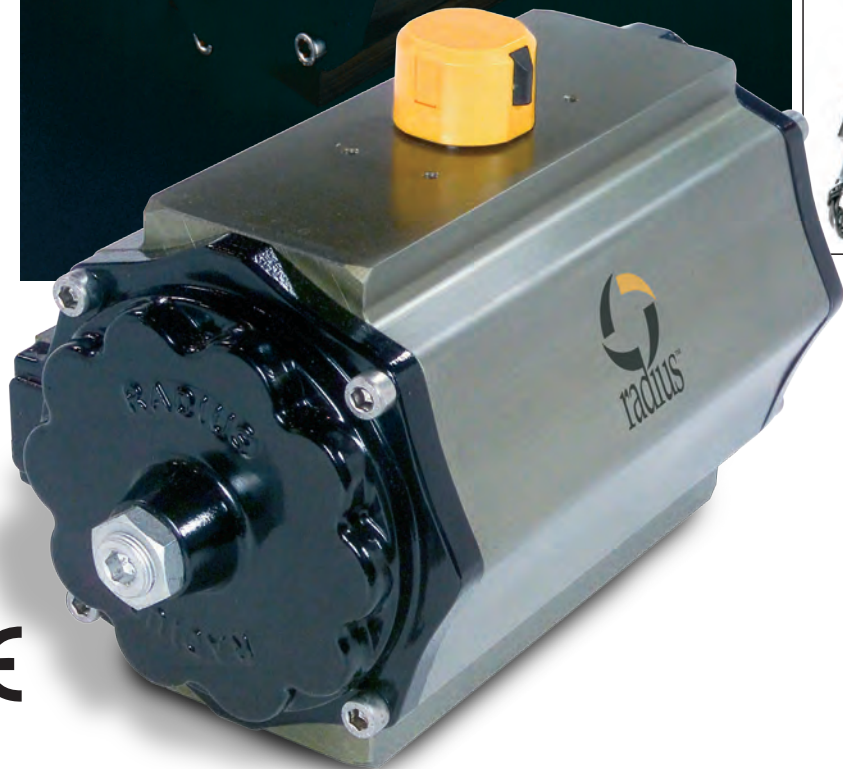
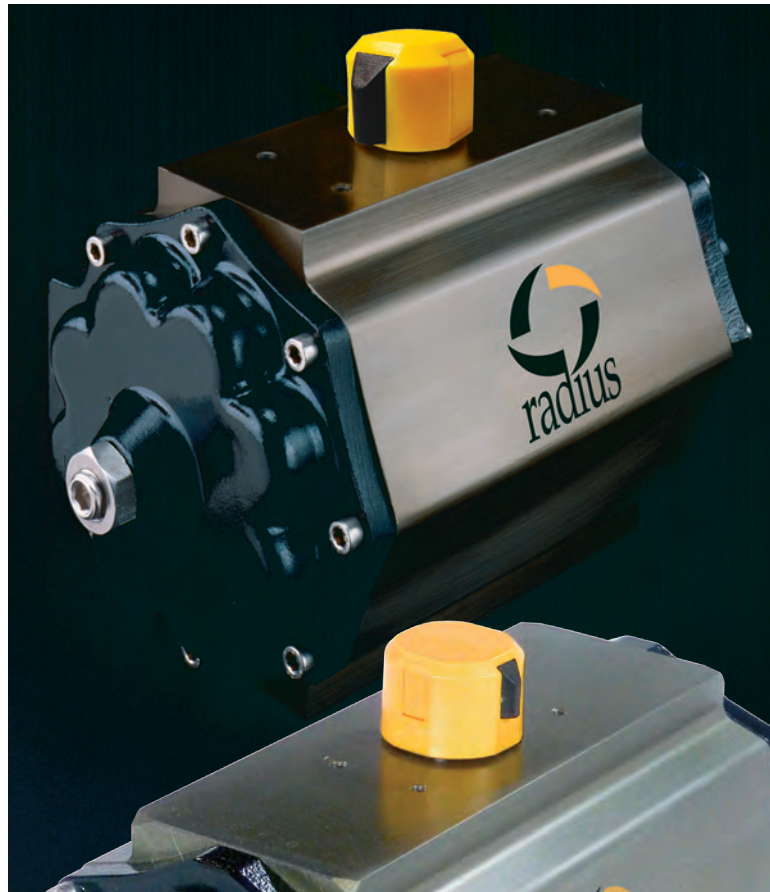


# radius



Series A  
pneumatic  
rack & pinion  
actuators



**SIL3**  
Safety Integrity Level





## EVOLUTION IN ENGINEERING

The Series A double acting and spring return pneumatic rack and pinion actuators from Radius™ offer uncompromising standards of safety, reliability and value. The Series A rack and pinion actuators are designed to operate “quarter-turn valves”. The wide torque range capabilities\* ensure that Radius™ is more than suitable for plug, ball, butterfly

valve and damper applications. Look over the features and benefits that Radius has to offer. Check the specifications. You’ll find that dollar for dollar Radius offers one of the finest valve actuators in the industry. Join the evolution in engineering, contact us today for further information or a quote.



Direct mount limit switch



Direct mount positioner



Direct mount pilot solenoid valves

**Seals:**  
Buna-N Nitrile is standard. Optional materials are available.

**Output Drive Shaft:**  
Electroless nickel plated carbon steel.

**Position Indicator:**  
UV resistant polypropylene.

**End Caps:**  
Precision-cast aluminum, corrosion resistant polyurethane coated inside and out.

**Travel Stops:**  
Patented design allows independent open and close adjustment, standard on all models.

**Fasteners:**  
Stainless steel.

**Spring Sets:**  
Springs are carbon steel and coated for corrosion resistance. Spring guides are corrosion resistant nylon.

