HANSEN TECHNOLOGIES

Bulletin G359d
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AW300H Butt Weld Angle Valve

Specifications, Applications, Service Instructions & Parts

BUTT WELD SHUT-OFF VALVES

**1/2" through 18"
(13mm through 450mm)
Globe & Angle
for Refrigerants**

CRN Canadian Registration CE

INTRODUCTION

These low pressure drop refrigerant shut-off valves are designed to be butt-welded directly to steel piping, thereby eliminating potential leaky flanges or threaded joints and simplifying installation. Forged and cast steel bodies are lightweight, yet have substantial wall thickness to help overcome corrosion loss. The cast steel body is rigid, reducing the potential for seat leakage due to flexing of the valve body under abnormal conditions. The "heart" of Hansen shut-off valves is the patented non-leak seal plus packing design. This seal design is used exclusively on Hansen shut-off valves and virtually eliminates stem seal leakage.

APPLICATIONS

Typical uses include:

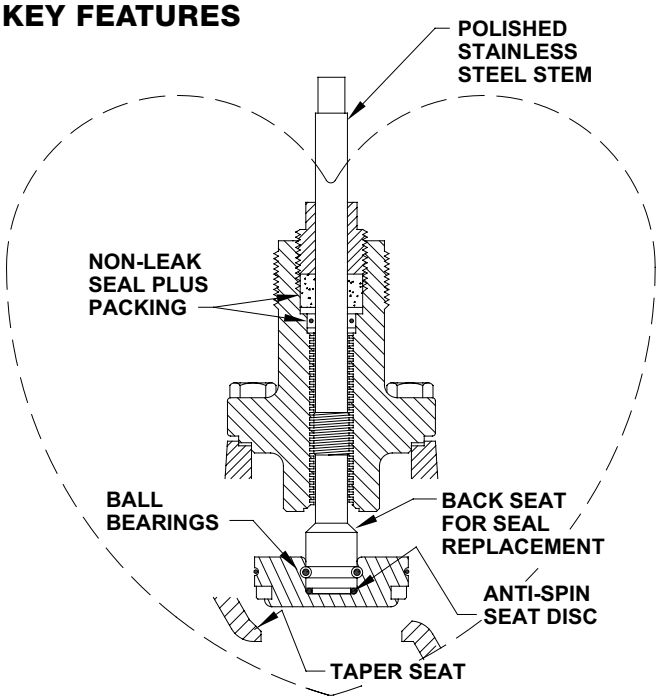
Ammonia refrigeration system suction, liquid, discharge, recirculating liquid, hot gas, thermosyphon, and oil lines, using handwheel or seal cap models.

Steel pipe portions of halocarbon, commercial, industrial, and air conditioning systems, using seal cap models.

Valves are also available for other fluids such as propane, propylene, and glycol with compatible seals. Contact factory with specific fluid and application details for written approval.

The low friction, no leak stem seal design permits the use of chain actuation for crossover applications without the need to retighten the packing.

KEY FEATURES



ADDITIONAL FEATURES

Globe and angle valves available.

Low pressure drop design

Interchangeable handwheel or seal cap.

Teflon seat disc.

Also available as Hand Expansion Valve.

Chain actuators available (1½" or 40mm and larger).

Suitable for R717 (ammonia), R22, R134a, R507a, R404a, R744 (CO_2) and other Hansen approved refrigerants.

600 psig (41 bar g) SWP valves are available.

Extended neck available up through 4" (100mm) for additional insulation clearance.

MATERIAL SPECIFICATIONS

Body: ½" to 1¼" (13mm–32mm), forged steel, ASTM A105; 1½" to 18" (40mm–450mm), cast steel, ASTM A-352, Grade LCB

Bonnet: Ductile iron, ½" to 8" (13mm–200mm) ASTM A-536; 10" to 18" (250mm–450mm) ASME SA-395

Stem: Polished stainless steel

Disc Holder: Plated steel

Seat Disc: Retained PTFE Teflon

Ball Bearings: Stainless steel

Packing Nut: Zinc plated steel

Stem Packing: Graphite composite plus neoprene O-ring in series

Handwheel: ½" to 1¼" (13mm–32mm) Zinc plated alloy; 1½" to 6" (40mm–150mm) Zinc plated iron alloy; 8" to 18" (200mm–450mm) cast aluminum

Seal Cap: ½" to 1¼" (13mm–32mm) Glass-filled polymer, safety vented; 1½" to 4" (40mm–100mm) Zinc plated steel; 5" to 18" (125mm–450mm) cast aluminum

Operating Temperature:

Standard, –60°F to 240°F (–51°C to 115°C), temperatures below –60°F (–51°C) to –76°F (–60°C) at coincident pressures

Optional, –20°F to 300°F (–29°C to 149°C) contact factory

Safe Working Pressure: 400 psig (28 bar g) standard, 600 psig (41 bar g) upon request

Connection Dimensions: ½" to 1 ½" Match Schedule 80 pipe, 2" to 10" Match Schedule 40 pipe, 12" & Up Match Standard Weight Pipe

ADVANTAGES

Compared to conventional stem seal designs, Hansen's patented no leak seal-plus-stem-packing virtually eliminates stem seal leakage. In addition, the stem is polished to avoid packing wear. The precision stem threads avoid stem wobble and the packing nut is close fitting to remove dirt particles and frost from the stem. This results in infrequent maintenance or tightening and almost no refrigerant loss.

Hansen valves are designed with anti-spin seat discs. High velocity gas can sometimes cause ordinary seat discs to fail over time. Hansen adds a snubber to prevent the seat disc from freely rotating when valve is in the open position.

Compared to threaded valves, Hansen welding valves eliminate the chance of future leaks at pipe threads. In addition, a butt weld pipe-to-valve body joint eliminates the inherent weakness and corrosion vulnerability of the threaded portion of pipe immediately adjacent to a screwed valve body or flange.

Compared to ball valves, Hansen welding valves have no threaded or flanged-gasket pipe joints. Hansen valves also will not open or close so rapidly as to cause severe pipe shock due to sudden change in liquid velocity. In addition, ball valve stem packing typically cannot be replaced while the valve is in a pressurized line. The stem packing on these Hansen valves can be replaced while the valve is in a pressurized line. Also, dirt or damage to ball valve Teflon seats cannot be overcome by greater stem closing forces, an advantage of Hansen valves.

INSTALLATION

All Hansen welded valves can be installed in horizontal or vertical pipe lines. Stems are normally installed horizontally, but, depending on the application, stems may be installed vertically. Inlet pressure or direction of flow for all valve sizes should normally be under valve seat disc. However, to avoid installing an angle valve with the stem down, it is better to install the valve with the normal flow opposite the direction of the arrow. For pressure differences exceeding approximately 125 psi (9 bar), valves 8" (200mm) and larger should have inlet pressure above valve disc, using a small bypass valve for preopening equalization.

Care must be taken when handling and installing large valves. Proper lifting devices and safety precautions must be observed.

A valve should have its bonnet assembly removed before welding. This reduces weight during welding, protects the Teflon seat disc from welding sparks, and facilitates cleaning of welding debris from the body interior prior to valve operation. The valve stem should be several turns open when removing and replacing the bonnet assembly. The Teflon seat disc should be protected when outside of the valve. Do not allow the Teflon seat to bump the valve body when removing it or stand the bonnet on the seat disc.

Where it is necessary or standard practice to weld a valve into the line without bonnet removal, the stem should be opened several turns to prevent heat damage to the seat disc. Extra care should be taken when welding angle valves without disassembly to avoid welding sparks striking the seat from the outlet weld connection.

Use of welding rings is recommended. They help alignment, control the gap for full penetration welding, and reduce the potential of welding debris entering the system. Welds should be annealed as necessary in accordance with good practice. Painting of valves and welds is recommended for corrosion protection. Pipe covering, where applied, should have a proper moisture barrier.

Before putting valves into service, all pipe weld connections, valve seats, bonnet seals, and stem seals should be tested for leaks at pressure levels called for in appropriate codes.

Shut-off valves leading to the atmosphere must not be left unsupervised and must be plugged or capped to prevent corrosion inside the valve as well as leakage due to seat expansion, vibration, pressure shock, or improper opening. Where hand wheel valves are subject to excessive vibration or liquid shock loads, the packing nut should be tightened to prevent handwheel vibration from potentially rotating valve stem. The valve seat should be cracked open to prevent hydrostatic expansion between the valve and the cap. A bleed valve and gauge should be installed to provide a means of monitoring and pump-out. Valves should never directly feed a water tank because of potential internal corrosion or seat opening caused by vibration.

INSULATION

Conventional valve-shaped block insulation can occasionally be used for both angle and globe valves. However, fabricated insulation shapes are recommended. If not available locally, Hansen can recommend a source of high quality, economical valve insulation. For exterior valve insulation dimensions refer to Sales Drawing 5002-28.

EXTENDED NECK VALVES

Hansen bonnets with extended necks, 1/2" thru 4" (13mm–100mm), meet or exceed the recommended low temperature insulation thickness dimensions of the IIAR Piping Handbook. In addition, the stem and packing nut trim are upgraded to 316 stainless steel materials. Stainless steel trim is recommended for environments where severe corrosive conditions exist. (Add an "E" suffix to the model number, for example AWE200C or GWE150H.)

