

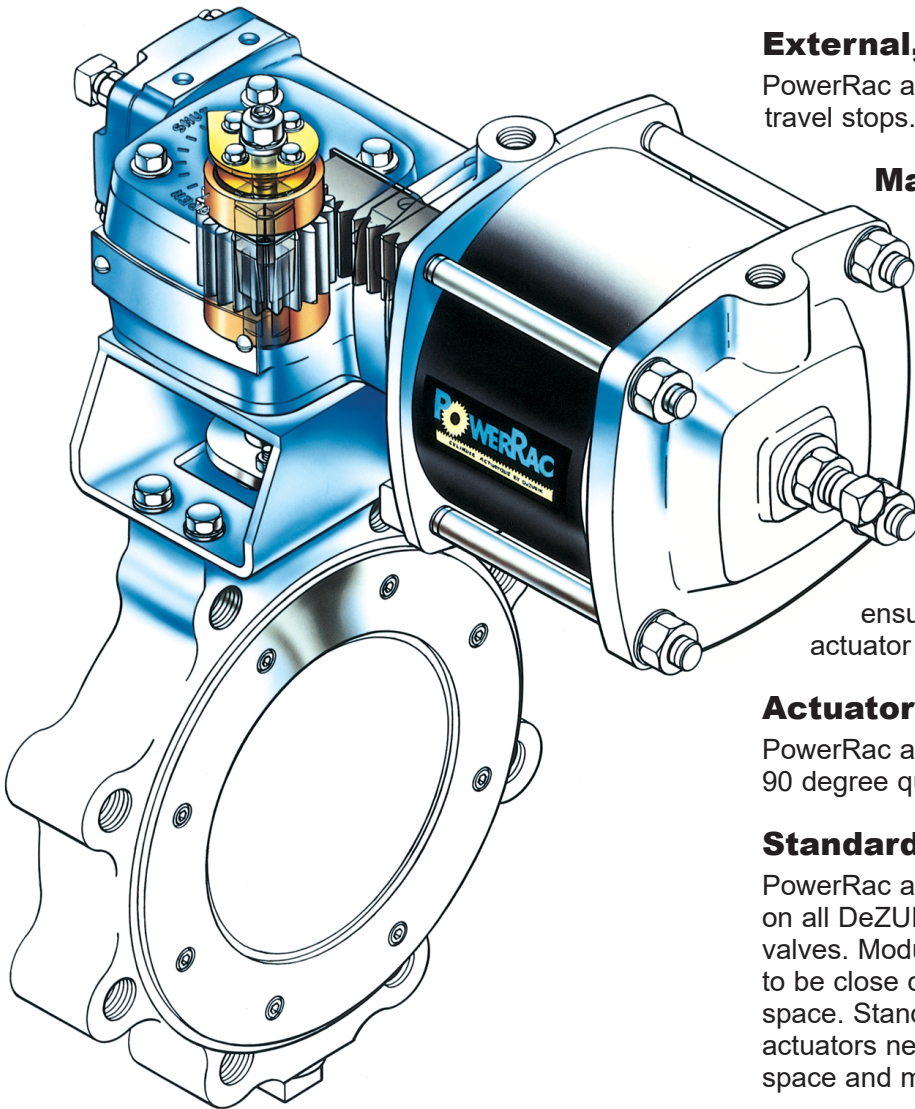
# **DeZURIK POWERRAC CYLINDER ACTUATORS**



