



# W60\W80\W90 Series Shut Off and Divert Valves

## Application

When stopping or diverting flow in a process system, the W60 single seat valve line provides both a flexible and reliable solution. These valves are pneumatically or manually operated, and offered in a wide variety of body configurations.

Available in 1" to 6" OD sizes.

Adapters: Refer to page 22 for descriptions of W80/W90 options

#### **Materials**

Product Wetted:	ASTM 316L (UNS-S31603); (DIN-1.4404)							
Non-Product:	ASTM 304 (UNS-S30400); (DIN-1.4301)							
Seat Material:	Tef Flow <sup>TM</sup> (Std) See Page 2 for other available seat options.							
Elastomers:	FKM (Std)							
	EPDM (Opt)							
Finish:	< 32Ra (<0.8 µm) Other finishes available upon request							





## **Pressure Ratings**

#### Standard

Valve Size w/ pressure at	1.0"/1.5" (25/38mm)	2.0" (51mm)	2.5" (64mm)	3.0" (76mm)	4.0" (102mm)	6.0"* (152mm)
70°F	500 PSI	450 PSI	400 PSI	350 PSI	200 PSI	150 PSI
(20°C)	(34.5 bar)	(31 bar)	(28 bar)	(24 bar)	(14 bar)	(10 bar)
160/180°F	375 PSI	350 PSI	300 PSI	250 PSI	150 PSI	100 PSI
(71/82°C)	(26 bar)	(24 bar)	(17 bar)	(17 bar)	(10 bar)	(6 bar)
250°F	250 PSI	250 PSI	200 PSI	150 PSI	125 PSI	75 PSI
(121°C)	(17 bar)	(17 bar)	(14 bar)	(10 bar)	(8 bar)	(5 bar)

#### Valve with High Pressure Adapter and Clamps

Valve Size w/ pressure at	1.0"/1.5" (25/38mm)	2.0" (51mm)	2.5" (64mm)	3.0" (76mm)	4.0" (102mm)	6.0"* (152mm)
70°F	1220 PSI	900 PSI	720 PSI			
(20°C)	(84 bar)	(62 bar)	(49 bar)			
160/180°F	1160 PSI	855 PSI	690 PSI			
(71/82°C)	(80 bar)	(60 bar)	(47 bar)			
250°F	1100 PSI	830 PSI	660 PSI			
(121°C)	(75 bar)	(57 bar)	(45 bar)			



3, 4 or 6 inch high pressure clamp not available.

W90 not available in high-pressure arrangements.

\*6" valves available in W61 Shutoff and W65 Divert only. For other valve types contact factory.

For all valve options see Valve Key Datasheet (DS-1204)

## **Seat Options**

Seat Type		Maximum Temperature	Application	Series
	TEF-FLOW™ (TF)	180°F (82°C)*	Standard seat of choice. General Purpose, >90% of applications	W60
	TEF-FLOW™ "P" (TFP)	280°F (137°C)	High Temp High Pressure Pressure Relief	W60 W80 W90
	Tri Ring (TR) EPDM, FKM	Oper. 280°F (137°C) EPDM Steril. 275°F (135°C) EPDM Oper. 350°F (176°C) FKM Steril. Consult Factory FKM	High Pressure Large Particulate	W60 W80 W90
	Metal (M)	375°F (190°C)	High Pressure High Flow Large Particulate	W60 W80
	Bonded (B) EPDM, FKM	230°F (110°C)	Large Particulate	W60

For higher temperature applications than those listed, please consult the factory.

\*Operating conditions such as flow rate and pressure must be considered when operating near max. temperature rating.





New Set & Forget Control Top

#### Features

- Transparent Control Top keeps all electrical components visible.
- Maintainable, designed with the user in mind, making assembly and troubleshooting worry free and easy.
- Waukesha Cherry-Burrell uses the industry's most widely recognized electrical components, so access to off the shelf replacement parts is easy, ensuring quick delivery and less down time.
- NEMA 4x (IP64)

#### **Connector Options**

- S/O Cord Grip for hard wire (std)
- Quick Disconnect Pin Connectors

#### **Interface Options**

- ASi Field Bus Card
- Device Net Field Bus Network Card

#### **Position Indication**

- Set & Forget Switch
- Inductive Proximity Switches 20-140V AC/DC, 2-Wire (Std)
- Microswitches 24VDC, 110VAC
- Intrinsically safe options 5-24VDC

#### **Solenoid Valves**

24VDC or 110V

#### W60/W80/W90 Series Shut-off and Divert Valves

Valve Size Inch (mm)	W61/W63 W81/W83 Standard Stroke	W62/W65 W82/W85 Standard Stroke	W61/W63 W81/W83 Long Stroke	W62/W65 W82/W85 Long Stroke	W61 Y-Body Extra Long Stroke	W90 Standard Stroke
1.0 (25)	.625 (16)	.625 (16)				.600 (14)
1.5 (40)	.813 (21)	.688 (17)				.600 (14)
2.0 (51)	.813 (21)	.688 (17)				.600 (14)
2.5 (64)	.813 (21)	.688 (17)	1.87 (48)	1.69 (43)	4.2 (107)	.600 (14)
3.0 (76)	.813 (21)	.688 (17)	2.31 (59)	2.09 (53)	4.2 (107)	.600 (14)
4.0 (101)	.813 (21)	.688 (17)	3.22 (82)	2.94 (75)	5.2 (132)	.600 (14)
6.0 (152)			3.22 (82)			