**Center Housing:**  
Extruded aluminum and hard anodized.

**Bearing Pad:**  
Polymer, corrosion resistant.

**Pistons:**  
Precision-cast and machined aluminum and hard anodized coated.

All Radius actuators are manufactured with silicone free lubricants.

\*Torque range capabilities (double acting - up to 48,635 in. lbs. and spring return - up to 16,082 in. lbs.)

## FEATURES AND BENEFITS

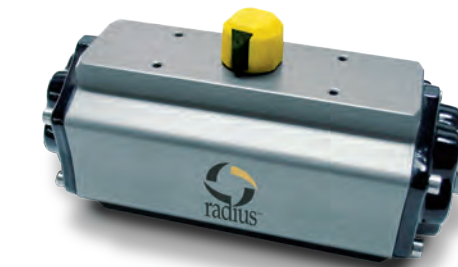
- Wide torque range available.
- Namur accessory mounting surfaces are standard on all Radius actuators for attachment of ancillary control devices.
- Radius quality standards and support.
- High visibility two-part position indicator may have upper portion removed to expose external Namur drive shaft for simple attachment of Namur accessory devices while retaining position indicating capability.
- Complete O-ring sealing protects against ingress of outside moisture and contaminants.
- Unique travel stops in both open & close direction are standard on all models and independently and externally adjustable using standard tools.
- One piece anti-blow-out bottom entry drive shaft.
- Available in Spring Return (AS) and Double Acting (AD) configurations. Multiple spring design allows for a wider range of torque from a single unit. All springs are self-contained and guided for optimum efficiency. All models are fully convertible between double acting & spring return.
- Corrosion resistant by design. Exacting standards of corrosion protection render Radius suitable for most hostile environments.
- Low-cost, closed circuit breathing system available (Namur fitting) to protect actuator internal parts from extremely corrosive environments.



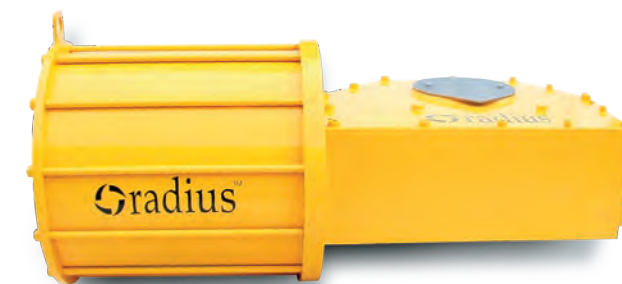
Series NUX CSA and FM approved explosion proof NAMUR mount solenoids.



Electroless Nickel Plated actuators.



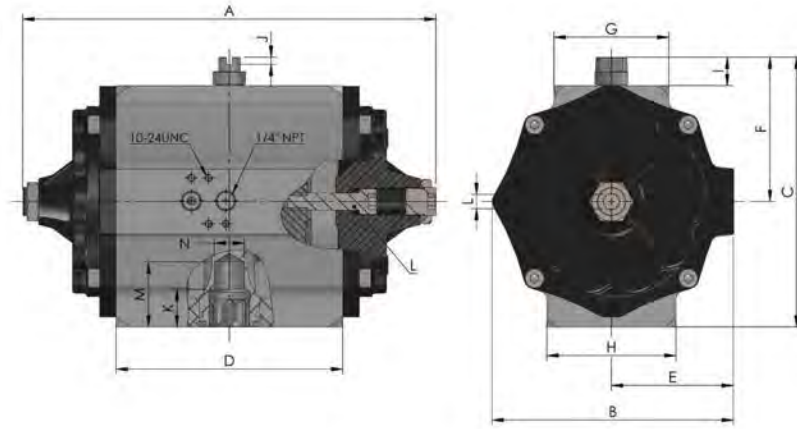
New 180 degree spring-to-center actuator.



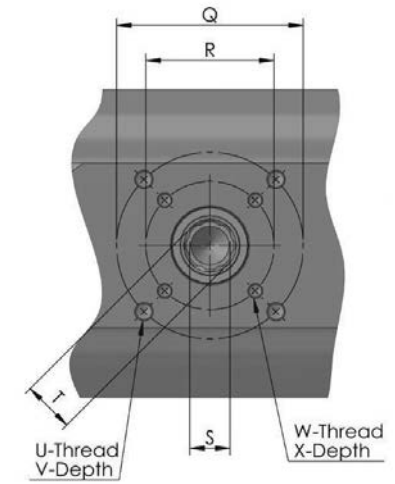
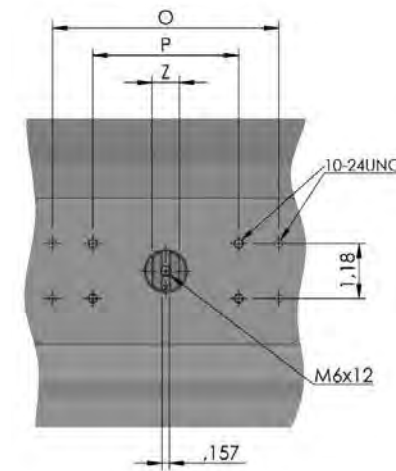
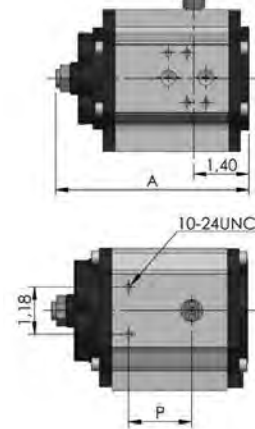
Radius also manufactures Scotch Yoke Actuators.