SIZING GUIDE

These flow capacity recommendations are not affected by the length of the pipe line. These are approximate optimum sizes based on power costs versus the investment costs of piping and its total installed cost. Piping sized to this capacity will have a 1°F (0.6°C) pressure drop for the following equivalent lengths:

suction lines . . . . . 700 diameters

discharge lines . . . . . 1400 diameters

liquid lines . . . . . 2400 diameters

Example: 275 feet (84m) of 3" (80mm) pipe and equivalent fittings amount to 1100 diameters, pressure drop for a suction line handling 81.5 tons (287 kW) at 20°F (–7°C) is 1100/700 times 1°F (0.6°C) drop, equals 1.6°F (1°C) or 1.8 psi (0.12 bar).

Example: Hansen valves have about 145 diameters of equivalent flow resistance, or 145/700 = 0.2°F (0.12°C) of equivalent pressure drop at the suction line capacities shown for a valve in a suction line.

The rationale for the vapor line sizing was developed by William V. Richards in two papers: "Refrigerant Vapor Line Sizing Not Dependent of Length," 16th International Congress of Refrigeration, IIR, Paris, 1983; and "Practical Pipe Sizing for Refrigerant Vapor Lines," Sixth Annual Meetings, IIAR, San Francisco, 1984.

FLOW COEFFICIENTS

NOMINAL SIZE		ANGLE				GLOBE			
INCH	MM	FLOW COEFFICIENT		EQUIVALENT LENGTH		FLOW COEFFICIENT		EQUIVALENT LENGTH	
		Cv	Kv	FEET	METERS	Cv	Kv	FEET	METERS
1/2"	13	6.0	5.2	3.7	1.1	4.0	3.5	8.4	2.6
3/4"	20	9.0	7.8	8.4	2.6	8.0	6.9	11	3.2
1"	25	19	16	7.2	2.2	15	13	12	3.5
1¼"	32	21	18	27	8.2	16	14	46	14
1½"	40	53	46	10	3.0	41	35	16	5.0
2"	50	80	69	23	7.0	67	58	33	10
2½"	65	173	150	13	3.8	163	141	14	4.3
3"	80	205	177	28	8.5	195	169	31	9.3
4"	100	320	277	47	14.3	290	251	57	17
5"	125	600	519	44	13.3	575	497	47	14
6"	150	820	709	61	18.5	790	683	66	20
8"	200	1440	1240	82	25.1	1380	1190	90	27
10"	250	2450	2120	93	28.4	2350	2030	101	31
12"	300	3400	2940	119	36.2	3270	2830	128	39
14"	350	4600	3980	113	34.4	4350	3770	126	38
16"	400	5640	4880	155	47.3	–	–	–	–
18"	450	6500	5620	222	67.6	–	–	–	–

FLOW CAPACITIES
PIPING AND VALVE SIZING GUIDE FOR AMMONIA

SERVICE	CONDITIONS				CAPACITIES (MM)									
	TEMPERATURE		PRESSURE		1/2" (13)		3/4" (20)		1" (25)		1¼" (32)		1½" (40)	
	°F	(°C)	PSIG	(BAR)	TONS	(kW)	TONS	(kW)	TONS	(kW)	TONS	(kW)	TONS	(kW)
Suction Lines Single Stage Compressor	+20	(-6.7)	33.5	(2.3)	–	–	–	–	8.6	(30)	15.8	(56)	21.3	(75.0)
	0	(-17.8)	15.7	(1.1)	–	–	–	–	5.7	(20)	10.4	(37)	13.9	(49.0)
Suction Lines Booster	-20	(-28.9)	3.6	(0.25)	–	–	–	–	4.2	(15)	7.4	(26)	10.3	(36.0)
	-40	(-40)	8.7"	(0.7)	–	–	–	–	–	–	4.4	(15)	6.3	(22.0)
Liquid Overfeed Return Lines (4X)	+20	(-6.7)	33.5	(2.3)	–	–	–	–	5.0	(18)	9.1	(32)	12.3	(43.0)
	0	(-17.8)	15.7	(1.1)	–	–	–	–	3.4	(12)	6.3	(22)	8.5	(30.0)
	-20	(-28.9)	3.6	(0.25)	–	–	–	–	2.2	(8.0)	4.0	(14)	5.5	(19.0)
	-40	(-40)	8.7"	(0.7)	–	–	–	–	–	–	2.4	(8.0)	3.4	(12.0)
Hot Gas Feed	+70	(+21.1)	114	(7.9)	2.2	(8)	4.3	(15)	7.3	(26)	14.1	(50)	19.6	(69.0)
Hot Gas Main	+70	(+21.1)	114	(7.9)	4.4	(15)	8.6	(30)	14.7	(52)	28.1	(99)	39.2	(138)
Compressor Discharge	+86	(+30)	155	(10.7)	–	–	–	–	12.6	(44)	24.1	(85)	33.6	(118)
Condenser Drains	+86	(+30)	–	–	6.0	(21)	14.5	(51)	24.0	(84)	50.0	(176)	77.0	(271)
Liquid Mains	+86	(+30)	–	–	28.3	(100)	53.1	(187)	90.8	(320)	143	(503)	202	(711)
Liquid Feed Branch	+86	(+30)	–	–	54.9	(193)	103	(363)	176	(620)	277	(975)	392	(1380)
Liquid Overfeed Supply (4X)	+10	(-12.2)	–	–	9.0	(32)	17.0	(60)	29.0	(102)	46.0	(162)	65.0	(229)

SERVICE	CONDITIONS				CAPACITIES (MM)									
	TEMPERATURE		PRESSURE		2" (50)		2½" (65)		3" (80)		4" (100)		5" (125)	
	°F	(°C)	PSIG	(BAR)	TONS	(kW)	TONS	(kW)	TONS	(kW)	TONS	(kW)	TONS	(kW)
Suction Lines Single Stage Compressor	+20	(-6.7)	33.5	(2.3)	35.7	(126)	51.1	(180)	81.5	(287)	146	(513)	235	(826)
	0	(-17.8)	15.7	(1.1)	22.7	(80.0)	34.0	(120)	53.9	(190)	94.6	(333)	156	(549)
Suction Lines Booster	-20	(-28.9)	3.6	(0.25)	16.8	(59.0)	24.8	(87.0)	39.7	(140)	68.9	(242)	114	(401)
	-40	(-40)	8.7"	(0.7)	9.9	(35.0)	14.4	(51.0)	23.4	(82.3)	40.8	(143)	66.8	(235)
Liquid Overfeed Return Lines (4X)	+20	(-6.7)	33.5	(2.3)	20.6	(72.4)	29.4	(103)	47.0	(165)	84.3	(296)	135	(475)
	0	(-17.8)	15.7	(1.1)	13.6	(48.0)	20.5	(72.0)	32.4	(114)	56.8	(200)	93.8	(330)
	-20	(-28.9)	3.6	(0.25)	8.9	(31.3)	13.1	(46.0)	21.0	(74.0)	36.4	(128)	60.5	(213)
	-40	(-40)	8.7"	(0.7)	5.4	(19.0)	7.90	(28.0)	12.8	(45.0)	22.4	(79.0)	36.7	(129)
Hot Gas Feed	+70	(+21.1)	114	(7.9)	36.5	(128)	53.0	(186)	82.5	(290)	145	(510)	231	(812)
Hot Gas Main	+70	(+21.1)	114	(7.9)	73.0	(257)	106	(373)	165	(580)	290	(1020)	463	(1628)
Compressor Discharge	+86	(+30)	155	(10.7)	62.6	(220)	90.3	(318)	142	(499)	249	(876)	397	(1396)
Condenser Drains	+86	(+30)	–	–	140	(492)	220	(774)	375	(1319)	740	(2602)	1320	(4642)
Liquid Mains	+86	(+30)	–	–	454	(1597)	657	(2311)	1031	(3626)	1808	(6358)	2886	(10150)
Liquid Feed Branch	+86	(+30)	–	–	881	(3098)	1273	(4477)	1999	(7030)	3506	(12330)	5596	(19680)
Liquid Overfeed Supply (4X)	+10	(-12.2)	–	–	144	(506)	208	(732)	327	(1150)	573	(2015)	915	(3218)