#### **Actuator Options**





H - Hand Lock HLG - Hand Lock, long stroke 6YLG - Hand Lock



#### "A" - Dimensions\*

Valve Size Inch (mm)	4 AR 4 AL 4 AA	5 AR 5 AL 5 AA	6 AR 6 AL 6 AA	HLG	н	м	4 RHAR	5 RHAR	6 RHAR	4 RHAL	5 RHAL	6 RHAL	6 ARLG ALLG	4AL3	4AR3	4 ALLG ARLG	6 AALG	6 YAR YAL
1.0 (25)	12.58 (320)	13.89 (352)	15.65 (397)		8.65 (220)	8.8 (224)								14.68 (372)	16.07 (408)			
1.5 (40)	12.58 (320)	13.89 (352)	15.65 (397)		8.65 (220)	8.8 (224)	15.89 (404)	17.27 (439)	19.14 (486)					14.68 (372)	16.07 (408)			
2.0 (51)	12.83 (326)	14.14 (359)	15.90 (404)		8.90 (226)	9.1 (231)	16.14 (410)	17.52 (445)	19.39 (492)	16.42 (417)	17.74 (451)	18.72 (475)		14.93 (379)	16.32 (415)			
2.5 (64)	13.08 (332)	14.39 (366)	16.15 (410)	11.6 (295)	9.15 (232)	9.3 (236)	16.39 (416)	17.77 (451)	19.64 (499)	16.67 (424)	17.99 (457)	18.97 (482)	25.3 (642)	15.1 (383)	16.57 (421)	23.1 (586)	19.7 (500)	36.9 (937)
3.0 (76)	13.33 (339)	14.64 (372)	16.40 (417)	11.8 (300)	9.40 (239)	9.6 (244)	16.64 (423)	18.02 (458)	19.89 (505)	16.92 (430)	18.24 (463)	19.22 (488)	25.5 (648)	15.3 (388)	16.82 (427)	23.4 (594)	20.4 (518)	36.8 (935)
4.0 (101)	13.81 (351)	15.12 (384)	16.88 (429)	12.3 (312)	9.88 (250)	10.0 (254)	17.13 (435)	18.50 (470)	20.37 (517)	17.41 (442)	18.73 (476)	19.70 (500)	26.0 (660)	15.8 (401)	17.30 (439)	23.9 (607)	21.8 (553)	38.1 (968)
6.0 (152)				12.4 (315)									27.2 (691)				22.8 (579)	

4AR 4" (101mm) Air to Raise

4HAR	4" (101mm) Heavy Duty Spring, Air to Raise
------	--

4RHAR*	* 4" (101mm) Spring Adjustable, Heavy Duty Spring, Air to Raise
4AL	4" (101mm) Air to Lower
4HAL	4" (101mm) Heavy Duty Spring, Air to Lower
4RHAL*	4" (101mm) Spring Adjustable, Heavy Duty Spring, Air to Lower
4AA	4" (101mm) Air to Air
4ALLG	4" (101mm) Air to Lower, long stroke
4ARLG	4" (101mm) Air to Raise, long stroke
5AR	5" (127mm) Air to Raise
5HAR	5" (127mm) Heavy Duty Spring, Air to Raise
5RHAR*	* 5" (127mm) Spring Adjustable, Heavy Duty Spring, Air to Raise
5AL	5" (127mm) Air to Lower
5HAL	5" (127mm) Heavy Duty Spring, Air to Lower
5RHAL*	5" (127mm) Spring Adjustable, Heavy Duty Spring, Air to Lower
5AA	5" (127mm) Air to Air
5ALD*	5" (127mm) Air to Lower, diaphragm
6HAR	6" (152mm) Heavy Duty Spring, Air to Raise
6RHAR*	* 6" (152mm) Spring Adjustable, Heavy Duty Spring, Air to Raise
6HAL	6" (152mm) Heavy Duty Spring, Air to Lower

6RHAL\*\* 6" (152mm) Spring Adjustable, Heavy Duty Spring, Air to Lower

6AR 6" (152mm) Light Spring, Air to Raise

6AL 6" (152mm) Light Spring, Air to Lower

6AA 6" (152mm) Air to Air

 4AR3 - 4" Air to Raise,
 4AL3 - 4" Air to Lower,

 3 position
 3 position



**4YAR** - 6" Air to Raise, extra long stroke

Note: For all valves with control tops add 4.02" (82mm) Standard, add 6.02" (142mm) Long Stroke

\*"A" Dimension is in fully extended (open) position

\*\* For sizing Over-Pressure valves, select a Heavy-Duty spring actuator with a holding pressure greater than the desired relief pressure. Designate with the "R" the valve model (i.e. WR61) and actuator size (i.e. 5RHAR).

