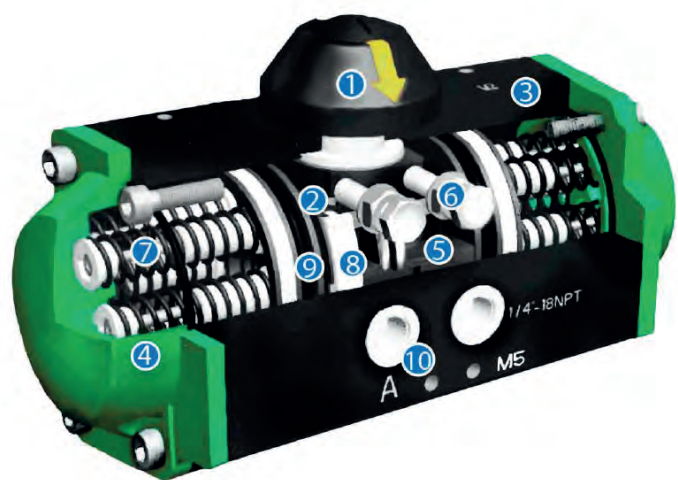


Construction / Design



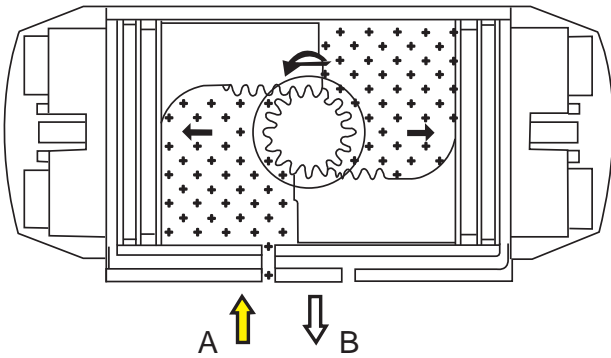
- 1.- **Indicator**
Indicator according to VID/VIE3845 is convenient for mounting accessories such as limit switch box, positioner, etc.
- 2.- **Pinion**
The design of the nickel-plated alloy steel integrated forging pinion drive is according to the NAMUR, ISO5211 and DIN3337 standards. Special standards are available upon request.
- 3.- **Actuator Body**
High quality aluminum alloy extrusion formed. The surface has been treated by anodized hardening followed by epoxy polyester coating. Other surface treatments are available e.g. PTFE and Nickel Plating as well as other colour coatings on request.
- 4.- **End Cap**
The surface has been treated by anodized hardening followed by epoxy polyester coating. Other surface treatments are available on request e.g. PTFE and Nickel Plating as well as other colours on request.
- 5.- **Piston**
Manufactured from die-cast aluminum and treated by anodized hardening process. Symmetric mounting of the piston helps to ensure easy maintenance. Reverse action requirements can be achieved by inverting the pistons.
- 6.- **Adjusting Bolt**
The two independent adjustment bolts can adjust opening and closing of the mounted valve within $\pm 5^\circ$.
- 7.- **Spring**
Preloaded high grade springs with surface epoxy resin painted, which can be demounted conveniently to satisfy different requirements of torque by changing quantity of springs.
- 8.- **Piston Ring**
Manufactured from low friction long life material POM. Can be easily changed for maintenance purposes.
- 9.- **O-rings**
Standard NBR rubber O-rings provide trouble-free operation at standard temperature ranges. For other temperature requirements relevant materials can be offered on request.
- 10.- **Air Connection**
Conforms to NAMUR standards
- 11.- All stop parts are manufactured from SS304.



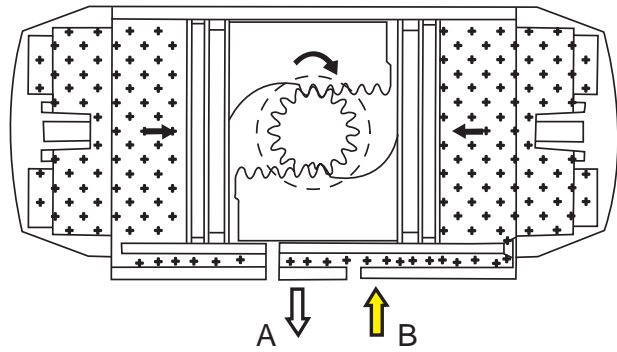
Operations

The standard rotation is clockwise to close; counter-clockwise rotation is obtained when port "A" is pressurized.

Double Acting Operation Function (Standard Rotation) Top View

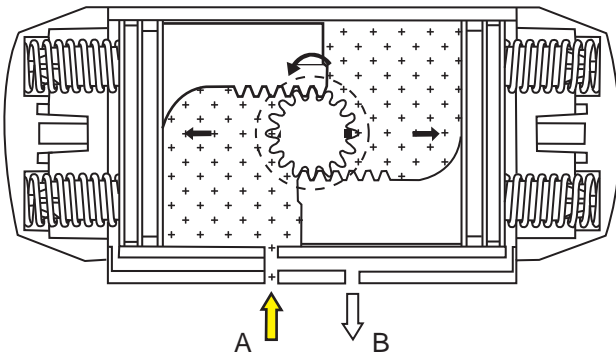


Air supplied to Port A forces the pistons apart and toward end positions, with exhaust air exiting at Port B, a counter-clockwise rotation is obtained.

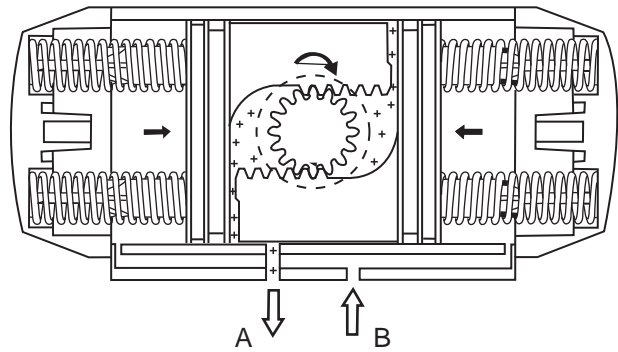


Air supplied to Port B forces the pistons together with exhaust air exiting at Port A, a clockwise rotation is obtained.

Single Acting Operation Function (Standard Rotation) Top View

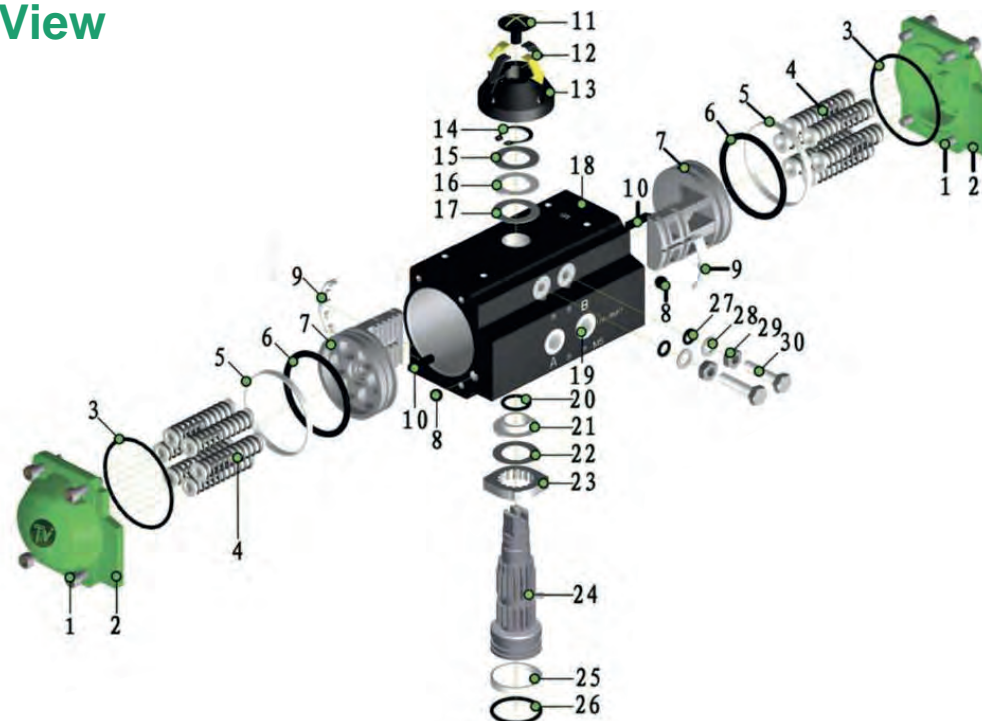


Air supplied to Port A forces the pistons apart and toward end positions, compressing the springs with exhaust air exiting at Port B, a counter-clockwise rotation is obtained.



