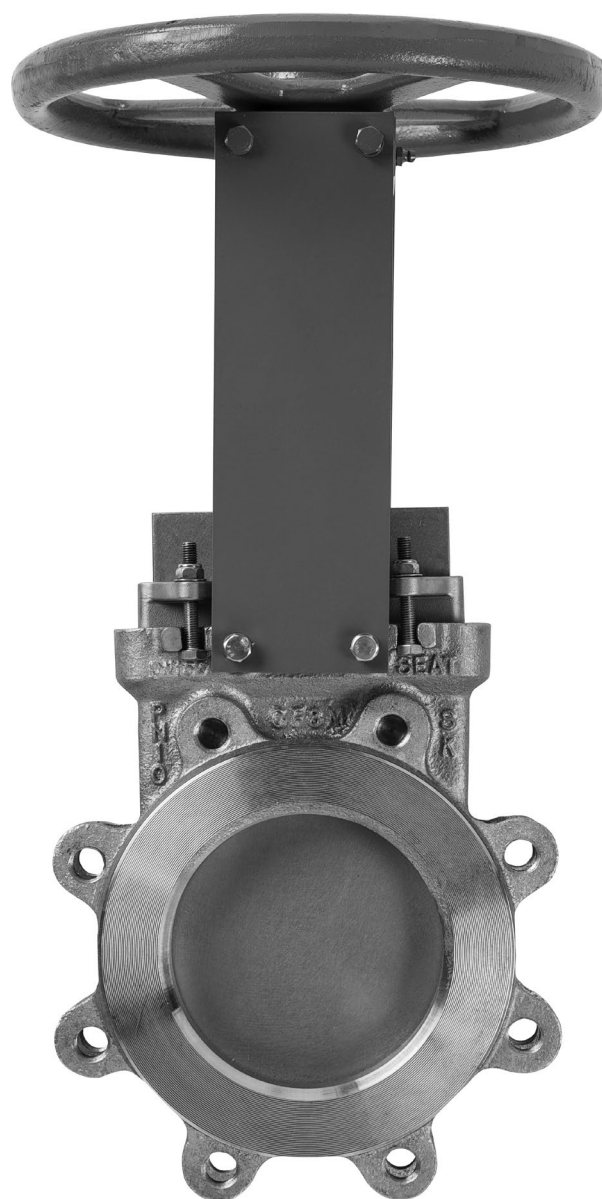


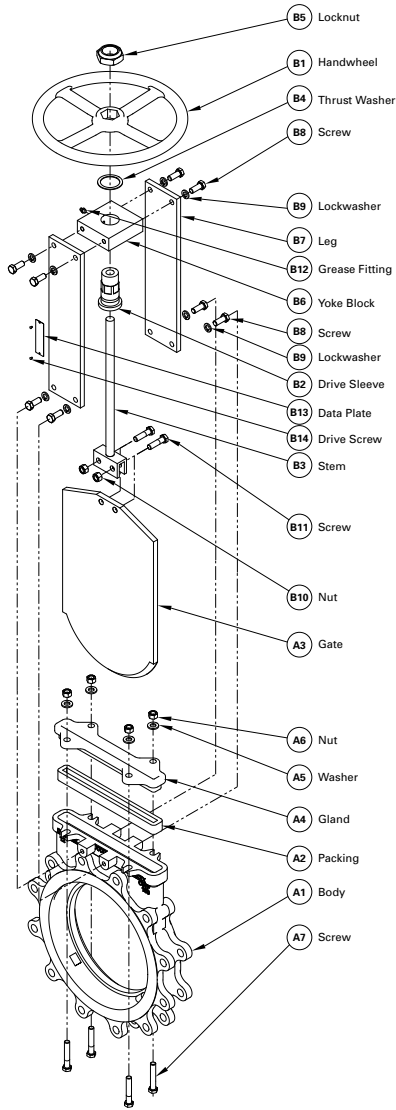


**DeZURIK KGN-MSU METAL SEATED
CAST STAINLESS STEEL
KNIFE GATE VALVES
TECHNICAL SPECIFICATIONS**



Materials of Construction

Item	Description	Material
A1	Body	304 Stainless Steel ASTM A351 CF8
		316 Stainless Steel ASTM A351 CF8M
A2	Packing	MSP - Square Braided PTFE Impregnated Synthetic Fiber to 500°F (260°C) (pH Range 4-10)
		CWP - Square Braided PTFE Impregnated Synthetic Fiber with One Ring Copper Wire Braided Scraper to 500°F (260°C) (pH Range 4-10)
		TDP - Dry Service Square Braided PTFE Packing with Solid PTFE Cord to 500°F (260°C) (pH Range 0-14)
		HBP - High Temperature Braided Packing to 1000°F (540°C) (pH Range 4-10)
		KWP - Square Braided PTFE Packing with One Ring Kevlar® (para-aramid) Fiber Scraper to 500°F (260°C) (pH Range 4-10)
		M03055 - PTFE Square Braided Packing with AFLAS® Fluoroelastomer Cord to 400°F (205°C) (pH Range 0-14)
A3	Gate	304 Stainless Steel ASTM A240
		316 Stainless Steel ASTM A240
A4	Gland	304 Stainless Steel ASTM A351 CF8
		316 Stainless Steel ASTM A351 CF8M
A5	Washer	304 Stainless Steel
A6	Gland Nut	304 Stainless Steel
A7	Gland Screw	304 Stainless Steel
B1	Handwheel	Painted Cast Iron
B2	Drive Sleeve	Brass
B3	Stem	410 Stainless Steel
B4	Thrust Washer	Brass
B5	Locknut	Zinc Plated Carbon Steel
B6	Yoke Block	Painted Carbon Steel or 304 Stainless Steel
B7	Leg	Painted Carbon Steel or 304 Stainless Steel
B8	Yoke Screw	304 Stainless Steel
B9	Lock Washer	304 Stainless Steel