# **Body Configurations (1 of 2)**





TD





TPS





















W63 Shut-off

# TS TD









\* Not Available on W90

#### Valve Dimensions

Valve Size Inch (mm)	A	В	BB	C Buttweld	C S-Line	сс	D	F S-Line	G Buttweld	G S-Line	н	l Buttweld	l S-Line
1.0	s	2.63	1.98	2.00	3.12	8.00	.69	1.83	2.00	2.50	.845	4.76	6.23
(25)		(67)	(50)	(51)	(79)	(203)	(18)	(46)	(51)	(63)	(21)	(120)	(158)
1.5	option	2.63	1.84	2.25	2.75	8.00	.94	1.69	2.00	2.50	.595	4.76	5.85
(40)		(67)	(47)	(57)	(70)	(203)	(24)	(43)	(51)	(63)	(15)	(120)	(149)
2.0	uator	3.13	2.14	3.00	3.50	8.00	1.19	1.99	2.13	2.63	.675	6.23	7.33
(51)		(79.5)	(54)	(76)	(89)	(203)	(30)	(51)	(54)	(67)	(17)	(158)	(186)
2.5	or act	3.63	2.38	3.00	3.50	8.00	1.44	2.27	2.38	2.88	.805	7.69	8.79
(64)		(92)	(60)	(76)	(89)	(203)	(30)	(58)	(60)	(73)	(20)	(195)	(223)
3.0	ge 3 f	4.13	2.64	3.25	3.75	8.00	1.69	2.55	2.75	3.25	.925	9.15	10.25
(76)		(105)	(67)	(83)	(95)	(203)	(43)	(65)	(70)	(83)	(24)	(232)	(260)
4.0	ee Ba	5.11	3.11	3.88	4.50	12.00	2.32	3.15	3.25	3.88	1.09	11.95	13.29
(101)		(130)	(79)	(99)	(114)	(305)	(59)	(80)	(83)	(98)	(28)	(303)	(337)
6.0 (152)	s	7.04 (179)		6.0 (152)	6.88 (175)		4.03 (102)		4.00 (101)	4.88 (124)	1.44 (36)		

# **Body Configurations (2 of 2)**

#### W62 Divert







CCD

CTC

TCT









TTD



CCS

CCC



## W65 Divert

CTD



TTC



CTT

CT

TTS







Valve Size Inch (mm)	A	В	C Buttweld	C S-Line	D	E
1.0	sı	2.63	2.00	3.12	.69	3.91
(25)		(67)	(51)	(79)	(17)	(99)
1.5	optior	2.63	2.25	2.75	.94	3.97
(40)		(67)	(57)	(70)	(24)	(101)
2.0	tuator	3.13	3.00	3.50	1.19	4.22
(50)		(79.5)	(76)	(89)	(30)	(107)
2.5	for ac	3.63	3.00	3.50	1.44	4.55
(65)		(92)	(76)	(89)	(30)	(116)
3.0	le 16	4.13	3.25	3.75	1.69	4.73
(80)		(105)	(83)	(95)	(43)	(120)
4.0	se Pag	5.11	3.88	4.50	2.32	5.06
(100)		(130)	(99)	(114)	(59)	(129)
6.0	Ň	7.04	6.00	6.88	4.03	6.20
(100)		(179)	(152)	(175)	(102)	(107)

NOTE: W65 only for 6 inch sizes

## **Pressure Loss Curves**

W80 and W90 valves ar charted below under corresponing W60 header

#### Model W61 & W64R





<sup>\*</sup>Note: For W61 S to S curves see W62 T to T curves

#### Model W63 & W64





#### Model W62





## **Pressure Loss Curves**

W80 and W90 valves ar charted below under corresponing W60 header





Model W62







Model W65





В

# W61 & W64R Holding Pressure Charts (1 of 2) W80 and W90 Holding Pressures are charted under the corresponding W60 header.

W90 Maximum Operating Pressure is 100 PSI.

		Actuator	Val	ve Size -	inches (r	nm) - Pres	sure in P	5I*
		Size (in)	1" (25)	1.5" (38)	2" (51)	2.5" (64)	3" (76)	4" (102)
Bottom Port (P <sub>1</sub> ),		4AR	160	125	70	45	31	18
Actuator spring		4HAR	213	177	99	64	44	25
holds closed aga	inst:	5AR	251	220	124	79	55	31
	5HAR <sup>1</sup>		378	212	136	94	54	
		6AR	347	317	178	114	79	45
		6HAR <sup>1</sup>			338	216	150	87
Side Port (P <sub>2</sub> ),	50PSI	4AR	223	270	132	80	54	29
Air to port A,	75PSI	4HAR <sup>1</sup>	371	419	205	124	84	45
will open	50PSI	5AR	356	398	195	118	79	43
against:	75PSI	5HAR <sup>1</sup>			261	158	106	57
	50PSI	6AR			278	168	113	61
	75PSI	6HAR <sup>1</sup>			334	202	136	72



#### W61 AR (air-to-raise) - Long Stroke

		Actuator	Valve Size - inches (mm) - Pressure in PSI*					
		Size (in)	2.5" (64)	3" (76)	4" (102)	6" (152)		
Bottom Port (P <sub>1</sub> ),		4ARLG	33	23	13			
Actuator spring		6ARLG	112	80	44	21		
holds closed agair	ist:	6YAR				15		
Side Port (P <sub>2</sub> ),	50PSI	4ARLG	93	63	34			
Air to port A,	50PSI	6ARLG	170	112	62	30		
will open against:	50PSI	6YAR				29		



#### W61Y-Body

	Actuator Size	Valve Size - inches (mm) - Pressure in PSI*			
Port (P <sub>1</sub> ), Actuator spring	(in)	2.5" (64)	3" (76)	4" (102)	
holds closed against:		6YAR	44	34	16
Port ( $P_2$ ), Air to Port A, holds open against:	50PSI	6YAR	52	35	16

NOTE: Y-Body must use 6YAR/AL Actuator

If pressure rating is higher than documented in tables consult factory before exceeding. Normal air supply requirement: 50 PSI for 4, 5, and 6 inch actuators and long stroke actuators 75 PSI for 4, 5, and 6 inch heavy duty spring actuators 8

<sup>1</sup> For sizing Over-Pressure valves, select a Heavy-Duty spring actuator with a holding pressure greater than the desired relief pressure. Designate with the "R" valve model (i.e. WR61) and actuator size (i.e. 5RHAR).