On loss of air pressure (air or electric failure) at port A allows the springs to force the pistons to the centre position with exhaust air exiting at Port A, a clockwise rotation is obtained.

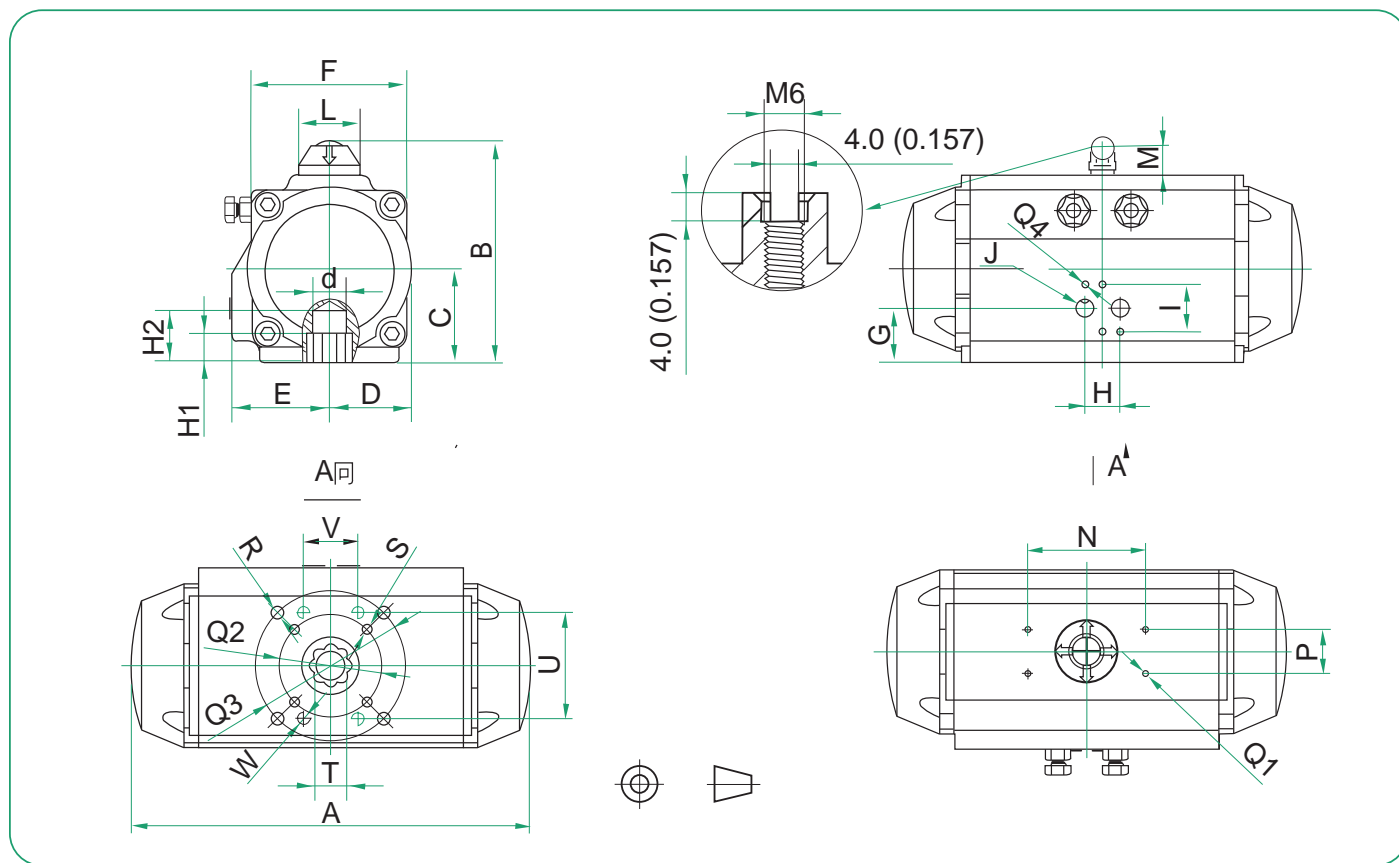
Explode View



Material List

| POS | DESCRIPTION | QTY | MATERIALS | SURFACE TREATED | OPTIONAL MATERIAL |
|-----|---------------------------|-----|-------------------------------|---------------------------------------|-----------------------|
| 1 | Socket Head Screw | 8 | SUS 304 | | |
| 2 | End Cap | 2 | AL ≤ ARP1165 WCB ≥ ARP1970 | Anode Hardening +Polyester Coating | CF8/CF8M |
| 3 | "O" ring (Cylinder Head) | 2 | NBR Rubber | | Viton/Silicone Rubber |
| 4 | Spring | 2 | Spring Steel | | |
| 5 | Piston Ring | 2 | POM | | |
| 6 | "O" ring (Piston) | 2 | NBR Rubber | | Viton/Silicone Rubber |
| 7 | Piston | 2 | AL380 | Anode Hardening | |
| 8 | Stopper | 2 | NBR Rubber | | |
| 9 | Guide Ring | 2 | PA6 | | |
| 10 | Guide Block | 1 | PA6 | | |
| 11 | Indicator Bolt | 4 | ABS | | |
| 12 | Indicator Arrowhead | 1 | ABS | | |
| 13 | Indicator | 1 | ABS | | |
| 14 | Snap Ring | 1 | Stainless Steel | | |
| 15 | Washer | 1 | SUS 304 | | |
| 16 | Disc Bearing | 1 | POM | | |
| 17 | Washer | 1 | SUS 304 | | |
| 18 | Body | 2 | AL 6063-T6 | Anode Hardening +Polyester Coating | CF8/CF8M |
| 19 | Plug | 1 | PVC | | SUS304/SUS316 |
| 20 | "O" ring (Pinion Top) | 1 | NBR Rubber | | |
| 21 | Bearing (pinion Top) | 1 | POM | | Viton/Silicone Rubber |
| 22 | Disc Bearing | 1 | SUS 304 | Nickel Plated | Viton/Silicone Rubber |
| 23 | Stroke Adjustment Stop | 1 | SAE 1020 | Nickel Plated | |
| 24 | Pinion Shaft | 1 | SAE 1045 | | |
| 25 | Bearing (Pinion Bottom) | 1 | POM | | |
| 26 | "O" ring (pinion bottom) | 2 | NBR Rubber | | |
| 27 | "O" ring (Adjusting Bolt) | 2 | NBR Rubber | | |
| 28 | Metal Washer | 2 | SUS 304 | | |
| 29 | Nut | 2 | SUS 304 | | |
| 30 | Adjusting Bolt | 2 | SUS 304 | | |

Installation Size and Dimensions



Compared with the ordinary actuators, we drill four extra thread holes on the bottom of actuator. Using our connecting plates, it can be connected with all kinds of international standard valve flanges fairly.



The large diameter hole of the output pinion on the bottom makes our actuator suitable for all kinds of valve stems and connecting keys by using our insert. Efficient and economic.



Extra deep hole for pinion shaft on the bottom of actuator is suitable for any long size valve stem.



