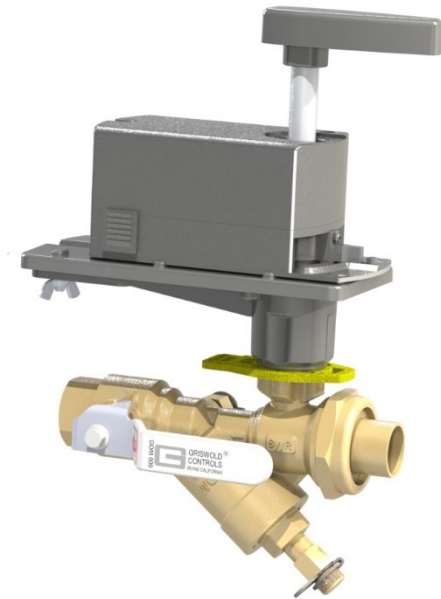




SPECIFICATIONS

PSI/Temperature Rating:	1/2"–1-1/2": 400 PSI / 250° F 1-1/2"L–2": 275 PSI / 250° F
Temperature Range:	-4°F to 250°F
Service:	Chilled water, hot water, up to 50% Glycol, or contact factory for additional fluids.
Flow Optimizer:	Glass Filled Polymer
Cartridge:	AISI Type 304 Stainless Steel AISI Type 17-7 PH Stainless Steel Spring
Body Material:	Forged DZR Brass
End Connections:	Brass – NPT or Sweat
Field Repairable Stems:	Dual Teflon seals and EPDM O-ring
Stem Seals:	EPDM O-Rings
Ball Valve:	Stainless Steel
Stem:	Brass (Optional: Stainless Steel)
Ball Seals:	Teflon Seals with EPDM O-Rings
Angle of Rotation:	0-90°
Accessories:	Combination P/T Test Valve and Manual Air Vent (CPTA) Standard
Leakage Rate:	ANSI Class IV, .01% of Cv

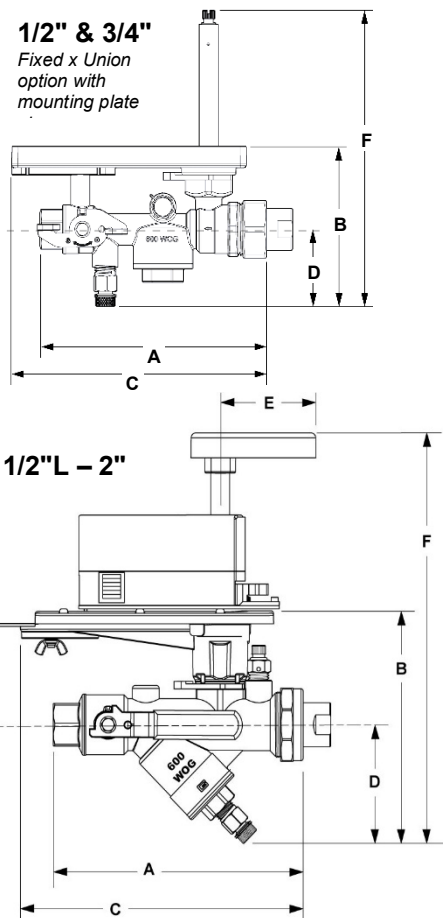
DIMENSIONS & WEIGHTS (NOMINAL) (measured in inches and lbs unless noted)

All dimensions are for planning purposes only and may change without notice.

