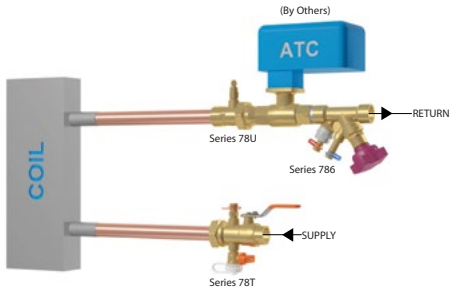
Series 78T/78U Manual Koil-Kit™ Coil Pack with TA Series 786H Sweat Globe Style Valve

08.63



1.0 PRODUCT DESCRIPTION

Available Sizes

- ½ – 2"/DN15 – DN50

Maximum Working Pressure

- 400 psi/2758 kPa/27.6 bar

Operating Temperature Range

- –4°F to +230°F/–20°C to +110°C

Function

- Provides simplified coil circuit installation that meets optimal hydronic system design requirements

Application

- Hot and cold water, including treated and untreated water systems
- This KOIL-KIT™ Coil Pack includes:
  - (1) Series 78T Ball Valve Union Combination – Sweat x Sweat
  - (1) Series 78U Union Port Fitting – Sweat x Male Union
  - (1) TA Series 786H Balancing Valve – Sweat x Sweat

NOTE

- The Series 78T includes a PT port and a blow-down valve. The Series 78U includes a PT port and a manual air vent.

2.0 CERTIFICATION/LISTINGS

Product designed and manufactured under the Victaulic Quality Management System, as certified by LPCB in accordance with ISO-9001:2008.

ALWAYS REFER TO ANY NOTIFICATIONS AT THE END OF THIS DOCUMENT REGARDING PRODUCT INSTALLATION, MAINTENANCE OR SUPPORT.

System No.		Location	
Submitted By		Date	

Spec Section		Paragraph	
Approved		Date	

3.0 SPECIFICATIONS – MATERIAL

Series 78T Ball Valve Union Combination

Body: Dezincification resistant (DZR) brass alloy

Union: DZR brass with EPDM O-ring

Tailpiece: DZR brass

Stem: Brass

Stem O-Ring Seals: EPDM

Handle: Steel with vinyl grip

Series 78U Union Port Fitting

Body: DZR brass alloy

Union: DZR brass with EPDM O-ring

Seals: EPDM O-ring

Tailpiece: DZR brass alloy

TA Series 786H Balancing Valve

Valve Body and Bonnet: AMETAL® DZR brass alloy

Sealing (Body/Bonnet): EPDM O-ring

Valve Plug: AMETAL®

Seat Seal: EPDM O-ring

Spindle: AMETAL®

Slip Washer: Polytetrafluoroethylene (PTFE)

Spindle Seal: EPDM O-ring

Spring: Stainless steel

Hand Wheel: Polyamide and TPE

Measuring Points: AMETAL®

Measuring Point Seals: EPDM

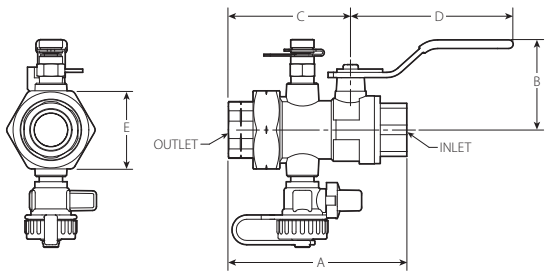
Measuring Point Caps: Polyamide and TPE

NOTE

- AMETAL® is the dezincification-resistant brass alloy of IMI TA.