Dimensions

ACTUADOR ARP

| MODEL SIZE | 0006 | 0010 | 0017 | 0031 | 0063 | 0098 | 0142 | 0236 | 0300 | 0462 | 0625 | 0848 | 1165 | 1970 | 3200 | 4025 | 5876 | 9210 |
|------------|-----------|-----------|-----------|-----------|-----------|-----------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|----------|----------|
| A | 3.23 | 4.29 | 5.83 | 6.26 | 8.39 | 0.80 | 10.67 | 12.40 | 13.62 | 16.22 | 17.44 | 19.37 | 21.54 | 24.17 | 28.70 | 33.03 | 35.43 | 45.59 |
| B | 2.83 | 2.95 | 3.58 | 4.21 | 4.88 | 5.43 | 5.87 | 6.89 | 7.48 | 8.27 | 9.06 | 10.00 | 10.91 | 13.62 | 15.28 | 16.06 | 18.11 | 20.35 |
| C | 1.22 | 1.10 | 1.34 | 1.65 | 2.01 | 2.28 | 2.52 | 2.87 | 3.11 | 3.46 | 3.86 | 4.33 | 4.80 | 5.75 | 6.57 | 7.01 | 8.07 | 9.21 |
| D | 0.81 | 1.06 | 1.14 | 1.42 | 1.73 | 1.93 | 2.20 | 2.52 | 2.72 | 3.15 | 3.46 | 3.90 | 4.29 | 5.16 | 5.79 | 6.38 | 7.44 | 10.24 |
| E | 1.18 | 1.30 | 1.61 | 1.85 | 2.09 | 2.24 | 2.60 | 3.03 | 3.23 | 3.62 | 3.86 | 4.17 | 4.41 | 5.16 | 5.79 | 6.81 | 7.68 | 10.24 |
| F | 1.99 | 2.36 | 2.09 | 2.60 | 3.23 | 3.62 | 4.17 | 4.76 | 5.12 | 5.87 | 6.30 | 7.09 | 7.80 | 9.09 | 10.00 | 11.42 | 13.23 | 13.03 |
| G | 1.02 | 1.10 | 1.02 | 1.18 | 1.14 | 1.26 | 1.46 | 1.46 | 1.81 | 2.09 | 2.05 | 2.36 | 2.60 | 2.76 | 3.54 | 3.35 | 3.62 | 9.17 |
| H | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 0.94 | 1.57 | 1.57 | 1.57 | 1.57 | 1.57 |
| I | 1.26 | 1.26 | 1.26 | 1.26 | 1.26 | 1.26 | 1.26 | 1.26 | 1.26 | 1.26 | 1.26 | 1.26 | 1.26 | 1.77 | 1.77 | 1.77 | 1.77 | 1.77 |
| 1 | NPT1/8" | NPT1/8" | NPT1/4" | NPT1/4" | NPT1/4" | NPT1/4" | NPT1/4" | NPT1/4" | NPT1/4" | NPT1/4" | NPT1/4" | NPT1/4" | NPT1/4" | NPT3/8" | NPT3/8" | NPT1/2" | NPT1/2" | NPT1/2" |
| L | Φ1.18 | Φ1.18 | Φ1.57 | Φ1.57 | Φ1.57 | Φ1.57 | Φ1.57 | Φ2.36 | Φ2.36 | Φ2.36 | Φ2.36 | Φ3.15 | Φ3.15 | Φ3.15 | Φ3.15 | Φ3.15 | Φ2.95 | Φ2.95 |
| M | 0.79 | 0.79 | 0.79 | 0.79 | 0.79 | 0.79 | 0.79 | 1.18 | 1.18 | 1.18 | 1.18 | 1.18 | 1.18 | 1.97 | 1.97 | 1.97 | 1.97 | 1.97 |
| N | 1.00 | 1.61 | 3.15 | 3.15 | 3.15 | 3.15 | 3.15 | 3.15 | 3.15 | 3.15 | 3.15 | 5.12 | 5.12 | 5.12 | 5.12 | 5.12 | 5.12 | 5.12 |
| P | 1.00 | 1.18 | 1.18 | 1.18 | 1.18 | 1.18 | 1.18 | 1.18 | 1.18 | 1.18 | 1.18 | 1.18 | 1.18 | 1.18 | 1.18 | 1.18 | 1.18 | 1.18 |
| Q1 | M5 | M5 | M5 | M5 | M5 | M5 | M5 | M5 | M5 | M5 | M5 | M5 | M5 | M5 | M5 | M5 | M5 | M5 |
| Q2 | Φ1.42(36) | Φ1.42(36) | Φ1.65(50) | Φ1.97(50) | Φ1.97(50) | Φ1.97(50) | Φ2.76(70) | Φ2.76(70) | Φ4.02(102) | Φ4.02(102) | Φ4.02(102) | Φ4.02(102) | Φ4.02(102) | Φ4.92(125) | - | - | - | - |
| Q3 | - | Φ1.65(50) | - | - | Φ2.76(70) | Φ2.76(70) | Φ4.02(102) | Φ4.02(102) | - | Φ4.92(125) | Φ4.92(125) | Φ5.51(140) | Φ5.51(140) | Φ6.50(166) | Φ6.50(166) | Φ6.50(166) | Φ10(254) | Φ10(254) |
| Q4 | M5 | M5 | M5 | M5 | M5 | M5 | M5 | M5 | M5 | M5 | M5 | M5 | M5 | M6 | M6 | M6 | M6 | M6 |
| R | - | 4-M6 | - | - | 4-M8 | 4-M8 | 4-M10 | 4-M10 | - | 4-M12 | 4-M12 | 4-M16 | 4-M16 | 4-M20 | 4-M20 | 4-M20 | 8-M16 | 8-M16 |
| S | 4-M5 | 4-M5 | 4-M5 | 4-M6 | 4-M6 | 4-M6 | 4-M8 | 4-M8 | 4-M10 | 4-M10 | 4-M10 | 4-M10 | 4-M10 | 4-M12 | - | - | - | - |
| T | 0.35(9) | 0.35(9) | 0.67(17) | 0.67(17) | 0.87(22) | 0.87(22) | 0.87(22) | 0.87(22) | 1.42(36) | 1.42(36) | 1.42(36) | 1.42(36) | 1.42(36) | 1.81(46) | 1.81(46) | 1.81(46) | 2.17(55) | 2.17(55) |
| H1 | 0.43 | 0.43 | 0.47 | 0.63 | 0.75 | 0.75 | 0.91 | 0.91 | 1.14 | 1.14 | 1.14 | 1.65 | 1.65 | 1.97 | 1.97 | 1.97 | 2.36 | 2.36 |
| d | - | - | Φ0.56 | Φ0.56 | Φ0.77 | Φ0.77 | Φ0.91 | Φ0.91 | Φ1.42 | Φ1.42 | Φ1.42 | Φ1.50 | Φ1.50 | Φ1.89 | Φ1.89 | Φ1.89 | Φ2.17 | Φ2.17 |
| H2 | - | - | 1.26 | 1.34 | 1.34 | 1.34 | 1.89 | 1.89 | 2.56 | 2.56 | 2.56 | 3.62 | 3.62 | 3.62 | 3.62 | 3.62 | 3.94 | 3.94 |
| U | - | - | - | - | - | - | 2.83 | 2.83 | 2.83 | 2.83 | 2.83 | 3.90 | 3.90 | - | - | - | - | - |
| V | - | - | - | - | - | - | 1.46 | 1.46 | 1.46 | 1.46 | 1.46 | 2.09 | 2.09 | - | - | - | - | - |
| W | - | - | - | - | - | - | M8 | M8 | M8 | M8 | M8 | M10 | M10 | - | - | - | - | - |

NOTES:
 Top mounting connection is in line with VDI/VDE3845 standards, permitting direct installation of accessories such as positioner or limit switch box.
 Bottom mounting connection is in line with ISO5211 and DIN3337 standards.
 Air supply connection is in line with VDI/VDE3845 and NAMUR standards, and can install solenoid valves conveniently



Weight and Air Consumption

| DATA MODEL | BODY DIAMETER | | | OPENING TIME DA | CLOSING TIME DA | APPROXIMATE WEIGHT-DA |
|-------------------|---------------|---------|--------|-----------------|-----------------|-----------------------|
| | Φ(In) | ccw (L) | CW (L) | S (sec.) | S (sec.) | lb |
| ARP0006 | 1.26 | 0.015 | 0.034 | 0.13 | 0.14 | 0.71 |
| ARP0010 | 1.57 | 0.032 | 0.068 | 0.14 | 0.16 | 1.53 |
| ARP0017 | 1.97 | 0.08 | 0.13 | 0.17 | 0.19 | 2.38 |
| ARP0031 | 2.48 | 0.15 | 0.25 | 0.19 | 0.22 | 3.42 |
| ARP0063 | 2.95 | 0.3 | 0.48 | 0.23 | 0.27 | 6.06 |
| ARP0098 | 3.46 | 0.5 | 0.73 | 0.33 | 0.35 | 8.33 |
| ARP0142 | 3.94 | 0.75 | 1.08 | 0.42 | 0.48 | 11.68 |
| ARP0236 | 4.53 | 1.19 | 1.8 | 0.72 | 0.93 | 18.5 |
| ARP0300 | 4.92 | 1.55 | 2.18 | 0.84 | 1.09 | 21.89 |
| ARP0462 | 5.71 | 2.40 | 3.55 | 1.32 | 1.42 | 31.08 |
| ARP0625 | 6.3 | 3.20 | 4.72 | 1.6 | 2.0 | 40.45 |
| ARP0848 | 7.09 | 4.30 | 6.80 | 2 | 2.4 | 55.12 |
| ARP1165 | 7.87 | 5.87 | 9.53 | 2.7 | 3.5 | 77.16 |
| ARP1970 | 9.45 | 10 | 15 | 3.5 | 4.5 | 138.89 |
| ARP3200 | 10.63 | 15 | 23 | 4.5 | 5.0 | 174.16 |
| ARP4025 | 11.81 | 21.1 | 30.5 | 8.8 | 12.7 | 299.39 |
| ARP5876 | 13.78 | 30.8 | 44.4 | 13 | 19 | 516.54 |
| ARP9210 | 15.75 | 48.3 | 69.6 | 20 | 29 | 745.16 |

