Victaulic® Series 789V Manual Balancing Valve

106.04

PROJECT INFORMATION

Project
Contractor
Job
Engineer
Date

1.0 PRODUCT DESCRIPTION

Available Sizes: 2½ - 16"/73.0 mm – DN400

Application/Function: Heating (Not Including Steam) and Cooling Systems/Balancing, Pre-Setting, Measuring, and Shut-Off

Maximum Working Pressure: 350 psi/2413 kPa/24 Bar

Maximum Operating Temperature: +14°F to 248°F/–12°C to +120°C

2.0 CERTIFICATIONS/LISTINGS

Product manufactured by Victaulic and/or certified suppliers in accordance with ISO-9001.

3.0 MATERIALS AND DESIGN

Body:

- Gray cast iron conforming to EN1561 EN-GJL-250 (GG25) for 2½ – 10"/73.0 mm – DN250 sizes
- Ductile iron conforming to EN1563 EN-GJS-500-7 (GGG50) for 12 – 16"/DN300 – DN400 sizes

Bonnet:

- Cast iron EN-GJL-250 (GG25) for 2½ – 3"/73.0 mm – DN80 sizes
- Brass CC491K (Rg5) for 4 – 6"/DN100 – DN150 sizes
- Cast iron EN-GJS-400-7 (GGG40) for 8 – 12"/DN200 – DN300 sizes
- Ductile iron EN-GJS-500-7 (GGG50) for 14 – 16"/DN350 – DN400 sizes

Bonnet Seal O-Ring: EPDM

Spindle: DZR brass CW602

Spindle Seal O-Ring: EPDM

Plug:

- DZR brass CW602 for 2½ – 3"/73.0 mm – DN80 sizes
- Brass CC491K (Rg5) for 4 – 16"/DN100 – DN400 sizes

Seat Seal: EPDM

PT Ports: DZR brass CW602

Set Screw: 304 stainless steel

Hand Wheel: Polyamide plastic

4.0 AVAILABLE ACCESSORIES

- Standard PT Ports
- PT Port Extensions
- Hand Wheel
- Hand Wheel Extension
- Measuring Nipple
- Locking Wires and Wire Crimps
- Memory Stop Hex Key
- Flow Wheel

THE INFORMATION CONTAINED ON THIS PAGE IS NOT INTENDED TO REPLACE THE FULL PRODUCT DATA LISTED LATER IN THIS DOCUMENT. THOROUGHLY READ AND UNDERSTAND ALL INSTALLATION INSTRUCTIONS AND PRODUCT SAFETY INFORMATION BEFORE INSTALLING THIS PRODUCT.

5.0 VALVE SELECTION GUIDE

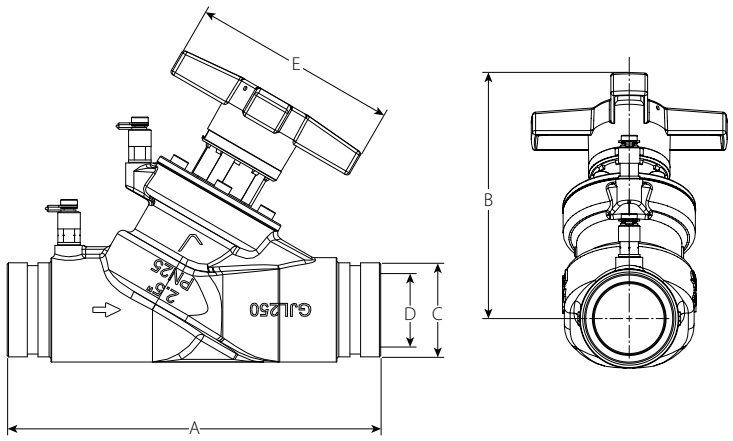
Nominal Size inches DN	Actual Outside Diameter inches mm	Absolute Minimum Flow Rate GPM LPM	Nominal Minimum Flow Rate GPM LPM	Nominal Maximum Flow Rate GPM LPM	Absolute Maximum Flow Rate GPM LPM
2 ½	2.875 73.0	1.58 7.18	2.40 10.91	113 514	333 1514
3 DN80	3.500 88.9	1.51 6.86	2.30 10.46	141 641	416 1891
4 DN100	4.500 114.3	2.24 10.2	3.40 15.5	252 1146	742 3373
5	5.563 141.3	2.96 13.5	4.50 20.5	361 1641	1061 4823
6 DN150	6.625 168.3	2.90 13.2	4.40 20.0	499 2268	1470 6683
8 DN200	8.625 219.1	9.87 44.9	15.0 68.2	1037 4714	3051 13870
10 DN250	10.750 273.0	11.2 50.9	17.0 77.3	1399 6360	4116 18711
12 DN300	12.750 323.9	34.9 159	53.0 241	1861 8460	5475 24889
14 DN350	14.000 355.6	220 1000	335 1523	2601 11824	7654 34795
16 DN400	16.000 406.4	257 1168	391 1777	4335 19707	12757 57993

