DeZURIK

BULLETIN
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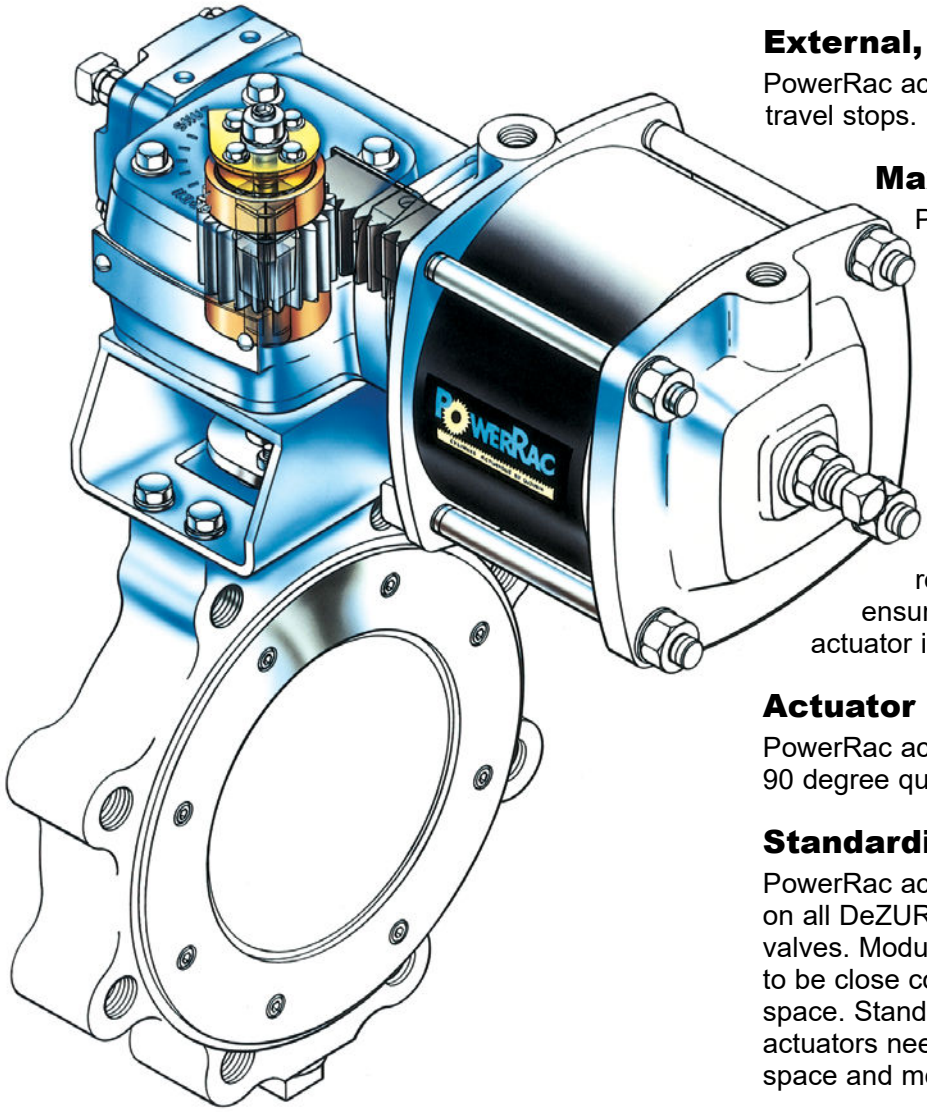
DeZURIK POWERRAC CYLINDER ACTUATORS

Design & Construction

PowerRac actuators are designed for all quarter turn valves. They feature a time and application proven rack and pinion system for converting linear motion to rotary. PowerRac actuators feature a high opening torque, necessary for on-off applications, and they also maintain high operating torque throughout the full stroke, important on modulating service.

A unique externally adjustable internal coupling between the valve shaft and the actuator drive allows a factory assembled and tested actuator to be close coupled to the valve and still provide a tightly clamped drive connection.



Modular Design

All PowerRac actuators are completely assembled, tested and ready for installation from the factory. Their modular design makes disassembly and assembly easy during routine maintenance or should inspection be required.

Enclosed Construction

PowerRac actuators are enclosed and sealed to protect internal parts from grit, moisture and corrosive contaminants. All actuators are permanently lubricated for smooth, efficient operation. They feature a cast iron housing and fiberglass cylinder for excellent corrosion resistance and long life.

External, Adjustable Stops

PowerRac actuators feature external, fully adjustable travel stops.

Maximum Air Pressure

PowerRac actuators are rated for 100 psi maximum operating pressure. Double acting actuators are sized for 60 and 80 psi supply pressures. Spring return actuators are sized for 60 psi supply pressure.

Low Cost Actuator

PowerRac actuators are designed and sized to DeZURIK's line of quarter turn valves. By matching valve torque requirements, each actuator is sized to ensure the lowest cost, most economical actuator is used.