Models 005 thru 500



Model 003



**Dimensions 90° Actuator (in.)**

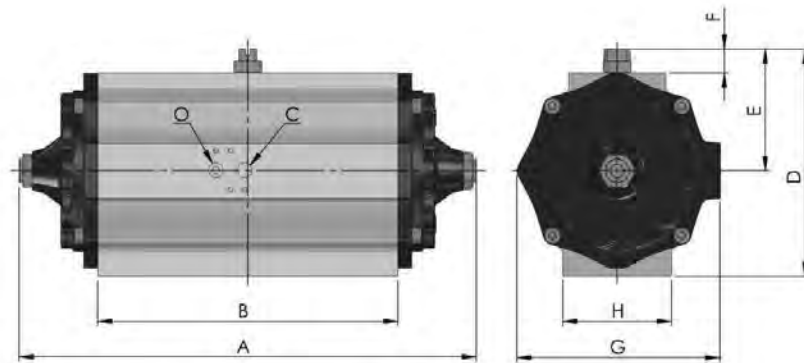
| Model            | MODEL DESIGNATION (AD = Double Acting, AS = Spring Return) |       |       |       |      |      |      |      |      |      |      |    |      |      |
|------------------|------------------------------------------------------------|-------|-------|-------|------|------|------|------|------|------|------|----|------|------|
|                  | A                                                          | B     | C     | D     | E    | F    | G    | H    | I    | J    | K    | L  | M    | N    |
| AD-003<br>AS-003 | 4.88                                                       | 3.50  | 4.37  | 2.87  | 1.93 | 2.52 | 1.81 | 1.89 | 0.79 | 0.16 | 0.63 | 5  | 0.63 | -    |
| AD-005<br>AS-005 | 7.09                                                       | 3.50  | 4.37  | 3.98  | 1.93 | 2.52 | 1.81 | 1.89 | 0.79 | 0.16 | 0.63 | 5  | 0.63 | -    |
| AD-008<br>AS-008 | 9.17                                                       | 4.41  | 5.16  | 4.96  | 2.24 | 2.87 | 1.81 | 2.83 | 0.79 | 0.16 | 0.71 | 6  | 1.22 | 0.59 |
| AD-012<br>AS-012 | 11.00                                                      | 4.41  | 5.16  | 6.69  | 2.24 | 2.87 | 1.81 | 2.83 | 0.79 | 0.16 | 0.79 | 6  | 1.30 | 0.63 |
| AD-020<br>AS-020 | 11.60                                                      | 5.24  | 5.94  | 7.01  | 2.76 | 3.31 | 1.97 | 2.83 | 0.79 | 0.16 | 0.98 | 8  | 1.77 | 0.87 |
| AD-030<br>AS-030 | 11.30                                                      | 6.65  | 7.44  | 6.22  | 3.35 | 3.98 | 3.15 | 3.54 | 0.79 | 0.16 | 0.98 | 10 | 1.77 | 0.83 |
| AD-040<br>AS-040 | 13.50                                                      | 6.65  | 7.83  | 8.50  | 3.35 | 3.98 | 3.15 | 3.54 | 1.18 | 0.20 | 1.22 | 10 | 1.77 | 1.18 |
| AD-060<br>AS-060 | 14.80                                                      | 7.68  | 9.06  | 9.13  | 3.94 | 5.04 | 2.95 | 3.54 | 1.18 | 0.20 | 1.22 | 12 | 1.85 | 1.18 |
| AD-100<br>AS-100 | 17.30                                                      | 8.27  | 9.69  | 10.70 | 4.25 | 5.43 | 3.15 | 4.33 | 1.18 | 0.20 | 1.50 | 12 | 2.17 | 1.57 |
| AD-140<br>AS-140 | 17.50                                                      | 9.13  | 10.70 | 10.00 | 4.72 | 5.91 | 3.54 | 5.12 | 1.18 | 0.20 | 1.61 | 12 | 2.17 | 1.57 |
| AD-200<br>AS-200 | 21.10                                                      | 9.13  | 10.70 | 13.90 | 4.72 | 5.91 | 3.54 | 5.12 | 1.18 | 0.20 | 2.09 | 14 | 3.15 | 2.01 |
| AD-250<br>AS-250 | 18.10                                                      | 12.00 | 13.40 | 12.50 | 5.94 | 7.17 | 3.94 | 6.14 | 1.18 | 0.20 | 2.01 | 14 | 2.17 | 1.57 |
| AD-370<br>AS-370 | 26.40                                                      | 12.00 | 13.40 | 17.60 | 5.94 | 7.17 | 3.94 | 6.14 | 1.18 | 0.20 | 2.60 | 17 | 2.60 | 1.97 |
| AD-500<br>AS-500 | 31.30                                                      | 16.00 | 17.70 | 19.70 | 8.15 | 9.25 | 5.31 | 7.09 | 1.18 | 0.20 | 3.11 | 22 | 5.00 | 2.36 |

(L) Dimension of the ALLEN Key hexagon to untighten the inner travel stop (mm)

**180° Actuator Double Acting**

| Model      | A     | B     | D     | E    | F    | G    | H    |
|------------|-------|-------|-------|------|------|------|------|
| AD-180-005 | 8.86  | 4.53  | 4.37  | 2.53 | 0.79 | 3.50 | 1.89 |
| AD-180-012 | 12.44 | 8.07  | 6.26  | 3.29 | 0.79 | 5.24 | 2.83 |
| AD-180-030 | 14.84 | 9.76  | 7.44  | 3.98 | 0.79 | 6.65 | 3.54 |
| AD-180-060 | 19.29 | 13.35 | 9.06  | 5.04 | 1.18 | 7.68 | 3.54 |
| AD-180-140 | 23.66 | 16.85 | 10.71 | 5.91 | 1.18 | 9.13 | 5.12 |

Pressure to be put in either the "O" inlet" or in the "C" inlet.