*The above indicated moving time of the actuator, are obtained in the following testcons:

1. Room temperature
2. Actuator stroke 90°
3. Solenoid valve with orifice of 4mm and flow capacity qn 400l/min.
4. Inside pipe diameter 5mm
5. Medium clean air
6. Air supply pressure 5.5 bar (79.75psi)
7. Actuator without external resistance load

Output Torque of Double Acting Actuator (inch)

Imperial unit in-lb:

| MODEL | AIR PRESSURE | | | | | | |
|----------|--------------|-------|-------|-------|-------|--------|---------|
| | 40PSI | 60PSI | 70PSI | 80PSI | 90PSI | 100PSI | 1200PSI |
| ARP0006D | 26 | 41 | 51 | 59 | 67 | 76 | 92 |
| ARP0010D | 41 | 64 | 77 | 89 | 101 | 113 | 137 |
| ARP0017D | 77 | 110 | 135 | 155 | 174 | 201 | 243 |
| ARP0031D | 130 | 197 | 245 | 275 | 311 | 340 | 421 |
| ARP0063D | 277 | 430 | 500 | 559 | 632 | 702 | 833 |
| ARP0098D | 431 | 641 | 752 | 870 | 970 | 1081 | 1328 |
| ARP0142D | 623 | 952 | 1085 | 1261 | 1419 | 1604 | 1959 |
| ARP0236D | 1050 | 1556 | 1837 | 2095 | 2362 | 2625 | 3149 |
| ARP0300D | 1327 | 1923 | 2289 | 2664 | 3003 | 3357 | 4047 |
| ARP0462D | 1872 | 2884 | 3588 | 4102 | 4614 | 5145 | 6317 |
| ARP0625D | 2849 | 4120 | 4784 | 5549 | 6180 | 6871 | 8331 |
| ARP0848D | 3622 | 5557 | 6492 | 7529 | 8331 | 9278 | 11325 |
| ARP1165D | 5087 | 7690 | 9037 | 10344 | 11536 | 12748 | 15390 |
| ARP1970D | 8709 | 13138 | 15248 | 17492 | 19684 | 21869 | 26230 |
| ARP3200D | 14203 | 21240 | 24772 | 28413 | 32044 | 35577 | 42755 |
| ARP4025D | 17865 | 26798 | 31443 | 35738 | 40201 | 44663 | 53595 |
| ARP5876D | 26086 | 39130 | 45862 | 52173 | 58695 | 65215 | 78251 |
| ARP9210D | 40891 | 61322 | 71881 | 81775 | 91993 | 102213 | 122654 |



Output Torque of Spring Acting Actuator (inch)

Imperial unit in-lb:

| MODEL SIZE | SPRING QUANTITY | Output Torque of Spring Return Actuator(inch) | | | | | | | | | | | | | | | | |
|---------------|--------------------|---|-----|-------|-----|-------|-----|-------|-----|-------|------|--------|------|--------|------|-----|-----|----|
| | | 40PSI | | 60PSI | | 70PSI | | 80PSI | | 90PSI | | 100PSI | | 120PSI | | 0° | 90° | |
| | | 0° | 90° | 0° | 90° | 0° | 90° | 0° | 90° | 0° | 90° | 0° | 90° | 0° | 90° | | | |
| ARP0010S | 2 | | | | | 51 | 33 | 62 | 45 | 73 | 56 | 87 | 69 | 110 | 93 | 27 | 44 | |
| | 4 | | | | | | | | | | | 55 | 21 | 70 | 34 | 92 | 58 | 44 |
| ARP0017S | 5 | 53 | 39 | 82 | 67 | 109 | 95 | 129 | 114 | 146 | 131 | 174 | 160 | 215 | 200 | 27 | 42 | |
| | 6 | 46 | 31 | 75 | 58 | 103 | 86 | 122 | 105 | 139 | 122 | 167 | 151 | 208 | 190 | 34 | 50 | |
| | 7 | 41 | 23 | 69 | 49 | 97 | 78 | 115 | 96 | 133 | 113 | 161 | 142 | 201 | 181 | 40 | 59 | |
| | 8 | | | 61 | 38 | 90 | 68 | 108 | 86 | 125 | 103 | 154 | 133 | 194 | 171 | 47 | 69 | |
| | 9 | | | 55 | 30 | 84 | 61 | 102 | 78 | 119 | 94 | 148 | 125 | 188 | 163 | 53 | 77 | |
| | 10 | | | | | 78 | 53 | 96 | 70 | 113 | 86 | 142 | 117 | 181 | 155 | 59 | 85 | |
| | 11 | | | | | 71 | 44 | 89 | 60 | 105 | 76 | 135 | 107 | 174 | 145 | 66 | 95 | |
| | 12 | | | | | 64 | 34 | 82 | 51 | 98 | 66 | 128 | 98 | 167 | 135 | 73 | 104 | |
| ARP0031S | 5 | 84 | 60 | 145 | 118 | 197 | 172 | 225 | 199 | 259 | 233 | 290 | 265 | 369 | 342 | 50 | 76 | |
| | 6 | 75 | 46 | 135 | 102 | 187 | 156 | 215 | 183 | 249 | 216 | 281 | 249 | 359 | 326 | 60 | 92 | |
| | 7 | 66 | 31 | 114 | 85 | 178 | 141 | 205 | 167 | 239 | 200 | 271 | 234 | 349 | 309 | 70 | 108 | |
| | 8 | | | 103 | 70 | 167 | 127 | 194 | 153 | 228 | 185 | 261 | 220 | 338 | 295 | 81 | 122 | |
| | 9 | | | 92 | 54 | 157 | 112 | 184 | 137 | 217 | 168 | 250 | 204 | 327 | 278 | 91 | 138 | |
| | 10 | | | | 38 | 147 | 97 | 173 | 121 | 206 | 152 | 240 | 188 | 316 | 262 | 102 | 154 | |
| | 11 | | | | | 138 | 81 | 163 | 105 | 196 | 135 | 230 | 173 | 306 | 245 | 112 | 170 | |
| | 12 | | | | | 128 | 67 | 154 | 90 | 186 | 120 | 221 | 158 | 296 | 230 | 121 | 185 | |
| ARP0031S | 5 | 183 | 130 | 325 | 266 | 402 | 346 | 457 | 399 | 526 | 467 | 602 | 545 | 728 | 668 | 102 | 159 | |
| | 6 | 167 | 102 | 307 | 233 | 385 | 316 | 439 | 168 | 508 | 435 | 584 | 514 | 710 | 636 | 119 | 190 | |
| | 7 | 149 | 73 | 287 | 201 | 366 | 286 | 420 | 337 | 488 | 403 | 565 | 484 | 689 | 604 | 139 | 221 | |
| | 8 | | | 266 | 169 | 346 | 256 | 399 | 306 | 467 | 371 | 545 | 453 | 668 | 572 | 159 | 252 | |
| | 9 | | | 246 | 137 | 328 | 226 | 381 | 275 | 448 | 339 | 527 | 423 | 649 | 540 | 178 | 283 | |
| | 10 | | | 226 | 105 | 309 | 197 | 361 | 244 | 428 | 307 | 507 | 392 | 629 | 508 | 197 | 314 | |
| | 11 | | | | | 291 | 167 | 342 | 213 | 407 | 275 | 488 | 362 | 609 | 476 | 217 | 345 | |
| | 12 | | | | | 272 | 137 | 322 | 182 | 387 | 243 | 469 | 331 | 589 | 444 | 236 | 376 | |
| ARP0031S | 5 | 278 | 187 | 469 | 366 | 591 | 496 | 703 | 604 | 798 | 696 | 917 | 820 | 1155 | 1053 | 166 | 266 | |
| | 6 | 248 | 140 | 435 | 313 | 560 | 446 | 670 | 552 | 764 | 643 | 885 | 769 | 1122 | 1000 | 199 | 317 | |
| | 7 | 218 | 93 | 401 | 260 | 528 | 396 | 637 | 501 | 731 | 590 | 853 | 718 | 1088 | 947 | 232 | 368 | |
| | 8 | | | 368 | 207 | 497 | 347 | 605 | 449 | 698 | 536 | 821 | 668 | 1055 | 894 | 264 | 419 | |
| | 9 | | | 335 | 154 | 467 | 297 | 574 | 398 | 665 | 483 | 790 | 617 | 1022 | 840 | 296 | 471 | |
| | 10 | | | 301 | 101 | 435 | 248 | 541 | 346 | 631 | 430 | 758 | 567 | 988 | 787 | 328 | 522 | |
| | 11 | | | | | 403 | 198 | 508 | 295 | 597 | 377 | 725 | 516 | 954 | 734 | 361 | 573 | |
| | 12 | | | | | 372 | 149 | 475 | 243 | 563 | 324 | 693 | 466 | 920 | 681 | 394 | 625 | |
| ARP0031S | 5 | 418 | 305 | 722 | 595 | 871 | 752 | 1038 | 914 | 1189 | 1062 | 1385 | 1264 | 1729 | 1602 | 222 | 345 | |
| | 6 | 377 | 241 | 676 | 523 | 827 | 684 | 993 | 844 | 1143 | 990 | 1341 | 1195 | 1683 | 1530 | 267 | 415 | |
| | 7 | 335 | 177 | 629 | 450 | 784 | 617 | 947 | 774 | 1096 | 917 | 1297 | 1127 | 1636 | 1458 | 312 | 485 | |
| | 8 | | | 582 | 378 | 740 | 549 | 902 | 704 | 1049 | 845 | 1252 | 1058 | 1589 | 1385 | 358 | 555 | |
| | 9 | | | 536 | 306 | 696 | 482 | 857 | 634 | 1002 | 773 | 1208 | 989 | 1543 | 1313 | 403 | 625 | |
| | 10 | | | 490 | 234 | 654 | 415 | 812 | 565 | 957 | 701 | 1164 | 921 | 1497 | 1241 | 447 | 694 | |
| | 11 | | | | | 610 | 348 | 767 | 494 | 910 | 629 | 1120 | 852 | 1450 | 1169 | 492 | 764 | |
| | 12 | | | | | 566 | 280 | 721 | 424 | 862 | 557 | 1074 | 783 | 1403 | 1097 | 538 | 834 | |