Actuator Mounting

PowerRac actuators can be mounted in any of four 90 degree quadrants for maximum versatility.

Standardized Mounting

PowerRac actuators are designed to be mounted on all DeZURIK quarter turn on-off and control valves. Modular design and compact size allow it to be close coupled to the valve, saving valuable space. Standardized mounting means fewer actuators need to be inventoried, saving inventory space and money.

Throttling Manual Override

As an option, PowerRac actuators are available with a throttling manual override, allowing valve operation in case of system or supply failure.

Accessory Mounting

A standardized accessory bracket allows easy mounting of all commonly used accessories. Accessory options include positioners, airsets, potentiometers, speed controls, position indicating switches and 3-way/4-way solenoid valves.

Valve Position Sensing

PowerRac actuators feature a line of DeZURIK position indicating switches that minimize the required clearance above the actuator and provide a bold, graphic display of valve position. All electrical components are enclosed in an explosion-proof, dust-proof watertight enclosure. The screw-on cover permits easy access for calibration. Switch settings can quickly be adjusted without the use of tools, or fine-tuned to within one degree with a hex driver.

Fail-Safe Operation

For applications, where fail-safe operation is a requirement, PowerRac actuators are available with a spring return option. The spring is caged at the factory for increased safety. Double acting actuators can be converted to spring return action by adding a spring cartridge. Unlike other actuators, adding a spring cartridge to a PowerRac does not reduce the operating torque. For added versatility, action can be changed from fail open to fail closed.

Stainless Steel Fittings & Tube

Piped accessories come standard with rubber hoses and brass fittings. They are also available with 316 stainless steel fittings and tubing.

Direct Mounted Positioner

Positioners are solidly mounted on the actuator housing with a rigid coupler, feeding exact valve position directly to the positioner. No lost motion assures accurate valve positioning.

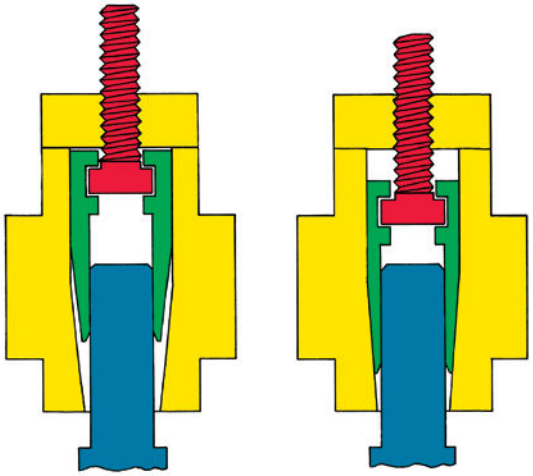
Positioner options include both pneumatic and electronic signal range, as well as U.L., C.S.A. and European electrical approval ratings. Span and zero adjustments can quickly be made, simplifying calibration and maintenance.

Rack & Pinion Design

The PowerRac actuator features a rugged rack and pinion design with hardened steel gears. Nominal play in the gears combined with a rigid coupling between the valve shaft and positioner drive allows thrust from the cylinder to precisely position the valve on modulating service.

Valve Coupling

A unique internal square collet* clamps the drive pinion to the valve shaft with a single external screw, totally eliminating all backlash in the drive connection. Direct actuator to valve mounting makes the valve/actuator package as compact as physically possible.