SIZE	A: LENGTH	(OPTIONAL) UNION END CONNECTIONS (INCHES) ¹									
		FNPT			MNPT			SWT			
		1/2"	3/4"		1/2"	3/4"		3/8"	1/2"	3/4"	
1/2"	5.8	1.0	N/A ²		1.0	1.2		0.8	0.8	1.1	
3/4"											
		FNPT			MNPT			SWT			
		1/2"	3/4"	1"	1/2"	3/4"	1"	3/8"	1/2"	3/4"	1"
1/2"L	6.5	1.0	1.0	N/A ²	1.0	1.0	1.4	1.0	0.7	0.9	1.3
3/4"L											
1"											
		FNPT			MNPT ³			SWT			
		1"	1-1/4"	1-1/2"	1"	1-1/4"	1-1/2"	1"	1-1/4"	1-1/2"	
1" L	10.2	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.4	
1-1/4"											
1-1/2"											
		FNPT ⁴			MNPT ⁴			SWT ⁴			
		1-1/2"	2"		1-1/2"	2"		1-1/2"	2"		
1-1/2" L	14.2	1.6	N/A		1.6	1.6		1.7	1.6		
2"											
SIZE	B	C	D	E	F		DEPTH	WEIGHT			
1/2" SS	w/o Plate 3.5	w/ Plate: 5.8	2.0	N/A	5.9		3.1	1.8			
3/4" SS	w/ Plate: 4.9										
1/2"	5.5	8.1	2.9	2.5	10.5		3.8	3.5			
3/4"											
1"											
1" L	10.7	7.8	3.9	2.5	11.7		4.3	7.8			
1-1/4"											
1-1/2"											
1-1/2" XL	7.4	8.8	3.4	2.5	12.0		5.2	12.0			
2" XI											

NOTES:

- ¹ For overall length, add union connection length to body length.
² Tailpiece not available for this size. Male tailpiece used with coupling.
³ 1"L–1-1/2" Valves can also take 1/2"–3/4" MNPT Tailpieces.
⁴ 1-1/4" FNPT, 1" and 1-1/4" MNPT, 1-1/4" SWT tailpieces also available.



MODEL NUMBER SELECTION

Diagram illustrating the connection of a Union End to a Union End Only. The Union End has a female sweat connection (A) and a male threaded connection (R). The Union End Only has a male threaded connection (A) and a female sweat connection (R). The connections are shown as lines connecting the two components.

Insert Actuator Model Number. If Actuator is supplied by others, insert "1" for Neptronic, "2" for Johnson Controls, "3" for Invensys, "4" for Honeywell, "5" for Siemens, "6" for Belimo, "7" for KMC Controls. "S" for AR0 without mounting kit (Siemens GDE and Belimo LM only)

CARTRIDGE FLOW RATES (+/-5%)

SIZE	CARTRIDGE SIZE	MODEL NO.	HEAD LOSS IN FEET ⁹	PSID RANGE	GPM
1/2" 3/4"	1/2"	AR02	7.4	2-32	0.25, 0.33, 0.50, 0.60, 075, 0.85, 1.00, 1.25, 1.50, 2.00, 2.50, 3.00
		AR04	13.4	4-57	0.50, 1.00, 1.50, 2.00, 2.50, 3.00
1/2"L 3/4"L 1"	3/4"	AR11	3.5	1-14	.33, .50, .67, 1.00, 1.33, 1.67, 2.00, 2.33, 2.67, 3.33, 4.00, 4.67, 5.00
		AR12	7.4	2-32	.55, .75, 1.00, 1.25, 1.50, 1.75, 2.00, 2.25, 2.50, 2.75, 3.00, 3.50, 4.0, 5.0, 6.0, 7.0, 8.0
		AR14	13.4	4-57	.75, 1.00, 1.33, 2.00, 2.67, 3.33, 4.00, 4.67, 5.33, 6.67, 8.00, 9.33, 10.00
		AR18	30.0	8-128	1.10, 1.50, 2.00, 3.00, 4.00, 5.00, 6.00, 7.00, 8.00, 10.0, 12.0, 14.0, 16.0
1"L 1-1/4" 1-1/2"	1-1/2"	AR21	3.5	1-14	5.33, 6.00, 6.67, 7.33, 8.00, 8.67, 9.33, 10.00, 10.67, 11.33, 12.00, 12.67, 13.33, 14.00, 14.67
		AR22	7.4	2-32	8.0, 9.0, 10.0, 11.0, 12.0, 13.0, 14.0, 15.0, 16.0, 17.0, 18.0, 19.0, 20.0, 21.0, 22.0
		AR24	13.4	4-57	10.67, 12.00, 13.33, 14.67, 16.00, 17.33, 18.67, 20.00, 21.33, 22.67, 24.00, 25.33, 26.67, 28.00, 29.33
		AR28	30.0	8-128	16.0, 18.0, 20.0, 22.0, 24.0, 26.0, 28.0, 30.0, 32.0, 34.0, 36.0, 38.0, 40.0, 42.0, 44.0
1-1/2"L 2"	2"	AR31	3.5	1-14	12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38
		AR32	7.4	2-32	18, 21, 24, 27, 30, 33, 36, 39, 42, 45, 48, 51, 54, 57
		AR34	13.4	4-57	24, 28, 32, 36, 40, 44, 48, 52, 56, 60, 64, 68, 72, 76
		AR38	30.0	8-128	36, 42, 48, 54, 60, 66, 72, 78, 84, 90, 96, 102, 108, 114

NOTES:

⁵ Insulation Option includes handle cover and Accessory extensions.