Sizing may be accomplished by using the nominal range of flows provided. Nominal flow rates are based on 1-psi pressure drop with minimum at half turn and maximum at fully open. Absolute flow rates are established by calculating the flow through the valve at its minimum recommended opening position (half turn) with a pressure drop of 1-ft of water and maximum opening position (fully open) with a pressure drop of 20-ft of water. These ranges were chosen as they are achievable by most systems and common measurement equipment.

Flows outside this the nominal range are achievable. It is the responsibility of the system designer to determine whether system conditions such as available differential pressure, maximum component pressure drop and velocity limits, and measurement accuracy will allow valve sizing outside this nominal range. However, it is not recommended to exceed the maximum flow rates listed above. Excessive pressure drop may cause excessive noise or cavitation within the system.

6.0 DIMENSIONS

Series 789V
Grooved End



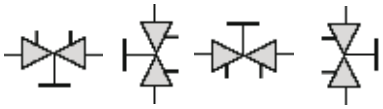
Size		Dimensions					Weight
Nominal inches DN	**Actual Outside Diameter** inches mm	**A** **End to End** inches mm	**B** **CL to Hand Wheel** inches mm	**C** **Groove OD** inches mm	**D** **ID** inches mm	**E** **Hand Wheel Width** inches mm	**Approx. (Each)** lb kg
2 ½	2.875 73.0	11.41 290	7.94 202	2.87 73	2.24 57	6.29 160	16.70 7.6
3 DN80	3.500 88.9	12.20 310	8.38 213	3.50 89	2.71 69	6.29 160	27.40 12.5
4 DN100	4.500 114.3	13.78 350	9.61 244	4.51 115	3.58 91	6.29 160	42.30 19.0
5	5.563 141.3	15.74 400	11.48 292	5.57 141	4.60 117	6.29 160	71.10 32.5
6 DN150	6.625 168.3	18.89 480	11.66 296	6.65 169	5.47 139	6.29 160	94.10 42.5
8 DN200	8.625 219.1	23.62 600	18.40 467	8.65 220	7.28 185	11.77 299	231.00 105.0
10 DN250	10.750 273.0	28.74 730	19.00 483	10.78 274	9.45 241	11.77 299	322.00 146.0
12 DN300	12.750 323.9	33.46 850	20.28 515	12.78 325	11.34 289	11.77 299	454.00 206.0
14 DN350	14.000 355.6	38.58 980	21.95 558	14.00 356	12.44 316	11.77 299	697.00 316.0
16 DN400	16.000 406.4	43.31 1100	25.97 660	16.00 406	14.58 371	11.77 299	1100.00 499.0

7.0 PERFORMANCE

Measuring Accuracy

The hand wheel zero position is calibrated and shall not be changed. Valves have a flow measurement accuracy of +/-5% when used within their recommended flow range and installed in accordance with the figure below. **NOTE:** For the most accurate results, a differential pressure meter should be used. For optimal flow accuracy, the valve should be installed with the hand wheel toward the downstream end.