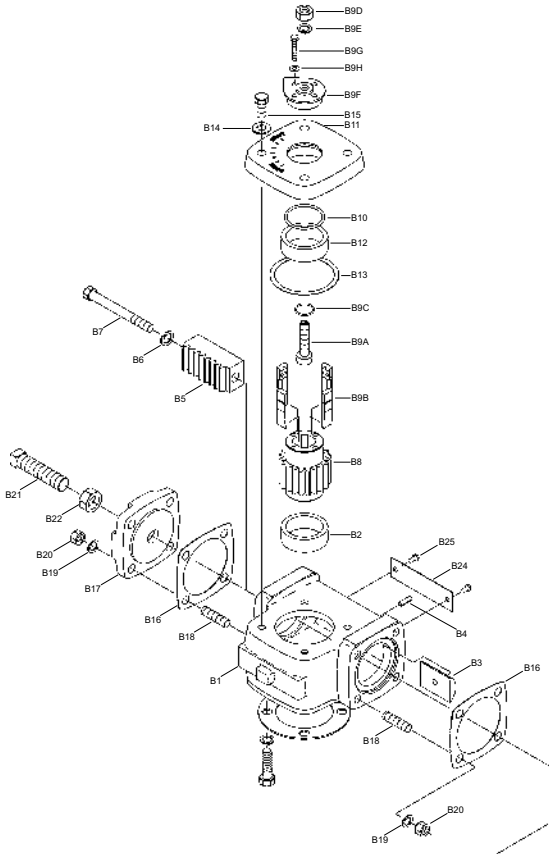


* Patent number 5,176,464

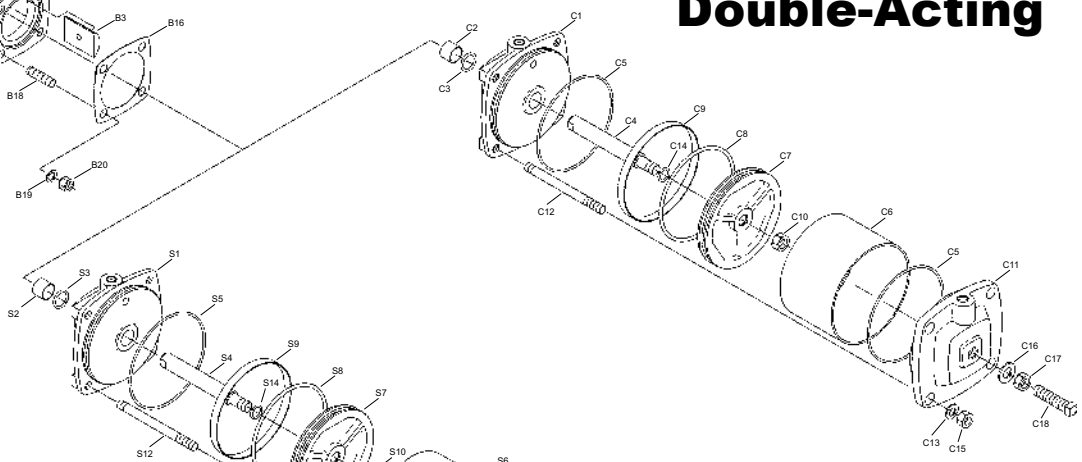
Materials of Construction

Item	Description	Material
B1	Housing	Cast Iron, ASTM A126 CL B
B2	Bearing	Bronze, ASTM B438
B3	Rack Bearing	Iron-Copper, ASTM B439-83 GR 4
B4	Pin	Zinz Plated Carbon Steel
B5	Rack	Nickel-Steel Powdered Metal, ASTM B783 FN-0208-80HT
B6	Lockwasher	Zlnc Plated Carbon Steel
B7	Rack Screw	Zinc Plated Carbon Steel, SAE GR 5
B8	Gear	Nickel-Steel Powdered Metal, ASTM B783 FN-0208-80HT
B9	Square Collet Assembly	
B9A	Adjusting Screw	17-4PH Stainless Steel, ASTM 564 Type 6 Condition A
B9B	Wedge	17-4PH Stainless Steel, ASTM A747 Condition H900
B9C	O-Ring	Nitrile
B9D	Nut	18-8 Stainless Steel or 316 Stainless Steel
B9E	Lockwasher	18-8 Stainless Steel or 316 Stainless Steel
B9F	Pointer	Nickel Steel Powdered Metal, ASTM B783 FN-0208-80HT
B9G	Screw	18-8 Stainless Steel
B9H	Washer	18-8 Stainless Steel
B10	O-Ring	Nitrile
B11	Top Cover	Cast Iron, ASTM A126 CL B
B12	Bearing	Bronze, ASTM B438
B13	Gasket	Non-Asbestos Organic Fibers
B14	Washer	Zinc Plated Carbon Steel or 316 Stainless Steel
B15	Top Cover Screw	Zinc Plated Carbon Steel or 316 Stainless Steel
B16	Gasket	Non-Asbestos Organic Fibers
B17	End Cover	Cast Iron, ASTM A126 CL B
B18	Stud	Zinc Plated Carbon Steel or 316 Stainless Steel
B19	Lockwasher	Zinc Plated Carbon Steel or 316 Stainless Steel
B20	Nut	Zinc Plated Carbon Steel or 316 Stainless Steel
B21	Stop Screw	Zinc Plated Carbon Steel or 316 Stainless Steel
B22	Jam Nut	Zinc Plated Carbon Steel or 316 Stainless Steel
B24	Data Plate	302 Stainless Steel
B25	Drive Screw	Cadmium Plated Carbon Steel
C1	Cylinder Head	Cast Iron ASTM A126 CL B
C2	Bearing	Bronze, ASTM, B438-73
C3	Seal	PTFE-Nitrile