B10	Gate Nut	304 Stainless Steel
B11	Gate Screw	304 Stainless Steel
B12	Grease Fitting	Brass
B13	Data Plate	316 Stainless Steel
B14	Drive Screw	Stainless Steel



Valve Selection

Shut-Off Capabilities

Metal Seats | Meet MSS SP-81 and TAPPI TIS 405-8

Pressure Ratings

2-24" (50-600mm)	150 psi C.W.P. (1030 kPa)
Above 24" (600mm)	100 psi C.W.P. (690 kPa)

Applicable Standards

DeZURIK KGN Knife Gate Valves are designed and/or tested to meet the following standards:

MSS SP-81	Metal Seated Valves, Stainless Steel Bonnetless Flanged Knife Gate Valves.
TAPPI TIS 405-8*	Recommendations for Stainless Steel Bonnetless Flanged Wafer Knife Gate Valves. * Revoked by TAPPI Same as MSS SP-81.
ASME B16.5 2-24" (50-600mm)	Flanges and Flanged Fittings ASME 150. Conforms to related drilling dimensions.
ASME 16.47 Above 24" (600mm)	Large diameter Steel Flanges. Series A. Conforms to related dimensions.

Flow Parameters

Valve Size	Cv* Kv	Port Area (in ² /cm ²)
	100% Open	
2"	232	3.04
50mm	201	19.6
3"	505	6.31
80mm	437	40.7
4"	890	10.76
100mm	770	69.4
6"	2050	24.2
150mm	1773	156.1
8"	3695	41.66
200mm	3196	268.8
10"	5935	65.53
250mm	5134	422.8
12"	8545	92.73
300mm	7391	598.3
14"	10505	111.76
350mm	9087	721
16"	14030	147.93
400mm	12136	954.4
18"	17900	189.94
450mm	15484	1225.4
20"	22730	235.69
500mm	19661	1520.6
24"	33280	344.55
600mm	28787	2222.9
30"	64900	648.72
750mm	56139	4185.3
36"	95400	934.82
900mm	82521	6031.1

*Cv = Flow in GPM of water at 1 psi pressure drop.
Kv = Flow in m³/hr. of water at 100kPa pressure drop.