For accuracy of measurement, it is recommended that the valve be installed (10) pipe diameters downstream of a pump or (5) pipe diameters downstream of elbows, valves, or other pipe fittings. In all cases, (2) pipe diameters should be located downstream of the valve.



Valve may be installed in any orientation.

7.1 PERFORMANCE

C_V Values for Various Hand Wheel Settings

Series 789V

The values below may be used when calculating and sizing a piping system.

Number of Turns	Nominal Size inches DN									
	2½	3 DN80	4 DN100	5	6 DN150	8 DN200	10 DN250	12 DN300	14 DN350	16 DN400
	C_v K_v	C_v K_v	C_v K_v	C_v K_v	C_v K_v	C_v K_v	C_v K_v	C_v K_v	C_v K_v	C_v K_v
0.5	2.40 2.08	2.27 1.96	3.37 2.92	4.27 3.69	4.40 3.81	15.0 13.0	17.0 14.7	–	–	–
1	4.21 3.64	5.14 4.45	8.76 7.58	12.9 11.1	15.8 13.6	28.0 24.2	34.0 29.4	–	–	–
1.5	6.54 5.66	8.18 7.07	14.6 12.6	22.2 19.2	27.5 23.7	43.0 37.2	53.0 45.8	–	–	–
2	11.7 10.1	13.8 12.0	21.0 18.2	31.0 26.8	40.3 34.9	54.3 47.0	70.1 60.6	234 202	–	–
2.5	17.5 15.2	21.8 18.8	28.0 24.3	40.3 34.9	57.2 49.5	67.2 58.1	91.1 78.8	292 253	–	–
3	28.0 24.3	30.5 26.4	38.6 33.3	56.7 49.0	104 89.9	90.5 78.3	117 101	350 303	339 293	391 338
3.5	39.7 34.4	40.9 35.4	60.7 52.5	73.6 63.7	152 131	126 109	158 136	456 394	397 344	469 406
4	50.8 44.0	52.3 45.2	84.1 72.8	93.5 80.8	204 177	169 147	210 182	549 475	467 404	548 474
4.5	60.7 52.5	64.5 55.8	109 94.0	119 103	248 214	233 202	286 248	654 566	561 485	682 590
5	71.3 61.6	75.5 65.3	131 113	150 129	297 257	309 267	386 333	759 657	654 566	803 695
5.5	81.8 70.7	88.1 76.2	154 133	186 161	339 293	391 339	496 429	876 758	759 657	948 820
6	91.1 78.8	101.6 87.9	178 154	216 187	376 325	467 404	607 525	993 859	911 788	1092 945
6.5	99.3 85.9	114 98.6	201 174	255 220	414 358	550 476	713 616	1110 960	1028 889	1246 1078
7	105 90.9	125 108	218 189	290 251	449 388	621 538	824 712	1227 1061	1145 990	1399 1210
7.5	110 95.5	134 116	237 205	329 285	473 409	686 594	929 803	1320 1142	1250 1081	1546 1337
8[1]	114 99.0	143 123	255 220	364 315	505 437	749 648	1016 879	1402 1213	1379 1192	1691 1463
8.5	–	–	–	–	–	807 698	1092 945	1460 1263	1460 1263	1840 1592
9	–	–	–	–	–	866 749	1186 1026	1519 1314	1542 1334	1994 1725
9.5	–	–	–	–	–	919 795	1197 1036	1577 1364	1589 1374	2115 1830
10	–	–	–	–	–	942 814	1256 1086	1694 1465	1659 1435	2238 1936
10.5	–	–	–	–	–	982 850	1308 1132	1752 1516	1752 1516	2342 2026
11	–	–	–	–	–	1009 873	1355 1172	1799 1556	1846 1597	2446 2116
11.5	–	–	–	–	–	1030 891	1384 1197	1822 1576	1916 1657	2569 2222
12[2]	–	–	–	–	–	1048 906	1414 1223	1834 1587	1986 1718	2691 2328

[1] Full open valve for 2½" through 6"

[2] Full open valve for 8" through 12"

7.1 PERFORMANCE (CONTINUED)

C_V Values for Various Hand Wheel Settings

Series 789V

The values below may be used when calculating and sizing a piping system.