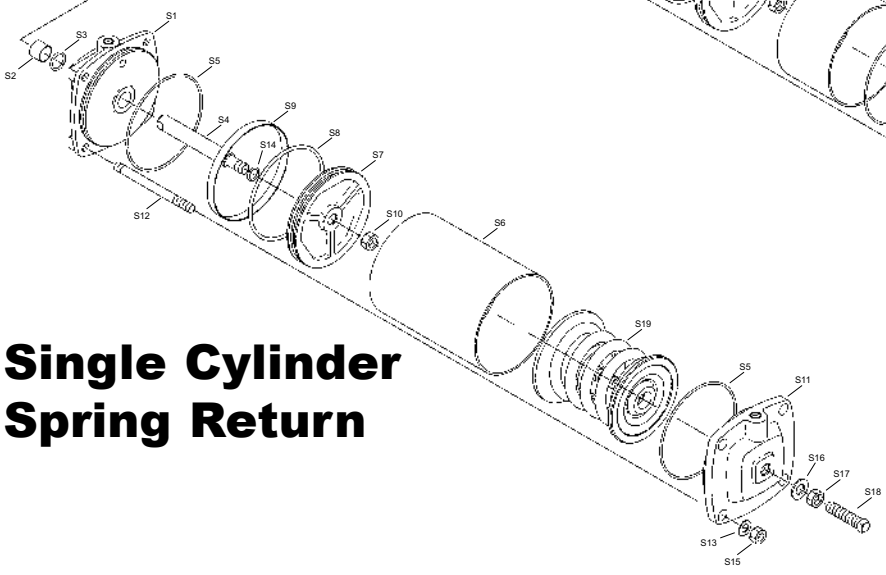
R1A & R2A



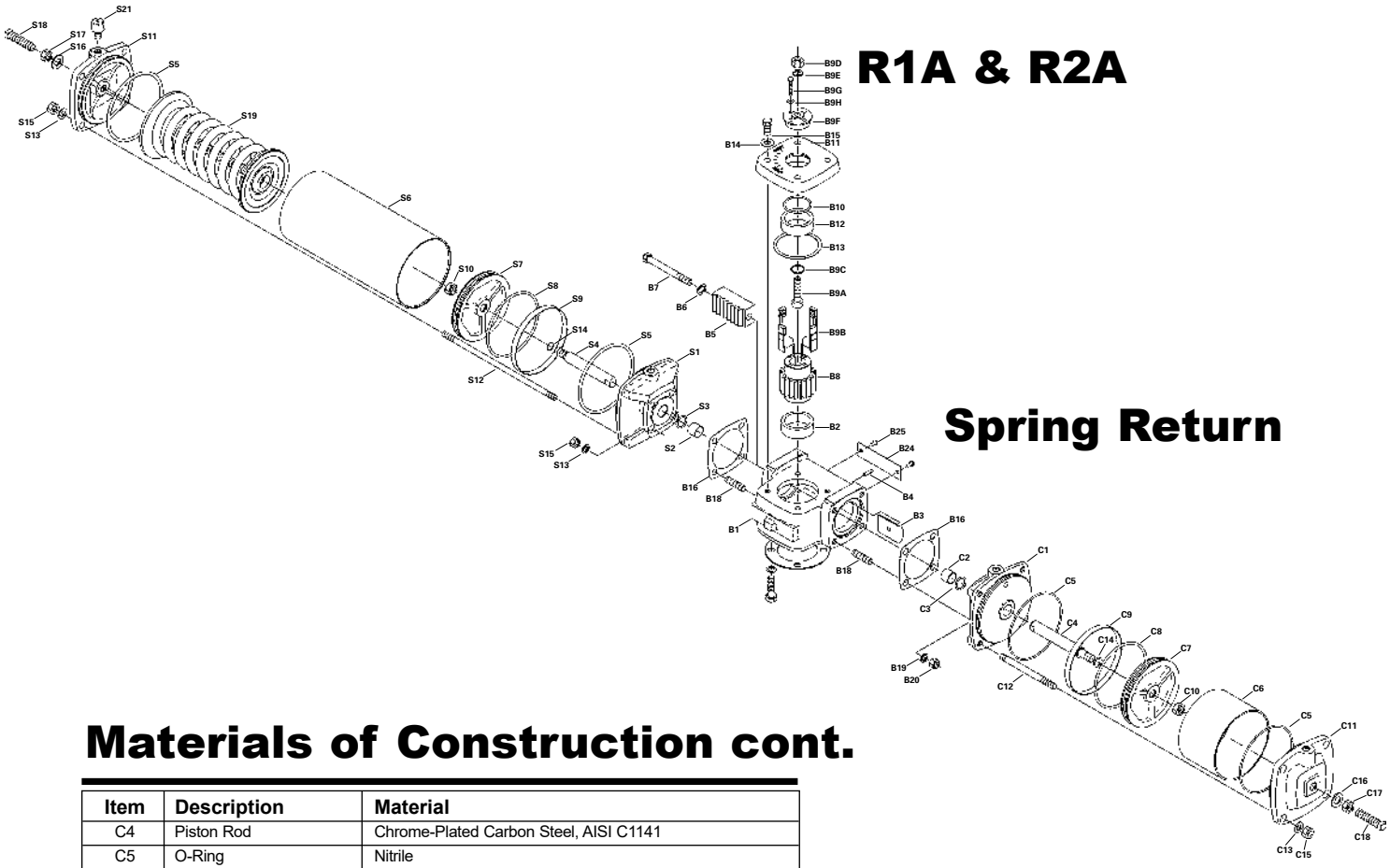
Double-Acting



Single Cylinder Spring Return



R1A & R2A



Spring Return

Materials of Construction cont.