Output Torque of Double Acting Actuator (inch)

Imperial unit in-lb:

| MODEL SIZE | SPRING QUANTITY | OUTPUT TORQUE OF SPRING RETURN ACTUATOR(INCH) | | | | | | | | | | | | | | | |
|------------|-----------------|---|------|-------|------|-------|------|-------|------|-------|------|--------|------|--------|-------|------|------|
| | | 40PSI | | 60PSI | | 70PSI | | 80PSI | | 90PSI | | 100PSI | | 120PSI | | 0° | 90° |
| | | 0° | 90° | 0° | 90° | 0° | 90° | 0° | 90° | 0° | 90° | 0° | 90° | 0° | 90° | 0° | 90° |
| ARP00236S | 5 | 716 | 513 | 1199 | 970 | 1487 | 1273 | 1731 | 1509 | 1987 | 1758 | 2267 | 2049 | 2774 | 2554 | 363 | 584 |
| | 6 | 651 | 407 | 1126 | 851 | 1418 | 1162 | 1660 | 1403 | 1913 | 1648 | 2197 | 1936 | 2701 | 2435 | 434 | 699 |
| | 7 | 586 | 301 | 1053 | 732 | 1350 | 1051 | 1589 | 1287 | 1831 | 1520 | 2127 | 1822 | 2628 | 2307 | 504 | 814 |
| | 8 | | | 970 | 613 | 1273 | 940 | 1518 | 1172 | 1758 | 1401 | 2049 | 1709 | 2554 | 2188 | 584 | 929 |
| | 9 | | | 897 | 494 | 1205 | 829 | 1447 | 1048 | 1685 | 1282 | 1979 | 1596 | 2472 | 2069 | 655 | 1044 |
| | 10 | | | | | 1136 | 718 | 1367 | 932 | 1611 | 1163 | 1910 | 1482 | 2399 | 1950 | 726 | 1159 |
| | 11 | | | | | 1068 | 607 | 1296 | 817 | 1538 | 1044 | 1840 | 1369 | 2325 | 1831 | 797 | 1274 |
| | 12 | | | | | | | 1225 | 701 | 1456 | 925 | 1761 | 1256 | 2243 | 1712 | 867 | 1389 |
| ARP0300S | 5 | 911 | 667 | 1456 | 1181 | 1854 | 1598 | 2211 | 1944 | 2536 | 2261 | 2912 | 2651 | 3580 | 3305 | 451 | 717 |
| | 6 | 826 | 529 | 1360 | 1025 | 1765 | 1453 | 2117 | 1793 | 2440 | 2106 | 2821 | 2502 | 3484 | 3149 | 544 | 867 |
| | 7 | 741 | 399 | 1263 | 879 | 1675 | 1316 | 2024 | 1651 | 2344 | 1959 | 2729 | 2363 | 3387 | 3003 | 637 | 1009 |
| | 8 | | | 1163 | 723 | 1581 | 1171 | 1926 | 1500 | 2243 | 1804 | 2633 | 2215 | 3287 | 2847 | 735 | 1159 |
| | 9 | | | 1067 | 568 | 1491 | 1025 | 1833 | 1349 | 2147 | 1648 | 2542 | 2066 | 3191 | 2692 | 827 | 1310 |
| | 10 | | | | | 1401 | 880 | 1740 | 1198 | 2051 | 1492 | 2450 | 1918 | 3094 | 2536 | 920 | 1460 |
| | 11 | | | | | 1312 | 743 | 1647 | 1056 | 1955 | 1346 | 2359 | 1779 | 2998 | 2390 | 1013 | 1602 |
| | 12 | | | | | 1218 | 598 | 1549 | 906 | 1854 | 1190 | 2263 | 1630 | 2898 | 2234 | 1111 | 1752 |
| ARP0462S | 5 | 1213 | 838 | 2142 | 1721 | 2897 | 2504 | 3382 | 2974 | 3897 | 3490 | 4438 | 4037 | 5576 | 5154 | 717 | 1124 |
| | 6 | 1074 | 627 | 1987 | 1483 | 2751 | 2281 | 3231 | 2743 | 3747 | 3260 | 4290 | 3810 | 5420 | 4916 | 867 | 1354 |
| | 7 | 936 | 415 | 1831 | 1245 | 2606 | 2959 | 3081 | 2512 | 3587 | 3030 | 4142 | 3584 | 5264 | 4678 | 1018 | 1584 |
| | 8 | | | 1685 | 1007 | 2469 | 1837 | 2939 | 2282 | 3455 | 2800 | 4002 | 3357 | 5118 | 4440 | 1159 | 1814 |
| | 9 | | | 1529 | 778 | 2324 | 1624 | 2788 | 2060 | 3304 | 2579 | 3854 | 3139 | 4962 | 4211 | 1310 | 2036 |
| | 10 | | | 1373 | 540 | 2179 | 1401 | 2637 | 1829 | 3154 | 2349 | 3706 | 2912 | 4806 | 3973 | 1460 | 2266 |
| | 11 | | | | | 2042 | 1179 | 2495 | 1598 | 3012 | 2119 | 3566 | 2686 | 4660 | 3735 | 1602 | 2496 |
| | 12 | | | | | 1905 | 957 | 2353 | 1367 | 2871 | 1888 | 3427 | 2459 | 4514 | 3497 | 1743 | 2726 |
| ARP0625S | 5 | 1953 | 1506 | 3113 | 2609 | 3845 | 3375 | 4572 | 4084 | 5173 | 4669 | 5912 | 5432 | 7324 | 6821 | 974 | 1460 |
| | 6 | 1766 | 1237 | 2902 | 2307 | 3649 | 3093 | 4368 | 3791 | 4962 | 4367 | 5711 | 5144 | 7114 | 6518 | 1177 | 1752 |
| | 7 | 1579 | 960 | 2692 | 1996 | 3452 | 2803 | 4164 | 3489 | 4752 | 4056 | 5511 | 4848 | 6903 | 6207 | 1381 | 2053 |
| | 8 | | | 2481 | 1694 | 3256 | 2521 | 3959 | 3196 | 4541 | 3754 | 5310 | 4560 | 6692 | 5905 | 1584 | 2345 |
| | 9 | | | 2280 | 1328 | 3068 | 2230 | 3764 | 2894 | 4340 | 3442 | 5118 | 4264 | 6491 | 5594 | 1779 | 2646 |
| | 10 | | | 2069 | 1080 | 2871 | 1948 | 3560 | 2601 | 4129 | 3140 | 4918 | 3976 | 6280 | 5292 | 1982 | 2938 |
| | 11 | | | | | 2675 | 1658 | 3365 | 2299 | 3918 | 2829 | 4717 | 3680 | 6070 | 4980 | 2186 | 3239 |
| | 12 | | | | | 2487 | 1376 | 3160 | 2006 | 3717 | 2527 | 4525 | 3392 | 5868 | 4678 | 2381 | 3531 |
| ARP0848S | 5 | 2352 | 1676 | 5713 | 4779 | 5161 | 4452 | 6143 | 5407 | 6903 | 6143 | 7917 | 7193 | 9897 | 9137 | 1381 | 2115 |
| | 6 | 2091 | 1237 | 5328 | 4202 | 4888 | 4050 | 5859 | 4989 | 6610 | 5713 | 7638 | 6784 | 9604 | 8707 | 1664 | 2531 |
| | 7 | 1831 | 960 | 4944 | 3625 | 4614 | 3649 | 5575 | 4572 | 6317 | 5283 | 7359 | 6374 | 9311 | 8276 | 1947 | 2947 |
| | 8 | | | 4559 | 3058 | 4341 | 3238 | 5291 | 4146 | 6024 | 4843 | 7080 | 5955 | 9018 | 7837 | 2230 | 3372 |
| | 9 | | | 4166 | 2490 | 4076 | 2837 | 5016 | 3729 | 5740 | 4413 | 6810 | 5545 | 8734 | 7407 | 2505 | 3788 |
| | 10 | | | 3772 | 1913 | 3802 | 2435 | 4732 | 3311 | 5447 | 3983 | 6531 | 5136 | 8441 | 6976 | 2788 | 4204 |
| | 11 | | | | | 3538 | 2034 | 4457 | 2894 | 5164 | 3552 | 6260 | 4726 | 8157 | 6546 | 3062 | 4620 |
| | 12 | | | | | 3264 | 1632 | 4173 | 2477 | 4871 | 3122 | 5981 | 4316 | 7864 | 6116 | 3345 | 5036 |
| ARP0031S | 5 | 328 | 2498 | 5713 | 4779 | 7195 | 6323 | 8425 | 7519 | 9558 | 8624 | 10864 | 9975 | 13412 | 12479 | 1912 | 2814 |
| | 6 | 2987 | 1986 | 5328 | 4202 | 6836 | 5785 | 8052 | 6960 | 9173 | 8047 | 10498 | 9425 | 13028 | 11902 | 2283 | 3372 |
| | 7 | 2645 | 1473 | 4944 | 3625 | 6477 | 5247 | 7679 | 6401 | 8789 | 7471 | 10132 | 8876 | 12643 | 11325 | 2655 | 3929 |
| | 8 | | | 4559 | 3058 | 6118 | 4717 | 7306 | 5850 | 8404 | 6903 | 9766 | 8336 | 12259 | 10757 | 3027 | 4478 |
| | 9 | | | 4166 | 2490 | 5751 | 4187 | 6925 | 5300 | 8011 | 6335 | 9391 | 7795 | 11865 | 10190 | 3407 | 5027 |
| | 10 | | | 3772 | 1913 | 5383 | 3649 | 6543 | 4741 | 7617 | 5759 | 9016 | 7246 | 11471 | 9613 | 3788 | 5584 |
| | 11 | | | | | 5024 | 3119 | 6170 | 4190 | 7233 | 5191 | 8649 | 6705 | 11087 | 9045 | 4160 | 6133 |
| | 12 | | | | | 4657 | 2581 | 5788 | 3631 | 6839 | 4614 | 8275 | 6156 | 10693 | 8469 | 4540 | 6691 |