# W61 & W64R Holding Pressure Charts (2 of 2)

			Val	ve Size -	inches (r	nm) - Pres	sure in P	SI*
		Size (in)	1" (25)	1.5" (38)	2" (51)	2.5" (64)	3" (76)	4" (102)
Side Port (P <sub>2</sub> ),		4AL	288	300	164	99	67	36
Actuator spring		4HAL	361	409	200	121	81	44
opens stem against:		5AL			216	131	88	47
		5HAL			388	234	158	85
		6AR			260	157	106	57
		6HAR				361	243	131
Port (P <sub>1</sub> ),	50PSI	4AL	111	76	43	27	19	11
Air to port B,	75PSI	4HAL	221	185	104	66	46	27
will hold closed	50PSI	5AL	218	187	105	67	47	27
against:	75PSI	5HAL	245	184	104	66	46	27
	50PSI	6AL	383	353	198	127	88	50
	75PSI	6HAL	328	213	120	77	53	32

#### W61 AL/HAL (air-to-lower) - Standard Stroke



#### W61 AR (air-to-lower) - Long Stroke

		Actuator	Valve Size	e - inches (	mm) - Pres	sure in PSI*
		Size (in)	2.5" (64)	3" (76)	4" (102)	6" (152)
Side Port (P <sub>2</sub> ), Actuator spring		4ALLG	53	39	24	
		6ALLG	147	104	60	29
opens stem against:		6YAL				29
Port (P <sub>1</sub> ),	50PSI	4ALLG	69	45	23	
Air to port B, will	50PSI	6ALLG	136	90	47	23
hold closed against:	50PSI	6YAL				17

#### W61Y-Body

		Actuator Size	Valve Size  - inches (mm) - Pressure in PSI*			
Port (P <sub>1</sub> ), Actuator spring		(in)	2.5" (64)	3" (76)	4" (102)	
holds closed against:		6YAL	57	46	27	
Port ( $P_2$ ), Air to Port A, holds open against:	50PSI	6YAL	52	35	16	



\* Bar = PSI

14.5

## W62 Holding Pressure Charts (1 of 2)



₽₁ ∎

### W62 AR/HAR (air-to-raise) - Standard Stroke

		Actuator	1	Valve Size	- inches (	mm) - Pres	sure in PSI	*
		Size (in)	1" (25)	1.5" (38)	2" (51)	2.5" (64)	3" (76)	4" (102)
Bottom Port (P <sub>1</sub> ),		4AR	125	125	70	45	31	19
Actuator spring		4HAR	177	177	99	64	44	26
holds closed agai	inst:	5AR	220	220	124	79	55	32
		5HAR	378	378	212	136	94	55
		6AR	317	317	178	114	79	45
		6HAR			338	216	150	88
Side Port (P <sub>2</sub> ),		4AR	238	253	142	91	63	37
Air to actuator (w	ith stem	4HAR	293	308	173	111	77	44
raised), spring will lower against:		5AR	320	333	187	120	83	48
		5HAR			336	215	149	86
		6AR			239	153	106	61
		6HAR				367	255	147
Port (P <sub>2</sub> ),	50PSI	4AR	270	270	132	80	54	28
Air to Port A,	75PSI	4HAR	419	419	205	124	84	44
will raise stem	50PSI	5AR	398	398	195	118	79	42
(opens) against:	75PSI	5HAR			261	158	106	56
	50PSI	6AR			278	168	113	61
	75PSI	6HAR			334	202	136	71
Port (P <sub>3</sub> ),	50PSI	4AR	118	99	48	29	20	10
Air to Port A,	75PSI	4HAR	264	244	119	72	49	25
(with stem	50PSI	5AR	264	247	121	73	49	26
raised), will hold	75PSI	5HAR	272	239	117	71	48	24
against:	50PSI	6AR	438	421	206	125	84	45
	75PSI	6HAR	185	121	59	36	24	9

10 If pressure rating is higher than documented in tables consult factory before exceeding. Normal air supply requirement: 50 PSI for 4, 5, and 6 inch actuators and long stroke actuators 75 PSI for 4, 5, and 6 inch heavy duty spring actuators

## **W62 Holding Pressure Charts**



	Actuator	Valve S Pr	Valve Size - inches (mm) Pressure in PSI*			
	(in)	2.5" (64)	3" (76)	4" (102)		
Port (P <sub>1</sub> ),	4ARLG	33	23	13		
Actuator spring holds closed against:	6ARLG	112	78	44		
Port ( $P_2$ ), Air to actuator	4ARLG	49	36	23		
(with stem raised), spring will lower against:	6ARLG	135	97	59		
Port ( $P_2$ ), Air to port A,	4ARLG	93	63	34		
against:	6ARLG	170	114	62		
Port ( $P_3$ ), Air to port A,	4ARLG	75	48	23		
against:	6ARLG	145	94	47		