Item	Description	Material
C4	Piston Rod	Chrome-Plated Carbon Steel, AISI C1141
C5	O-Ring	Nitrile
C6	Tube	Glass Filament Wound
C7	Piston	Cast Iron ASTM A126 CL B
C8	O-Ring	Nitrile
C9	Seal	PTFE
C10	Nut	Zinc Plated Carbon Steel
C11	Cylinder Cap	Ductile Iron, ASTM A536 65-45-12
C12	Tie Rod	Zinc Plated Carbon Steel or 316 Stainless Steel
C13	Washer	Zinc Plated Carbon Steel or 316 Stainless Steel
C14	O-Ring	Nitrile
C15	Nut	Zinc Plated Carbon Steel or 316 Stainless Steel
C16	Thread Seal	Steel and Nitrile
C17	Jam Nut	Zinc Plated Carbon Steel or 316 Stainless Steel
C18	Set Screw	Zinc Plated Carbon Steel or 316 Stainless Steel
S1	Cylinder Head	Cast Iron, ASTM A126 CL B
S2	Bearing	PTFE Fabric with Cadmium Plated Carbon Steel Backing
S3	Seal	PTFE-Nitrile
S4	Piston Rod	Chrome-Plated Carbon Steel, AISI C1141
S5	O-Ring	Nitrile
S6	Tube	Glass Filament Wound
S7	Piston	Cast Iron, ASTM A126 CL B
S8	O-Ring	Nitrile
S9	Seal	PTFE
S10	Nut	Zinc Plated Carbon Steel
S11	Cylinder Cap	Ductile Iron, ASTM A536 65-45-12
S12	Tie Rod	Zinc Plated Carbon Steel or 316 Stainless Steel
S13	Washer	Zinc Plated Carbon Steel or 316 Stainless Steel
S14	O-Ring	Nitrile
S15	Nut	Zinc Plated Carbon Steel or 316 Stainless Steel
S16	Thread Seal	Steel and Nitrile
S17	Jam Nut	Zinc Plated Carbon Steel or 316 Stainless Steel
S18	Stop Screw	Zinc Plated Carbon Steel or 316 Stainless Steel
S19	Spring Assembly	Silicone Manganese Spring – AISI 5160; Ductile Iron Cap and Base – ASTM A536, Grade 80-55-06; Carbon Steel Rod and Washer – Grade 2
S21	Breather	Brass with Sintered Bronze Filter