Valve Selection

Valve and Actuator Weights

Valve Size	Basic Valve	With Handwheel	With Bevel Gear & Handwheel	With Cylinder		
				Size	lbs.	Kg.
2" 50mm	7 3	15 7	N/A	4" (100mm)	22	10
3" 80mm	11 5	22 10	N/A	4" (100mm)	26	12
4" 100mm	16 7	28 13	N/A	4" (100mm)	32	15
				6" (150mm)	47	22
6" 150mm	28 13	44 20	N/A	4" (100mm)	53	24
				6" (150mm)	68	31
				8" (200mm)	77	35
8" 200mm	45 20	72 33	N/A	6" (150mm)	88	40
				8" (200mm)	98	44
10" 250mm	69 31	102 46	141 64	8" (200mm)	134	61
				10" (250mm)	168	76
				12" (300mm)	198	90
12" 300mm	99 45	143 65	178 81	8" (200mm)	170	77
				10" (250mm)	204	92
				12" (300mm)	234	106
14" 350mm	127 58	183 83	216 98	10" (250mm)	238	108
				12" (300mm)	270	122

Note:
Weights are approximate and do not include crating.

Pounds
Kilograms

Valve Size	Basic Valve	With Handwheel	With Bevel Gear & Handwheel	With Cylinder		
				Size	lbs.	Kg.
16" 400mm	174 79	252 114	277 126	10" (250mm)	301	136
				12" (300mm)	332	150
				14" (350mm)	361	164
18" 450mm	227 103	328 149	336 152	12" (300mm)	397	180
				14" (350mm)	427	194
				16" (400mm)	695	315
20" 500mm	319 145	439 199	446 202	12" (300mm)	499	226
				14" (350mm)	529	240
				16" (400mm)	809	367
24" 600mm	473 215	607 275	611 277	12" (300mm)	670	304
				14" (350mm)	701	318
				16" (400mm)	997	452
				18" (450mm)	1090	494
30" 750mm	600 272	N/A	798 362	12" (300mm)	1023	464
				14" (350mm)	1055	479
				16" (400mm)	1167	529
				18" (450mm)	1265	574
				20" (500mm)	1376	624
36" 900mm	785 356	N/A	1013 459	14" (350mm)	1277	579
				16" (400mm)	1396	633
				18" (450mm)	1499	680
				20" (500mm)	1613	732

Ordering

To order simply complete the valve order code from information shown. An ordering example is shown for your reference.

Valve Style

Give valve style code as follows:

KGN = Cast Stainless Steel Knife Gate Valves

Body Material

Give body material code as follows:

S1 = 304 Stainless Steel
S2 = 316 Stainless Steel

Valve Size

Give valve size code as follows:

2 = 2" (50mm)	14 = 14" (350mm)
3 = 3" (80mm)	16 = 16" (400mm)
4 = 4" (100mm)	18 = 18" (450mm)
6 = 6" (150mm)	20 = 20" (500mm)
8 = 8" (200mm)	24 = 24" (600mm)
10 = 10" (250mm)	30 = 30" (750mm)
12 = 12" (300mm)	36 = 36" (900mm)

Notes: Gate roller supports are required on 24" 30" and 36" valves when the valve is not mounted in an upright position.

Body Style

Give body style code as follows:

MSU = Metal Seated Unidirectional

End Connection

Give end connection code as follows:

F1 = Flanged, ASME 150 UNC Tapping for Threads

Ordering Example:

KGN,6,MSU,F1,S2,MSPS2-M*Actuator

Packing Material

Give packing material code as follows:

Standard Packing

MSP = Square Braided PTFE Impregnated Synthetic Fiber to 500°F (260°C) (pH Range 4-10)

Special Packing

CWP = Square Braided PTFE Packing with one ring Copper Wire Braided Scraper to 500°F (260°C) (pH Range 4-10)
TDP = Dry Service Square Braided PTFE Packing with solid PTFE Cord to 500°F (260°C) (pH Range 0-14)
HBP = High Temperature Braided Packing to 1000°F (540°C) (pH Range 4-10)
KWP = Square Braided PTFE Packing with One Ring Kevlar® (para-aramid) Fiber Scraper to 500°F (260°C) (pH Range 4-10)
M03055 = PTFE Square Braided Packing with AFLAS® Fluoroelastomer Cord to 400°F (205°C) (pH Range 0-14)

Gate Material

Give gate material code as follows:

S1 = 304 Stainless Steel
S2 = 316 Stainless Steel

Seat Material

Give seat material code as follows:

M = Metal Seated to 1000°F (540°C)

Note:
The limiting factor in valve selection is the lowest temperature limit of the packing or seat.