FLOW CAPACITIES
PIPING AND VALVE SIZING GUIDE FOR AMMONIA

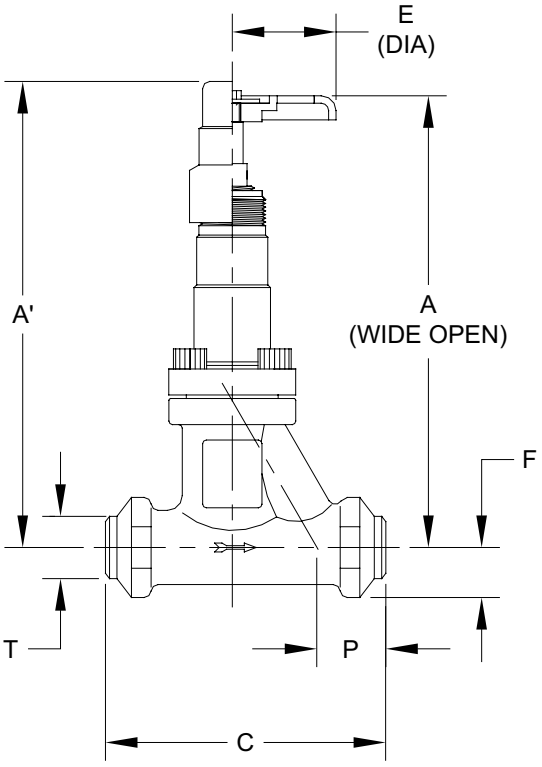
SERVICE	CONDITIONS				CAPACITIES (MM)									
	TEMPERATURE		PRESSURE		6" (150)		8" (200)		10" (250)		12" (300)		14" (350)	
	°F	(°C)	PSIG	(BAR)	TONS	(kW)	TONS	(kW)	TONS	(kW)	TONS	(kW)	TONS	(kW)
Suction Lines Single Stage Compressor	+20	(-6.7)	33.5	(2.3)	343	(1206)	628	(2209)	1020	(3387)	1490	(5240)	1821	(6404)
	0	(-17.8)	15.7	(1.1)	225	(791.0)	414	(1456)	662	(2328)	946	(3327)	1156	(4065)
Suction Lines Booster	-20	(-28.9)	3.6	(0.25)	165	(580.0)	306	(1076)	486	(1709)	709	(2494)	867	(3049)
	-40	(-40)	8.7"	(0.7)	97.8	(344.0)	181	(637.0)	288	(1013)	419	(1474)	512	(1801)
Liquid Overfeed Return Lines (4X)	+20	(-6.7)	33.5	(2.3)	198	(696.0)	362	(1273)	587	(2064)	856	(3010)	1046	(3679)
	0	(-17.8)	15.7	(1.1)	135	(475.0)	249	(876.0)	398	(1400)	568	(1998)	694	(2441)
	-20	(-28.9)	3.6	(0.25)	87.5	(308.0)	162	(570.0)	256	(900)	375	(1319)	458	(1611)
	-40	(-40)	8.7"	(0.7)	53.7	(189.0)	100	(352.0)	158	(556)	232	(816)	284	(999)
Hot Gas Feed	+70	(+21.1)	114	(7.9)	338	(1189)	595	(2093)	949	(3338)	1377	(4843)	1683	(5919)
Hot Gas Main	+70	(+21.1)	114	(7.9)	673	(2367)	1190	(4185)	1898	(6675)	2754	(9685)	3366	(11838)
Compressor Discharge	+86	(+30)	155	(10.7)	580	(2040)	1021	(3591)	1629	(5729)	2363	(8310)	2888	(10157)
Condenser Drains	+86	(+30)	–	–	2030	(7139)	4200	(14771)	–	–	–	–	–	–
Liquid Mains	+86	(+30)	–	–	4218	(14834)	–	–	–	–	–	–	–	–
Liquid Feed Branch	+86	(+30)	–	–	8179	(28764)	–	–	–	–	–	–	–	–
Liquid Overfeed Supply (4X)	+10	(-12.2)	–	–	1337	(4702)	–	–	–	–	–	–	–	–

FLOW CAPACITIES
PIPING AND VALVE SIZING GUIDE FOR AMMONIA

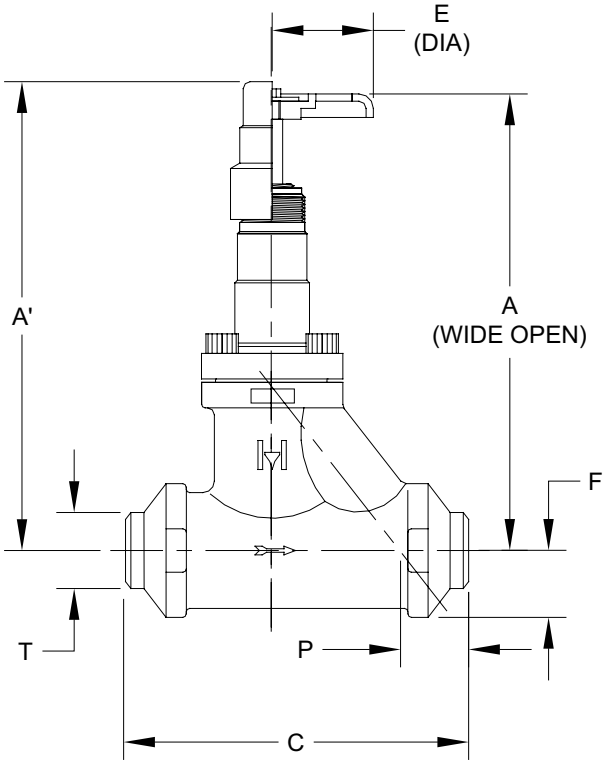
SERVICE	CONDITIONS				CAPACITIES (MM)			
	TEMPERATURE		PRESSURE		16" (400)		18" (450)	
	°F	(°C)	PSIG	(BAR)	TONS	(kW)	TONS	(kW)
Suction Lines Single Stage Compressor	+20	(-6.7)	33.5	(2.3)	2310	(8124)	2663	(9365)
	0	(-17.8)	15.7	(1.1)	1684	(5922)	1941	(6826)
Suction Lines Booster	-20	(-28.9)	3.6	(0.25)	1162	(4087)	1339	(4709)
	-40	(-40)	8.7"	(0.7)	692	(2434)	798	(2806)
Liquid Overfeed Return Lines (4X)	+20	(-6.7)	33.5	(2.3)	1258	(4424)	1450	(5099)
	0	(-17.8)	15.7	(1.1)	944	(3320)	1088	(3826)
	-20	(-29)	3.6	(0.25)	614	(2159)	708	(2490)
	-40	(-40)	8.7"	(0.7)	381	(1340)	439	(1544)
Hot Gas Feed	+70	(+21)	114	(7.9)	–	–	–	–
Hot Gas Main	+70	(+21)	114	(7.9)	–	–	–	–
Compressor Discharge	+86	(+30)	155	(10.7)	3883	–	–	–

GLOBE INSTALLATION DIMENSIONS

½" THROUGH 1¼" (13MM THROUGH 32MM)



1/2" AND 3/4"
(13MM AND 20MM)

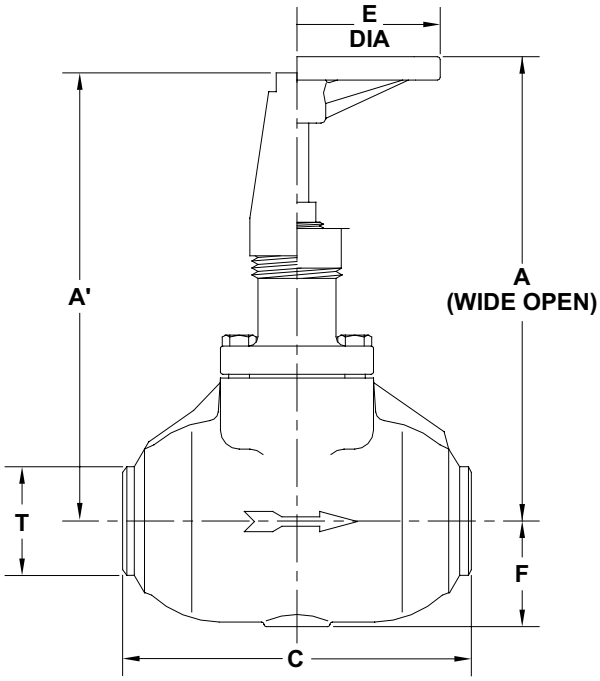


1" AND 1¼"
(25MM AND 32MM)

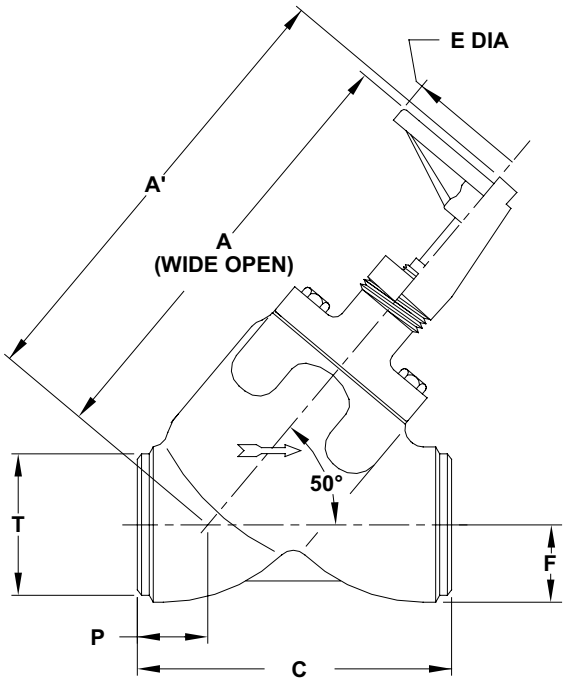
SIZE (MM)	A	A′	C	E	F	P	T	ADD TO A, A′ EXT NECK
1/2" (13)	7.62" (194)	7.86" (200)	4.73" (120)	3.5" (89)	0.84" (21)	1.17" (30)	0.84" (21)	1.8" (45)
3/4" (20)	7.62" (194)	7.86" (200)	4.73" (120)	3.5" (89)	0.84" (21)	1.17" (30)	1.05" (27)	1.8" (45)
1" (25)	7.88" (200)	8.09" (206)	5.93" (150)	3.50" (89)	1.15" (29)	1.17" (30)	1.31" (33)	1.8" (45)
1¼" (32)	7.88" (200)	8.09" (206)	5.93" (150)	3.50" (89)	1.15" (29)	1.17" (30)	1.66" (42)	1.8" (45)

GLOBE INSTALLATION DIMENSIONS

1½" THROUGH 14" (40MM THROUGH 350MM)