⁶ Select the Fixed End First and the Union End Second. For AR0 fixed end only option fill in 2nd digit with an "X".

⁷ Tailpiece is not available for this size. Male tailpiece used with coupling.

⁸ Fixed end not available for this size. Union tailpiece only.

⁹ Head Loss in Feet is provided for pump head calculations. (1 PSI = 2.307 Feet of Water)

ACTUATED BALL Cv¹⁰ AND FLOW RATE TABLE (GPM)

SIZE	MODEL NO.	FULL ¹¹ PORT	CLOSE OFF ΔP ¹²	FLOWRATE (GPM) @ DIFFERENTIAL PRESSURE (PSI)											
				2-Position HVAC Apps					HVAC Modulating Apps						
				Cv		1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	7.0	10.0
				0.5	1.0										
1/2"	AR0 1		130PSI	0.30	0.43	0.53	0.61	0.68	0.74	0.80	0.86	0.91	1.0	1.1	1.4
	AR0 2			0.78	1.1	1.3	1.6	1.7	1.9	2.1	2.2	2.3	2.5	2.9	3.5
	AR0 3			1.0	1.4	1.7	2.0	2.2	2.4	2.6	2.8	3.0	3.1	3.7	4.4
	AR0 4			1.8	2.6	3.2	3.7	4.1	4.5	4.9	5.2	5.5	5.8	6.9	8.2
	AR0 5	•		3.1	4.4	5.4	6.2	7.0	7.6	8.2	8.8	9.3	9.8	11.6	13.9
3/4"	AR0 1		130PSI	0.30	0.43	0.53	0.61	0.68	0.74	0.80	0.86	0.91	1.0	1.1	1.4
	AR0 2			0.66	0.94	1.2	1.3	1.5	1.6	1.8	1.9	2.0	2.1	2.5	3.0
	AR0 3			0.92	1.3	1.6	1.8	2.1	2.3	2.4	2.6	2.8	2.9	3.4	4.1
	AR0 4			1.8	2.5	3.1	3.5	4.0	4.3	4.7	5.0	5.3	5.6	6.6	7.9
	AR0 5	•		2.8	3.9	4.8	5.5	6.2	6.8	7.3	7.8	8.3	8.7	10.3	12.3
1/2"L	AR1 1		130PSI	0.3	0.4	0.5	0.6	0.6	0.7	0.7	0.8	0.8	0.9	1.1	1.3
	AR1 2			0.5	0.7	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.9	2.2
	AR1 3			0.9	1.3	1.6	1.8	2.1	2.3	2.4	2.6	2.8	2.9	3.4	4.1
	AR1 4			1.7	2.4	2.9	3.4	3.8	4.2	4.5	4.8	5.1	5.4	6.3	7.6
	AR1 5			2.6	3.7	4.5	5.2	5.9	6.4	6.9	7.4	7.8	8.3	9.8	11.7
	AR1 6	•		4.4	6.2	7.6	8.8	9.8	10.7	11.6	12.4	13.2	13.9	16.4	19.6
3/4"L	AR1 1		130PSI	0.3	0.4	0.5	0.6	0.6	0.7	0.7	0.8	0.8	0.9	1.1	1.3
	AR1 2			0.5	0.7	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.9	2.2
	AR1 3			0.9	1.3	1.6	1.8	2.1	2.3	2.4	2.6	2.8	2.9	3.4	4.1
	AR1 4			1.8	2.6	3.2	3.7	4.1	4.5	4.9	5.2	5.5	5.8	6.9	8.2
	AR1 5			3.0	4.3	5.3	6.1	6.8	7.4	8.0	8.6	9.1	9.6	11.4	13.6