Manual Actuators

Manual Actuators are available with Carbon Steel (CS) or Type 304 Stainless Steel (S1) Yoke.

Handwheel Actuators

Valve Size	Order Code		Maximum Pressure Differential (psi/kPa)
	Yoke Material		
	Carbon Steel	304 SST	
2" 50mm	MN-HD10-CS	MN-HD10-S1	150 1030
3" 80mm	MN-HD10-CS	MN-HD10-S1	150 1030
4" 100mm	MN-HD10-CS	MN-HD10-S1	150 1030
6" 150mm	MN-HD12-CS	MN-HD12-S1	150 1030
8" 200mm	MN-HD12-CS	MN-HD12-S1	150* 1030
10" 250mm	MN-HD14-CS	MN-HD14-S1	150* 1030
12" 300mm	MN-HD14-CS	MN-HD14-S1	125* 860
14" 350mm	MN-HD18-CS	MN-HD18-S1	100* 690
16" 400mm	MN-HD18-CS	MN-HD18-S1	75* 515
18" 450mm	MN-HD24-CS	MN-HD24-S1	50* 340
20" 500mm	MN-HD24-CS	MN-HD24-S1	25* 170
24" 600mm	MN-HD24-CS	MN-HD24-S1	25* 170

* Bevel gear actuators recommended for dry solids paper stock slurries or when pressure exceeds limits shown.

Ordering Example:

KGN,14,MSU,F1,S2,MSP,S2-M*MN-HD18-S1

Bevel Gear Handwheel Actuators

Valve Size	Order Code		Maximum Pressure Differential (psi/kPa)
	Yoke Material		
	Carbon Steel	304 SST	
10" 250mm	MNB-HD12-CS	MNB-HD12-S1	150 1030
12" 300mm	MNB-HD12-CS	MNB-HD12-S1	150 1030
14" 350mm	MNB-HD12-CS	MNB-HD12-S1	150 1030
16" 400mm	MNB-HD12-CS	MNB-HD12-S1	150 1030
18" 450mm	MNB-HD12-CS	MNB-HD12-S1	150 1030
20" 500mm	MNB-HD16-CS	MNB-HD16-S1	150 1030
24" 600mm	MNB-HD16-CS	MNB-HD16-S1	150 1030
30" 750mm	MNB-HD30-CS	MNB-HD30-S1	100 690
36" 900mm	MNB-HD30-CS	MNB-HD30-S1	100 690

Notes:

Available with 180 degree mounting add -180 after the actuator order code and as 2nd line information on the order.

Bevel Gear actuators provide vertical mounting of the handwheel or chainwheel or can be used where space limitations dry solids paper stock slurries or pressure limits prohibit the use of a standard handwheel actuator.

Ordering Example:

KGN,14,MSU,F1,S2,MSP,S2-M*MNB-HD12-S1

Cylinder Actuators

Cylinder Actuators are available with Carbon Steel (CS) or Type 304 Stainless Steel (S1) Yoke.