1½" – 3", 4" EXT NECK
(40MM – 80MM), (100MM)



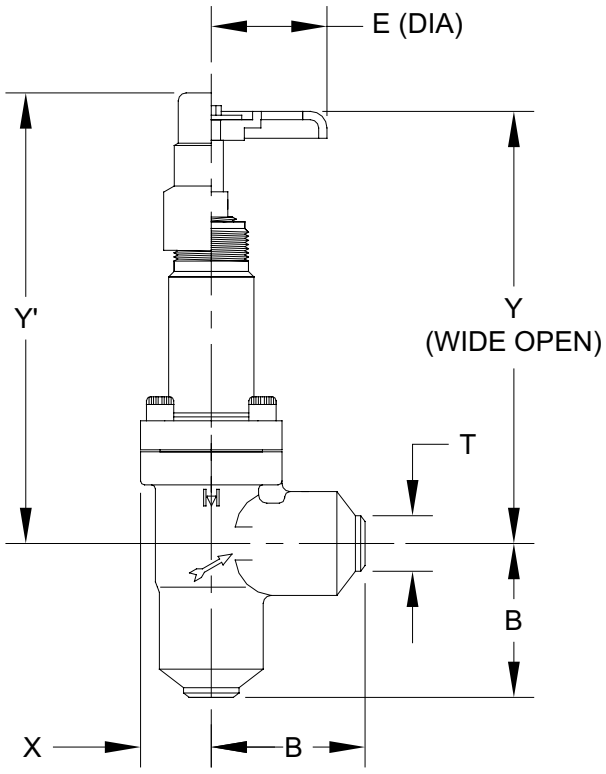
4" – 14"
(100MM – 350MM)

SIZE (MM)	A	A′	C	E	F	P	T	ADD TO A, A′ EXT NECK
1½" (40)	8.88" (225)	9.13" (232)	7.25" (184)	4.25" (108)	2.12" (54)	–	1.90" (48)	2.85" (72)
2" (50)	8.88" (225)	9.13" (232)	7.25" (184)	4.25" (108)	2.13" (54)	–	2.38" (60)	2.85" (72)
2½" (65)	12.13" (308)	11.75" (298)	9.25" (235)	7.63" (194)	2.75" (70)	–	2.88" (73)	3.64" (92)
3" (80)	12.13" (308)	11.75" (298)	9.25" (235)	7.63" (194)	2.75" (70)	–	3.50" (89)	3.64" (92)
4" (100)	13.75" (349)	14.25" (362)	10.00" (254)	7.63" (194)	2.50" (64)	2.50" (64)	4.50" (114)	–
4" EXT NECK* (100)	13.12" (333)	12.12" (308)	12.50" (318)	7.63" (194)	3.75" (95)	–	4.50" (114)	–
5" (125)	21.38" (543)	21.63" (549)	11.65" (396)	10.00" (254)	3.00" (76)	2.65" (67)	5.56" (141)	–
6" (150)	22.10" (561)	22.15" (563)	13.26" (337)	10.00" (254)	3.50" (89)	2.73" (69)	6.63" (168)	–
8" (200)	29.10" (739)	29.51" (750)	18.10" (459)	16.00" (406)	4.61" (117)	3.98" (101)	8.63" (219)	–
10" (250)	35.29" (896)	36.16" (918)	23.38" (594)	16.00" (406)	5.81" (148)	5.19" (132)	10.75" (273)	–
12" (300)	42.16" (1071)	46.39" (1178)	29.20" (742)	20.00" (508)	7.00" (178)	6.27" (159)	12.75" (324)	–
14" (350)	47.55" (1208)	49.66" (1261)	32.86" (835)	20.00" (508)	7.63" (194)	7.23" (184)	14.00" (356)	–

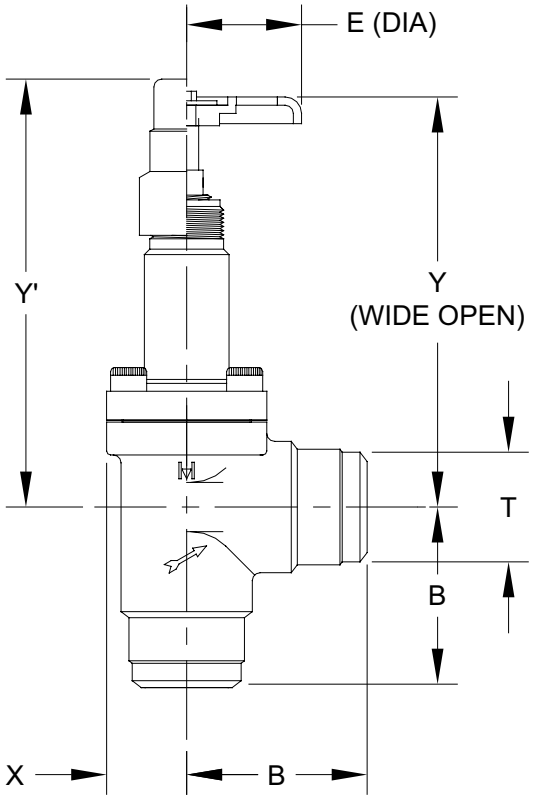
* 4" (100mm) Extended Neck is "T" style body only.

ANGLE INSTALLATION DIMENSIONS

½" THROUGH 1¼" (13MM THROUGH 32MM)



1/2" AND 3/4"
(13MM AND 20MM)

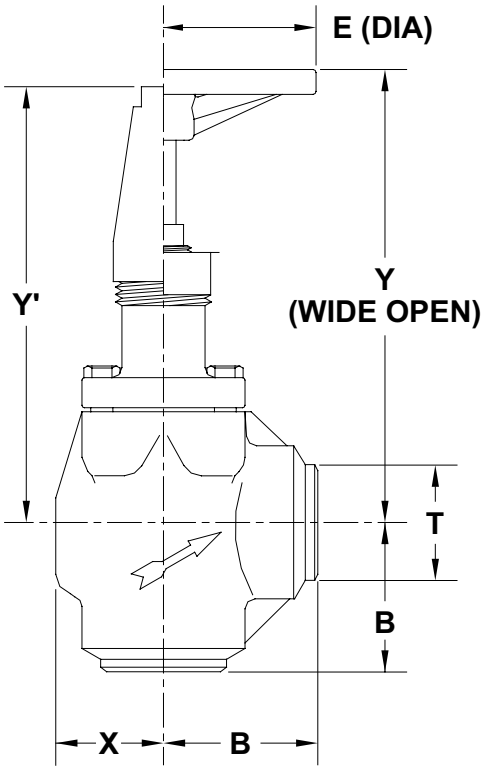


1" AND 1¼"
(25MM AND 32MM)

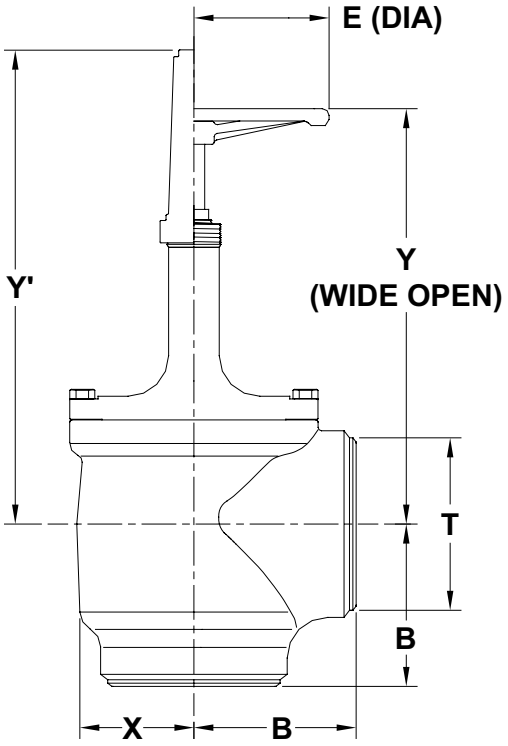
SIZE (MM)	B	E	T	X	Y	Y′	ADD TO Y, Y′ EXT NECK
1/2" (13)	2.33" (59)	3.50" (89)	0.84" (21)	1.07" (27)	6.46" (164)	6.70" (170)	1.80" (45)
3/4" (20)	2.33" (59)	3.50" (89)	1.05" (27)	1.07" (27)	6.46" (164)	6.70" (170)	1.80" (45)
1" (25)	2.75" (70)	3.50" (89)	1.31" (33)	1.22" (31)	6.24" (158)	6.52" (166)	1.80" (45)
1¼" (32)	2.75" (70)	3.50" (89)	1.66" (42)	1.22" (31)	6.24" (158)	6.52" (166)	1.80" (45)

ANGLE INSTALLATION DIMENSIONS

1½" THROUGH 18" (40MM THROUGH 450MM)