	AR1 6	•		5.2	7.4	9.1	10.5	11.7	12.8	13.8	14.8	15.7	16.5	19.6	23.4
1"	AR1 1		130PSI	0.2	0.3	0.4	0.4	0.5	0.5	0.6	0.6	0.6	0.7	0.8	0.9
	AR1 2			0.4	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.3	1.6	1.9
	AR1 3			0.9	1.3	1.6	1.8	2.1	2.3	2.4	2.6	2.8	2.9	3.4	4.1
	AR1 4			1.6	2.3	2.8	3.3	3.6	4.0	4.3	4.6	4.9	5.1	6.1	7.3
	AR1 5			2.7	3.8	4.7	5.4	6.0	6.6	7.1	7.6	8.1	8.5	10.1	12.0
	AR1 6	•		4.9	6.9	8.5	9.8	10.9	12.0	12.9	13.8	14.6	15.4	18.3	21.8
1"L	AR2 3		100PSI	3.0	4.2	5.1	5.9	6.6	7.3	7.9	8.4	8.9	9.4	11.1	13.3
	AR2 4			5.0	7.1	8.7	10.0	11.2	12.3	13.3	14.2	15.1	15.9	18.8	22.5
	AR2 1			7.4	10.5	12.9	14.8	16.6	18.2	19.6	21.0	22.3	23.5	27.8	33.2
	AR2 2	•		10.2	14.4	17.6	20.4	22.8	24.9	26.9	28.8	30.5	32.2	38.1	45.5
1-1/4"	AR2 3		100PSI	2.8	4.0	4.9	5.7	6.3	6.9	7.5	8.0	8.5	8.9	10.6	12.6
	AR2 4			5.2	7.3	8.9	10.3	11.5	12.6	13.7	14.6	15.5	16.3	19.3	23.1
	AR2 1			7.4	10.4	12.7	14.7	16.4	18.0	19.5	20.8	22.1	23.3	27.5	32.9
	AR2 2	•		10.3	14.6	17.9	20.6	23.1	25.3	27.3	29.2	31.0	32.6	38.6	46.2
1-1/2"	AR2 3		100PSI	2.8	4.0	4.9	5.7	6.3	6.9	7.5	8.0	8.5	8.9	10.6	12.6
	AR2 4			5.2	7.3	8.9	10.3	11.5	12.6	13.7	14.6	15.5	16.3	19.3	23.1
	AR2 1			7.2	10.2	12.5	14.4	16.1	17.7	19.1	20.4	21.6	22.8	27.0	32.3
	AR2 2	•		10.3	14.5	17.8	20.5	22.9	25.1	27.1	29.0	30.8	32.4	38.4	45.9
1-1/2"L	AR3 1		100PSI	24.0	34.0	41.6	48.1	53.8	58.9	63.6	68.0	72.1	76.0	90.0	107.5
	AR3 2			36.8	52.0	63.7	73.5	82.2	90.1	97.3	104.0	110.3	116.3	137.6	164.4
	AR3 3	•		46.0	65.0	79.6	91.9	102.8	112.6	121.6	130.0	137.9	145.3	172.0	205.5
2"	AR3 1		100PSI	24.0	34.0	41.6	48.1	53.8	58.9	63.6	68.0	72.1	76.0	90.0	107.5
	AR3 2			36.8	52.0	63.7	73.5	82.2	90.1	97.3	104.0	110.3	116.3	137.6	164.4
	AR3 3	•		48.1	68.0	83.3	96.2	107.5	117.8	127.2	136.0	144.2	152.1	179.9	215

NOTES:

¹⁰ The Cv is the gallons of water per minute (gpm) at 60°F that the valve will pass at 1 PSI pressure drop.

¹¹ These valves are full port and do not have the Optimizer insert.