#### W62 AR (air-to-raise) - Long Stroke

W62 AL (air-to-lower) - Long Stroke



	Actuator	Valve Size - inches (mm) Pressure in PSI*			
	(in)	2.5" (64)	3" (76)	4" (102)	
Port (P <sub>1</sub> ), Air to port B	4ALLG	69	45	22	
noids closed against:	6ALLG	135	91	47	
Port (P <sub>2</sub> ), (stem low-	4ALLG	54	39	24	
against:	6ALLG	148	103	61	
Port ( $P_2$ ), Air to port B,	4ALLG	85	59	33	
close stem against:	6ALLG	158	110	62	
Port ( $P_3$ ), (stem raised) actuator spring holds against:	4ALLG	36	24	13	
	6ALLG	123	83	45	

PSI

14.5

# W62 Holding Pressure Charts (2 of 2)



### W62 AL/HAL (air-to-lower) - Standard Stroke

		Actuator	7	Valve Size	- inches (	- inches (mm) - Pressure in PSI*			
		Size (in)	1" (25)	1.5" (38)	2" (51)	2.5" (64)	3" (76)	4" (102)	
Bottom Port	50PSI	4AL	76	76	43	27	19	16	
(P <sub>1</sub> ),	75PSI	4HAL	185	185	104	66	46	27	
Air to port	50PSI	5AL	187	187	105	67	47	27	
B, will hold	75PSI	5HAL	184	184	104	66	46	28	
against:	50PSI	6AL	353	353	198	127	88	50	
	75PSI	6HAL	213	213	120	77	53	33	
Port (P <sub>2</sub> ),		4AL	335	335	164	99	67	31	
(stem lowered),	spring	4HAL	409	409	200	121	81	43	
opens stem against:		5AL		441	216	131	88	47	
		5HAL			388	234	158	84	
		6AL			260	157	106	57	
		6HAL				361	243	129	
Port (P <sub>2</sub> ),	50PSI	4AL	189	204	115	73	51	32	
Air to Port B,	75PSI	4HAL	301	316	178	114	79	45	
(With stem	50PSI	5AL	288	301	169	108	75	43	
raised), will	75PSI	5HAL	379	404	227	145	101	59	
close stem	50PSI	6AL			260	166	115	66	
agamst.	75PSI	6HAL			356	227	158	92	
Port (P <sub>3</sub> ),		4AL	184	164	81	49	33	15	
(stem raised) ac	tuator	4HAL	253	233	114	69	46	24	
spring holds aga	ainst:	5AL	300	290	142	86	58	31	
		5HAL	531	497	244	147	99	52	
		6AL	402	385	189	114	77	41	
		6HAL			323	195	131	68	

12 If pressure rating is higher than documented in tables consult factory before exceeding. Normal air supply requirement: 50 PSI for 4, 5, and 6 inch heavy duty spring actuators

# W63 & W64 Holding Pressure Charts (1 of 2)

		Actuator	Val	ve Size -	inches (r	nm) - Pres	sure in P	SI*
		Size (in)	1" (25)	1.5" (38)	2" (51)	2.5" (64)	3" (76)	4" (102)
Port (P <sub>2</sub> ),		4AR	203	253	142	91	63	37
Stem raised, actu	ator	4HAR	257	308	173	111	77	44
spring will open a	against:	5AR	289	333	187	120	83	48
		5HAR			336	215	149	86
		6AR	384	426	239	153	106	61
		6HAR				367	255	147
Port (P <sub>1</sub> ),	50PSI	4AR	165	99	48	29	20	10
Air to port A,	75PSI	4HAR	312	244	119	72	49	25
will hold valve	50PSI	5AR	305	247	121	73	49	26
closed against:	75PSI	5HAR	353	239	117	71	48	24
	50PSI	6AR	478	421	206	125	84	45
	75PSI	6HAR	339	121	59	36	24	9

#### W63 AR/HAR (air-to-raise) - Standard Stroke



#### W63 AR (air-to-raise) - Long Stroke

	Actuator Size	Valve Size - inches (mm) - Pressure in PSI*				
	(in)	2.5" (64)	3" (76)	4" (102)		
Port (P <sub>2</sub> ), Stem raised, ac-	4ARLG	48	37	23		
tuator spring will open against:	6ARLG	131	97	58		
Port (P <sub>1</sub> ), Air to port A,	4ARLG	77	48	23		
will hold valve closed against:	6ARLG	149	94	47		

14.5

# W63 & W64 Holding Pressure Charts (2 of 2)

			Val	ve Size -	inches (r	nm) - Pres	sure in P	SI*
		Size (in)	1" (25)	1.5" (38)	2" (51)	2.5" (64)	3" (76)	4" (102)
Port (P <sub>1</sub> ),		4AL	231	164	81	49	33	17
Actuator spring		4HAL <sup>1</sup>	301	233	114	69	46	24
holds closed aga	inst:	5AL	349	290	142	86	58	31
		5HAL <sup>1</sup>		497	244	147	99	52
		6AL	442	385	189	114	77	41
		6HAL <sup>1</sup>			323	195	131	68
Port (P <sub>2</sub> ),	50PSI	4AL	154	204	115	73	51	30
Air to Port B,	75PSI	4HAL <sup>1</sup>	265	316	178	114	79	45
will open	50PSI	5AL	257	300	169	108	75	43
against:	75PSI	5HAL <sup>1</sup>	319	404	227	145	101	59
	50PSI	6AL	420	462	260	166	115	66
	75PSI	6HAL <sup>1</sup>			356	227	158	92