## 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.

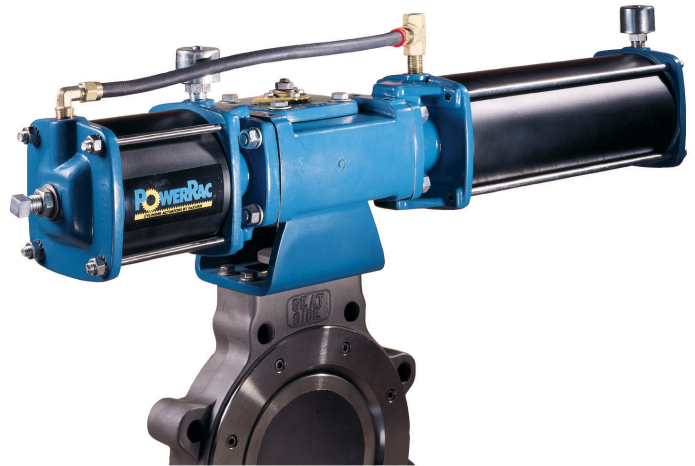


## Fail-Safe Operation

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.



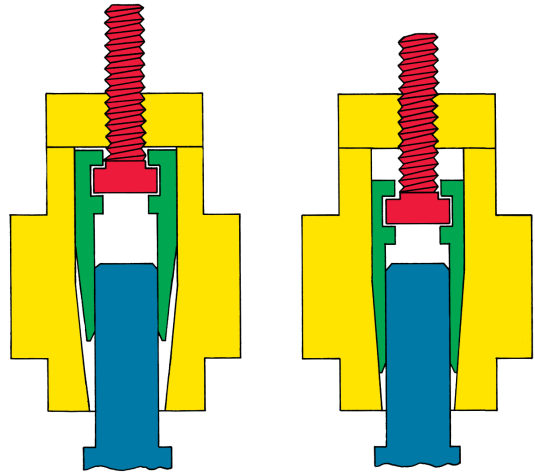
## Rack & Pinion Design

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.