Number of Turns	Nominal Size inches DN									
	2½ C_v K_v	3 DN80 C_v K_v	4 DN100 C_v K_v	5 C_v K_v	6 DN150 C_v K_v	8 DN200 C_v K_v	10 DN250 C_v K_v	12 DN300 C_v K_v	14 DN350 C_v K_v	16 DN400 C_v K_v
12.5	–	–	–	–	–	–	–	–	2079 1798	2807 2428
13	–	–	–	–	–	–	–	–	2138 1849	2922 2528
13.5	–	–	–	–	–	–	–	–	2185 1890	3030 2621
14	–	–	–	–	–	–	–	–	2231 1930	3135 2712
14.5	–	–	–	–	–	–	–	–	2313 2001	3232 2796
15	–	–	–	–	–	–	–	–	2360 2041	3329 2880
15.5	–	–	–	–	–	–	–	–	2442 2112	3391 2933
16	–	–	–	–	–	–	–	–	2465 2132	3452 2986
16.5	–	–	–	–	–	–	–	–	2488 2152	3527 3051
17	–	–	–	–	–	–	–	–	2512 2173	3601 3115
17.5	–	–	–	–	–	–	–	–	2635 2279	3665 3170
18[3]	–	–	–	–	–	–	–	–	2547 2203	3729 3226
18.5	–	–	–	–	–	–	–	–	–	3784 3273
19	–	–	–	–	–	–	–	–	–	3838 3320
19.5	–	–	–	–	–	–	–	–	–	3890 3365
20	–	–	–	–	–	–	–	–	–	3942 3410
20.5	–	–	–	–	–	–	–	–	–	3988 3450
21	–	–	–	–	–	–	–	–	–	4034 3490
21.5	–	–	–	–	–	–	–	–	–	4092 3540
22	–	–	–	–	–	–	–	–	–	4150 3590
22.5	–	–	–	–	–	–	–	–	–	4202 3635
23	–	–	–	–	–	–	–	–	–	4254 3680
23.5	–	–	–	–	–	–	–	–	–	4295 3715
24[4]	–	–	–	–	–	–	–	–	–	4335 3750

[3] Full open valve for 14"

[4] Full open valve for 16"

7.2 PERFORMANCE

Correction Factors

For liquids other than water, the flow values can be adjusted as follows:

Divide the flow rate by the square root of the specific gravity.

$$\text{Actual Flow} = \frac{q_{Calculated}}{\sqrt{SG}}$$

This applies to liquids having, on the whole, the same viscosity as water, i.e. most water/glycol mixtures and water/brine solutions at room temperature. At low temperatures, the viscosity increases and laminar flow may occur in certain valves. The risk increases with small valves, low settings and low differential pressures.

Correction Factors

When Δp and the design flow rate are known, use the formula shown to calculate the CV value.

$$C_v = 1.52 \frac{q}{\sqrt{\Delta p}}$$

q in GPM, Δp in Ft. of H_2O

$$C_v = \frac{q}{\sqrt{\Delta p}}$$

q in GPM, Δp in psi

When measuring pressure drop across the Series 789V valves installed in the vertical position, the measured value should be adjusted by the static head created by the distance between the PT ports.

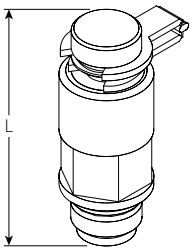
NOTE:

- Suitable for water-glycol mixtures to 57%

7.3 PERFORMANCE

Accessories (Sold Separately)

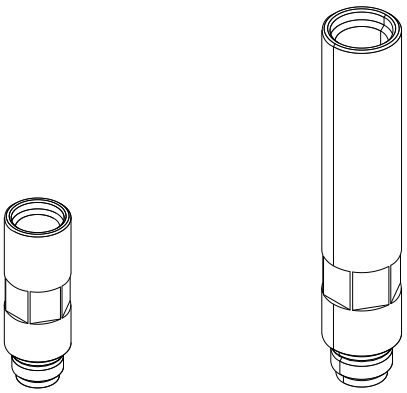
Replacement PT Ports



L inches mm	Diameter inches mm	Part Code
1.79 45.5	0.69 17.5	P000788RPT (Red)[2] P000788BPT (Blue)[2] K000788VPT (Kit of one red, one blue)

[2] When ordering, the part code includes only one PT port. Each valve requires two PT ports (one red, one blue).

