

Series 788V and 789V Manual Balancing Valves

⚠ 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.

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

IMPORTANT INFORMATION

The Series 788V Manual Balancing Valve with flanged ends and 789V Manual Balancing Valve with grooved ends contain PT ports to measure differential pressure across the valve. These valves are designed only for water and water/glycol mixtures. For any other applications, contact Victaulic.

RECEIVING AND HANDLING THE SHIPMENT

- Check the valve for any damage caused during transit. Any damage shall be reported immediately upon receipt.
- **DO NOT** lift valves by the hand wheel. Lifting by the hand wheel will cause damage and may render the valve inoperable. Verify that all lifting devices and straps are rated for the weight of the valve assemblies listed below.

Valve Weights

Nominal Size inches DN	Actual Outside Diameter inches mm	Weight Approximate (Each)	
		Grooved lbs kg	Flanged lbs kg
2½	2.875 73.0	17 8	30 14
3 DN80	3.500 88.9	28 13	40 18
4 DN100	4.500 114.3	42 19	60 27
5	5.563 141.3	71 32	94 43
6 DN150	6.625 168.3	94 43	126 57

Nominal Size inches DN	Actual Outside Diameter inches mm	Weight Approximate (Each)	
		Grooved lbs kg	Flanged lbs kg
8 DN200	8.625 219.1	231 105	240 109
10 DN250	10.750 273.0	322 146	382 173
12 DN300	12.750 323.9	454 206	579 263
14 DN350	14.000 355.6	697 316	767 348
16 DN400	16.000 406.4	1100 499	1105 501

STORAGE

- Protect the valve from direct sunlight and mechanical damage. Valves shall be stored in a dry area that is protected from dirt and debris accumulation.
- Store valves in temperatures from -4°F up to 140°F/-20°C up to +60°C, maximum relative air humidity of 95%.
- **DO NOT** expose valves to aggressive fluids or heat sources.

VALVE SELECTION

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 1/2	2.875 73.0	1.58 5.98	2.40 9.08	113 428	333 1260
3 DN80	3.500 88.9	1.51 5.72	2.30 8.71	141 534	416 1575
4 DN100	4.500 114.3	2.24 8.48	3.40 12.87	252 954	742 2808
5	5.563 141.3	2.96 11.20	4.50 17.03	361 1366	1061 4016
6 DN150	6.625 168.3	2.90 10.98	4.40 16.65	499 1889	1470 5564
8 DN200	8.625 219.1	9.87 37.36	15.0 56.78	1037 3925	3051 11548
10 DN250	10.750 273.0	11.2 42.39	17.0 64.35	1399 5295	4116 15579
12 DN300	12.750 323.9	34.9 132.10	53.0 200.61	1861 7044	5475 20723
14 DN350	14.000 355.6	220 832.70	335 1267.98	2601 9845	7654 28970
16 DN400	16.000 406.4	257 972.75	391 1479.94	4335 16408	12757 48285

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.

INSTALLATION REQUIREMENTS

- DO NOT use any lubricants or oils when installing the valve. **Consult with the chemical manufacturer and reference Victaulic publication 05.01 to verify fluids or additives are compatible with valve seals and all other seal materials in the system.**
- The Series 788V and 789V can be installed in the supply or return line to maintain flow; however, Victaulic recommends installing the valve in the return line to reduce noise, flow instability, and cavitation risk.
- Verify that the flow direction arrow on the valve body is facing the direction of flow and that the valve body is rotated to the desired position for hand wheel access.
- Flanged valves have an ANSI B16.5 Class 150 bolt hole pattern. The mating flange shall have the same number and diameter of bolts and the same bolt circle as the valve. Follow the instructions for the mating flange for complete installation and bolt torque requirements.
- For 12-inch/DN300 and smaller sizes of grooved-end valves, follow the instructions in the I-100 Field Installation Handbook for the particular coupling being used for installation. The I-100 can be downloaded by scanning the QR code to the right.
 - For 14-inch/DN350 and larger sizes of grooved-end valves, follow the instructions in the I-W100 Field Installation Handbook for the particular coupling being used for installation. The I-W100 can be downloaded by scanning the QR code to the right.
- After installation, verify that the hand wheel and measuring connections are easily accessible.
- Once installation is completed, and before initial operation, the system shall be filled and bled of air. DO NOT exceed 1.1 times the maximum working pressure of the valve during testing. Check all installation points for leaks.