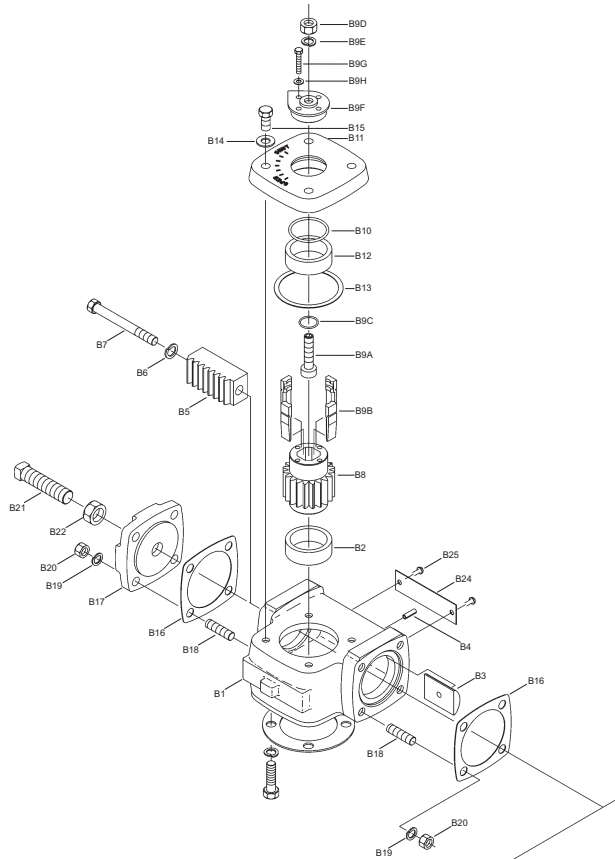


\* Patent number 5,176,464

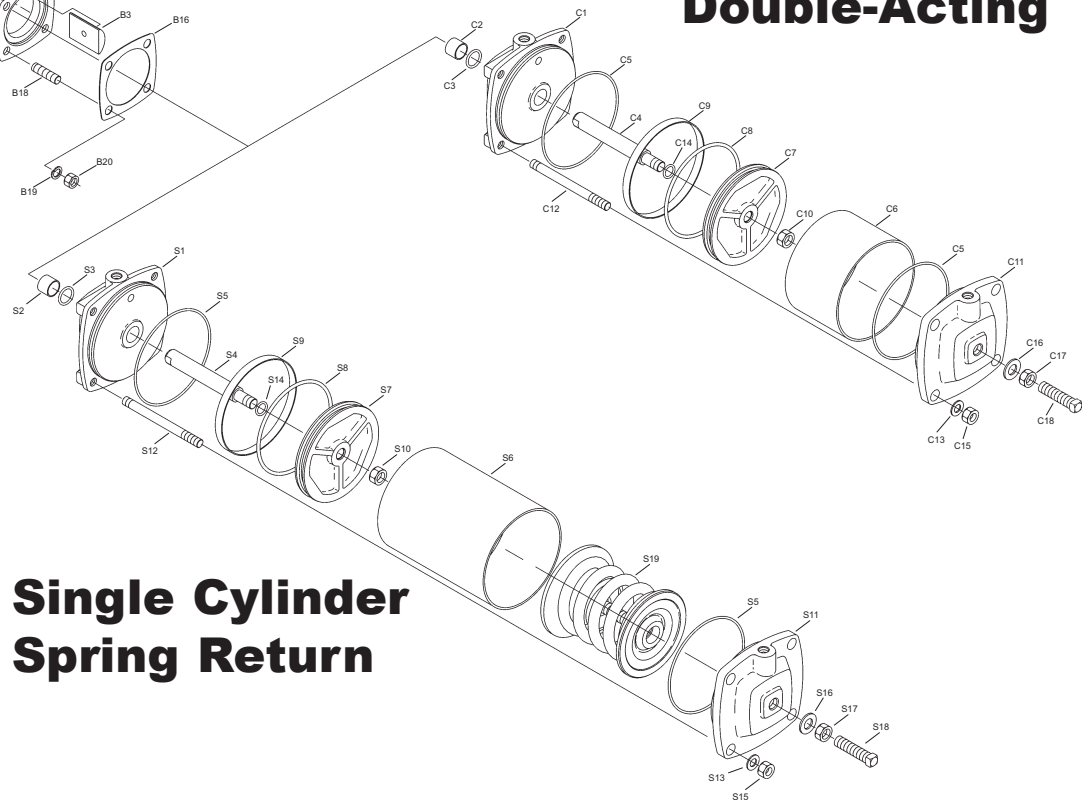
# Materials of Construction

| 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                    | Zinc Plated Carbon Steel                            |
| B5   | Rack                   | Nickel-Steel Powdered Metal, ASTM B783 FN-0208-80HT |
| B6   | Lockwasher             | Zinc 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  |