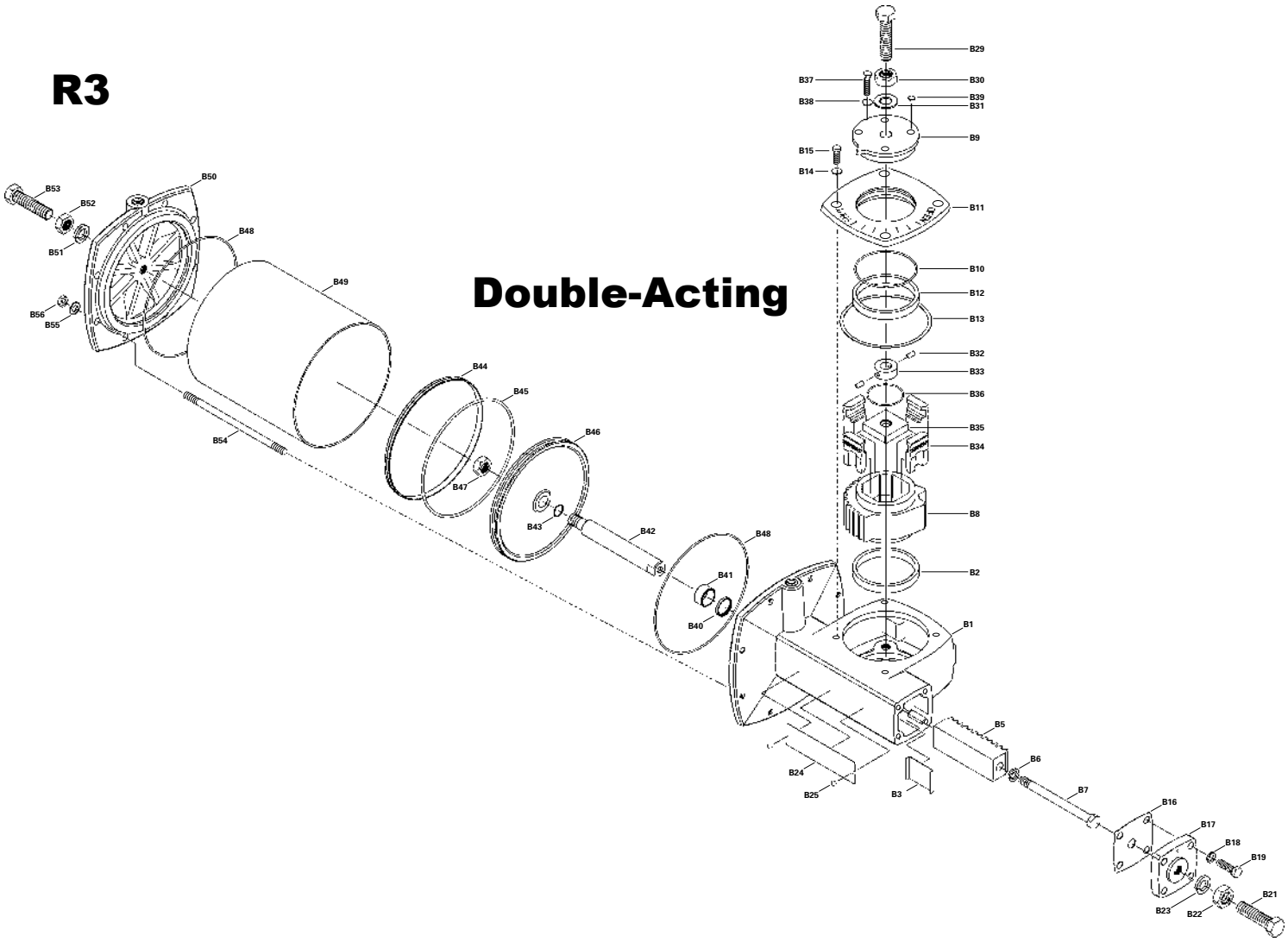
Materials of Construction

Item	Description	Material
B1	Housing	Cast Iron, ASTM A126 CL B
B2	Bearing	Bronze, SAE 660
B3	Rack Bearing	PTFE Fabric Bonded to 316 Stainless Steel Backing
B5	Rack	Nickel-Steel Powdered Metal, ASTM B783 FN-0208-80HT
B6	Lockwasher	Zinc Plated Carbon Steel
B7	Rack Screw	Black Oxide Coated Steel
B8	Gear	Nickel-Steel Powdered Metal, ASTM B783 FN-0208-80HT
B9	Pointer	Cast Iron, ASTM A126 CL B
B10	O-Ring	Nitrile
B11	Top Cover	Cast Iron, ASTM A126 CL B
B12	Bearing	Bronze, SAE 660
B13	Gasket	Non-Asbestos Organic Fibers
B14	Washer	316 Stainless Steel
B15	Screw	316 Stainless Steel
B16	Gasket	Non-Asbestos Organic Fibers
B17	End Cover	Cast Iron, ASTM A126 CL B
B18	Washer	316 Stainless Steel
B19	Screw	316 Stainless Steel
B21	Stop Screw	316 Stainless Steel
B22	Jam Nut	316 Stainless Steel
B23	Lockwasher	316 Stainless Steel
B24	Data Plate	302 Stainless Steel
B25	Drive Screw	18-8 Stainless Steel
B29	Adjusting Screw	316 Stainless Steel

Item	Description	Material
B30	Jam Nut	316 Stainless Steel
B31	Washer	316 Stainless Steel
B32	Pin	Chrome Steel, Type 420
B33	Collar	Steel, ASTM A108
B34	Wedge	Cast 17-4PH Stainless Steel
B35	Block	Steel, ASTM A108 GR 1018
B36	O-Ring	Nitrile
B37	Screw	316 Stainless Steel
B38	Washer	316 Stainless Steel
B39	Plugs	Plastic
B40	Seal	PTFE-Nitrile
B41	Bearing	Bronze, Oil Impregnated, ASTM B438
B42	Piston Rod	Chrome Plated Steel, ASTM A108
B43	O-Ring	Nitrile
B44	Piston Seal	PTFE
B45	O-Ring	Nitrile
B46	Piston	Cast Iron, ASTM A126 CL B
B47	Nut	Zinc Plated Carbon Steel
B48	O-Ring	Nitrile
B49	Tube	Glass Filament Wound
B50	Cylinder Gap	Cast Ductile Iron, ASTM A536
B51	Thread Seal	Steel with Nitrile
B52	Jam Nut	316 Stainless Steel
B53	Stop Screw	316 Stainless Steel
B54	Tie Rod	316 Stainless Steel
B55	Washer	316 Stainless Steel
B56	Nut	316 Stainless Steel