**Mounting Dimensions 90° Actuator (in.)**

| Model            | MODEL DESIGNATION (AD = Double Acting, AS = Spring Return) |      |      |      |      |      |             |      |             |      |      |             |
|------------------|------------------------------------------------------------|------|------|------|------|------|-------------|------|-------------|------|------|-------------|
|                  | O                                                          | P    | Q    | R    | S    | T    | U           | V    | W           | X    | Z    | ISO-5211    |
| AD-003<br>AS-003 | -                                                          | 1.57 | 1.97 | 1.42 | 0.43 | 0.56 | 1/4"-20UNC  | 0.35 | 10-24UNC    | 0.31 | 0.31 | F03 / F05*  |
| AD-005<br>AS-005 | -                                                          | 3.15 | 1.97 | 1.42 | 0.43 | 0.56 | 1/4"-20UNC  | 0.35 | 10/24UNC    | 0.31 | 0.31 | F03 / F05*  |
| AD-008<br>AS-008 | -                                                          | 3.15 | 2.76 | 1.97 | 0.67 | 0.87 | 5/16"-18UNC | 0.47 | 1/4"-20UNC  | 0.35 | 0.39 | F05 / F07** |
| AD-012<br>AS-012 | -                                                          | 3.15 | 2.76 | 1.97 | 0.75 | 0.99 | 5/16"-18UNC | 0.47 | 1/4"-20UNC  | 0.35 | 0.39 | F05 / F07   |
| AD-020<br>AS-020 | -                                                          | 3.15 | 2.76 | -    | 0.87 | 1.11 | 5/16"-18UNC | 0.47 | -           | -    | 0.59 | F07         |
| AD-030<br>AS-030 | -                                                          | 3.15 | 4.02 | 2.76 | 0.87 | 1.11 | 3/8"-16UNC  | 0.59 | 5/16"-18UNC | 0.47 | 0.59 | F07 / F10   |
| AD-040<br>AS-040 | 5.12                                                       | 3.15 | 4.02 | 2.76 | 1.06 | 1.43 | 3/8"-16UNC  | 0.59 | 5/16"-18UNC | 0.47 | 0.87 | F07 / F10   |
| AD-060<br>AS-060 | 5.12                                                       | 3.15 | 4.02 | 2.76 | 1.06 | 1.43 | 3/8"-16UNC  | 0.59 | 5/16"-18UNC | 0.47 | 0.87 | F07 / F10   |
| AD-100<br>AS-100 | 5.12                                                       | 3.15 | 4.92 | 4.02 | 1.42 | 1.90 | 1/2"-13UNC  | 0.71 | 3/8"-16UNC  | 0.59 | 1.34 | F12 / F10   |
| AD-140<br>AS-140 | 5.12                                                       | 3.15 | 4.92 | 4.02 | 1.42 | 1.90 | 1/2"-13UNC  | 0.71 | 3/8"-16UNC  | 0.59 | 1.34 | F12 / F10   |
| AD-200<br>AS-200 | 5.12                                                       | 3.15 | 5.51 | -    | 1.81 | 2.37 | 5/8"-11UNC  | 0.94 | -           | -    | 1.34 | F14         |
| AD-250<br>AS-250 | 5.12                                                       | 3.15 | 5.51 | -    | 1.42 | 1.90 | 5/8"-11UNC  | 0.94 | -           | -    | 1.34 | F14         |
| AD-370<br>AS-370 | 5.12                                                       | 3.15 | 6.50 | -    | 1.81 | 2.37 | 3/4"-10UNC  | 1.18 | -           | -    | 1.34 | F16         |
| AD-500<br>AS-500 | 5.12                                                       | 3.15 | 6.50 | -    | 2.17 | 2.84 | 3/4"-10UNC  | 1.18 | -           | -    | 1.34 | F16         |

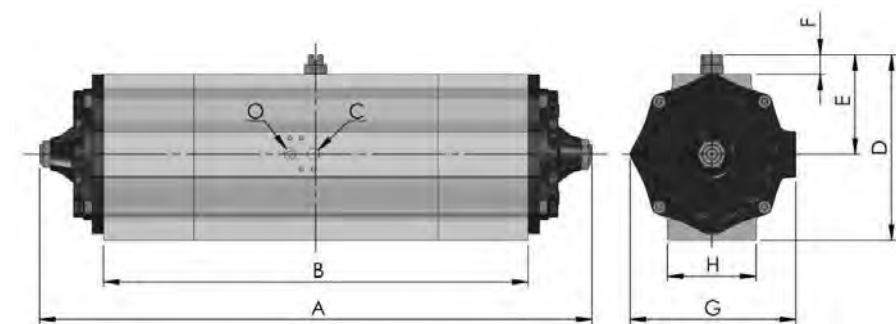
\* Also available with a singular F04 drilling.

\*\* Also available with F04 / F07 drilling.

**RPC Actuators 3 Positions**

| Model      | A     | B     | D     | E    | F    | G    | H    |
|------------|-------|-------|-------|------|------|------|------|
| AS-RPC-005 | 13.11 | 10.35 | 4.37  | 2.53 | 0.79 | 3.5  | 1.89 |
| AS-RPC-012 | 17.52 | 14.21 | 6.26  | 3.29 | 0.79 | 5.24 | 2.83 |
| AS-RPC-030 | 21.06 | 17.2  | 7.44  | 3.98 | 0.79 | 6.65 | 3.54 |
| AS-RPC-060 | 26.77 | 22.44 | 9.06  | 5.04 | 1.18 | 7.68 | 3.54 |
| AS-RPC-140 | 34.65 | 30.24 | 10.71 | 5.91 | 1.18 | 9.13 | 5.12 |

These actuators have 3 positions. The central position is reached by spring force. To move 90° clockwise or counter-clockwise, it is necessary to put pressure in either the "O" inlet or in the "C" inlet. Torques and remaining dimensions are the same as their respective standard models.