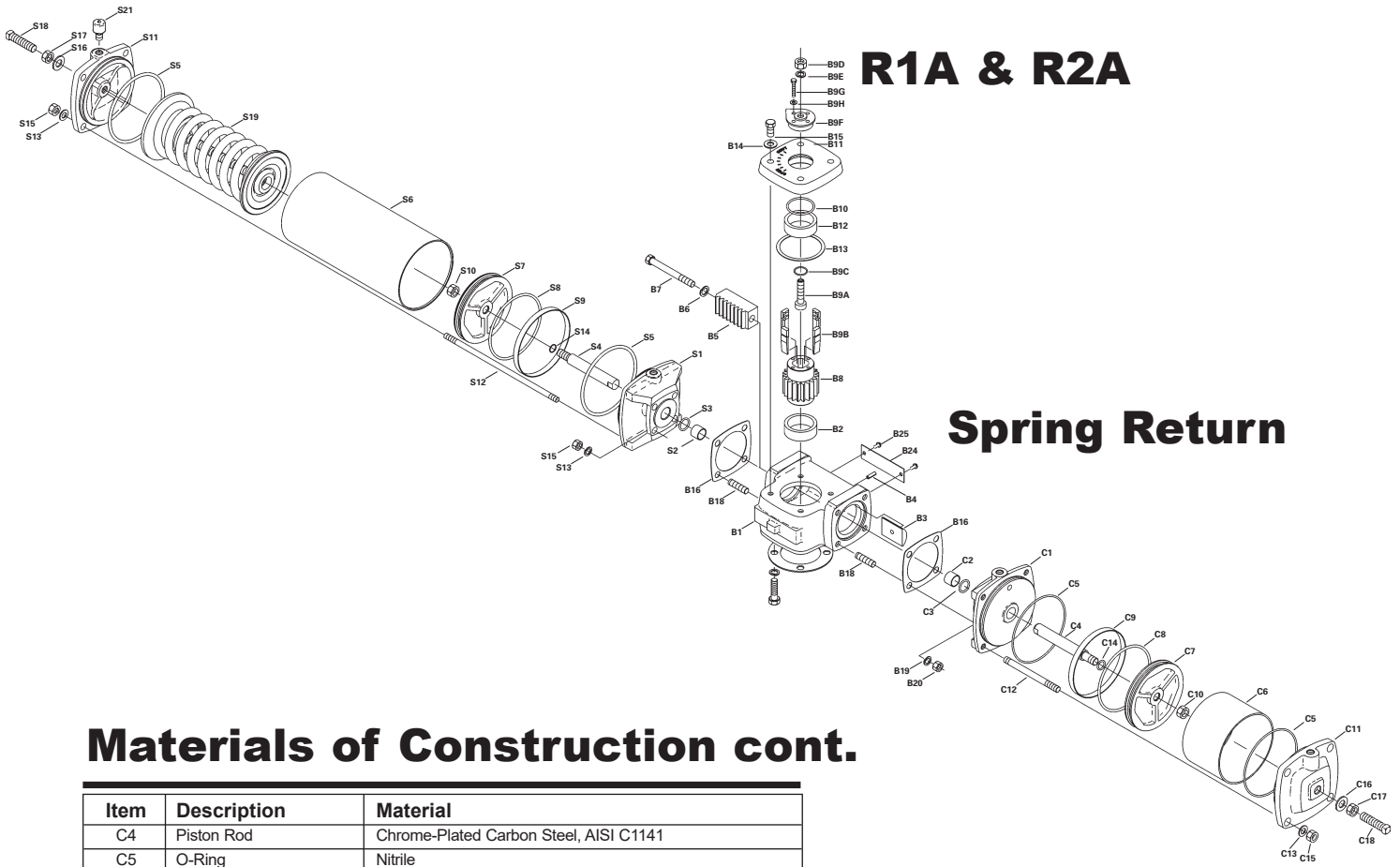
## R1A & R2A



## Double-Acting



## Single Cylinder Spring Return



## Materials of Construction cont.

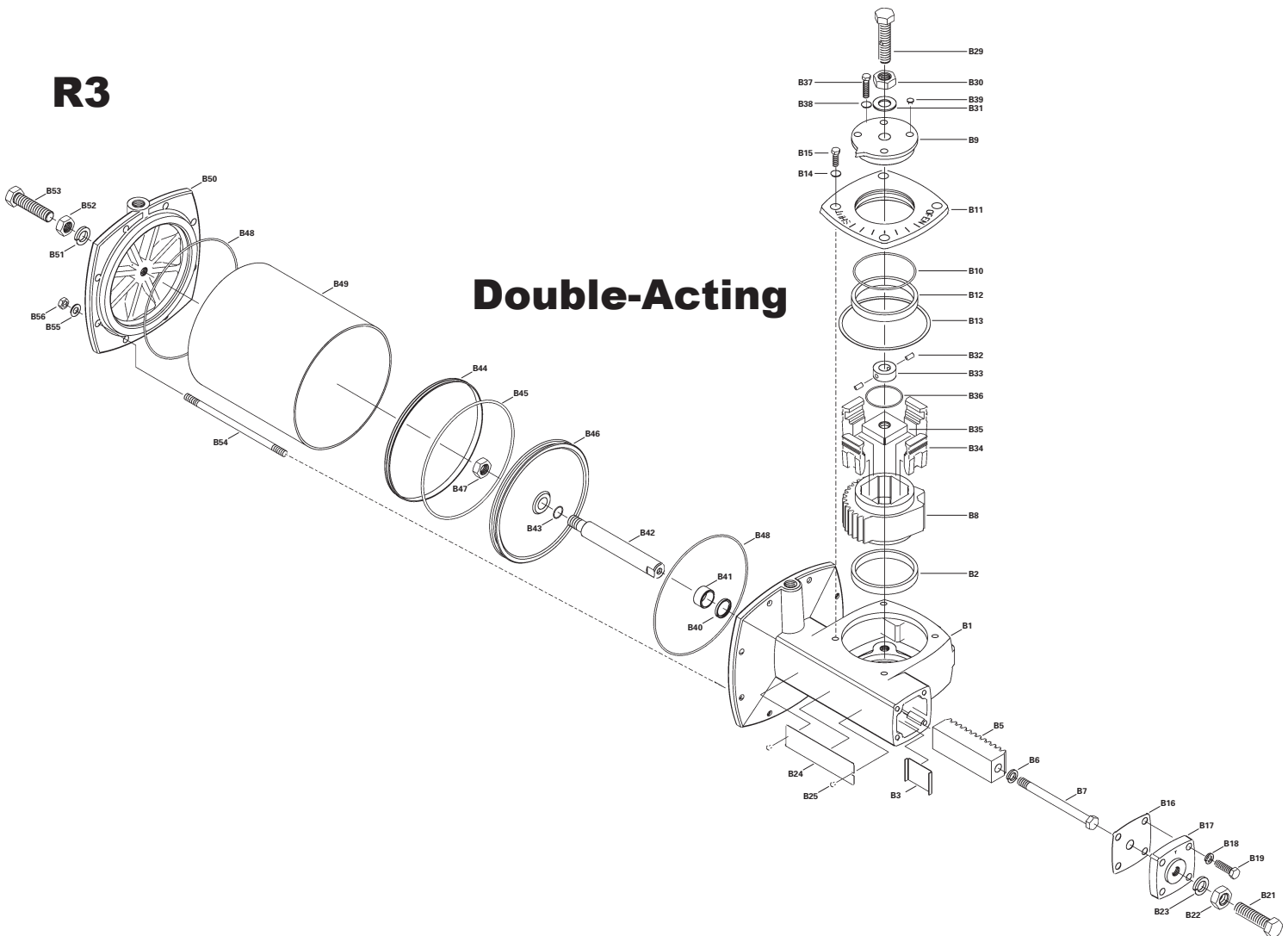
| Item | Description     | Material  |
|------|-----------------|---|
| C4   | Piston Rod      | Chrome-Plated Carbon Steel, AISI C1141  |
| C5   | O-Ring          | Nitrile   |
| C6   | Tube            | Glass Filament Wound  |
| C7   | Piston          | Cast Iron ASTM A126 CL B  |