Output Torque of Double Acting Actuator (inch)

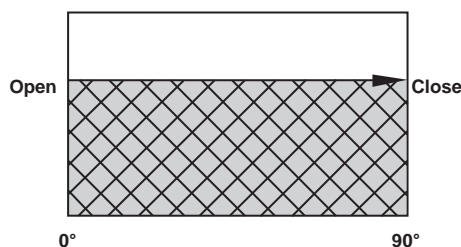
Imperial unit in-lb:

| MODEL SIZE | SPRING QUANTITY | OUTPUT TORQUE OF SPRING RETURN ACTUATOR(INCH) | | | | | | | | | | | | | | | |
|------------|-----------------|---|-------|-------|--------|-------|-------|-------|--------|-------|-------|--------|-------|--------|-------|-------|-------|
| | | 40PSI | | 60PSI | | 70PSI | | 80PSI | | 90PSI | | 100PSI | | 120PSI | | 0° | 90° |
| | | 0° | 90° | 0° | 90° | 0° | 90° | 0° | 90° | 0° | 90° | 0° | 90° | 0° | 90° | | |
| ARP1970S | 5 | 5737 | 4419 | 9796 | 8313 | 12134 | 10749 | 14249 | 12811 | 16342 | 14859 | 18685 | 17273 | 22888 | 21405 | 3230 | 4664 |
| | 6 | 5135 | 3564 | 9119 | 7352 | 11501 | 9852 | 13592 | 11878 | 15665 | 13898 | 18040 | 16357 | 22210 | 20444 | 3885 | 5593 |
| | 7 | 4541 | 2694 | 8450 | 6372 | 10878 | 8938 | 12944 | 10929 | 14996 | 12936 | 17395 | 15450 | 21524 | 19482 | 4531 | 6540 |
| | 8 | | | 7736 | 5402 | 10245 | 8032 | 12287 | 9987 | 14319 | 11975 | 16758 | 14535 | 20846 | 18521 | 5186 | 7478 |
| | 9 | | | 7123 | 4449 | 9639 | 7143 | 11656 | 9064 | 13669 | 11014 | 16113 | 13628 | 20160 | 17560 | 5814 | 8399 |
| | 10 | | | 6445 | 3506 | 9006 | 6263 | 11000 | 8150 | 12991 | 10052 | 15459 | 12713 | 19491 | 16589 | 6469 | 9310 |
| | 11 | | | | | 8374 | 5358 | 10343 | 7209 | 12314 | 9100 | 14823 | 11788 | 18814 | 15637 | 7124 | 10248 |
| | 12 | | | | | 7742 | 4426 | 9686 | 6241 | 11636 | 8148 | 14169 | 10882 | 18127 | 14667 | 7779 | 11213 |
| ARP3200S | 5 | 9790 | 7690 | 16278 | 13916 | 20149 | 17944 | 23597 | 21307 | 27081 | 24719 | 30849 | 28599 | 37793 | 35431 | 4797 | 7080 |
| | 6 | 8887 | 6429 | 15298 | 12479 | 19217 | 16577 | 22629 | 19886 | 26083 | 23254 | 29898 | 27204 | 36795 | 33966 | 5779 | 8452 |
| | 7 | 8016 | 5119 | 14319 | 11041 | 18286 | 15210 | 21742 | 18466 | 22613 | 21789 | 28948 | 25809 | 35797 | 32501 | 6726 | 9877 |
| | 8 | | | 13339 | 9567 | 17355 | 13843 | 20685 | 17045 | 24087 | 20324 | 27997 | 24414 | 34799 | 31036 | 7655 | 11284 |
| | 9 | | | 12359 | 8111 | 16423 | 12475 | 19726 | 15625 | 23089 | 18860 | 27047 | 23019 | 33709 | 29571 | 8673 | 12744 |
| | 10 | | | 11297 | 6628 | 15492 | 11108 | 18759 | 14204 | 22091 | 17395 | 26097 | 21624 | 32803 | 28106 | 9611 | 14125 |
| | 11 | | | | | 14560 | 9741 | 17791 | 12784 | 21094 | 15930 | 25146 | 20229 | 31805 | 26642 | 10558 | 15523 |
| | 12 | | | | | 13672 | 8459 | 16823 | 11364 | 20096 | 14465 | 24196 | 18833 | 30807 | 25177 | 11505 | 16904 |
| ARP4025S | 5 | 11857 | 8854 | 20041 | 16662 | 25147 | 21994 | 29181 | 25905 | 33444 | 30066 | 38225 | 35008 | 46838 | 43460 | 6531 | 9797 |
| | 6 | 10661 | 7064 | 18695 | 14648 | 23891 | 20115 | 27876 | 23952 | 32098 | 28051 | 36943 | 33089 | 45492 | 41445 | 7832 | 11744 |
| | 7 | 9464 | 5265 | 17349 | 12625 | 22635 | 18226 | 26571 | 21990 | 30752 | 26028 | 35662 | 31162 | 44146 | 39422 | 9133 | 13700 |
| | 8 | | | 16003 | 10602 | 21379 | 16338 | 25266 | 20028 | 29406 | 24005 | 34380 | 29236 | 42800 | 37399 | 10434 | 15656 |
| | 9 | | | 13302 | 8578 | 20115 | 14449 | 23952 | 180066 | 28051 | 21982 | 33089 | 27309 | 41445 | 35376 | 11744 | 17612 |
| | 10 | | | | 6555 | 18858 | 12561 | 22647 | 16104 | 26706 | 19958 | 31808 | 25382 | 40100 | 33352 | 13045 | 19567 |
| | 11 | | | | | 17602 | 10672 | 21342 | 14142 | 25360 | 17935 | 30526 | 23455 | 38754 | 31329 | 14346 | 21523 |
| | 12 | | | | | | | 20071 | 12247 | 24525 | 16701 | 28993 | 21169 | 37912 | 30088 | 15657 | 23481 |
| ARP5826S | 5 | 17326 | 12947 | 29278 | 24353 | 36683 | 32086 | 42613 | 37837 | 48843 | 43917 | 55829 | 51138 | 68398 | 63473 | 9523 | 14284 |
| | 6 | 15576 | 10327 | 27310 | 21405 | 34846 | 29334 | 40704 | 34978 | 46874 | 40969 | 53954 | 48331 | 66430 | 60525 | 11425 | 17134 |
| | 7 | 13834 | 7707 | 25351 | 18457 | 33017 | 26583 | 38805 | 32120 | 44915 | 38021 | 52089 | 45523 | 64471 | 57577 | 13319 | 19983 |
| | 8 | | | 23382 | 11509 | 31180 | 23832 | 36896 | 29261 | 42947 | 35073 | 50214 | 42715 | 62502 | 54629 | 15222 | 22833 |
| | 9 | | | 21414 | 12561 | 29343 | 21080 | 34987 | 26402 | 40979 | 32126 | 48339 | 39908 | 60534 | 51681 | 17125 | 25683 |
| | 10 | | | 19446 | 9613 | 27506 | 18329 | 33078 | 23544 | 39010 | 29178 | 46465 | 37100 | 58566 | 48733 | 19028 | 28532 |
| | 11 | | | | | 25677 | 15577 | 31179 | 20685 | 37051 | 26230 | 44599 | 34293 | 56606 | 45785 | 20921 | 31382 |
| | 12 | | | | | | | 29333 | 17915 | 35840 | 24422 | 42370 | 30952 | 55387 | 43969 | 22826 | 34244 |
| ARP9210S | 5 | 27189 | 20337 | 45913 | 38205 | 57524 | 50329 | 66823 | 59348 | 76583 | 68874 | 87532 | 80191 | 107244 | 99535 | 14895 | 22346 |
| | 6 | 24446 | 16227 | 42828 | 33581 | 54644 | 46014 | 63831 | 54864 | 73498 | 64251 | 84594 | 75787 | 104158 | 94912 | 17877 | 26816 |
| | 7 | 21712 | 12117 | 39752 | 28958 | 51773 | 41699 | 60848 | 50381 | 70422 | 59628 | 81664 | 71384 | 101082 | 90288 | 20851 | 31285 |
| | 8 | | | 36666 | 24334 | 48894 | 37384 | 57856 | 45898 | 67336 | 55004 | 78726 | 66981 | 97997 | 85665 | 23833 | 35754 |
| | 9 | | | 33590 | 19711 | 46022 | 33068 | 54873 | 41415 | 64260 | 50381 | 75796 | 62578 | 94921 | 81042 | 26807 | 40223 |
| | 10 | | | 30505 | 150088 | 43143 | 28753 | 51882 | 36931 | 61175 | 45758 | 72858 | 58175 | 91836 | 76418 | 29789 | 44693 |
| | 11 | | | | | 40263 | 24438 | 48890 | 32448 | 58090 | 41134 | 69919 | 53771 | 88750 | 71795 | 32772 | 49162 |
| | 12 | | | | | | | 45907 | 27965 | 55013 | 36511 | 66990 | 49368 | 85674 | 67172 | 35745 | 53631 |