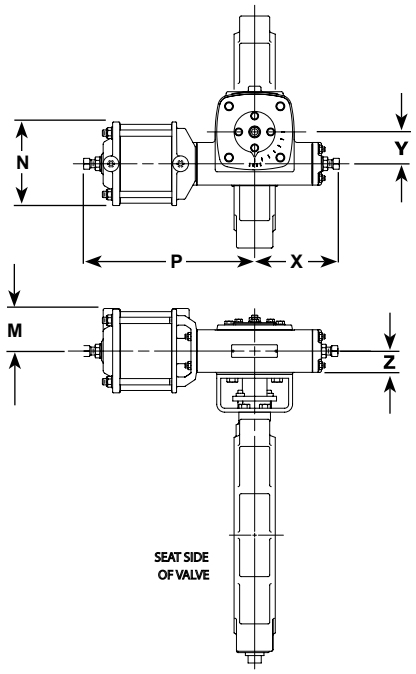
R3

Double-Acting



Dimensions

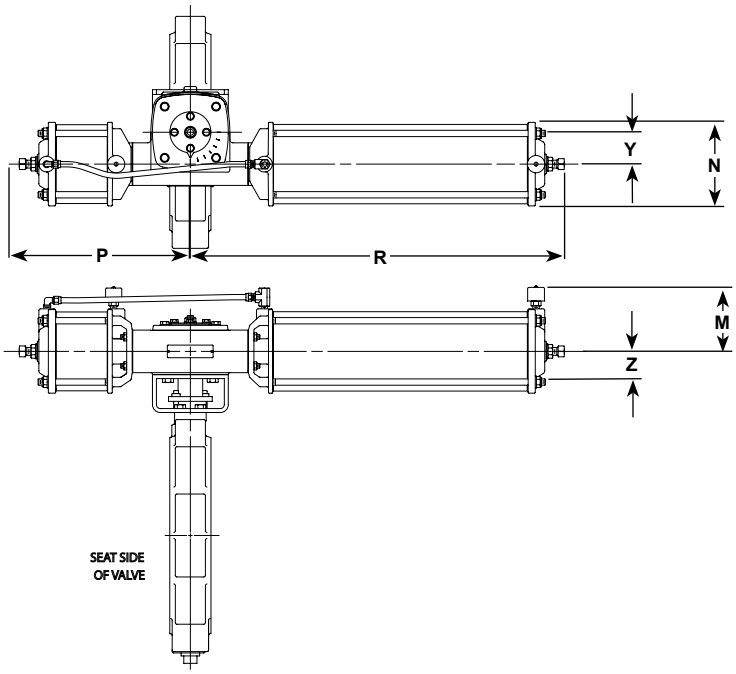
Double-Acting & Spring Return–Single Cylinder



Double-Acting & Spring Return–Single Cylinder

Actuator	Dimensions					
	M	N	P	X	Y	Z
PR-R1A-PC4	2.31 59	4.50 114	12.12 308	5.75 146	1.47 37	1.50 38
PR-R1A-PC6	3.38 86	6.62 168	12.62 321	5.75 146	1.47 37	1.50 38
PR-R1-SC4A	3.88 99	4.50 114	15.38 391	5.75 146	1.47 37	1.50 38
PR-R1-SC6A	4.94 125	6.62 168	16.38 416	5.75 146	1.47 37	1.50 38
PR-R1-SC6B	4.94 125	6.62 168	17.69 449	5.75 146	1.47 37	1.50 38
PR-R2A-PC6	3.38 86	6.62 168	16.00 406	7.50 191	2.53 64	1.84 171
PR-R2A-PC8	3.38 86	10.25 260	16.12 409	7.50 191	2.53 64	1.84 47
PR-R3A-PC8	4.81 122	10.25 260	19.25 489	9.69 246	3.84 98	2.31 59
PR-R3A-PC10	5.88 149	11.75 298	19.25 489	9.69 246	3.84 98	2.31 59

Spring Return–Double Cylinder



Spring Return–Double Cylinder

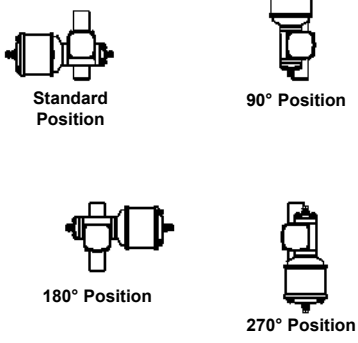
Actuator	Dimensions						
	M	N	P	R		Y	Z
				Spring-to-Close	Spring-to-Open		
PR-R1A-SC4	3.88 99	4.50 114	12.12 308	21 533	19.12 486	1.47 37	1.50 38
PR-R1A-SC6	4.94 126	6.62 168	12.62 321	21.88 556	19.16 487	1.47 37	11.5 38
PR-R2A-SC6	4.94 126	6.62 168	16.00 406	30.5 775	25.00 635	2.53 64	1.84 47
PR-R2A-SC8	6.38 162	10.25 260	16.12 409	32.75 832	27.50 698	2.53 64	1.84 47

Inches
Millimeter

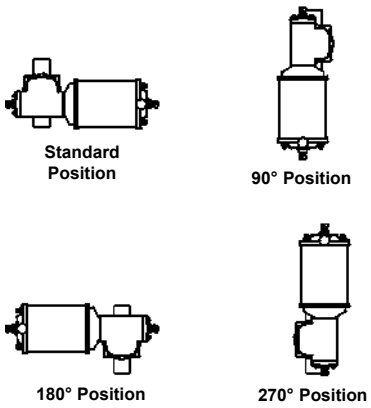
Note: All dimensions are subject to change without notice. Request certified drawings for use in preparing piping layouts.