Scan QR code to
access the I-100



Scan QR code to
access the I-W100

CHECKING FLOW THROUGH THE VALVE

To check flow through the valve, use:

$$Q = C_v \cdot \sqrt{\Delta p}$$

Where:

Q = Flow rate in gallons per minute (GPM)

Δp = Pressure differential across orifice in pounds per square inch (psi)

C_v = C_v of Valve at Given Hand Wheel Position

Example: With a pressure loss of 2 psi and a $C_{v\text{OP}}$ of 3, calculated flow is:

$$Q = C_v \cdot \sqrt{\Delta p} = 3 \cdot \sqrt{2} = 3 \cdot 1.414 = 4.24 \text{ gpm}$$

Flow Values Across Valve for Sizes Listed Below¹ – C_v/K_v

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
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 C_v = GPM at ΔP of 1 psi across the valve at any given setting. 1 psi = 2.31 feet of water.² Full open valve for 2 ½-inch through 6-inch/DN150 sizes³ Full open valve for 8 – 12-inch/DN200 – DN300 sizes

Table continues on the following page

Flow Values Across Valve for Sizes Listed Below¹ – C_v/K_v (Continued)

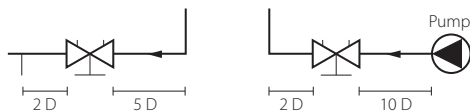
Number of Turns	Nominal Size – inches/DN									
	2½	3 DN80	4 DN100	5	6 DN150	8 DN200	10 DN250	12 DN300	14 DN350	16 DN400
12.5	–	–	–	–	–	–	–	–	2079 1798	2807 2428
13	–	–	–	–	–	–	–	–	2138 1849	2922 2528
13.5	–	–	–	–	–	–	–	–	2185 1890	3030 2621
14	–	–	–	–	–	–	–	–	2231 1930	3135 2712
14.5	–	–	–	–	–	–	–	–	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

⁴ Full open valve for 14-inch/DN350 size

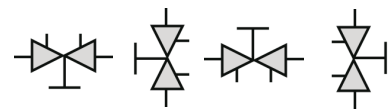
⁵ Full open valve for 16-inch/DN400 size

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.

CORRECTION FACTORS

$$\text{Actual Flow} = \frac{Q}{\sqrt{SG}}$$

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

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

This applies to liquids having the same viscosity as water (i.e. most water/glycol mixtures at room temperature).

When the flow setting is verified or changed to the final setting, the memory stop should be set. Refer to the applicable "Setting the Memory Stop" section for the valve size.

USING THE PRESSURE/TEMPERATURE PORTS

⚠ WARNING



- **DO NOT touch any hot, non-insulated surfaces of the Series 788V or 789V.**
- **Proceed with caution when using differential pressure measurement device to prevent burns from hot water that may be released during hookup.**

- **Always refer to the operating manual for the differential pressure measurement device for complete hookup and safety requirements.**

Failure to follow these instructions could result in serious personal injury.

The pressure/temperature (PT) ports of the Series 788V and 789V can be connected to a differential pressure measurement device to determine flow through the valve. Always refer to the operating manual for the differential pressure measurement device for complete hookup and safety requirements.