60 PSI (410 kPa) Air Supply

Valve Size	Order Code		Maximum Pressure Differential (psi/kPa)	
			On - Off	
	Carbon Steel Yoke	304 SST Yoke	Dry Solids Slurries Paper Stock	Liquids & Gases
2" 50mm	CY-PC4-CS	CY-PC4-S1	150	150
			1030	1030
3" 80mm	CY-PC4-CS	CY-PC4-S1	150	150
			1030	1030
4" 100mm	CY-PC4-CS	CY-PC4-S1	100	150
			690	1030
	CY-PC6-CS	CY-PC6-S1	150	N/R
			1030	
6" 150mm	CY-PC4-CS	CY-PC4-S1	N/A	50
			340	
			125	150
	CY-PC6-CS	CY-PC6-S1	860	1030
			150	N/R
	CY-PC8-CS	CY-PC8-S1	1030	
			75	125
	CY-PC6-CS	CY-PC6-S1	515	860
			150	150
	CY-PC8-CS	CY-PC8-S1	1030	1030
			100	150
	CY-PC10-CS	CY-PC10-S1	690	1030
			150	N/R
12" 300mm	CY-PC8-CS	CY-PC8-S1	75	125
			515	860
			125	150
	CY-PC10-CS	CY-PC10-S1	860	1030
			150	N/R
	CY-PC12-CS	CY-PC12-S1	1030	
			100	150
	CY-PC10-CS	CY-PC10-S1	690	1030
			150	1030
14" 350mm	CY-PC10-CS	CY-PC10-S1	100	150
			690	1030
			150	N/R
	CY-PC12-CS	CY-PC12-S1	1030	
			75	125
	CY-PC14-CS	CY-PC14-S1	515	860
			125	150
	CY-PC12-CS	CY-PC12-S1	860	1030
			150	N/R
16" 400mm	CY-PC12-CS	CY-PC12-S1	125	150
			860	1030
			150	N/R
	CY-PC14-CS	CY-PC14-S1	1030	
			100	150
	CY-PC12-CS	CY-PC12-S1	690	1030
			150	N/R
	CY-PC14-CS	CY-PC14-S1	1030	
			100	150
	CY-PC16-CS	CY-PC16-S1	690	1030
			150	N/R
18" 450mm	CY-PC12-CS	CY-PC12-S1	50	125
			340	860
			125	150
	CY-PC14-CS	CY-PC14-S1	860	1030
			150	N/R
20" 500mm	CY-PC12-CS	CY-PC12-S1	25	75
			170	515
			75	150
	CY-PC14-CS	CY-PC14-S1	515	1030
			150	N/R
	CY-PC16-CS	CY-PC16-S1	1030	
			25	75
	CY-PC18-CS	CY-PC18-S1	170	515
			75	150
	CY-PC14-CS	CY-PC14-S1	515	1030
			150	N/R
24" 600mm	CY-PC12-CS	CY-PC12-S1	25	75
			170	515
			75	150
	CY-PC14-CS	CY-PC14-S1	515	1030
			150	N/R
	CY-PC16-CS	CY-PC16-S1	1030	
			25	75
	CY-PC18-CS	CY-PC18-S1	170	515
			75	150
	CY-PC14-CS	CY-PC14-S1	515	1030
			150	N/R
30" 750mm	CY-PC12-CS	CY-PC12-S1	25	75
			170	515
			75	150
	CY-PC14-CS	CY-PC14-S1	515	1030
			150	N/R
	CY-PC16-CS	CY-PC16-S1	1030	
			25	75
	CY-PC18-CS	CY-PC18-S1	170	515
			75	150
	CY-PC14-CS	CY-PC14-S1	515	1030
			150	N/R
36" 900mm	CY-PC12-CS	CY-PC12-S1	25	75
			170	515
			75	150
	CY-PC14-CS	CY-PC14-S1	515	1030
			150	N/R
	CY-PC16-CS	CY-PC16-S1	1030	
			25	75
	CY-PC18-CS	CY-PC18-S1	170	515
			75	150
	CY-PC20-CS	CY-PC20-S1	690	1030
			150	N/R

N/R = Not Required. Use next smaller actuator.
N/A = Not Available. Use next larger actuator.