Actuator Mounting Positions

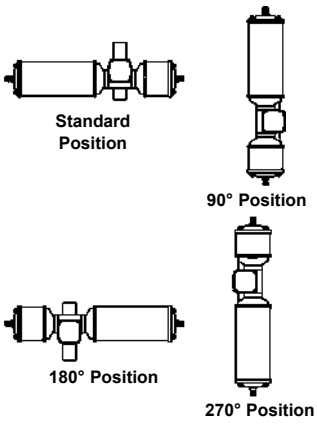
Double-Acting & Spring Return– Spring-to-Open Single Cylinder



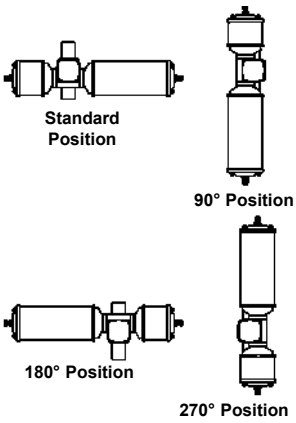
Spring Return Spring-to-Close– Single Cylinder



Spring Return Spring-to-Open– Double Cylinder



Spring Return Spring-to-Close– Double Cylinder



Actuator Torques & Weights

Double-Acting

Actuator Size	Torque-Ft-Lbs. (NM) 60 psi (4 Bar)	Torque-Ft-Lbs. (NM) 80 psi (5.5 Bar)	Weight LBS (KG)
PR-R1A-PC4	56 (76)	75 (102)	28 (13)
PR-R1A-PC6	126 (171)	170 (230)	42 (19)
PR-R2A-PC6	255 (346)	340 (461)	59 (27)
PR-R2A-PC8	450 (610)	600 (813)	82 (37)

Spring Return

Actuator Size	Torque Ft-Lbs. (NM) 60 psi (4 Bar)	Weight LBS (KG) Spring-to-Open	Weight LBS (KG) Spring-to-Close
PR-R1A-SC4	56 (76)	50 (23)	53 (24)
PR-R1A-SC6	126 (171)	92 (42)	94 (43)
PR-R2A-SC6	255 (346)	114 (52)	129 (59)
PR-R2A-SC8	450 (610)	184 (83)	208 (94)
*PR-R1A-SC4A	56 (76)	36 (17)	38 (17)
*PR-R1A-SC6A	126 (171)	52 (24)	54 (25)
*PR-R1A-SC6B	126 (171)	56 (26)	58 (27)

*Single cylinder

Ordering

To order a PowerRac actuator, select the actuator model from the appropriate valve style sizing charts. Specify mounting position on the line following the valve/actuator code. As reference information, the actuator code is defined in the following charts.

Double-Acting

Cylinder Type
Give cylinder type code as follows:

PR	=	PowerRac Actuator
PRL	=	PowerRac Actuator with Lockout

Gear Size
Give gear size code as follows:

R1A	=	1" (25mm) Radius Gear
R2A	=	2" (50mm) Radius Gear
R3A	=	3" (80mm) Radius Gear

Cylinder Size
Give cylinder size code as follows:

PC4	=	4" (100mm) Diameter Cylinder
PC6	=	6" (150mm) Diameter Cylinder
PC8	=	8" (200mm) Diameter Cylinder
PC10	=	10" (250mm) Diameter Cylinder

Ordering Example:
BHP,2,L1,CS,TC,S2-S2-FT-TT*PR-R1A-PC4
180° actuator mounting

Spring Return

Cylinder Type
Give cylinder type code as follows:

PR	=	PowerRac Actuator

Gear Size
Give gear size code as follows:

R1A	=	1" (25mm) Radius Gear
R2A	=	2" (50mm) Radius Gear

Cylinder Size
Give cylinder size code as follows:

Double Cylinder		
SC4	=	4" (100mm) Diameter Cylinder
SC6	=	6" (150mm) Diameter Cylinder
SC8	=	8" (200mm) Diameter Cylinder
Single Cylinder		
SC4A	=	4" (100mm) Diameter Cylinder
SC6A	=	6" (150mm) Diameter Cylinder
SC8A	=	8" (200mm) Diameter Cylinder

Spring Action*
Give spring action code as follows:

D	=	Direct, Spring-to-Open
R	=	Reverse, Spring-to-Close

Spring Size*
Give spring size code as follows:

60	=	60 psi Minimum Rating

Ordering Example:
BHP,3,L1,S2,G1,S2NH-S5-NS-S2*PR-R1A-SC4-R-60
270° actuator mounting

* Note: Spring cylinders are not field reversible

Sales and Service

For information about our worldwide locations, approvals, certifications and local representative:
Web Site: DeZURIK.com **E-Mail:** info@DeZURIK.com

DeZURIK

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