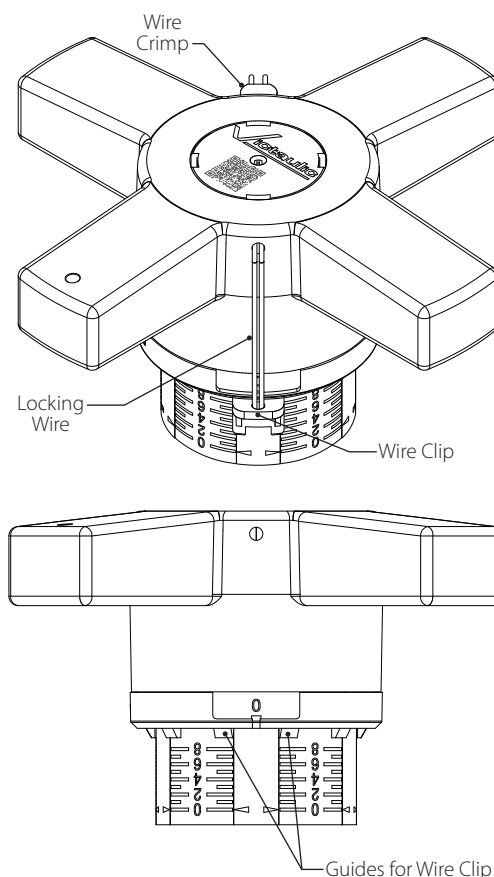
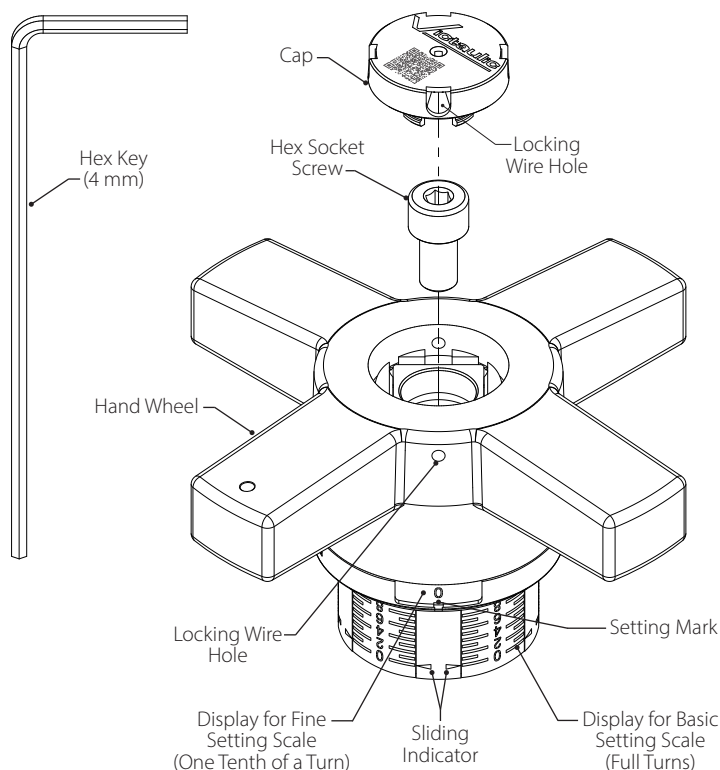
NOTE: When PT ports are not in use, the caps shall be replaced.

SETTING THE MEMORY STOP FOR 6-INCH/DN150 AND SMALLER VALVE SIZES

The memory stop can be set once the required flow rate setting is determined by referencing the "Valve Selection" table on page 2. Fully closing the valve does not change the memory stop setting.

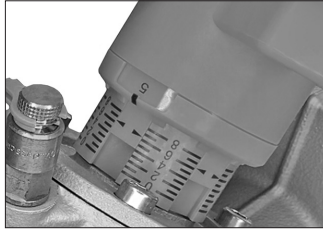
The selected memory stop setting can be read off two scales: basic setting and fine setting. Reference the images below, which identify the display areas for these settings.

- Each full turn of the hand wheel is shown in the display for the basic setting.
- Each one tenth of a turn of the hand wheel is shown in the display for the fine setting.



Continued on the following page

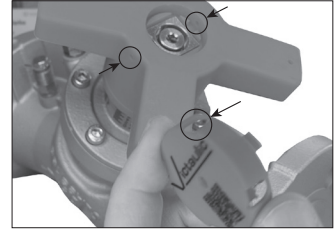
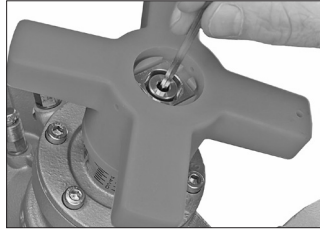
SETTING THE MEMORY STOP FOR 6-INCH/DN150 AND SMALLER VALVE SIZES (CONTINUED)



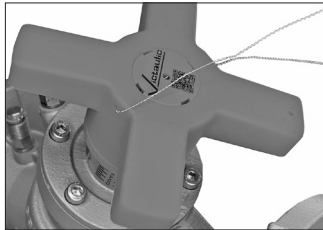
1. Turn the hand wheel to reach the desired setting. In the above photo, setting 6.5 is selected.