80 PSI (550 kPa) Air Supply

Valve Size	Order Code		Maximum Pressure Differential (psi/kPa)	
			On - Off	
	Carbon Steel Yoke	304 SST Yoke	Dry Solids Slurries Paper Stock	Liquids & Gases
2" 50mm	CY-PC4-CS	CY-PC4-S1	150	150
			1030	1030
3" 80mm	CY-PC4-CS	CY-PC4-S1	150	150
			1030	1030
4" 100mm	CY-PC4-CS	CY-PC4-S1	150	150
			1030	1030
6" 150mm	CY-PC4-CS	CY-PC4-S1	50	75
			340	515
	CY-PC6-CS	CY-PC6-S1	150	150
			1030	1030
8" 200mm	CY-PC6-CS	CY-PC6-S1	100	150
			690	1030
	CY-PC8-CS	CY-PC8-S1	150	N/R
			1030	
10" 250mm	CY-PC8-CS	CY-PC8-S1	150	150
			1030	1030
12" 300mm	CY-PC8-CS	CY-PC8-S1	100	150
			690	1030
	CY-PC10-CS	CY-PC10-S1	150	N/R
			1030	
14" 350mm	CY-PC10-CS	CY-PC10-S1	125	150
			860	1030
	CY-PC12-CS	CY-PC12-S1	150	N/R
			1030	
16" 400mm	CY-PC10-CS	CY-PC10-S1	100	150
			690	1030
	CY-PC12-CS	CY-PC12-S1	150	N/R
			1030	
18" 450mm	CY-PC12-CS	CY-PC12-S1	150	150
			1030	1030
20" 500mm	CY-PC12-CS	CY-PC12-S1	125	150
			860	1030
	CY-PC14-CS	CY-PC14-S1	150	N/R
			1030	
24" 600mm	CY-PC12-CS	CY-PC12-S1	75	150
			515	1030
			150	N/R
	CY-PC14-CS	CY-PC14-S1	1030	
			100	150
	CY-PC16-CS	CY-PC16-S1	690	N/R
			100	150
	CY-PC12-CS	CY-PC12-S1	25	75
			170	515
	CY-PC14-CS	CY-PC14-S1	75	100
			515	690
	CY-PC16-CS	CY-PC16-S1	100	N/R
			690	
30" 750mm	CY-PC12-CS	CY-PC12-S1	25	75
			170	515
			75	100
	CY-PC14-CS	CY-PC14-S1	515	690
			100	150
	CY-PC16-CS	CY-PC16-S1	690	N/R
			100	150
	CY-PC14-CS	CY-PC14-S1	25	75
			170	515
	CY-PC16-CS	CY-PC16-S1	75	100
			515	690
	CY-PC18-CS	CY-PC18-S1	100	N/R
			690	

Ordering Example:

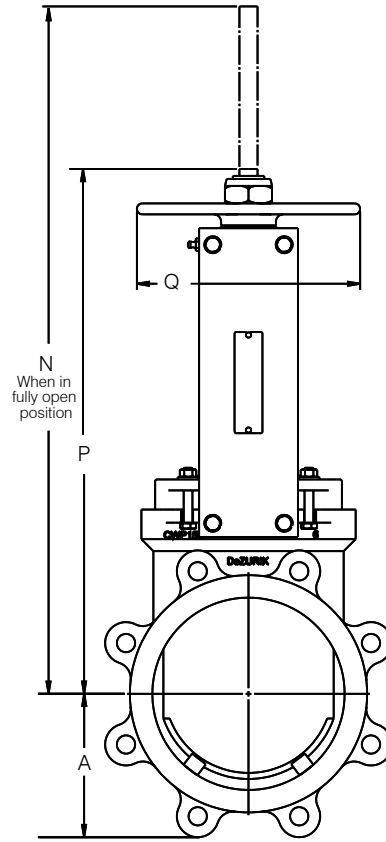
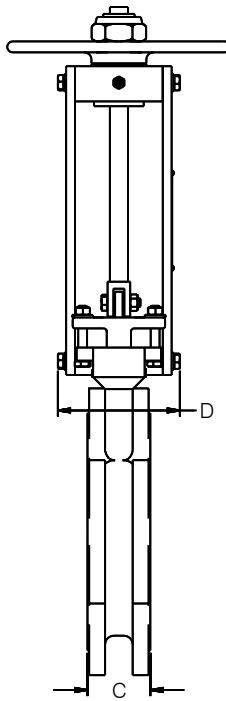
KGN,4,MSU,F1,S2,MSP,S2-M*CY-PC4-CS-180
Actuator mounted 180 degree from standard

Dimensions

Basic Valve with Handwheel Actuator

Valve Size	A	C	D	N	P	Q
2" 50mm	2.30 58	1.88 48	3.24 82	13.36 339	11.19 284	10.00 254
3" 80mm	2.87 73	2.00 51	3.39 86	16.86 428	13.83 351	10.00 254
4" 100mm	4.21 107	2.00 51	3.39 86	19.24 489	15.35 390	10.00 254
6" 150mm	5.14 131	2.25 57	4.37 111	25.43 646	18.80 478	12.00 305
8" 200mm	6.22 158	2.75 70	4.51 115	29.47 749	21.91 557	12.00 305
10" 250mm	7.67 195	2.75 70	5.17 131	34.77 883	25.37 644	14.00 356
12" 300mm	9.00 229	3.00 76	6.12 155	39.62 1006	28.29 719	14.00 356
14" 350mm	10.04 255	3.00 76	6.36 162	43.81 1113	31.53 801	18.00 457
16" 400mm	11.41 290	3.50 89	7.31 186	49.80 1265	35.57 904	18.00 457
18" 450mm	12.24 311	3.50 89	7.31 186	55.28 1404	39.26 997	24.00 610
20" 500mm	13.43 341	4.50 114	8.38 213	60.98 1549	43.14 1096	24.00 610
24" 600mm	15.75 400	4.50 114	8.36 212	70.39 1788	48.93 1243	24.00 610
30" 750mm	19.28 490	4.62 117				
36" 900mm	22.89 581	4.62 117				