## Actuator Cycle Times and Specifications

### Actuator Cycle Times

| Actuator Cycle Times |                                          |         |                                               |         |                                 |             |               |         |              |       |        |        |       |
|----------------------|------------------------------------------|---------|-----------------------------------------------|---------|---------------------------------|-------------|---------------|---------|--------------|-------|--------|--------|-------|
| ACTUATOR SIZE        | AIR VOLUME PER STROKE (in <sup>3</sup> ) |         | AIR VOLUME PER STROKE (in <sup>3</sup> ) 180° |         | OPERATING TIME at 80 PSI (sec.) |             |               |         | WEIGHT (lbs) |       |        |        |       |
|                      | Opening                                  | Closing | Opening                                       | Closing | DOUBLE ACTING                   | 180° MODELS | SPRING RETURN |         | AD           | AS    | 180°   |        |       |
|                      |                                          |         |                                               |         |                                 |             | Opening       | Closing |              |       |        |        |       |
| AD-003 - AS-003      | 6.5                                      | 6.1     | -                                             | -       | < 1                             | -           | 1             | < 1     | 2.76         | 2.87  | -      |        |       |
| AD-005 - AS-005      | 10.1                                     | 11.4    | 20.2                                          | 22.8    | < 1                             | < 1         | 1             | < 1     | 3.42         | 3.86  | 5.30   |        |       |
| AD-008 - AS-008      | 21.9                                     | 27.5    | -                                             | -       | < 1                             | -           | 1             | < 1     | 5.95         | 6.83  | -      |        |       |
| AD-012 - AS-012      | 32.6                                     | 40.3    | 65.2                                          | 80.6    | < 1                             | < 1         | 1             | < 1     | 7.94         | 9.37  | 12.30  |        |       |
| AD-020 - AS-020      | 49.2                                     | 55.5    | -                                             | -       | < 1                             | -           | 1             | < 1     | 10.47        | 12.68 | -      |        |       |
| AD-030 - AS-030      | 68.3                                     | 83.6    | 136.6                                         | 167.2   | 1 - 2                           | 1 - 2       | 1.5           | 1       | 15.65        | 18.08 | 24.20  |        |       |
| AD-040 - AS-040      | 105                                      | 115.9   | -                                             | -       | 1 - 2                           | -           | 1.5           | 1       | 20.90        | 25.40 | -      |        |       |
| AD-060 - AS-060      | 161.1                                    | 194.7   | 322.2                                         | 389.4   | 1.5 - 2.5                       | 1.5 - 2.5   | 2             | 1 - 2   | 27.60        | 35.30 | 35.00  |        |       |
| AD-100 - AS-100      | 239.8                                    | 269.1   | -                                             | -       | 2 - 3                           | -           | 3.5           | < 1*    | 2.5          | < 1*  | 40.80  | 45.20  | -     |
| AD-140 - AS-140      | 287.4                                    | 251.4   | 574.8                                         | 502.8   | 3.5 - 4.5                       | 3.5 - 4.5   | 4             | < 1*    | 3.5          | < 1*  | 51.80  | 59.50  | 73.00 |
| AD-200 - AS-200      | 383.8                                    | 491.2   | -                                             | -       | 4 - 5                           | -           | 5             | < 1*    | 4            | < 1*  | 75.00  | 88.20  | -     |
| AD-250 - AS-250      | 467.4                                    | 533.3   | -                                             | -       | 5 - 6                           | -           | 5.5           | < 1*    | 5            | < 1*  | 87.10  | 101.40 | -     |
| AD-370 - AS-370      | 863.5                                    | 1067.3  | -                                             | -       | 5.5 - 6.5                       | -           | 7             | 1.5*    | 6            | 1*    | 132.30 | 169.80 | -     |
| AD-500 - AS-500      | 1281.5                                   | 1586.6  | -                                             | -       | 9 - 10                          | -           | 13 - 14       | 3*      | 6 - 7        | 1*    | 251.30 | 308.60 | -     |

\*NOTE: Special modifications can be done to all actuators to increase the cycle time. Times are approximate (testing was performed with a supply of 80 PSI, an ambient temperature of 68°F, with electric-valve of 180 gal/min., tubing that provides the electric-valve of 0.315 inch of diameter and the actuator without load).

### Technical Specifications

**According to:** ISO 9001:2008, IEC 61508:2010 (SIL3), LOM 05ATEX6032 X, GOST (CU TR 012) and European Pressure Equipment Directive 97/23/EC point 3.10.

**Working Pressure:** From 14.5 PSI to 120 PSI for double acting actuators. From 40 PSI to 120 PSI for spring return actuators.