4.0 DIMENSIONS

Series 78T Ball Valve Union Combination



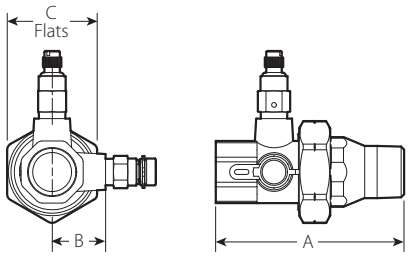
Size						Dimensions					Weight
Nominal Inlet x Outlet inches DN			Actual Outside Diameter Inlet x Outlet inches mm			A Sweat inches mm	B inches mm	C inches mm	D inches mm	E inches mm	Approx. (Each) lb kg
½ DN15	x	½ DN15	0.840 21.3	x	0.840 21.3	4.10 105	1.90 49	2.80 71	4.00 100	1.50 37	1.4 0.6
¾ DN20	x	¾ DN20	1.050 26.9	x	1.050 26.9	4.40 112	2.00 51	2.90 73	4.00 100	1.80 46	1.7 0.8
1 DN25	x	1 DN25	1.315 33.7	x	1.315 33.7	5.00 126	2.20 55	3.30 84	5.30 135	1.80 46	2.1 1.0
1 ¼ DN32	x	1 ¼ DN32	1.660 42.4	x	1.660 42.4	5.40 136	2.40 60	3.50 89	5.30 135	2.60 67	3.5 1.6
1 ½ DN40	x	1 ½ DN40	1.900 48.3	x	1.900 48.3	6.10 155	2.80 71	3.90 99	5.90 151	2.60 67	4.9 2.2
2 DN50	x	2 DN50	2.375 60.3	x	2.375 60.3	6.90 174	3.00 77	4.10 104	5.90 151	3.30 83	7.3 3.3

NOTE

- Optional tailpieces may be ordered for reductions and for changing end configurations from sweat to threaded or threaded to sweat. If needed, specify optional tailpiece when ordering.

4.1 DIMENSIONS

Series 78U Union Port Fitting



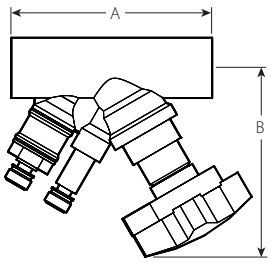
Size						Dimensions			Weight
Nominal Inlet	x	Outlet	Actual Outside Diameter Inlet	x	Outlet	A Sweat	B	C	Approx. (Each)
inches DN			inches mm			inches mm	inches mm	inches mm	lb kg
½ DN15	x	½ DN15	0.840 21.3	x	0.840 21.3	3.48 89	0.84 21	1.46 37	0.7 0.3
¾ DN20	x	½ DN15	1.050 26.9	x	0.840 21.3	3.87 98	1.08 27	1.81 46	1.0 0.5
		¾ DN20			1.050 26.9	3.87 98	1.08 27	1.81 46	0.9 0.4
1 DN25	x	½ DN15	1.315 33.7	x	0.840 21.3	4.03 102	1.08 27	1.81 46	1.0 0.5
		¾ DN20			1.050 26.9	4.03 102	1.08 27	1.81 46	1.1 0.5
		1 DN25			1.315 33.7	4.14 105	1.08 27	1.81 46	1.1 0.5
1 ¼ DN32	x	½ DN15	1.660 33.7	x	0.840 21.3	4.36 111	1.46 37	2.63 67	1.9 0.9
		¾ DN20			1.050 26.9	4.36 111	1.46 37	2.63 67	1.9 0.9
		1 DN25			1.315 33.7	4.36 111	1.46 37	2.63 67	1.9 0.9
		1 ¼ DN32			1.660 42.4	4.19 106	1.46 37	2.63 67	2.1 1.0
1 ½ DN40	x	¾ DN20	1.900 48.3	x	1.050 26.9	4.19 106	1.46 37	2.63 67	2.2 1
		1 DN25			1.315 33.7	4.19 106	1.46 37	2.63 67	2.2 1.0
		1 ¼ DN32			1.660 42.4	4.19 106	1.46 37	2.63 67	2.3 1.0
		1 ½ DN40			1.900 48.3	4.40 112	1.46 37	2.63 67	2.3 1.0
2 DN50	x	1 DN25	2.375 60.3	x	1.315 33.7	4.47 114	1.76 45	3.26 83	3.1 1.4
		1 ¼ DN32			1.660 42.4	4.47 114	1.76 45	3.26 83	3.1 1.4
		1 ½ DN40			1.900 48.3	4.47 114	1.76 45	3.26 83	3.2 1.5
		2 DN50			2.375 60.3	4.47 114	1.76 45	3.26 83	3.2 1.5

NOTE

- Optional tailpieces may be ordered for reductions and for changing end configurations from sweat to threaded or threaded to sweat. If needed, specify optional tailpiece when ordering.