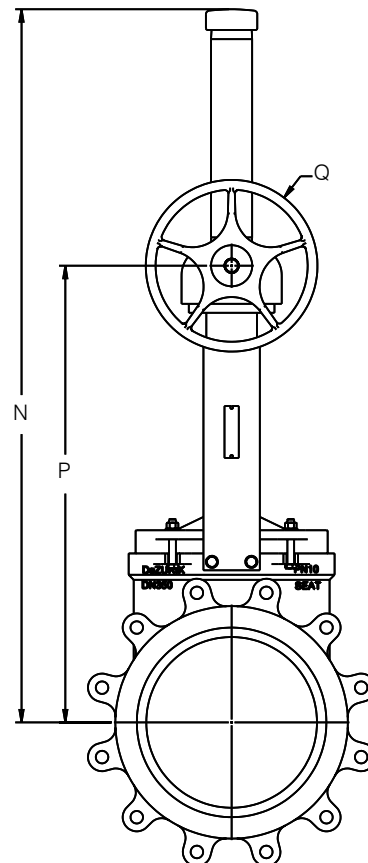
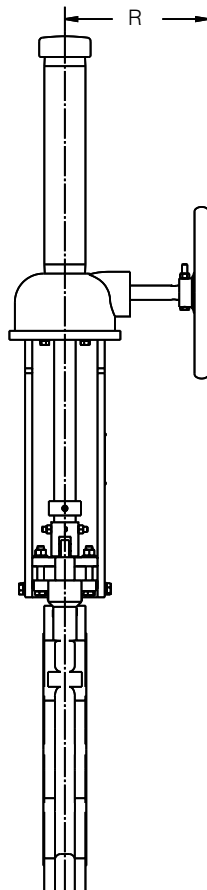
Inches
Millimeters



Bevel Gear Actuator

Valve Size	N	P	Q	R
10" 250mm	40.66 1033	26.24 667	12.00 305	10.12 257
12" 300mm	44.09 1120	29.67 754	12.00 305	10.12 257
14" 350mm	49.84 1266	31.91 811	12.00 305	10.12 257
16" 400mm	53.55 1360	35.63 905	12.00 305	10.12 257
18" 450mm	61.45 1561	39.52 1004	12.00 305	10.12 257
20" 500mm	65.05 1652	43.12 1095	16.00 406	10.50 267
24" 600mm	74.78 1899	48.85 1241	16.00 406	10.50 267
30" 750mm	105.93 2691	69.31 1761	30.00 762	12.49 317
36" 900mm	116.81 2967	80.20 2037	30.00 762	12.49 317

Inches
Millimeters



Dimensions

Cylinder Actuator

2-20" (50-500mm)