**Air Supply:** Air or non corrosive gas.

**Working Temperatures:** From -4°F to 176°F.

**Lubrication:** All actuators are supplied lubricated for their normal working life.

**Rotation:** Counter-clockwise in opening. To reverse actuator rotation, invert pistons.

**Movement:** Rotation of 0° + 2.5° and 0 -2.5° / Rotation of 90° + 2.5° and 90° -2.5°

### Double Acting Models

| Model No.      | Output Torques (in. lbs.) |         |         |          |
|----------------|---------------------------|---------|---------|----------|
|                | Supply Air Pressure       |         |         |          |
|                | 40 psig                   | 60 psig | 80 psig | 100 psig |
| AD-003         | 66                        | 100     | 133     | 168      |
| AD-005         | 133                       | 200     | 266     | 336      |
| AD-008         | 283                       | 423     | 566     | 708      |
| AD-012         | 425                       | 635     | 850     | 1053     |
| AD-020         | 637                       | 968     | 1292    | 1611     |
| AD-030         | 876                       | 1325    | 1779    | 2213     |
| AD-040         | 1319                      | 1990    | 2673    | 3328     |
| AD-060         | 2009                      | 3080    | 4151    | 5204     |
| AD-100         | 3054                      | 4590    | 6160    | 7665     |
| AD-140         | 3850                      | 5867    | 7868    | 9860     |
| AD-200         | 5337                      | 8044    | 10789   | 13418    |
| AD-250         | 6789                      | 10187   | 13719   | 17064    |
| AD-370         | 11887                     | 17825   | 24012   | 29862    |
| AD-500         | 19029                     | 28897   | 38766   | 48635    |
| 180° Actuators |                           |         |         |          |
| AD-005         | 133                       | 200     | 266     | 336      |
| AD-012         | 425                       | 635     | 850     | 1053     |
| AD-030         | 876                       | 1325    | 1779    | 2213     |
| AD-060         | 2009                      | 3080    | 4151    | 5204     |
| AD-140         | 3850                      | 5867    | 7868    | 9860     |

25% Safety factor is recommended.