4.2 DIMENSIONS

TA Series 786H Balancing Valve



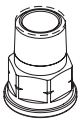
Size		Dimensions		Weight
Nominal inches DN	Actual Outside Diameter inches mm	A End to End inches mm	B Center to Top inches mm	Approx. (Each) lb kg
½ DN15	0.840 21.3	3.54 90	3.94 100	1.4 0.6
¾ DN20	1.050 26.9	3.82 97	3.94 100	1.4 0.6
1 DN25	1.315 33.7	4.33 110	4.13 105	1.9 0.9
1 ¼ DN32	1.660 42.4	4.88 124	4.13 105	2.4 1.1
1 ½ DN40	1.900 48.3	5.12 130	4.72 120	3.1 1.4
2 DN50	2.375 60.3	6.08 154	4.72 120	4.5 2.0

4.3 OPTIONAL PARTS

Series 78T/78U Union Tailpieces (Optional)

Female Tailpiece

Sweat Tailpiece



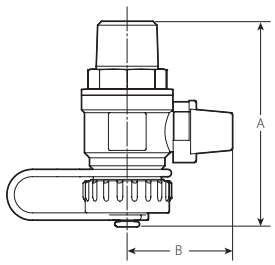
Male Tailpiece

Size			Victaulic Part Code		
Nominal inches			Female Tailpiece	Sweat Tailpiece	Male Tailpiece
½	x	½	P00478Y304	P00478Y504	P00478U404
¾	x	½	P00678Y304	P00678Y504	P00678U404
		¾	P00678Y306	P00678Y506	P00678U406
1	x	½	P00678Y304	P00678Y504	P00678U404
		¾	P00678Y306	P00678Y506	P00678U406
		1	P00678Y310	P00678Y510	P00678U410
1 ¼	x	½	–	–	P01278U404
		¾	P01278Y306	P01278Y506	P01278U406
		1	P01278Y310	P01278Y510	P01278U410
		1 ¼	P01278Y312	P01278Y512	P01278U412
1 ½	x	½	–	–	P01278U404
		¾	P01278Y306	P01278Y506	P01278U406
		1	P01278Y310	P01278Y510	P01278U410
		1 ¼	P91278Y312	P01278Y512	P01278U412
		1 ½	P01278Y314	P01278Y514	P01278U414
2	x	1	–	–	P02078U410
		1 ¼	P02078Y312	P01278Y512	P02078U412
		1 ½	P02078Y314	P01278Y514	P02078U414
		2	P02078Y320	P02078Y520	P02078U420

4.4 OPTIONAL PARTS

Hose End Drain Valve (Optional)

A hose end drain valve is factory-installed on the Series 78T.

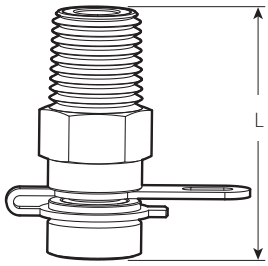


Size	Dimensions		
NPT inches mm	**A** inches mm	**B** inches mm	**Part Code**
¼ 6	2.04 52	1.37 35	P-002-78Y-DRN
½ 13	2.74 70	1.53 39	P-004-78Y-DRN

4.5 OPTIONAL PARTS

Probe Port (Optional)

For Series 78T and Series 78U

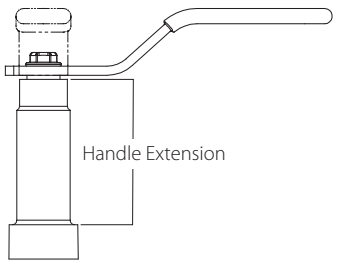


Connection Size	Dimensions	
	L inches mm	**Part Code**
¼ NPT	1.55 39	P-002-78Y-PTP

