BE LIABLE FOR ANY CONSEQUENTIAL OR SPECIAL DAMAGES.

WEIGHTS AND DIMENSIONS: Shipping weights and dimensions given in catalogs and drawings are as close to actual as practicable but are not guaranteed. No claims will be allowed because of any discrepancy between actual weights or dimensions of material shipped and listed data in catalog.

SHIPPING AND PACKING: All material is carefully packed for shipment and Seller will not be responsible for loss, delay or breakage after having received "in good order" receipts from the transportation company. All claims for breakage, loss, delay and damage should be made to carriers, but Seller will render all possible assistance in securing satisfactory adjustment of such claims. Goods will be shipped by the method and via carrier Seller believes dependable, unless the buyer designates the carrier. Goods held at factory beyond delivery date for convenience of buyer will be invoiced on date of completion and terms of payment will apply as from invoice date. Such goods will be subject to charges for warehousing and other expenses incident to such delay.

REJECTION OF SHIPMENT: If the purchaser is unable or unwilling to accept any shipment, the purchaser shall be liable to the Seller, in addition to any other rights for which the Seller may be entitled, for freight, express, storage, extra cost of handling, and other expenses incurred thereby.

CANCELLATION: All orders are firm and are not subject to cancellation or change in specifications, shipping schedules or other conditions without Seller's written consent, which will be given only upon agreement to compensate for loss caused by such cancellation or changes.

SHORTAGE CLAIMS: Claims for shortage or incorrect filling of orders must be made within 60 days from date of delivery.

WARRANTY: The Seller warrants that the equipment manufactured by it and covered by this order is free from defects in material and workmanship and, without charge, product found to be defective in material or workmanship will be repaired, or at Seller's option replaced F.O.B. original point of shipment, if written notice of failure is received by Seller within one (1) year after date of shipment for valve bodies and five (5) years after date of shipment for catalogued HVAC/BAC electric actuators (unless specifically noted elsewhere), provided said product has been properly installed, operated in accordance with the Seller's instructions, and provided such defects are not due to abuse or decomposition by chemical or galvanic action. THIS EXPRESS WARRANTY IS IN LIEU OF AND EXCLUDES ALL OTHER WARRANTIES, GUARANTEES, OR REPRESENTATIONS, EXPRESS OR IMPLIED. THERE IS NO IMPLIED WARRANTY OF MERCHANTABILITY OR OF FITNESS FOR A PARTICULAR PURPOSE. Seller assumes no responsibility for repairs made on the Seller's equipment unless done by the Seller's authorized personnel, or by written authority from the Seller. The Seller makes no guarantee with respect to material not manufactured by it. Seller shall not be liable for consequential damage in case of any failure to meet the conditions of any guarantee or shipping schedule, nor will claims for labor, loss of profits, repairs or other expenses incidental to replacement be allowed. The Seller in connection with the manufacture and sale of its equipment makes no other representation, guarantee or warranty, expressed or implied.

PURCHASER'S REMEDIES: The purchaser's remedies with respect to equipment manufactured by Seller covered by this order or contract and found to be defective shall be limited exclusively to the right of repair or replacement of such defective equipment. IN NO EVENT SHALL SELLER BE LIABLE FOR CLAIMS (BASED UPON BREACH OF CONTRACT, BREACH OF EXPRESS OR IMPLIED WARRANTY, OR NEGLIGENCE) FOR ANY OTHER DAMAGES, WHETHER DIRECT, IMMEDIATE, FORESEEABLE, CONSEQUENTIAL, OR SPECIAL OR FOR ANY EXPENSES INCURRED BY REASON OF THE USE OR MISUSE, SALE OR FABRICATION OF PRODUCTS WHICH DO OR DO NOT CONFORM TO THE TERMS AND CONDITIONS OF THIS ORDER OR CONTRACT.

CONSEQUENTIAL DAMAGES: IN NO EVENT SHALL BUYER BE ENTITLED TO RECOVER ANY CONSEQUENTIAL OR INCIDENTAL DAMAGES, INCLUDING BUT NOT LIMITED TO ANY COMMERCIAL LOSS OR INJURY TO ANY PERSON, WHETHER OR NOT SAID DAMAGES ARE CAUSED, IN WHOLE OR IN PART, BY ANY DELAY, FAILURE, NONPERFORMANCE OR NEGLIGENCE OF SELLER, OR THE BREACH BY SELLER OF ANY OF THE TERMS OF SALE CONTAINED HEREIN OR ANY OTHER TERM OR CONDITION MADE A PART OF THE CONTRACT BETWEEN SELLER AND BUYER.

RETURNS: Return material shipments shall be prepaid and clearly marked with a Sales Shipping Authorization (SSA) number issued by the Seller. Items returned for repair shall include detailed information about the application/installation, and the nature of the trouble experienced. Credit may be issued by the Seller for unused, current product, returned in saleable condition, after deduction of a restocking fee, typically 25% of the purchase price. Warranty coverage, or credit consideration, will be determined only after receipt and inspection of the material by the Seller.

BOND PREMIUMS: In the event the Seller shall be required as a condition of the manufacture and sale of equipment to furnish a performance bond, the buyer shall pay as a part of the purchase price of said equipment all bond premiums and expense in connection therewith.

DESIGNS: All designs and specifications shown in Seller's catalog are subject to change without notice.

PATENT INFRINGEMENT: The Seller will hold the purchaser and user harmless from infringement of any United States patent covering equipment of its manufacture. This, of necessity, is limited to the equipment per se and cannot be extended to applications of such equipment by others. The purchaser and user shall advise the Seller immediately in the event any claims of infringement are brought to their attention.

COMPLIANCE WITH LAWS: Seller has complied with all applicable Federal, State and local laws and regulations in connection with the manufacture and sale of all equipment. No responsibility or liability will be taken for import duties, laws, regulations or taxes imposed by any foreign country.

GOVERNING LAW: This contract shall be governed by, construed, and enforced in accordance with the laws of the State of Pennsylvania.

ERRORS: All clerical errors are subject to correction.

Warren Controls was founded in the early 1950's and was known as Warren Automatic Controls. Warren is the name of the county in New Jersey where the business was founded. The first products were regulators designed for the HVAC and marine industries. The company was purchased and renamed Warren Controls Corporation in 1971, largely specializing and growing in a variety of flow control products for commercial, industrial, and military applications.

In 2003, Warren Controls Inc., as we are known today now resides in a modern 60,000 Sq. Ft. manufacturing facility in Bethlehem, PA. Our product lines continue to grow through extensive product development and target marketing. Today, Warren offers four broad product lines for Building Automation Control Valves, Industrial Process Valves up to ANSI Class 300, Mechanical Level Controls for deaerators and boilers, and Military / Marine Valves to MIL specifications.

We serve a variety of end use and OEM customers and manage an extensive independent representative and distribution sales network. Find out who the local Sales Agent is in your area. Or, feel free to contact the company directly to answer your questions and serve your needs.

WARREN CONTROLS

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