### Available Options

Low temperature versions down to -85°F

High temperature versions up to 356°F

### Manual Overrides

#### Spring Return Actuators

RKS-45: AS-008, AS-012, AS-020, AS-030, AS-040 & AS-060

RKS-75: AS-100, AS-140 & AS-200

RKS-125: AS-250 & AS-370

RKS-400: AS-500

#### Double Acting Actuators

RKE-45: AD-008, AD-012, AD-020, AD-030 & AD-040

RKE-75: AD-060, AD-100 & AD-140

RKE-125: AD-200 & AD-370



## Spring Return Output Torque

### Spring Return Models

| Model No. | Spring Set | Output Torques (in. lbs.) and Pressure Ratings |            |                     |         |           |         |           |         |           |         |
|-----------|------------|------------------------------------------------|------------|---------------------|---------|-----------|---------|-----------|---------|-----------|---------|
|           |            | Spring Torque                                  |            | Supply Air Pressure |         |           |         |           |         |           |         |
|           |            | Spring Start                                   | Spring End | 40 psig             |         | 60 psig   |         | 80 psig   |         | 100 psig  |         |
|           |            | Air Start                                      | Air End    | Air Start           | Air End | Air Start | Air End | Air Start | Air End | Air Start | Air End |
| AS003     | 2          | 36                                             | 21         | 45                  | 30      | 79        | 64      | -         | -       | -         | -       |
|           | 3          | 54                                             | 31         | 35                  | 12      | 69        | 46      | -         | -       | -         | -       |
|           | 4          | 73                                             | 42         | -                   | -       | 58        | 27      | 90        | 59      | 127       | 96      |
|           | 5          | 91                                             | 52         | -                   | -       | -         | -       | 80        | 42      | 115       | 77      |
|           | *6         | 110                                            | 63         | -                   | -       | -         | -       | 69        | 23      | 104       | 58      |
| AS005     | 4          | 73                                             | 42         | 91                  | 60      | 158       | 127     | -         | -       | -         | -       |
|           | 6          | 109                                            | 63         | 70                  | 24      | 137       | 91      | -         | -       | -         | -       |
|           | 8          | 146                                            | 84         | -                   | -       | 116       | 54      | 181       | 119     | -         | -       |
|           | 10         | 182                                            | 105        | -                   | -       | -         | -       | 160       | 83      | 231       | 154     |
|           | *12        | 219                                            | 127        | -                   | -       | -         | -       | 139       | 46      | 210       | 117     |
| AS008     | 4          | 156                                            | 96         | 188                 | 127     | 327       | 267     | 471       | 411     | -         | -       |
|           | 6          | 234                                            | 143        | 140                 | 50      | 280       | 189     | 423       | 333     | 565       | 474     |
|           | 8          | 312                                            | 191        | -                   | -       | 232       | 112     | 375       | 255     | 517       | 397     |
|           | *10        | 389                                            | 239        | -                   | -       | -         | -       | 327       | 177     | 469       | 319     |
|           | 12         | 469                                            | 283        | -                   | -       | -         | -       | 283       | 106     | 425       | 239     |
| AS012     | 4          | 255                                            | 145        | 280                 | 170     | 490       | 381     | 705       | 595     | -         | -       |
|           | 6          | 382                                            | 218        | 207                 | 42      | 418       | 253     | 632       | 467     | -         | -       |
|           | 8          | 510                                            | 290        | -                   | -       | 345       | 126     | 559       | 340     | 763       | 543     |
|           | *10        | 637                                            | 363        | -                   | -       | -         | -       | 487       | 212     | 690       | 416     |
|           | 12         | 765                                            | 435        | -                   | -       | -         | -       | -         | -       | 637       | 310     |
| AS020     | 8          | 482                                            | 270        | 367                 | 155     | 698       | 485     | -         | -       | -         | -       |
|           | 10         | 603                                            | 337        | 300                 | 35      | 630       | 365     | 955       | 689     | -         | -       |
|           | 12         | 723                                            | 404        | -                   | -       | 563       | 245     | 888       | 569     | -         | -       |
|           | 14         | 843                                            | 472        | -                   | -       | 496       | 124     | 820       | 449     | 1139      | 767     |
|           | *16        | 965                                            | 540        | -                   | -       | -         | -       | 752       | 327     | 1071      | 646     |
| AS030     | 10         | 628                                            | 398        | 478                 | 248     | 926       | 696     | -         | -       | -         | -       |
|           | 12         | 754                                            | 478        | 398                 | 122     | 847       | 570     | 1301      | 1025    | -         | -       |
|           | 14         | 880                                            | 558        | -                   | -       | 767       | 445     | 1221      | 899     | -         | -       |
|           | 16         | 1005                                           | 637        | -                   | -       | 687       | 319     | 1142      | 774     | 1575      | 1207    |
|           | 18         | 1131                                           | 717        | -                   | -       | 608       | 193     | 1062      | 648     | 1496      | 1082    |
| *20       | 1257       | 797                                            | -          | -                   | -       | -         | 982     | 522       | 1416    | 956       |         |
| AS040     | 10         | 969                                            | 544        | 774                 | 350     | 1445      | 1021    | -         | -       | -         | -       |
|           | 12         | 1163                                           | 653        | 666                 | 156     | 1337      | 827     | 2020      | 1510    | -         | -       |
|           | 14         | 1357                                           | 762        | -                   | -       | 1228      | 633     | 1911      | 1316    | -         | -       |
|           | 16         | 1551                                           | 871        | -                   | -       | 1119      | 439     | 1802      | 1122    | 2457      | 1777    |
|           | 18         | 1744                                           | 980        | -                   | -       | 1010      | 245     | 1693      | 928     | 2348      | 1583    |
| *20       | 1938       | 1089                                           | -          | -                   | -       | -         | 1584    | 735       | 2239    | 1390      |         |
| AS060     | 10         | 1350                                           | 819        | 1190                | 659     | 2261      | 1730    | -         | -       | -         | -       |
|           | 12         | 1620                                           | 982        | 1027                | 389     | 2098      | 1460    | 3169      | 2531    | -         | -       |
|           | 14         | 1890                                           | 1146       | -                   | -       | 1934      | 1190    | 3005      | 2261    | -         | -       |
|           | 16         | 2160                                           | 1310       | -                   | -       | 1770      | 920     | 2841      | 1991    | 3894      | 3045    |
|           | 18         | 2430                                           | 1474       | -                   | -       | 1606      | 651     | 2677      | 1721    | 3731      | 2775    |
| *20       | 2699       | 1637                                           | -          | -                   | -       | -         | 2514    | 1452      | 3567    | 2505      |         |
| AS100     | 10         | 2124                                           | 1195       | 1859                | 929     | 3396      | 2466    | -         | -       | -         | -       |
|           | 12         | 2549                                           | 1434       | 1620                | 504     | 3157      | 2041    | 4726      | 3611    | 6231      | 5116    |
|           | 14         | 2974                                           | 1673       | -                   | -       | 2918      | 1617    | 4487      | 3186    | 5992      | 4691    |
|           | 16         | 3399                                           | 1912       | -                   | -       | 2679      | 1192    | 4248      | 2761    | 5753      | 4266    |
|           | 18         | 3824                                           | 2151       | -                   | -       | 2440      | 767     | 4009      | 2337    | 5514      | 3841    |
| *20       | 4248       | 2390                                           | -          | -                   | -       | -         | 3770    | 1912      | 5275    | 3416      |         |
| AS140     | 14         | 2912                                           | 1667       | 1979                | 735     | 4199      | 2955    | -         | -       | -         | -       |
|           | 16         | 3328                                           | 1906       | 1741                | 319     | 3961      | 2539    | 5963      | 4540    | -         | -       |
|           | 18         | 3744                                           | 2145       | -                   | -       | 3722      | 2123    | 5724      | 4124    | -         | -       |
|           | 20         | 4160                                           | 2383       | -                   | -       | 3484      | 1707    | 5486      | 3708    | 7477      | 5700    |
|           | 22         | 4576                                           | 2621       | -                   | -       | 3246      | 1291    | 5248      | 3292    | 7239      | 5284    |
| *24       | 4992       | 2859                                           | -          | -                   | -       | -         | 5010    | 2876      | 7001    | 4868      |         |
| AS200     | 10         | 3332                                           | 1952       | 3385                | 2005    | 6092      | 4712    | -         | -       | -         | -       |
|           | 12         | 3999                                           | 2342       | 2995                | 1338    | 5702      | 4045    | 8447      | 6790    | -         | -       |
|           | 14         | 4665                                           | 2732       | -                   | -       | 5312      | 3379    | 8057      | 6124    | -         | -       |
|           | 16         | 5332                                           | 3123       | -                   | -       | 4921      | 2712    | 7667      | 5457    | 10295     | 8086    |
|           | 18         | 5998                                           | 3513       | -                   | -       | 4531      | 2046    | 7276      | 4791    | 9905      | 7420    |
| *20       | 6665       | 3903                                           | -          | -                   | -       | -         | 6886    | 4124      | 9515    | 6753      |         |
| AS250     | 20         | 4114                                           | 2368       | 4385                | 2639    | 7853      | 6107    | -         | -       | -         | -       |
|           | 24         | 4936                                           | 2842       | 3911                | 1817    | 7379      | 5285    | 10877     | 8783    | -         | -       |
|           | 28         | 5759                                           | 3315       | -                   | -       | 6906      | 4462    | 10403     | 7959    | -         | -       |
|           | 32         | 6581                                           | 3790       | -                   | -       | 6431      | 3640    | 9929      | 7137    | 13274     | 10483   |
|           | 36         | 7405                                           | 4263       | -                   | -       | 6080      | 2817    | 9455      | 6314    | 12801     | 9660    |
| *40       | 8227       | 4737                                           | -          | -                   | -       | -         | 8982    | 5492      | 12327   | 8837      |         |
| AS370     | 10         | 7859                                           | 4138       | 7749                | 4027    | 13764     | 10043   | -         | -       | -         | -       |
|           | 12         | 9431                                           | 4965       | 6921                | 2455    | 12937     | 847     |           |         |           |         |