2. To secure the setting (memory stop), use a slotted screwdriver to remove the cap by gently prying it from the center of the hand wheel. Use the 4-mm hex key (provided in the accessory bag) to turn the adjustment stem's hex socket screw clockwise until it seats.



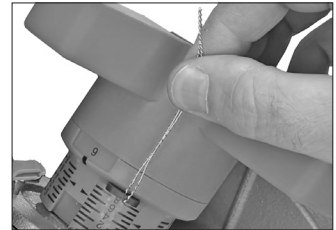
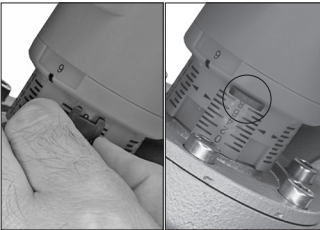
3. If this setting is intended to be sealed with locking wire, verify that the holes of the cap align with the holes in the hand wheel before re-installing the cap.



4a. TO SEAL: Insert a locking wire through the holes in the hand wheel and cap. Crimp the locking wire to secure the cap so that the setting cannot be changed. **NOTE:** the valve can still be fully closed.



4b. TO LOCK AND SEAL: A wire clip is provided in the accessory bag. Push the wire clip up into the hand wheel between the guides. Insert a locking wire through the holes in the hand wheel/cap and then through the hole in the clip. Verify that the locking wire is tight against the side of the hand wheel before crimping. **NOTE:** The valve cannot be operated unless the locking wire and wire clip are removed.

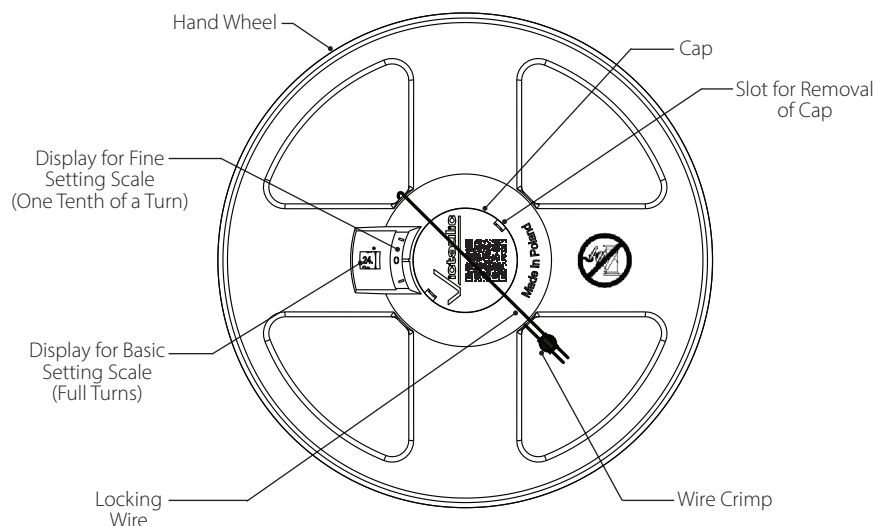


SETTING THE MEMORY STOP FOR 8-INCH/DN200 AND LARGER VALVE SIZES

The memory stop can be set once the required flow rate setting is determined by referencing the "Valve Selection" table on page 2. Fully closing the valve does not change the memory stop setting.

The selected memory stop setting can be read off two scales: basic setting and fine setting. Reference the image below, which identifies the display areas for these settings.

- a) Each full turn of the hand wheel is shown in the display for the basic setting.
- b) Each one tenth of a turn of the hand wheel is shown in the display for the fine setting.



- 1.** Turn the hand wheel to reach the desired setting.
- 2.** To secure the setting (memory stop), use a slotted screwdriver to remove the cap by gently prying it from the center of the hand wheel. Use the slotted screwdriver to turn the adjustment stem clockwise until it seats.
- 3.** Reinstall the cap.
- 4.** **TO SEAL:** Insert a locking wire through two holes of the hand wheel and around the center of the cap, as illustrated above. Crimp the locking wire to secure the cap so that the setting cannot be changed. **NOTE:** The valve can still be fully closed.