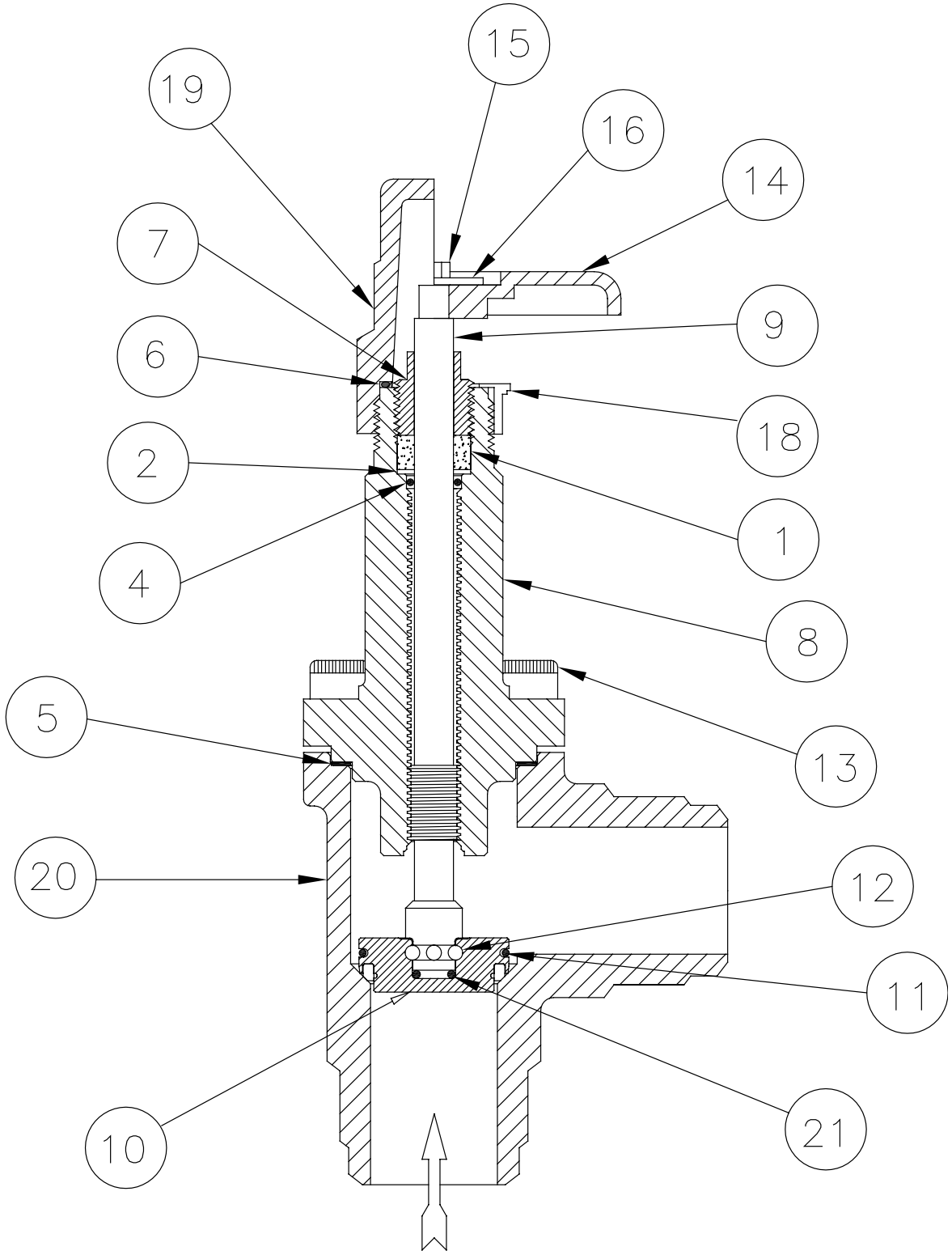
1½" – 8"
(40MM – 200MM)



10" – 18"
(250MM – 450MM)

SIZE (MM)	B	E	T	X	Y	Y′	ADD TO Y, Y′ EXT NECK
1½" (40)	3.38" (86)	4.25" (108)	1.90" (48)	1.88" (48)	7.75" (197)	8.00"" (203)	2.85" (72)
2" (50)	3.38" (86)	4.25" (108)	2.38" (60)	1.88" (48)	7.75" (197)	8.00" (203)	2.85" (72)
2½" (65)	3.38" (86)	7.63" (194)	2.88" (73)	2.38" (60)	11.00" (280)	10.63" (270)	3.64" (92)
3" (80)	3.38" (86)	7.63" (194)	3.50" (89)	2.38" (60)	11.00" (280)	10.63" (270)	3.64" (92)
4" (100)	3.88" (98)	7.63" (194)	4.50" (114)	3.00" (76)	11.00" (280)	10.63" (270)	3.65" (93)
5" (125)	4.47" (131)	10.00" (254)	5.56" (141)	3.47" (88)	16.42" (417)	16.62" (422)	–
6" (150)	5.15" (131)	10.00" (254)	6.63" (168)	3.85" (98)	16.55" (420)	16.78" (426)	–
8" (200)	6.90" (175)	16.00" (406)	8.63" (219)	6.11" (155)	22.12" (562)	22.52" (572)	–
10" (250)	9.44" (240)	16.00" (406)	10.75" (273)	6.63" (168)	26.47" (672)	27.34" (694)	–
12" (300)	12.00" (305)	20.00" (508)	12.75" (324)	8.66" (220)	30.34" (783)	33.86" (860)	–
14" (350)	12.97" (329)	20.00" (508)	14.00" (356)	9.20" (234)	34.92" (887)	36.91" (938)	–
16" (400)	13.16" (334)	30.00" (752)	16.00" (406)	10.25" (260)	59.45" (1510)	45.60" (1158)	–
18" (450)	14.42" (366)	30.00" (752)	18.00" (457)	11.55" (293)	62.40" (1585)	44.50" (1130)	–

½" THROUGH 1¼" (13 MM THROUGH 32 MM) BUTT WELD SHUT-OFF VALVES



NOTE: Angle valve shown; kits are the same for globe valves.

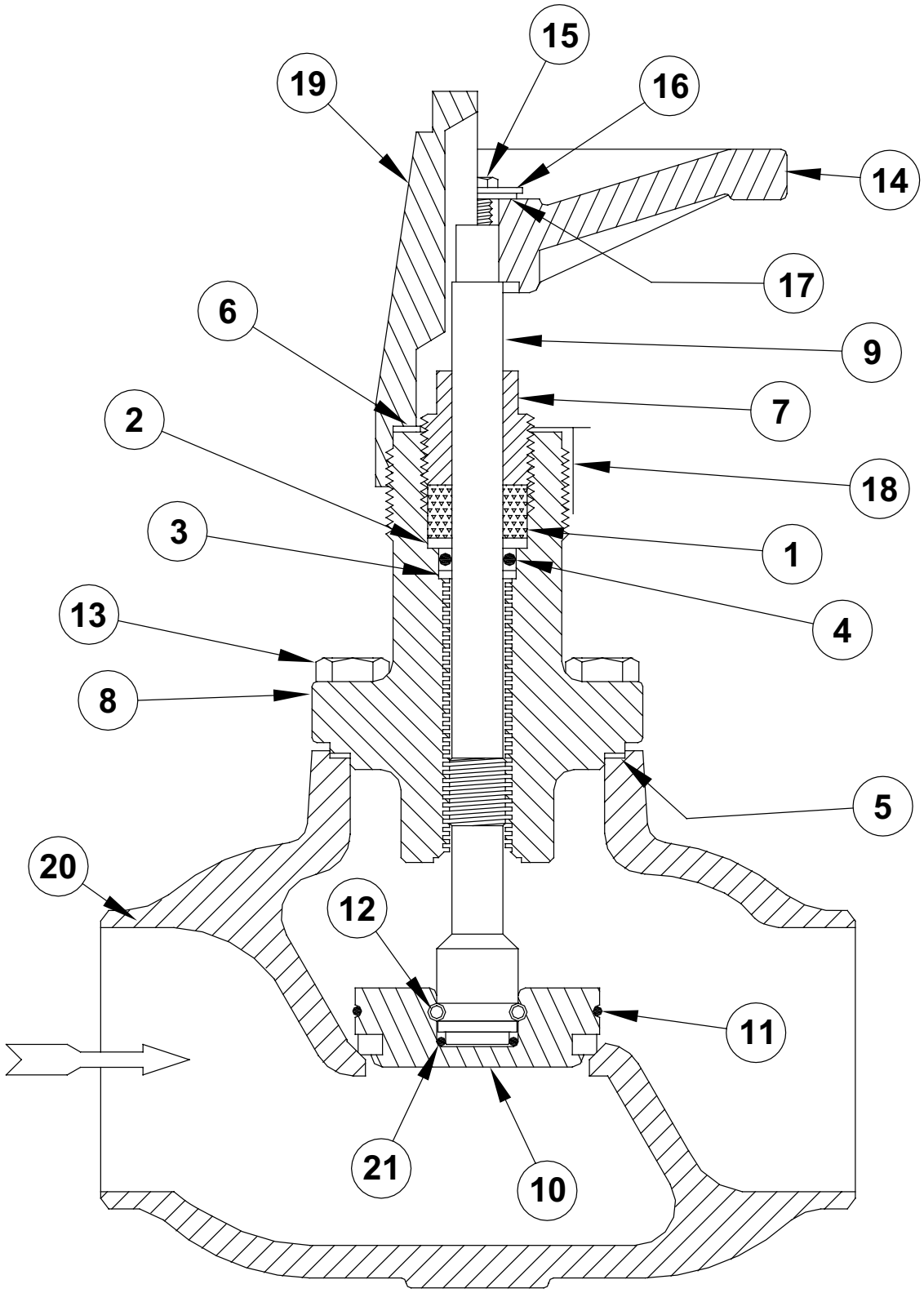
REPLACEMENT PARTS – BUTT WELD SHUT-OFF VALVES

½" THROUGH 1¼" (13MM THROUGH 32MM)