#### W63 AL/HAL (air-to-lower) - Standard Stroke

#### W63 AL (air-to-lower) - Long Stroke

	Actuator Size	Valve Size  - inches (mm) - Pressure in PSI*				
	(in)	2.5" (64)	3" (76)	4" (102)		
Port (P <sub>1</sub> ), Actuator spring holds closed against:	4ALLG	36	24	13		
	6ALLG	123	83	45		
Port $(P_2)$ , Air to Port B, will open stem against:	4ALLG	85	59	33		
	6ALLG	158	110	62		



14 If pressure rating is higher than documented in tables consult factory before exceeding. Normal air supply requirement: 50 PSI for 4, 5, and 6 inch actuators and long stroke actuators 75 PSI for 4, 5, and 6 inch heavy duty spring actuators

<sup>1</sup> For sizing Over-Pressure valves, select a Heavy-Duty spring actuator with a holding pressure greater than the desired relief pressure. Designate with the "R" valve model (i.e. W<u>R</u>61) and actuator size (i.e. 5<u>R</u>HAR).

## **W65 Holding Pressure Charts**

W65 AR/HAR (air-to-raise) - Standard Stroke



## W65 AR/HAR (air-to-raise) - Standard Stroke

		Actuator	1	Valve Size	- inches (	mm) - Pres	sure in PSI	*
		Size (in)	1" (25)	1.5" (38)	2" (51)	2.5" (64)	3" (76)	4" (102)
Bottom Port (P	),	4AR	214	162	76	50	34	19
Actuator spring		4HAR	284	230	109	70	47	26
holds closed ag	ainst:	5AR	336	289	139	87	59	32
		5HAR		495	237	150	101	56
		6AR		418	200	126	85	46
		6HAR			367	239	161	89
Port (P <sub>3</sub> ),		4AR	344	344	169	102	69	37
stem raised, spi	ring	4HAR	418	418	205	124	83	45
lowers stem aga	ainst:	5AR		433	218	132	89	49
					392	237	160	89
					279	168	114	63
		6HAR				404	274	152
Port (P <sub>2</sub> ),	50PSI	4AR	223	275	138	79	53	29
Air to Port A,	75PSI	4HAR	371	425	212	124	83	45
will raise Stem	50PSI	5AR	356	403	200	117	79	43
against:	75PSI	5HAR			272	157	106	57
	50PSI	6AR			285	167	113	61
	75PSI	6HAR			361	200	135	73
Port (P <sub>1</sub> ),	50PSI	4AR	93	113	48	29	19	10
Air to Port A,	75PSI	4HAR	238	258	119	72	48	25
(with stem	50PSI	5AR	241	259	120	73	48	26
raised), will	75PSI	5HAR	228	263	116	70	46	24
noid against:	50PSI	6AR	416	433	206	125	83	45
	75PSI	6HAR	102	167	58	35	22	10

# W65 Holding Pressure Charts (1 of 2)

### W65 AR (air-to-raise) - Long Stroke

	Actuator	Valve Size - inches (mm) - Pressure in PSI*					
	(in)	2.5" (64)	3" (76)	4" (102)	4" (152)		
Port (P <sub>1</sub> ), Actuator spring holds closed	4ARLG	36	24	13			
against:	6ARLG	123	83	45	19		
Port (P <sub>3</sub> ), (stem raised) spring lowers stem	4ARLG	53	39	21			
against:	6ARLG	147	103	60	26		
Port $(P_2)$ , Air to port A, will raise stem against:	4ARLG	93	63	34			
	6ARLG	170	114	62	24		
Port (P <sub>1</sub> ), (with stem raised) will holds	4ARLG	76	48	26			
against:	6ARLG	146	94	48	18		



## W65 AL (air-to-lower) - Long Stroke

	Actuator	Valve Size - inches (mm) - Pressure in PSI*					
	Size (in)	2.5" (64)	3" (76)	4" (102)	4" (152)		
Port (P <sub>1</sub> ), Air to port B, will hold closed	4ALLG	76	48	24			
against:	6ALLG	149	97	49	18		
Port (P <sub>1</sub> ), (stem raised) spring holds closed against:	4ALLG	36	24	13			
	6ALLG	123	83	45	19		
Port (P <sub>3</sub> ), Air to port B, will lower stem against:	4ALLG	93	63	34			
	6ALLG	173	117	64	24		
Port ( $P_2$ ), stem low- ered, actuator spring	4ALLG	53	39	24			
raises stem against:	6ALLG	147	103	60	26		