REPLACEMENT PARTS AND ACCESSORIES
(Sold Separately)

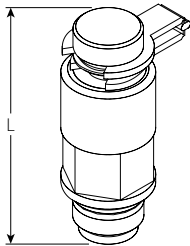


⚠ WARNING

- Depressurize and drain the piping system and allow the system temperature to cool to below 100°F/38°C before attempting to install any replacement parts and accessories.

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

Replacement PT Ports

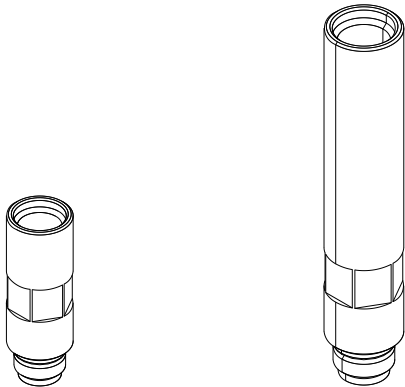


L inches mm	Diameter inches mm	Part Code
1.79 45.5	0.69 17.5	P000788RPT (Red) ⁶ P000788BPT (Blue) ⁶ K000788VPT (Kit of one red, one blue)

The PT ports are field-replaceable. Depressurize and drain the piping system before attempting to replace the PT port(s). Remove the existing PT port(s) and thread the new port(s) into the valve body. DO NOT use PTFE thread sealant tape or pipe dope on the threads.

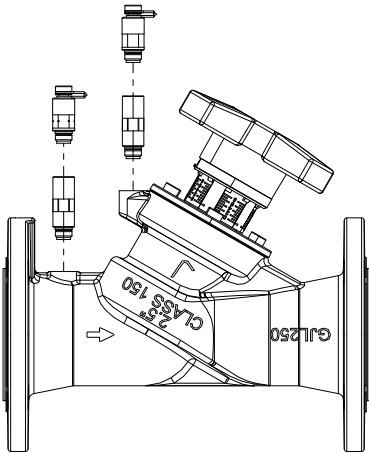
⁶ When ordering, the part code includes only one PT port. Each valve requires two PT ports (one red, one blue).

PT Port Extensions



PT Port Extension for 2 inches/51 mm of Insulation, Kit of Two Part Code	PT Port Extension for 4 inches/102 mm of Insulation Kit of Two Part Code
K0007882PT ³	K0007884PT ⁷

⁷ When ordering, the part code includes only one PT port extension. Each valve requires two PT port extensions.



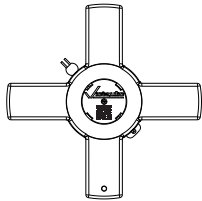
In applications where the 788V or 789V will be insulated, PT port extensions are available to provide clearance for 2 inches/51 mm or 4 inches/102 mm of insulation. Depressurize and drain the piping system before attempting to replace the PT port(s). Remove the standard PT port(s) and thread the new extension(s) into the valve body. Thread the standard PT port(s) into the new extension(s), as shown above. DO NOT use PTFE thread sealant tape or pipe dope on any of the threads.

Series 788V and 789V Manual Balancing Valves

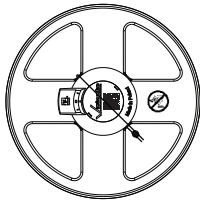
REPLACEMENT PARTS AND ACCESSORIES
(CONTINUED)

(Sold Separately)

Replacement Hand Wheels



2 1/2 – 6"/73 mm – DN150

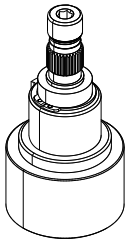


8 – 16"/DN200 – DN400

Part Code
P024788VHL

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

Hand Wheel Extension for 6-inch/DN150 and Smaller
Valve Sizes



Part Code
K024788VHE

Measuring Nipple (4-inch/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

IDENTIFICATION



Project:	
Unit Name:	
Valve Type:	
Valve Size:	
Valve Setting:	
Handle Position:	
Design Flow Rate:	
Δp:	
Options:	

Replacement tags are available and can be filled out and attached to the valve for future reference. **NOTE:** A blank tag is included with each valve from the factory.