ITEM	DESCRIPTION	QTY	PART NO
	Gasket Kit 1/2", 3/4", 1", 1-1/4" (13mm, 20mm, 25mm, 32mm)		**50-1040**
	Gasket Kit, Extended Neck 1/2", 3/4", 1", 1-1/4" (13mm, 20mm, 25mm, 32mm)		**50-1171**
	Above kits consist of:		
1	Stem Packing	1	
2	Stem Washer	1	
4	Stem O-Ring	1	
5	Bonnet Gasket	1	
6	Seal Cap O-Ring	1	
7	Packing Nut	1	
7b	Packing Nut, Extended Neck	1	
21	O-Ring, Anti-Spin	1	
	Bonnet Assembly Kit 1/2", 3/4" (13mm, 20mm)		**50-1094**
	Bonnet Assembly Ext Neck Kit 1/2", 3/4" (13mm, 20mm)		**50-1172**
	Bonnet Assembly Kit 1", 1-1/4" (25mm, 32mm)		**50-1095**
	Bonnet Assembly Ext Neck Kit 1", 1-1/4" (25mm, 32mm)		**50-1174**
	Above kits consist of:		
8	Bonnet	1	
9	Stem	1	
9b	Stem, Extended Neck	1	
10	Disc Assembly	1	
11	Ball Retainer	1	
12	Balls	10	
13	Bonnet Cap Screw	4	
	Gasket Kit	1	
	Handwheel Kit		**50-1005**
	Above kits consist of:		
14	Handwheel	1	
15	Screw	1	
16	Nameplate	1	
18	Bonnet Thread Cap	1	
	Seal Cap Kit		**50-1036**
	Above kits consist of:		
6	Seal Cap O-Ring	1	
19	Seal Cap	1	
20	Body	1	

NOTE: A plate steel cap is available to order, specify part number 75-1014.

1½" THROUGH 4" (40MM THROUGH 100MM) – BUTT WELD SHUT-OFF VALVES



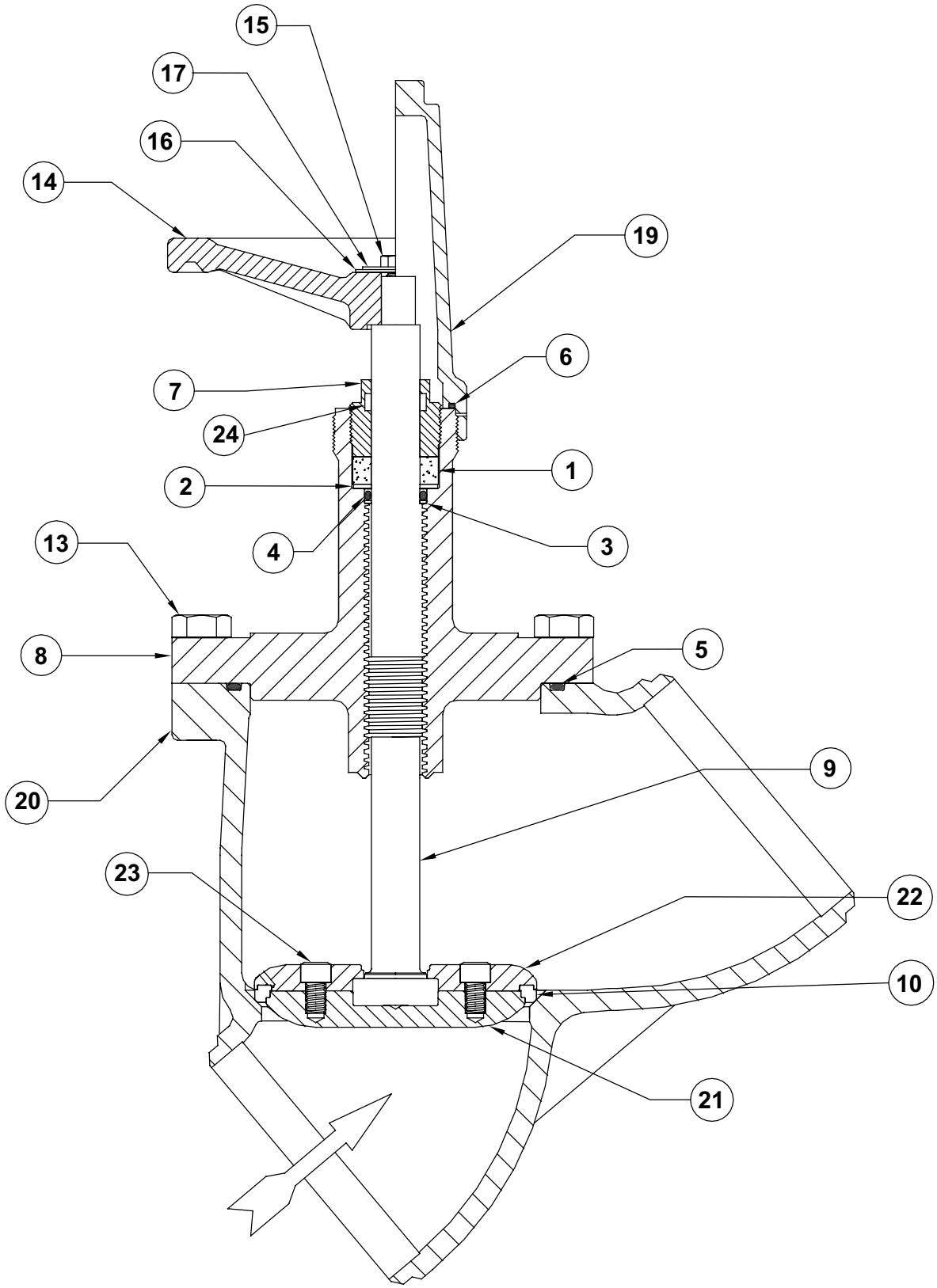
NOTE: Globe valve shown; kits are the same for angle valves.

REPLACEMENT PARTS – BUTT WELD SHUT-OFF VALVES

1½" THROUGH 4" (40MM THROUGH 100MM)

ITEM	DESCRIPTION	QTY	PART NO
	Gasket Kit 1-1/2", 2" (40mm, 50mm)		**50-1023**
	Gasket Kit Ext Neck 1-1/2", 2" (40mm, 50mm)		**50-1164**
	Gasket Kit 2-1/2", 3" (65mm, 80mm)		**50-1043**
	Gasket Kit Ext Neck 2-1/2", 3" (65mm, 80mm)		**50-1166**
	Gasket Kit 4" (100mm)		**50-1065**
	Gasket Kit Ext Neck 4" (100mm)		**50-1203**
	Above kits consist of:		
1	Stem Packing	1	
2	Stem Washer	1	
3	Back-up Washer	1	
4	Stem O-Ring	1	
5	Bonnet Gasket	1	
6	Seal Cap Gasket	1	
7	Packing Nut	1	
21	O-Ring, Anti-Spin	1	
	Bonnet Assembly Kit 1-1/2", 2" (40mm, 50mm)		**50-1024**
	Bonnet Assembly Ext Neck Kit 1-1/2", 2" (40mm, 50mm)		**50-1165**
	Bonnet Assembly Kit 2-1/2", 3" (65mm, 80mm)		**50-1044**
	Bonnet Assembly Ext Neck Kit 2-1/2", 3" (65mm, 80mm)		**50-1167**
	Bonnet Assembly Kit 4"		**50-1066**
	Bonnet Assembly Ext Neck Kit 4" (100mm)		**50-1184**
	Above kits consist of:		
8	Bonnet	1	
8b	Bonnet Ext Neck	1	
9	Stem	1	
9b	Stem Ext Neck	1	
13	Bonnet Cap Screw	4	
	Gasket Kit	1	
10	Disc Assembly Kit	1	
11	Ball Retainer	1	
12	Balls	1	
	Handwheel Kit 1-1/2", 2" (40mm, 50mm)		**50-1026**
	Handwheel Kit 2-1/2", 3", 4" (65mm, 80mm, 100mm)		**50-1037**
	Above kits consist of:		
14	Handwheel	1	
15	Screw	1	
16	Nameplate	1	
17	Support Washer	1	
18	Bonnet Thread Cap	1	
	Seal Cap Kit 1-1/2", 2" (40mm, 50mm)		**50-1027**
	Seal Cap Kit 2-1/2", 3", 4" (65mm, 80mm, 100mm)		**50-1038**
	Above kits consist of:		
6	Seal Cap Gasket	1	
19	Seal Cap	1	
20	Body	1	