4.6 OPTIONAL PARTS

Handle Extension (Optional)

For Series 78T

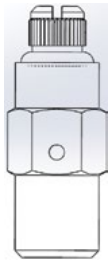


Valve Inlet Size	Victaulic Part Code	
	2" Handle Extension	4" Handle Extension
½ – ¾	P00478Y2HL	P00478Y4HL
1 – 1 ¼"	P01278Y2HL	P01278Y4HL
1 ½ – 2"	P02078Y2HL	P02078Y4HL

4.7 OPTIONAL PARTS

Air Vent

A manual air vent is factory-installed on the Series 78U. This product can also be mounted on the Series 78T or provided loose for other piping needs.



Connection Size	Part Code
¼ NPT	P-002-78U-MAV

5.0 PERFORMANCE

C_v/K_v values for flow of water at +60°F/+16°C are shown in the table.

Formulas for C_v and K_v values

$\Delta P = Q^2/C_v^2$ $\quad$ $\Delta P = Q^2/K_v^2$

$Q = C_v \times \sqrt{\Delta P}$ $\quad$ $Q = K_v \times \sqrt{\Delta P}$

Where:

Flow Coefficient	C_v	K_v
Q (Flow)	GPM	m^3/hr
ΔP (Pressure Drop)	psi	bar

Series 78T Ball Valve Union Combination

Size		Flow Coefficient (Fully Open)
Nominal inches DN	**Actual Outside Diameter** inches mm	**Sweat** C_v K_v
½ DN15	0.840 21.3	7.5 6.5
¾ DN20	1.050 26.9	17.0 14.7
1 DN25	1.315 33.7	34.0 29.4
1 ¼ DN32	1.660 42.4	54.9 47.5
1 ½ DN40	1.900 48.3	85.5 74.0
2 DN50	2.375 60.3	149.7 129.5

Series 78U Union Port Fitting

Size		Flow Coefficient (Fully Open)
Nominal inches DN	**Actual Outside Diameter** inches mm	**Sweat** C_v K_v
½ DN15	0.840 21.3	6.1 5.3
¾ DN20	1.050 26.9	17.3 14.9
1 DN25	1.315 33.7	35.3 30.4
1 ¼ DN32	1.660 42.4	61.0 52.6
1 ½ DN40	1.900 48.3	82.7 71.3
2 DN50	2.375 60.3	127.9 110.3

5.1 PERFORMANCE

TA Series 786H Balancing Valve

Valve Selection Guide

Size		Flow Data		
Nominal inches DN	**Actual Outside Diameter** inches mm	**Absolute Min Flow** GPM LPM	**Nominal Range of Flow** GPM LPM	**Absolute Max Flow** GPM LPM
½ DN15	0.840 21.3	0.1 0.5	0.6 – 2.8 2.3 – 10.6	8.6 32.6
¾ DN20	1.050 26.9	0.4 1.5	2.0 – 6.0 7.6 – 22.7	20.0 76.0
1 DN25	1.315 33.7	0.5 1.7	3.9 – 10.0 14.8 – 37.9	30.0 114.0
1 ¼ DN32	1.660 42.4	0.9 3.3	5.0 – 15.0 18.9 – 56.8	48.0 182.0
1 ½ DN40	1.900 48.3	1.3 4.9	6.6 – 20.0 25.0 – 75.7	66.0 250.0
2 DN50	2.375 60.3	2.0 7.6	12.6 – 36.0 47.7 – 136.0	110.0 416.0

NOTES

- Balancing valves should be sized in accordance with the GPM/LPM flows (and not in relation to pipeline size). Sizing balancing valves based on the minimum or maximum flow rates is not recommended. Valves should be sized using the nominal flow rate only. The Minimum Flow is calculated from the minimum open setting of the valve and a minimum pressure drop 1 Ft. WG (= 3 kPa). The Nominal Flow is calculated from the maximum open setting of the valve and the minimum recommended pressure drop, 2 Ft. WG (= 6 kPa). The Maximum Flow is calculated from the maximum open setting of the valve and the maximum pressure drop, 20 Ft. WG (= 60 kPa). A computer program, TA-Select, is available for calculation of valve handwheel pre-set position and other applications.
- For information regarding Allen Wrench sizes see the Material Specifications section on page 3.
- **Measuring Accuracy:** The hand wheel zero position is calibrated and must not be changed. Valves have an accuracy of flow measurement of 2% to 3% when used within their recommended flow range and installed in accordance with the figure below.
- For the most accurate results, a Series 734 TA SCOPE or Series 73M CMI should be used. However, any differential pressure meter may be used.