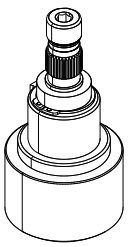
PT Port Extensions



PT Port Extension for 2"/51 mm of Insulation, Kit of Two Part Code	PT Port Extension for 4"/102 mm of Insulation Kit of Two Part Code
P0007882PT[3]	P0007884PT[3]

[3] When ordering, the part code includes only one PT port extension. Each valve requires two PT port extensions.

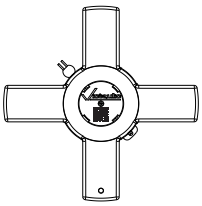
Hand Wheel Extension for 2 ½ – 6"/73.0 mm – DN150 Valve Sizes



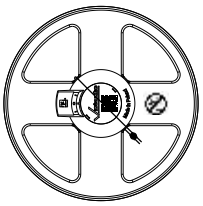
Part Code
P024788VHE

7.3 PERFORMANCE (CONTINUED)

Hand Wheels



2 ½ – 6"/73 mm – DN150



8 – 16"/DN200 – DN400

Part Code
P024788VHL

Part Code
8 – 12" P080788VHL 14" P140788VHL 16" P160788VHL

Measuring Nipple (4"/102 mm Extension, Kit of Two)

Part Code
K000788VMN

Locking Wires and Wire Crimps

Sold in sets of 10 each

Part Code
K000788RWL

Memory Stop Hex Key

4-mm size for memory stop setting screw

Part Code
P000788HKY

8.0 NOTIFICATIONS

⚠ WARNING

- **Read and understand all instructions before attempting to install any Victaulic products.**
- **Always verify that the piping system has been completely depressurized and drained immediately prior to installation, removal, adjustment, or maintenance of any Victaulic products.**
- **Confirm that any equipment, branch lines, or sections of piping that may have been isolated for/during testing or due to valve closures/positioning are identified, depressurized, and drained immediately prior to installation, removal, adjustment, or maintenance of any Victaulic products.**
- **Wear safety glasses, hardhat, foot protection, and hearing protection.**

Failure to follow these instructions could result in death or serious personal injury and property damage.

9.0 REFERENCE MATERIALS

08.30: Victaulic® KOIL-KIT™ Coil Pack
08.34: Victaulic® Automatic Balancing Valves - Series 76T, 76B, 76K, 76V, 76G, and 76F
106.01: Victaulic Series 786V Manual Balancing Valve
106.02: Victaulic® Series 787V Manual Balancing Valve
106.03: Victaulic Series 788V Manual Balancing Valve
106.05: Victaulic® Series 78KV Manual Balancing Valve
106.15: Victaulic® Series UBP Unibody PICV Balancing Valve
106.20: Victaulic® Series UBA Unibody ABV Balancing Valve
106.21: Victaulic® Series UBM Unibody Manual Balancing Valve
106.30: Victaulic® Series UH1 Braided Flexible Hose
I-786V/787V: Victaulic® Series 786V and 787V Manual Balancing Valves Installation and Maintenance Instructions
I-788V/789V: Victaulic® Series 788V and 789V Manual Balancing Valves Installation and Maintenance Instructions
I-UBA: Victaulic® Series UBA Unibody ABV Balancing Valve Installation and Maintenance Instructions
I-UBM: Victaulic® Series UBM Unibody Manual Balancing Valve Installation and Maintenance Instructions
I-UBP: Victaulic® Series UBP Unibody PICV Balancing Valve Installation and Maintenance Instructions
I-UH1: Victaulic® Series UH1 Braided Flexible Hose Installation and Use Guidelines