| C8   | O-Ring          | 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<br>Cap and Base – ASTM A536, Grade 80-55-06;<br>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                                 |

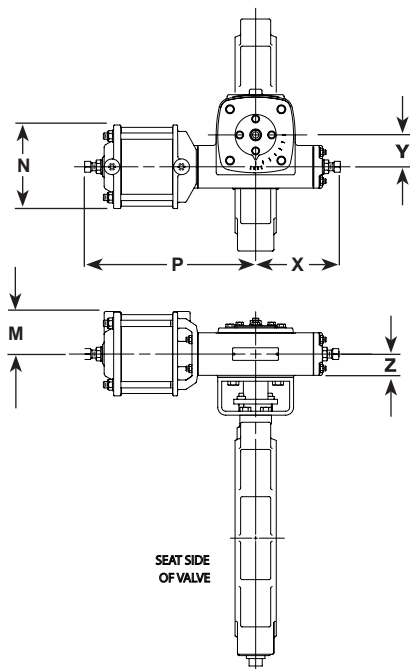
| Item | Description  | Material                           |
|------|--------------|------------------------------------|
| B30  | Jam Nut      | 316 Stainless Steel                |
| B31  | Washer       | 316 Stainless Steel                |
| B32  | Pin          | Chrome Steel, Type 420             |
| 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