The illustration relates to the accuracy of differential pressure measurement and is not an installation requirement.

5.2 PERFORMANCE

TA Series 786H Balancing Valve

Cv Values for Various Handle Settings

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

	C_V Values for Sizes listed below[1]					
No. of Turns	**½"**	**¾"**	**1"**	**1 ¼"**	**1 ½"**	**2"**
0.50	0.157	0.616	0.693	1.38	2.19	3.03
1.00	0.261	0.903	1.19	2.42	3.93	4.74
1.50	0.401	1.41	2.46	3.88	5.48	7.82
2.00	0.714	2.25	4.21	6.03	7.23	13.2
2.50	1.08	3.13	6.08	8.98	10.6	18.3
3.00	1.69	4.29	7.69	11.4	14.8	24.9
3.50	2.39	5.21	9.01	13.8	18.7	31.2
4.00[2]	2.96	6.23	9.93	16.4	22.3	37.3

[1] C_V = GPM at a ΔP of 1 psi/7 kPa) through the valve at any given setting.
1 psi = 2.31 ft. of H_2O

[2] Full open valve.

5.3 CORRECTION FACTORS

For liquids other than water, the flow values from the balancing wheel 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.

A computer program (Hy-Select) is available for calculation of pre-setting values and other applications. When the flow setting is verified or changed to the final setting, the memory stop should be set. Contact Victaulic for further information.

When Δp and the design flow rate are known, use the formula shown to calculate the C_V 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

A computer program, Hy-Select, is available from Victaulic for calculation of pre-setting values and other applications.

5.4 PART CODES

Kit Description	Nominal Kit Size	Expected Control Valve Size (Series 78U Outlet and Valve Size Inlet)	Balancing Valve Size	Without Customer-Supplied ATC Valve	
				Without PT Ports and Handle Extensions	With PT Ports and Handle Extensions
				Victaulic Part Code	
78T Sweat x Sweat, 78U Sweat x Male Union, 786H Sweat x Sweat without 2' hoses attached	½	½	½	K000799P51	K00A799A4J
	¾	½	½	K000799462	K00A7998TB
	¾	½	¾	K000799EV5	K00A7998TC
	¾	¾	¾	K000799206	K00A7995JI
	1	½	½	K00A7998U0	K00A7998TD
	1	½	1	K000799C15	K00A7998TE
	1	¾	¾	K00A7998U1	K00A7998TF
	1	¾	1	K000799B93	K00A7998TG
	1	1	1	K00A799BSX	K00A7995JJ
	1 ¼	¾	1 ¼	K00A7998U2	K00A7998TH
	1 ¼	1 ¼	1 ¼	K000799EV6	K00A7995JK
	1 ½	1 ¼	1 ½	K00A7998U6	K00A7998TI
	1 ½	1 ½	1 ½	K000799Y70	K00A799A4M
	2	1 ½	2	K00A7998U7	K00A7998TJ
	2	2	2	K000799P53	K00A7995JL

6.0 NOTIFICATIONS

⚠ WARNING

- **Read and understand all instructions before attempting to install, remove, adjust, or maintain any Victaulic piping products.**
- **Depressurize and drain the piping system before attempting to install, remove, adjust, or maintain any Victaulic piping products.**
- **Wear safety glasses, hardhat, and foot protection.**

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

7.0 REFERENCE MATERIALS

08.16: Victaulic Balancing Valves - TA Series 786H/787H/788/789 and Series 78KH

I-KOIL-KIT: Victaulic KOIL-KIT™ Coil Pack Installation and Maintenance Instructions