5" THROUGH 8" (125MM THROUGH 200MM – BUTT WELD SHUT-OFF VALVES



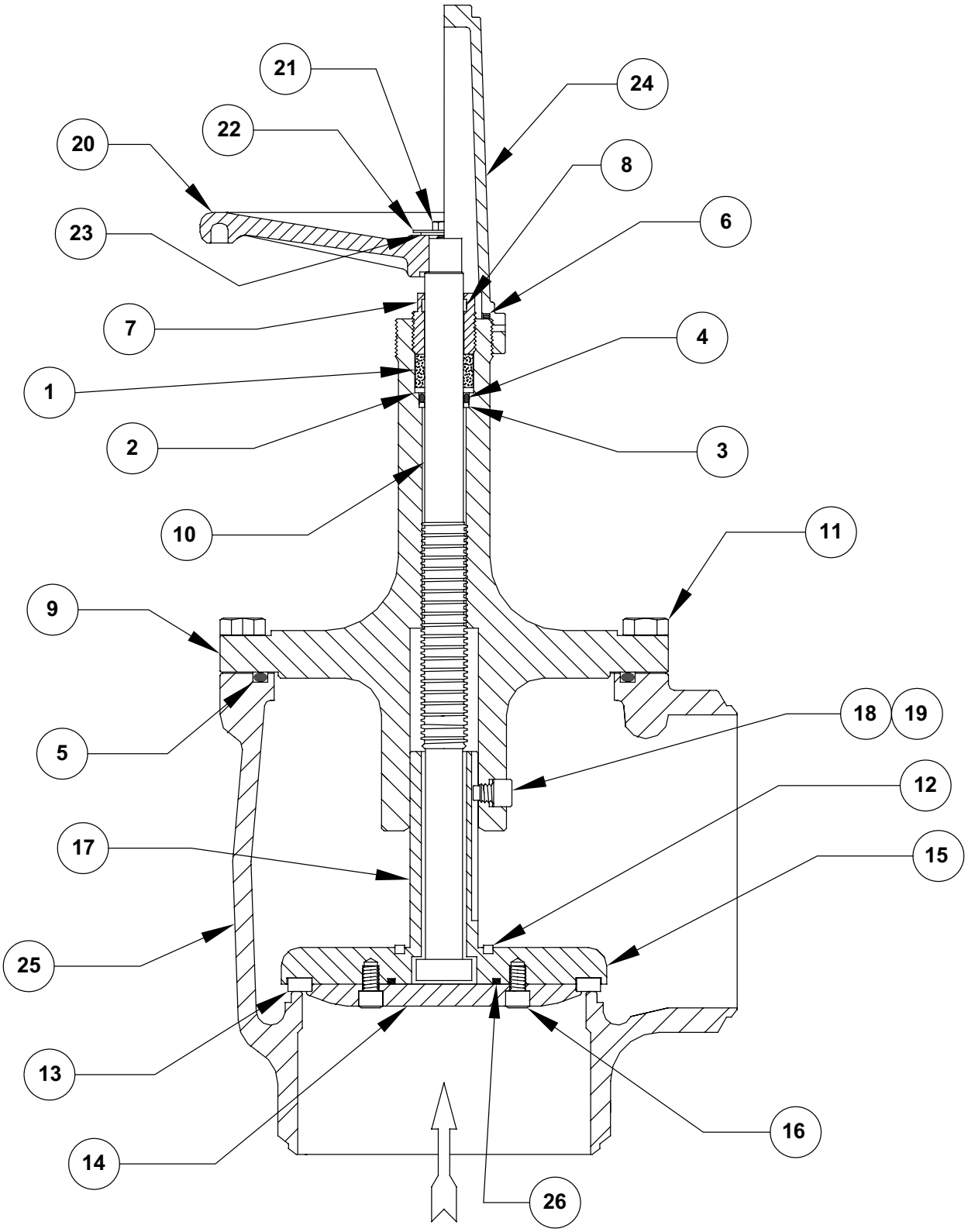
NOTE: Globe valve shown; kits are the same for angle valves.

REPLACEMENT PARTS – BUTT WELD SHUT-OFF VALVES

5" THROUGH 8" (125MM THROUGH 200MM)

ITEM	DESCRIPTION	QTY	PART NO
	Gasket Kit 5" (125mm)		**50-1082**
	Gasket Kit 6" (150mm)		**50-1083**
	Gasket Kit 8" (200mm)		**50-1084**
	Above kits consist of:		
1	Stem Packing	1	
2	Stem Washer	1	
3	Back-up Washer	1	
4	Stem O-Ring	1	
5	Bonnet O-Ring	1	
6	Seal Cap O-Ring	1	
7	Packing Nut	1	
	Bonnet Assembly Kit 5" (125mm)		**50-1080**
	Bonnet Assembly Kit 6" (150mm)		**50-1081**
	Bonnet Assembly Kit 8" (200mm)		**50-1085**
	Above kits consist of:		
8	Bonnet	1	
9	Stem Assembly	1	
13	Bonnet Cap Screw	4	
21	Lower Disc Holder	1	
22	Upper Disc Holder	1	
23	Disc Holder Screw	4	
24	Bushing, Stem Guide	1	
	Gasket Kit	1	
	Disc Assy	1	
	Handwheel Kit 5", 6" (125mm, 150mm)		**50-1089**
	Handwheel Kit 8" (200mm)		**50-1090**
	Above kits consist of:		
14	Handwheel	1	
15	Screw	1	
16	Back-Up Washer (8" Only)	1	
17	Nameplate	1	
	Seal Cap Kit 5", 6" (125mm, 150mm)		**50-1091**
	Seal Cap Kit 8" (200mm)		**50-1092**
	Above kits consist of:		
6	Seal Cap	1	
19	Seal Cap	1	
20	Body	1	

10" THROUGH 18" (250MM THROUGH 450MM) – BUTT WELD SHUT-OFF VALVES



NOTE: Angle valve shown; kits are the same for globe valves.

REPLACEMENT PARTS – BUTT WELD SHUT-OFF VALVES

10" THROUGH 18" (250MM THROUGH 450MM)

ITEM	DESCRIPTION	QTY	PART NO
	Gasket Kit 10" (250mm)		**50-1122**
	Gasket Kit 12" (300mm)		**50-1123**
	Gasket Kit 14" (350mm)		**50-1124**
	Gasket Kit 16" (400mm)		**50-1196**
	Gasket Kit 18" (450mm)		**50-1197**
	Above kits consist of:		
1	Stem Packing	1	
2	Packing Washer	1	
3	Back-up Washer	1	
4	Stem O-Ring	1	
5	Bonnet O-Ring	1	
6	Seal Cap O-Ring	1	
7	Packing Nut	1	
8	Bushing, Stem Guide	1	
	Bonnet Assembly Kit 10" (250mm)		**50-1125**
	Bonnet Assembly Kit 12" (300mm)		**50-1126**
	Bonnet Assembly Kit 14" (350mm)		**50-1127**
	Bonnet Assembly Kit 16" (400mm)		**50-1198**
	Bonnet Assembly Kit 18" (450mm)		**50-1199**
	Above kits consist of:		
9	Bonnet	1	
10	Stem Assembly	1	
11	Bonnet Cap Screw	8	
12	Ring, Teflon Back Seat	1	
14	Lower Disc Holder	1	
15	Upper Disc Holder	1	
16	Disc Screw	8	
17	Guide Tube	1	
18	Screw Guide	1	
19	Washer, Screw Guide	1	
	Disc Kit Assy		
	Gasket Kit	1	
	Handwheel Kit 10" (250mm)		**50-1131**
	Handwheel Kit 12", 14" (300mm, 350mm)		**50-1132**
	Handwheel Kit 16", 18" (400mm, 450mm)		**50-1193**
	Above kits consist of:		
20	Handwheel	1	
21	Screw	1	
22	Nameplate	1	
23	Support Washer	1	
	Seal Cap Kit 10" (250mm)		**50-1133**
	Seal Cap Kit 12", 14" (300mm, 350mm)		**50-1134**
	Seal Cap Kit 16", 18" (400mm, 450mm)		**50-1194**
	Above kits consist of:		
6	Seal Cap O-Ring	1	
24	Seal Cap	1	
25	Body	1	

SERVICE AND MAINTENANCE

Hansen steel butt welding shut-off valves require practically no service or maintenance due to the combination of polished stainless steel stems and reliable O-ring stem seals plus graphite composite packing. This almost entirely eliminates stem leakage, the common ailment of shut-off valves.

To help ensure safety, verify the tightness of the packing nut whenever the position (open or closed) is changed on isolation shut-off valves before opening the system. Ensuring that the packing nut is tight helps reduce the possibility that any line or system vibration may cause a slight unseating of a closed valve.

STEM PACKING

When verifying the tightness of the packing nut, use an adjustable wrench. Extrusion of some black graphite packing material along the stem is normal. If the O-ring or the adjustable packing ever needs replacement as evidenced by refrigerant or oil leakage at the stem, open the valve stem firmly to the back-seat position. This separates the O-ring and packing from the system refrigerant. Remove the packing nut carefully and then use a wire hook or a small blade screwdriver to remove the packing and O-ring. Take care not to scratch the stem or bonnet sealing surfaces. Carefully install the backup washer (1½"–18" or 13mm–450mm only), new lubricated stem O-ring, stem washer, and stem packing. Tighten the packing nut only enough to give the handwheel slight turning friction.

VALVE SEAT

To inspect or replace the valve seat disc, isolate the valve from the system and safely pump out all refrigerant to zero pressure with the stem open at least one turn. Evenly loosen all bolts one to two turns. Using a screwdriver, break the seal between the bonnet and valve body, proceeding cautiously to avoid any refrigerant which may still remain inside the valve body. Remove the bonnet bolts and bonnet assembly, being careful not to damage the Teflon seat disc surface. If the seat surface in the body is marred, it may be possible to repair the seat by polishing with emery paper.

If the Teflon seat disc is damaged, replace the entire disc assembly ½" (13mm) thru 4" (100mm) by first removing the ball retainer spring, ball bearings and anti-spin O-ring. Install a new disc assembly including anti-spin O-ring. Alternately, use a lathe to take a 1/64" (0.4 mm) by 45° surface cut on the Teflon seat. The 5" (125mm) thru 18" (450mm) Teflon seats can be replaced by disassembling the disc holder by loosening and removing the disc screws. Replace the Teflon ring, the upper disc O-ring in 10" (250mm) and above, and reassemble the disc.