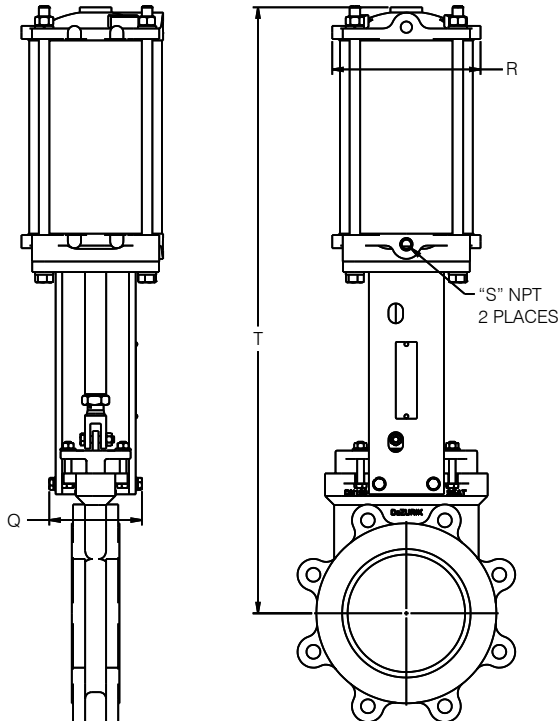
Valve Size	Actuator Code	Q	R	S	T
2" 50mm	CY-PC4	3.08 78	5.00 127	1/4"	18.95 481
	CY-PC4	3.26 83	5.00 127	1/4"	22.18 563
4" 100mm	CY-PC4	3.26 83	5.00 127	1/4"	23.71 602
	CY-PC6	3.26 83	7.00 178	1/4"	25.31 643
6" 150mm	CY-PC4	4.37 111	5.00 128	1/4"	28.91 734
	CY-PC6	4.37 111	7.00 178	1/4"	28.93 735
	CY-PC8	4.37 111	9.00 229	1/4"	29.37 746
8" 200mm	CY-PC6	4.50 114	7.00 178	1/2"	34.15 867
	CY-PC8	4.50 114	9.00 229	1/2"	34.63 880
10" 250mm	CY-PC8	5.39 137	9.00 229	1/2"	42.54 1081
	CY-PC10	5.39 137	11.25 286	1/2"	43.95 1116
12" 300mm	CY-PC8	6.18 157	9.00 229	1/2"	45.85 1165
	CY-PC10	6.18 157	11.25 286	1/2"	47.25 1200
	CY-PC12	6.18 157	13.25 337	1/2"	47.22 1199
14" 350mm	CY-PC10	6.41 163	11.25 286	1/2"	53.04 1347
	CY-PC12	6.41 163	13.25 337	1/2"	53.01 1347
16" 400mm	CY-PC10	7.27 185	11.25 286	1/2"	56.44 1434
	CY-PC12	7.27 185	13.25 337	1/2"	56.41 1433
	CY-PC14	7.27 185	15.50 394	1/2"	56.47 1434
18" 450mm	CY-PC12	7.31 186	13.25 337	1/2"	64.30 1633
	CY-PC14	7.31 186	15.50 394	1/2"	64.36 1635
20" 500mm	CY-PC12	8.10 206	13.25 337	1/2"	67.90 1725
	CY-PC14	8.10 206	15.50 394	1/2"	67.96 1726
	CY-PC16	8.10 206	17.00 432	1/2"	69.59 1768

Inches
Millimeters

24-36" (600-900mm)

Valve Size	Actuator Code	Q	R	S	T
24" 600mm	CY-PC12	8.36 212	13.25 337	1/2"	77.63 1972
	CY-PC14	8.36 212	15.50 394	1/2"	77.69 1973
	CY-PC16	8.36 212	17.00 432	1/2"	79.32 2015
30" 750mm	CY-PC12	9.46 240	13.25 337	1/2"	91.30 2319
	CY-PC14	9.46 240	15.50 394	1/2"	92.05 2338
	CY-PC16	9.46 240	17.00 432	1/2"	92.18 2341
	CY-PC18	9.46 240	19.00 483	1/2"	92.43 2348
36" 900mm	CY-PC14	9.46 240	15.50 394	1/2"	108.75 2762
	CY-PC16	9.46 240	17.00 432	1/2"	108.88 2766
	CY-PC18	9.46 240	19.00 483	1/2"	109.00 2769
	CY-PC20	9.46 240	21.00 533	1/2"	109.38 2778

Inches
Millimeters



Cylinder Actuator Accessories

Air Filter Regulator

The DeZURIK Air Filter Regulator is designed to provide clean accurate air pressure to all pneumatic actuators.

Position Indicating Switches

For all pneumatic actuators position indicating switches may be ordered as part of a complete valve/actuator assembly. Two switches will automatically be set to indicate full open and full closed positions.

Four-Way Solenoid Valve

For all pneumatic actuators solenoid valves may be ordered mounted and piped as part of the complete valve/actuator assembly or as a separate item.

Sales and Service

For information about our worldwide locations approvals certifications and local representative:

Web Site: www.dezurik.com E-Mail: info@dezurik.com



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DeZURIK Inc. 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 by DeZURIK Inc. Certified drawings are available upon request.