# **W65 Holding Pressure Charts**

		Actuator	, v	Valve Size	- inches (	mm) - Pres	sure in PSI	*
		Size (in)	1" (25)	1.5" (38)	2" (51)	2.5" (64)	3" (76)	4" (102)
Port (P <sub>1</sub> ),	50PSI	4AL	149	96	44	31	21	12
Air to Port	75PSI	4HAL	295	241	115	73	50	27
B, will hold	50PSI	5AL	292	245	117	74	50	28
closed	75PSI	5HAL	327	237	110	74	50	28
against:	50PSI	6AL			226	140	94	52
	75PSI	6HAL		267	120	86	59	33
Port (P <sub>1</sub> ), (stem	raised),	4AL	158	178	80	49	32	17
spring holds clo	sed	4HAL	227	248	114	69	46	24
against:		5AL	285	300	142	86	57	31
		5HAL			243	147	98	52
		6AL	380	397	188	114	76	41
		6HAL			322	196	129	68
Port (P <sub>3</sub> ),	50PSI	4AL	278	258	134	81	55	31
Air to Port B,	75PSI	4HAL	428	408	207	125	85	47
will lower stem	50PSI	5AL	407	389	197	119	81	45
against:	75PSI	5HAL			265	160	109	61
	50PSI	6AL			300	182	124	68
	75PSI	6HAL			415	249	171	95
Port (P <sub>2</sub> ), (stem		4AL	288	302	170	99	66	36
lowered) actuator		4HAL	360	414	206	120	81	44
spring raises stem		5AL	400	446	222	130	87	48
against:		5HAL			398	233	157	85
		6AL			265	157	105	57
		6HAL				359	241	131

#### W65 AL/HAL (air-to-lower) - Standard Stroke



\* Bar =  $\frac{PSI}{14.5}$ 

If pressure rating is higher than documented in tables consult factory before exceeding. Normal air supply requirement: 50 PSI for 4, 5, and 6 inch actuators and long stroke actuators 75 PSI for 4, 5, and 6 inch heavy duty spring actuators

## **Air Assist Charts**

## Air Boost for Port B - See Figure 1

Chart shows additional product holding pressure per 1 PSI of air applied to port B to:

(1) air assist spring holding force<sup>1</sup> (spring to close)

(2) calculate holding power on air to air actuator

(3) calculate additional holding power above the nominal air requirement of the actuator<sup>3</sup>

## Air Boost for Port A - See Figure 2

Chart shows additional product holding pressure per 1 PSI of air applied to port A to:

(1) air assist spring holding force<sup>2</sup> (spring to close)

(2) calculate holding power on air to air actuator

(3) calculate additional holding power above the nominal air requirement of the actuator<sup>3</sup>

<sup>1</sup> Refer to W61 & W65 holding pressure charts for spring only holding force.

<sup>2</sup> Refer to W62 & W63 holding pressure charts for spring only holding force.

<sup>3</sup> Air requirements: 50 PSI to actuate 4", 5", & 6" Actuators (refer to holding pressure charts for holding power)

75 PSI to actuate 4" & 5" Heavy Duty and 6" Heavy Duty Spring Actuators (refer to holding pressure charts for holding)

\* Bar = 
$$\frac{PSI}{14.5}$$

#### Example:

W61T-3" with 5" Air to Raise (Spring to Close) actuator required to hold against 75 PSI product pressure.

Holding	pressure required:	75 PS

Minus Spring only holding force:	- 55 PSI
(From page16)	

Additional holding power required:	20 PSI
------------------------------------	--------

Air Appint	Additional holding power required					
pressure required	=	Product Ratio from chart above				
Air Assist pressure required 18	=	20 2.6 7.79 PSI Air Required to Port B				



Product pressure applied to bottom of plug.

ctuator	Product Ratio per Valve Size (PSI)*						
Size (in)	1" (25)	1.5" (38)	2" (51)	2.5" (64)	3" (76)	4" (102)	6" (152)
4"	6.5	6.5	3.7	2.4	1.6	0.9	
5"	10.4	10.4	5.8	3.7	2.6	1.5	
6"	15.0	15.0	8.4	5.4	3.7	2.1	.95
-Body*				2.2	1.7	.93	

\* Y Body Valve is only available with 6YAR and 6YAL actuators

Actuator	Product Ratio per Valve Size (PSI)*						
Size (in)	1" (25)	1.5" (38)	2" (51)	2.5" (64)	3" (76)	4" (102)	6" (152)
4"	8.7	8.7	4.3	2.6	1.7	1.0	
5"	13.8	13.8	6.8	4.1	2.8	1.5	
6"	19.8	19.8	9.7	5.9	3.9	2.2	.92
Y-Body							



Product pressure applied to top of plug.

## WR61/WR63 Over-Pressure Valve Pressure Rise

#### Utilizing either Air-to-Rise or Air-to-Lower adjustable-spring actuators respectively



\* Valve Seat Size

Pressure rise and reseating values are estimated based on water at 70° F. Results can vary subject to flow conditions and product properties. NOTE: Not for use as an ASME-coded relief valve.

#### Chart Guide

- 1. Locate curve for selected actuator size and valve seat size.
- 2. Where relief flow rate intersects curve, determine pressure rise.
- 3. Add pressure-rise to relief-pressure and relief-path line-pressure loss, elevation loss, destination pressure etc. For estimated total pressure during relief.
- 4. Use reseat pressure to gauge minimum differential between set pressure and normal operating pressure.

Reseating Pressure						
Valve Seat Size	Reduction in pressure from set pressure (PSI)*					
(Inches)	WR61	WR63				
1.5" (38)	20	30				
2" (51)	12	22				
2.5" (64)	8	18				
3" (76)	5	15				
4" (102)	5	15				

## W60 Series Valves: Safe, Strong and Sanitary



#### **Sanitary Design for CIP**

- Long-radius bodies are free-draining without recesses for superior cleaning performance.
- Stationary seals close to the product zone: choice of O-ring, quad or wiping-stem seals.
- Spin-cleaning, Snap-on PTFE seats for reliable sealing: choice of PTFE, PEEK<sup>™</sup>, Tri-Ring, Metal or bonded rubber.