# Dimensions

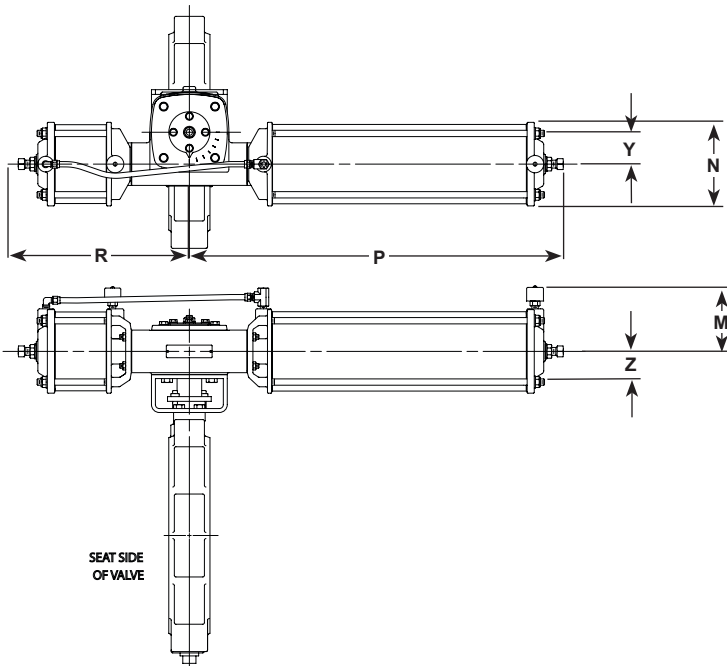
## Double-Acting & Spring Return–Single Cylinder



## Double-Acting & Spring Return–Single Cylinder

| Actuator    | Dimensions |       |       |      |      |      |
|-------------|------------|-------|-------|------|------|------|
|             | M          | N     | P     | X    | Y    | Z    |
| PR-R1A-PC4  | 2.31       | 4.50  | 12.12 | 5.75 | 1.47 | 1.50 |
|             | 59         | 114   | 308   | 146  | 37   | 38   |
| PR-R1A-PC6  | 3.38       | 6.62  | 12.62 | 5.75 | 1.47 | 1.50 |
|             | 86         | 168   | 321   | 146  | 37   | 38   |
| PR-R1-SC4A  | 3.88       | 4.50  | 15.38 | 5.75 | 1.47 | 1.50 |
|             | 99         | 114   | 391   | 146  | 37   | 38   |
| PR-R1-SC6A  | 4.94       | 6.62  | 16.38 | 5.75 | 1.47 | 1.50 |
|             | 125        | 168   | 416   | 146  | 37   | 38   |
| PR-R1-SC6B  | 4.94       | 6.62  | 17.69 | 5.75 | 1.47 | 1.50 |
|             | 125        | 168   | 449   | 146  | 37   | 38   |
| PR-R2A-PC6  | 3.38       | 6.62  | 16.00 | 7.50 | 2.53 | 1.84 |
|             | 86         | 168   | 406   | 191  | 64   | 171  |
| PR-R2A-PC8  | 3.38       | 10.25 | 16.12 | 7.50 | 2.53 | 1.84 |
|             | 86         | 260   | 409   | 191  | 64   | 47   |
| PR-R3A-PC8  | 4.81       | 10.25 | 19.25 | 9.69 | 3.84 | 2.31 |
|             | 122        | 260   | 489   | 246  | 98   | 59   |
| PR-R3A-PC10 | 5.88       | 11.75 | 19.25 | 9.69 | 3.84 | 2.31 |
|             | 149        | 298   | 489   | 246  | 98   | 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       | 4.50  | 12.12 | 21              | 19.12          | 1.47 | 1.50 |
|            | 99         | 114   | 308   | 533             | 486            | 37   | 38   |
| PR-R1A-SC6 | 4.94       | 6.62  | 12.62 | 21.88           | 19.16          | 1.47 | 11.5 |
|            | 126        | 168   | 321   | 556             | 487            | 37   | 38   |
| PR-R2A-SC6 | 4.94       | 6.62  | 16.00 | 30.5            | 25.00          | 2.53 | 1.84 |
|            | 126        | 168   | 406   | 775             | 635            | 64   | 47   |
| PR-R2A-SC8 | 6.38       | 10.25 | 16.12 | 32.75           | 27.50          | 2.53 | 1.84 |
|            | 162        | 260   | 409   | 832             | 698            | 64   | 47   |