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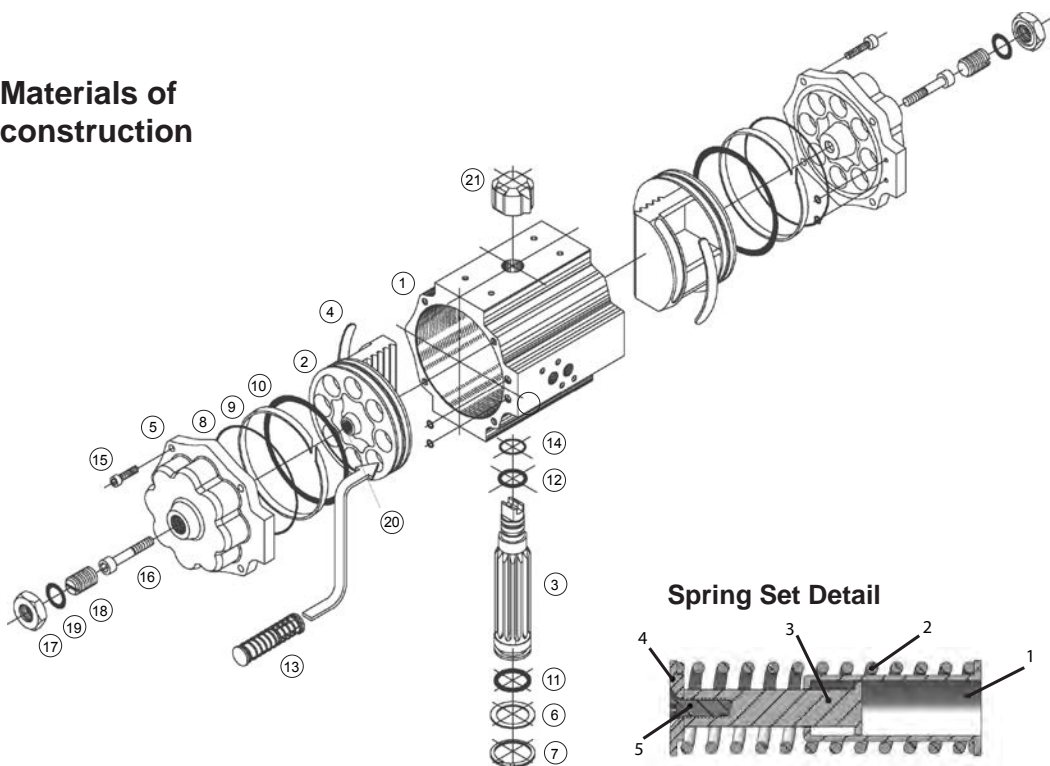
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Radius LLC is  
ISO 9001:2008 certified

## Materials of construction



| Item | Description       | Quantity                  | Material                | Surface Finish             |   |
|------|-------------------|---------------------------|-------------------------|----------------------------|---|
| 1    | Body              | 1                         | AW-6063-T6 Al. Alloy    | Hard Anodized              |   |
| 2    | Piston            | 2                         | L-2653 T6 Al.           | Hard Anodized              |   |
| 3    | Drive Shaft       | 1                         | C-45E (F-1140)          | Nickel Plated              |   |
| *    | 4                 | Bearing Pad               | 2 to 4                  | DELTRIN (Polyoxymethylene) | - |
| 5    | End Cap           | 2                         | L-2653-60 T6 Al. Alloy  | Polyurethane Paint         |   |
| *    | 6                 | Thrust Washer             | 1                       | DELTRIN (Polyoxymethylene) | - |
| *    | 7                 | Retaining Ring            | 1                       | Stainless Steel AISI302    | - |
| *    | 8                 | End Cap O-Ring            | 2                       | NBR 70Sh                   | - |
| *    | 9                 | Piston Bearing            | 2 to 4                  | PTFE                       | - |
| *    | 10                | Piston O-Ring             | 2                       | NBR 70Sh                   | - |
| *    | 11                | Bottom Drive Shaft O-Ring | 1                       | NBR 70Sh                   | - |
| *    | 12                | Top Drive Shaft O-Ring    | 1                       | NBR 70Sh                   | - |
| 13   | Spring Set        | 12 to 44                  | See spring set detail   | See spring set detail      |   |
| *    | 14                | Double Sealing O-Ring     | 1                       | NBR 70Sh                   | - |
| 15   | End Cap Bolts     | 8 to 36                   | DIN-912 A2              | -                          |   |
| 16   | Inner Travel Stop | 2                         | DIN-912 12.9            | DACROMET 320               |   |
| 17   | Travel Stop Nut   | 2                         | Stainless Steel AISI302 | -                          |   |
| 18   | Outer Travel Stop | 2                         | Stainless Steel AISI302 | -                          |   |
| *    | 19                | Travel Stop O-Ring        | 2                       | NBR 70Sh                   | - |
| 20   | Helicoil          | 2                         | Stainless Steel 18.10   | -                          |   |
| 21   | Indicator         | 1                         | Polypropylene           | -                          |   |

• Comprises repair kit sold separately

### Spring Set Detail

| Item | Description      | Quantity | Material               | Surface Finish |
|------|------------------|----------|------------------------|----------------|
| 1    | Preloader Body   | 1        | NYLON + 30% fiberglass |                |
| 2    | Spring           | 1        | CrSi Steel Alloy       | DACROMET 320   |
| 3    | Preloader Shaft  | 1        | NYLON + 30% fiberglass |                |
| 4    | Preloader Washer | 1        | NYLON + 30% fiberglass |                |
| 5    | Preloader Bolt   | 1        | Carbon Steel           | Zinc Plated    |