#### Long lasting and Easy to Maintain

- Machined-from-Bar construction with thick walls and interlocking bodies to resist distortion and active plant environments.
- Multiple PTFE bearings for stem alignment and strength.
- Long life actuator is field-maintainable with finger-safe, caged springs and cartridge-piston assemblies.

#### Simple, Flexible Design of proven dependability

- Modular bonnets: Standard, High-Pressure (up to 1200 PSI), W80 Series Flush (for steam or liquid) W90 Series Diaphragm (for complete isolation of product zone).
- Rugged, See-Through Control Tops: Set & Forget Switch Technology, Proximity and Micro-Switches, Bus Cards: As-i and DeviceNet.



## Made in Wisconsin

**W62TT** 

## 2 Piece Valve Control Top

Combining the strongest, most durable construction available with new features and options reflecting the latest in control technology.

Retrofitable upgrade for all W-Series valves.



Safe posit on th Flex Oper seat alert

**Reliable:** valve position feedback sensor manufactured by IFM Efector, a market leader in sensing technology.

Easy: no tools needed to set the switches.

Simple: no mechanical adjustments at all.

**Stable:** no worries about vibration shifting switches out of position.

**Safe:** provides up to (3) three 24VDC switch positions assignable via the push-buttons on the switch face.

**Flexible:** (3) LED's provide visual indication of Open, Closed and an intermediate position (i.e. seat lift for mix proof applications; seat wear alert for single-seat applications).

## **Valve Adapter Options**



The 'standard' adaptor is used on all models of short and long stroke W60 Series valves. Machined from SS316L bar with a thick cross-section, the adaptor adds strength to the valve body and provides alignment for the stem. The outer perimeter seals to the valve body with an O-ring that is located forward to the product zone to minimize crevices. The product stem passes through the adaptor and is sealed to the adaptor with an O-ring. A Teflon bearing guides the stem and takes up the mechanical loading imparted by hydraulic forces. This increases the service life of the stem seal. Adaptors are made in 1"-6" sizes.



The pressure limitation of the W60 adaptor is the sealing capability of the dynamic O-ring on the product stem. This variation of the W60 adaptor uses a backing ring added on the atmospheric side to support the stem O-ring. This significantly boosts the pressure rating on the stem O-ring. The product stem passes through the adaptor and is sealed to the adaptor with an O-ring and is guided by a Teflon bearing.



This adaptor is used to convert a 'standard' W60 series valve to a W80. The outer perimeter seals to the valve body with an O-ring that is located forward to the product zone to minimize crevices. The product stem passes through the adaptor and is sealed in the upper part and the lower part of the adaptor with O-rings. The space between the O-rings is flushed with a suitable liquid or steam. The Teflon bearing is located in the flushed chamber. Adaptors are made in 1"-6" sizes. For vacuum-rated, extended shelf-life (ESL) applications, the W80A adaptor adds steam trace to the adapter-to-valve body connection.



This adaptor is used to convert a 'standard' W60 series valve to a diaphragm-stem seal valve for use with extended shelf-life (ESL) applications. The valve stem is modified to work in conjunction with the adaptor. This adaptor is made in sizes 1-½" through 4". All sizes use the 1-½" diaphragm with the difference in diameter being taken up by a spacer ring. The outer perimeter of the spacer ring is sealed to the 'standard' W60 body with an O-ring. The stem used with the W90 adaptor is a two piece design. The seat rings are FDA compliant PEEK<sup>™</sup>, suitable to 280°F and high pressures.



For high-risk and hard to clean product applications, the wiping stem seal fills the gap between the product zone and the traditional O-ring stem seal. The adaptor is a twopiece design to allow easy inspection or replacement of the wiping stem seal. The outer perimeter seals to the valve body with an O-ring that is located forward to the product zone to minimize crevices. A Teflon bearing is used to guide and support the valve stem.

# Notes:

## **Website**

For technical details on products and services available from SPX Process Equipment, contact us at www.spxprocessequipment.com.

Download specific technical product information including:

Mix Proof Valves

Your local contact:

- **Brochures**
- Data sheets
- Maintenance Manuals

### **Other Waukesha Cherry-Burrell Products:**





PD Pumps





#### **PROCESS EQUIPMENT**

**Votators**<sup>®</sup>



THE WILLIAMS - CARVER COMPANY, INC. 4001 MISSION RD P.O. BOX #3140 KANSAS CITY, KS 66103-0140 Office (913) 236-4949 Fax (913) 236-9331 www.williamscarver.com

Pumps



SPX Process Equipment 611 Sugar Creek Road Delavan, WI 53115 Phone: (262)728-1900 or (800)252-5200 Fax: (262)728-4904 or (800)252-5012 E-mail: wcb@spx.com

For more information about our worldwide locations, approvals, certifications, and local representatives, please visit www.spxpe.com.

SPX Corporation reserves the right to incorporate our latest design and material changes without notice or obligation.

Design features, materials of construction and dimensional data, as described in this bulletin, are provided for your information only and should not be relied upon unless confirmed in writing.