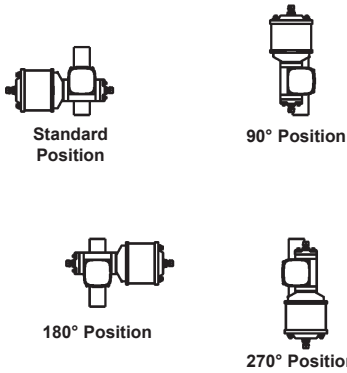
Inches  
Millimeter

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

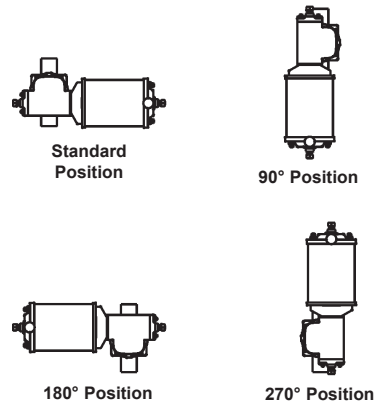


# Actuator Mounting Positions

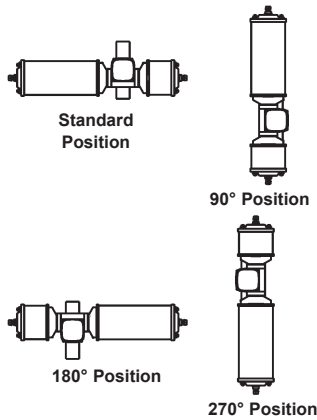
## Double-Acting & Spring Return– Spring-to-Open Single Cylinder



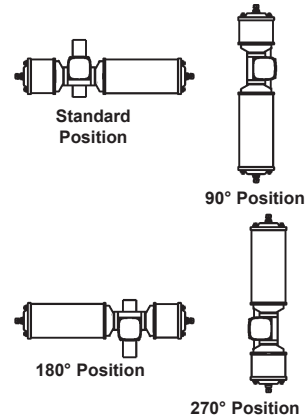
## Spring Return Spring-to-Close– Single Cylinder



## 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) |                  | Weight LBS (KG) |
|---------------|---------------------|------------------|-----------------|
|               | 60 psi (4 Bar)      | 80 psi (5.5 Bar) |                 |
| 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)<br>60 psi (4 Bar) | Weight LBS (KG) |                 |
|---------------|---------------------------------------|-----------------|-----------------|
|               |                                       | Spring-to-Open  | 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

### 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:

- 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

### 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 Action\*

Give spring action code as follows:

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

## Spring Return

### Cylinder Type

Give cylinder type code as follows:

- PR = PowerRac Actuator

### 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](http://DeZURIK.com) E-Mail: [info@DeZURIK.com](mailto:info@DeZURIK.com)



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