¹² Close-Off Pressures measured with 35 in-lb. actuator. The "Close Off Pressure" is the maximum allowable pressure drop across the valve body when the valve is fully closed. (Do not use actuators with torques higher than 90 in-lbs)

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6/25

F-5391D

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ACTUATOR SELECTION



The Griswold Controls Universal Mounting Plate on all 1/2" to 3" valves is compatible with the following actuators besides the actuators detailed in the following tables. Contact the factory if you have a different model number not listed below.¹³

Honeywell: ML6161D2006, ML6174D2009, ML7161A2008, ML7174A2001, ML6185A1000, ML6185C1008, ML8185A1008, ML8185C1006, ML7285A1007, ML7285C1005, MN6105, MN7510, MN7520, MN6110

Schneider Electric: MF40-6083, MA40-7043, MA40-7043-501, MA40-7040, MA40-7040-501, MF40-7043, MF40-7043-501, MS40-7043, MS40-7043-501

Johnson Controls: M9106-AGA2, M9106-AGC2, M9106-GGA2, M9106-GGC2, M9206-AGA2, M9206-AGC2, M9206-GGA2, M9206-GGC2, M9104-AGA-2S, M9208-GGA-2, M9208-GGA-3

Belimo: LM24, LM24S, LF24, LF24S, LF120, LF120S, LF24-3, LF24-3S, LM24SR, LF24SR, LF24SRS, LMB24-SR-T, LMB24-3-T

Neptronic: BBT-24, BBT-1000, BBT-1060, BBT-1021, BBT-1080, BBTHV-1100, BBTHV-1160, BBTHV-1120, BBTHV-1180, BBM2000A, BBM2060A

SUITABLE FOR 1/2" TO 2" VALVES

SIEMENS	GDE131.1P	GDE161.1P	GMA121.1P	GMA131.1P	GMA161.1P
Power Supply	24Vac	24Vac	24Vac/dc	24Vac/dc	24Vac/dc
Torque	44 in-lb	44 in-lb	62 in-lb	62 in-lb	62 in-lb
Control Signal: On/Off			•		
Control Signal: 3 Point	•			•	
Control Signal: Modulating 0–10 VDC		•			•
Speed	90 sec	90 sec	90 sec	90 sec	90 sec
Fail Safe (Spring Return)			•	•	•
Operating Power	3.3 VA	3.3 VA	5 VA	5 VA	5 VA
Mounting Components	9656-250	9656-250	9656-250	9656-250	9656-250
Weight	1.1 pounds	1.1 pounds	3.0 pounds	3.0 pounds	3.0 pounds
Wiring Diagram					

NOTES:

¹³ Do not use actuators capable of torques higher than 90 in-lbs.

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SUITABLE FOR 1/2" TO 1" VALVES ONLY

KMC CONTROLS	MEP-4201	MEP-4255	MEP-4252
Power Supply	24 Vac/dc	100-240 Vac	24 Vac/dc
Torque	25 in-lb	25 in-lb	25 in-lb
Control Signal: On/Off	•	•	
Control Signal: 3 Point	•		
Control Signal:			Modulating 2-10VDC
Speed	<35 sec	<25 sec	<50 sec
Fail Safe (Capacitor)		•	•
Operating Power	6 VA	6 VA	6 VA
Mounting Components	9656-248	9656-248	9656-248
Weight	1.1 pounds	1.5 pounds	1.5 pounds
Wiring Diagram	See actuator cover for wiring diagram		

SUITABLE FOR 1/2" TO 2" VALVES

KMC CONTROLS	MEP-4001	MEP-4002	MEP-4554	MEP-4555	MEP-4501	MEP-4552 (formerly MEP-5372)	MEP-4551 (formerly MEP-5373)	MCP- 36315000
Power Supply	24 Vac	24 Vac	24 Vac/dc	100-240 Vac	24 Vac	24 Vac	24 Vac	Pneumatic
Torque	40 in-lb	40 in-lb	45 in-lb	45 in-lb	40 in-lb	45 in-lb	45 in-lb	59 in-lb
Control Signal: On/Off			•	•	•			
Control Signal: 3 Point	•				•		•	
Control Signal:		Modulating 2-10VDC				Modulating 2-10VDC		8-13 psi
Speed	90 sec	90 sec	<35 sec	<25 sec	<35 sec	50 sec	90 sec	
Fail Safe (Capacitor)			•	•		•	•	
Operating Power	2 VA	4 VA	6 VA	6 VA	6 VA	6 VA	6 VA	
Mounting Components	9656-250	9656-250	9656-248	9656-248	9656-248	9656-250	9656-250	9656-852
Weight	1.1 pounds	1.1 pounds	1.5 pounds	1.5 pounds	1.1 pounds	3.0 pounds	3.0 pounds	1.5 pounds
Wiring Diagram	See actuator cover for wiring diagram							