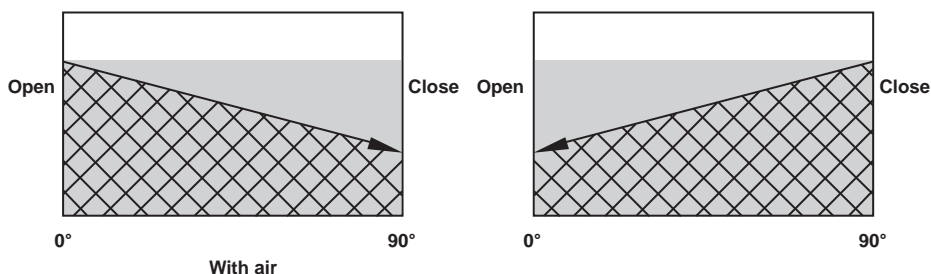


Curves

Output Torque of Double Acting Actuator



Output Torque of Spring Return Actuator



Service Conditions to Consider

■ **Operating media:**

Dry or lubricated air, or inert gas, or non-corrosive gases that compatible with actuator inner parts and lubricant are available. The media temperature must 10°C lower than ambient temperature at least, and the maximum particle diameter must less than 20µ.

■ **Air supply pressure:**

3 Bar (40 psi) ~ 8 Bar (120 psi).

■ **Travel adjustment:**

Have adjustment range of ±5° for the rotating 90°.

■ **Operating temperature:**

- a. Standard: -20°C to +80°C.
- b. Low temperature: -40°C to +80°C.
- c. High temperature: -15°C to 150°C.

■ **Lubricant:**

Use the lubricant that temperature range at -20°C to +80°C. Select special lubricant when the operating condition is low temperature or high temperature.

The Grade of Anticorrosion & Recommended Service Environment

| PARTS | THE GRADE OF ANTICORROSION | |
|-------------------|--|---------------------------------|
| | A | B |
| BODY | ANODISE HARDENING + EPOXY POLYESTER COATING | STAINLESS STEEL CF8/CF8M |
| CAP | ANODISE HARDENING + EPOXY POLYESTER COATING | STAINLESS STEEL CF8/CF8M |
| DRIVE SHAFT | CARBON STEEL NICKEL PLATED | STAINLESS STEEL CF8/CF8M |
| PISTON | ANODISE HARDENING | STAINLESS STEEL CF8/CF8M |
| SERVICE CONDITION | NORMAL CONDITION OR LOW THICKNESS ACID ENVIRONMENT | HIGH THICKNESS ACID ENVIRONMENT |

Actuator Sizing Guide

ACTUATION SIZING DATA:

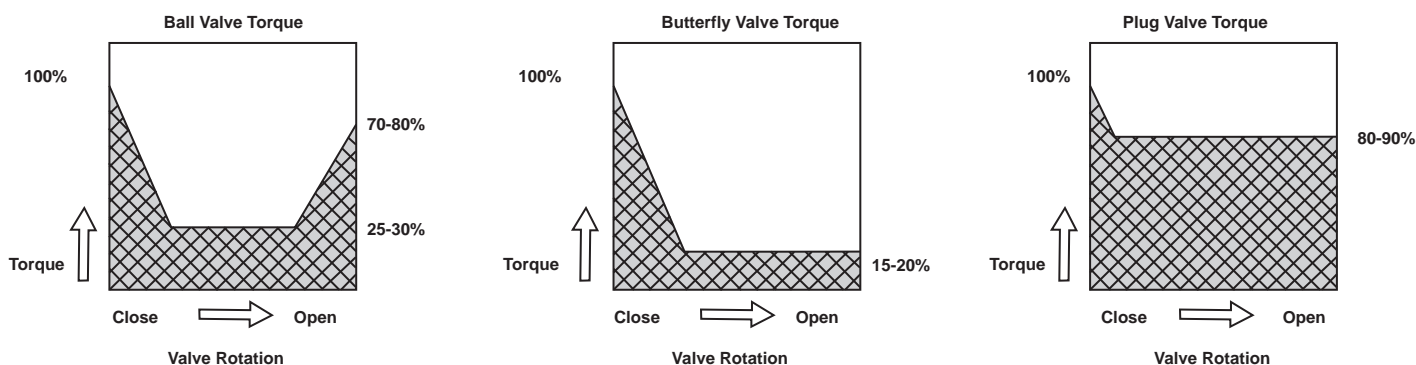
This reference data are designed to help choose ARP actuator. Before installing the ARP actuator on valve, you must consider the following factors:

- The operating life of this actuator is 3 years or 1 million times.
- Non-metal parts should be replaced when the actuator is used over half a million times.
- The air pressure for the actuator.
- The operation torque of valve coupled with safety factor that manufacturer recommended (based on operations).
- The types of actuator, i.e. Double Acting Actuator and Spring Return Actuator, and its output torque under certain supply air .