Replace body gasket or O-ring and reassemble bonnet into body using care not to damage Teflon seat surface. Be careful not to pinch the O-ring. If necessary, retain O-ring in O-ring groove by using a suitable O-ring grease. Ensure the stem is opened at least several turns.

Hansen assembles valves with bonnet cap screws factory tightened as follows: ½" to 1¼" (13mm to 32mm)–30 ft-lb (41 Nm); 1½" (40mm) and 2" (50mm)–40 ft-lb (54 Nm); 2½" (65mm) and 3" (80mm)–60 ft-lb (81 Nm); 4" (100mm)–180 ft-lb (244 Nm); and 5" to 18" (125mm to 450mm)–200 ft-lb (271Nm). Test the valve for leaks before returning it to service.

TROUBLESHOOTING VALVE LEAKS

On the rare occasion when a small valve leak is discovered, the following procedures may help:

Stem seal leaks – The possibility of this occurrence is based on many factors, such as frequency of use, exercising, debris or rust on stem, etc. First, simply tighten the packing nut to see if this eliminates the leak. If not, back seat the valve or isolate it entirely from the refrigeration system. See Stem Packing section of this bulletin.

Bonnet gasket leaks – If a gasket leak is discovered at the bonnet-to-body interface, first bring the pressure in the valve to zero pressure and check the bonnet bolt tightness. If the leak persists, isolate the valve from the refrigeration system and disassemble the valve. Check the gasket sealing surfaces on the bonnet and valve body for scratches or gouges. These scratches can sometimes be polished smooth. Install a new gasket and reassemble the valve. Evenly tighten all bolts to properly seat the bonnet. Repeat the pressure test.

Bonnet O-ring leaks – Valves 5" (125mm) and larger use bonnet O-rings. If a leak is discovered at the bonnet-to-body interface, first bring the pressure in the valve to zero pressure and check the bonnet bolt torque. The torque recommendations are provided below. If the leak persists, isolate the valve from the refrigeration system and disassemble the valve. Check for debris on the surfaces of the bonnet and O-ring groove in the valve body. Check for scratches and polish the surfaces. Clean and check the O-ring for cuts, cracks and embedded debris. Check the bonnet and valve surface for flatness. Occasionally, the edge of the bonnet on the valve body is struck or dropped which could damage or raise the sealing surface of the bonnet. This prevents the two sealing surfaces from being completely engaged. Remove the raised edge. Also, if not carefully re-assembled, the bonnet may have been slightly askew, preventing proper sealing. Before reassembling the valve, clean the sealing surfaces and O-ring apply suitable grease to the O-ring. Install the bonnet, making sure the stem is open several turns. Evenly tighten, then torque the bonnet bolts to the specified value below. Pressure test the valve to check for leaks.

ORDERING INFORMATION, EXTENDED NECK BUTT WELD SHUT-OFF VALVES

SIZE	DESCRIPTION	CAT NO
1/2" (13mm)	Globe, Handwheel	GWE051H
	Angle, Handwheel	AWE050H
	Globe, Seal Cap	GWE051C
	Angle, Seal Cap	AWE050C
3/4" (20mm)	Globe, Handwheel	GWE076H
	Angle, Handwheel	AWE075H
	Globe, Seal Cap	GWE076C
	Angle, Seal Cap	AWE075C
1" (25mm)	Globe, Handwheel	GWE101H
	Angle, Handwheel	AWE100H
	Globe, Seal Cap	GWE101C
	Angle, Seal Cap	AWE100C
1¼" (32mm)	Globe, Handwheel	GWE126H
	Angle, Handwheel	AWE125H
	Globe, Seal Cap	GWE126C
	Angle, Seal Cap	AWE125C
1½" (40mm)	Globe, Handwheel	GWE150H
	Angle Handwheel	AWE150H
	Globe, Seal Cap	GWE150C
	Angle, Seal Cap	AWE150C
2" (50mm)	Globe, Handwheel	GWE200H
	Angle, Handwheel	AWE200H
	Globe, Seal Cap	GWE200C
	Angle, Seal Cap	AWE200C
2½" (65mm)	Globe,Handwheel	GWE251H
	Angle, Handwheel	AWE251H
	Globe, Seal Cap	GWE251C
	Angle, Seal Cap	AWE251C
3" (80mm)	Globe, Handwheel	GWE301H
	Angle, Handwheel	AWE301H
	Globe, Seal Cap	GWE301C
	Angle, Seal Cap	AWE301C
4"* (100mm)	Globe, Handwheel	GWE400H
	Angle, Handwheel	AWE402H
	Globe, Seal Cap	GWE400C
	Angle, Seal Cap	AWE402C

*Note: 4" Extended Neck Globe is a “T” style valve.

ORDERING INFORMATION, BUTT WELD SHUT-OFF VALVES

SIZE	DESCRIPTION	CAT NO
1/2" (13mm)	Globe, Handwheel	GWB051H
	Angle, Handwheel	AWB050H
	Globe, Seal Cap	GWB051C
	Angle, Seal Cap	AWB050C
3/4" (20mm)	Globe, Handwheel	GWB076H
	Angle, Handwheel	AWB075H
	Globe, Seal Cap	GWB076C
	Angle, Seal Cap	AWB075C
1" (25mm)	Globe, Handwheel	GWB101H
	Angle, Handwheel	AWB100H
	Globe, Seal Cap	GWB101C
	Angle, Seal Cap	AWB100C
1¼" (32mm)	Globe, Handwheel	GWB126H
	Angle, Handwheel	AWB125H
	Globe, Seal Cap	GWB126C
	Angle, Seal Cap	AWB125C
1½" (40mm)	Globe, Handwheel	GW150H
	Angle Handwheel	AW150H
	Globe, Seal Cap	GW150C
	Angle, Seal Cap	AW150C
2" (50mm)	Globe, Handwheel	GW200H
	Angle, Handwheel	AW200H
	Globe, Seal Cap	GW200C
	Angle, Seal Cap	AW200C
2½" (65mm)	Globe,Handwheel	GW251H
	Angle, Handwheel	AW251H
	Globe, Seal Cap	GW251C
	Angle, Seal Cap	AW251C
3" (80mm)	Globe, Handwheel	GW301H
	Angle, Handwheel	AW301H
	Globe, Seal Cap	GW301C
	Angle, Seal Cap	AW301C
4" (100mm)	Globe, Handwheel	GW402H
	Angle, Handwheel	AW402H
	Globe, Seal Cap	GW402C
	Angle, Seal Cap	AW402C
5" (125mm)	Globe, Handwheel	GW500H
	Angle, Handwheel	AW500H
	Globe, Seal Cap	GW500C
	Angle, Seal Cap	AW500C
6" (150mm)	Globe, Handwheel	GW600H
	Angle, Handwheel	AW600H
	Globe, Seal Cap	GW600C
	Angle, Seal Cap	AW600C
8" (200mm)	Globe, Handwheel	GW800H
	Angle, Handwheel	AW800H
	Globe, Seal Cap	GW800C
	Angle, Seal Cap	AW800C
10" (250mm)	Globe, Handwheel	GW1000H
	Angle Handwheel	AW1000H
	Globe, Seal Cap	GW1000C
	Angle, Seal Cap	AW1000C
12" (300mm)	Globe, Handwheel	GW1200H
	Angle, Handwheel	AW1200H
	Globe, Seal Cap	GW1200C
	Angle, Seal Cap	AW1200C
14" (350mm)	Globe,Handwheel	GW1400H
	Angle, Handwheel	AW1400H
	Globe, Seal Cap	GW1400C
	Angle, Seal Cap	AW1400C
16" (400mm)	Angle, Handwheel	AW1600H
	Angle, Seal Cap	AW1600C
18" (450mm)	Angle, Handwheel	AW1800H
	Angle, Seal Cap	AW1800C

TO ORDER

Specify catalog number. To order valves for 600 psig (41 bar g) SWP, add the letter “C” prefix to catalog number (Example: CGW200H). CE marked valves are available for 1¼" through 14" (32mm to 350mm), add the letter "E" suffix (Example: AW150HE).

CAUTION

Hansen valves are for refrigeration only. These instructions must be completely read and understood before selecting, using or servicing Hansen valves and electronics. Only knowledgeable, trained refrigeration mechanics should install, operate, or service. Stated temperature and pressure limits should not be exceeded. Bonnets should not be removed from valves unless system has been evacuated to zero pressure. See also Safety Precautions in the current List Price Schedule and the Safety Precautions Sheet supplied with product.

WARRANTY

All Hansen products, except electronics, are guaranteed against defective materials or workmanship for one year F.O.B. factory. Electronics are guaranteed against defective materials or workmanship for 90 days F.O.B. factory. No consequential damages or field labor is included.

TYPICAL SPECIFICATIONS

“Weldable refrigerant shut-off valves shall have stainless steel stems with dual seals, forged or cast steel bodies, back-seating design for packing replacement, bonnet threads for installation of stem seal caps, butt weld ends machined dimensionally correct for schedule 80 pipe (sizes ½"–1½"), schedule 40 pipe (sizes 2"–10") and gauge or standard weight pipe (sizes 12" and above), and suitable for a safe working pressure of 400 psig (28 bar g) or 600 psig (41 bar g) as manufactured by Hansen Technologies Corporation, or approved equal.”

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