Actuator's direction of rotation and failure mode (failure open and close)

It is very important to choose a correct actuator. For example, the stem will be over forced if the actuator is too big. Whereas, there will be not enough torque to operate valve if the actuator is too small. Usually, we consider the required torque to operate valves is from the frictions between metal parts of valve (such as ball and disc) and seals (body). According to the valves' working condition, a lot of factors can influence the torque, such as operating temperature, frequency of operation, management and pressure difference, delivery media (lubricated, dry, muddy).

BELOW QUOTED TORQUE CHARACTERISTICS OF THREE DIFFERENT TYPES OF 90° TRAVEL VALVES:



■ **Ball Valve:**

Ball valve construction concept is based essentially on a polished ball (include a through port) contained in two seats (upstream and downstream). The ball rotation allows the flow, or stops the flow through the valve. Differential Pressure between upstream and downstream pressures forces the ball against the downstream seat (floating ball). In this case, the valve torque is generated by the friction between ball and seat and also between stem and packing. As shown in the diagram , the highest torque point is when, in presence of pressure, the valve is in the closed position, and passes to the open position (breakaway torque).

■ **Butterfly Valve:**

Butterfly valve construction concept is based essentially on a disc fixed on an axis, which in the closed position, is completely contained by the seat. The open position is obtained when, with a rotation, the disc (through its stem) becomes parallel to the flow. On the contrary, the closed position is obtained when the disc is perpendicular to the flow. In the case of the butterfly valve, the torque is generated by the friction between the disc and the seat, by the stem packing and also by the differential pressure that forces on the disc. The highest torque point, as shown in the diagram, is in the closed position, and only after a small rotation it is considerably reduced.

■ **Plug Valve:**

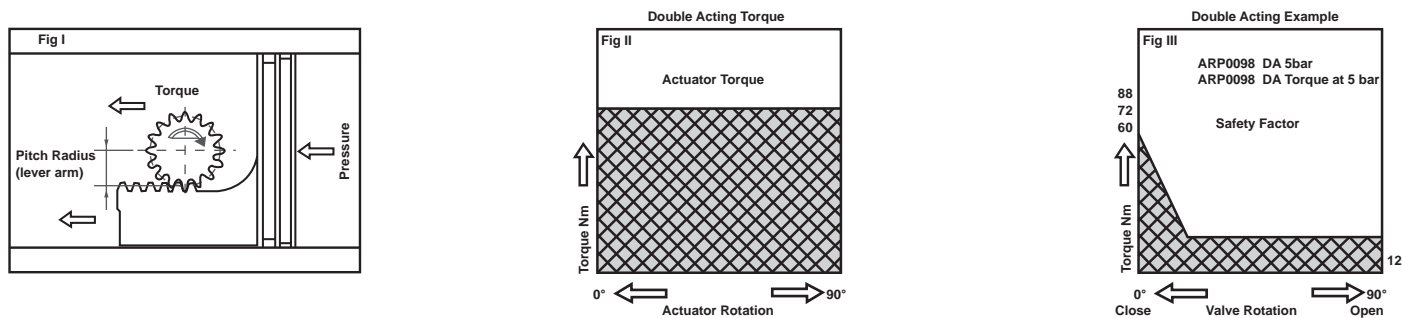
The construction principle of the plug valve is basically according to the plug sealed in the conical cock body. There is a channel at a direction of the plug. Along with plug screws in the valve, the valve will open or close. The operating torque is decided by the friction of the valve seat and the plug during the open and close process and is often not influenced by the fluid's pressure. As shown in the picture. The torque is maximal when the valve closes. As without the influence of the pressure, the superior torque will be kept at the following operation.

Double Acting Actuation Guide:

The output torque of rack and pinion pneumatic actuator = piston pressure (air supply pressure) × pitch radius (lever of arm), as Fig.I. Besides, the friction resistance and efficiency are very high. As Fig.II, both of the output torque are linear when CCW or CW. The suggested safety factor for double acting actuators under normal working conditions is 15%-20%.

Example (check the technical data sheet):

Butter valve's output torque = 60NM Safety factor (20%) = 60NM × (1+20%) = 72NM Air supply pressure = 5 bar
 When air supply pressure is 5 Bar, the kind of DFS double acting actuator with output 72NM you need at least is DFS085 for this operation.



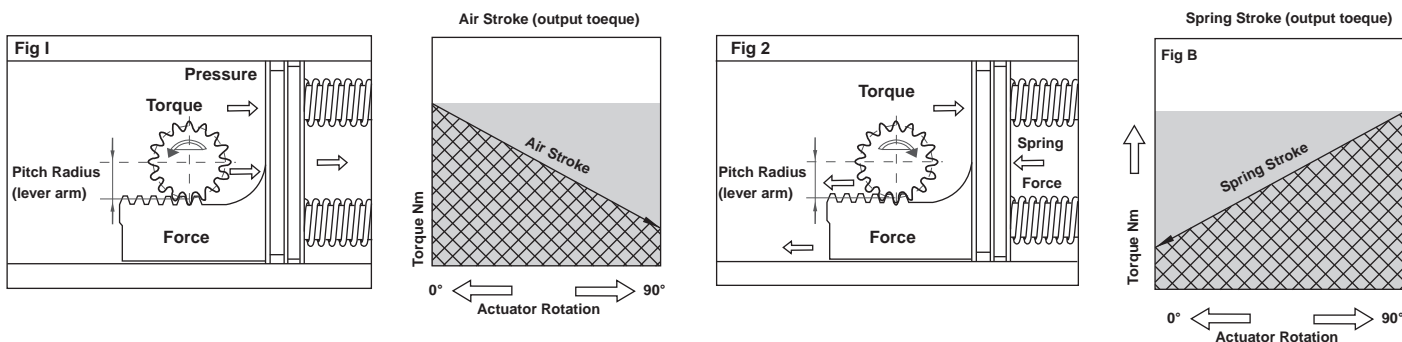
Spring Return Actuation Sizing Guide:

In the application of SR actuator, the output torque is coming from two different process of operation (Fig.1 and Fig.2). According to the travel position (0° and 90°), every operation gets two different torque. SR actuator's output torque = pressure (air or spring work on the piston) × pitch radius (lever of arm).

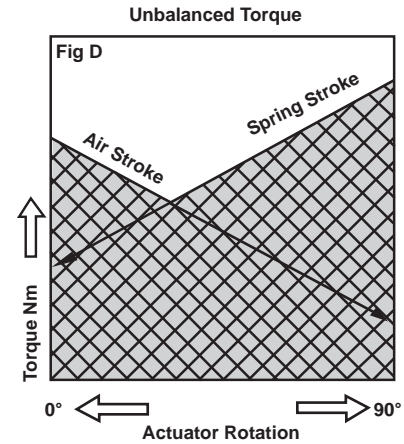
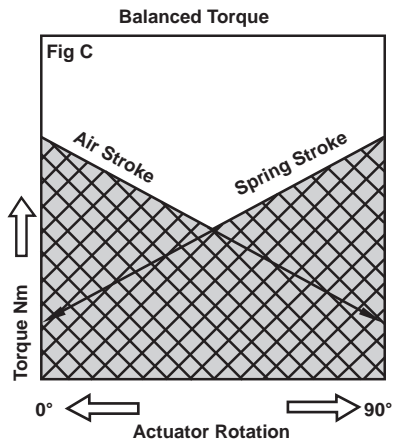
The first situation (Fig.1): output torque is coming from air supply pressure inside the Port 2 and squeezing the spring. It is known as "air travel output torque". In this situation, air supply pressure pressurized from 0° position to 90° position.

As squeeze spring have a reaction force, torque is decreasing gradually from the starting 0° position to 90° position (Fig. A).

The second situation (Fig.2): the output torque is coming from the spring return forcing work on the piston when out of air. It is known as "spring travel output torque". In this situation, because of the comeback of spring, torque is decreasing gradually from the starting 90° position to 0° position (Fig. B).



In a word, ARP actuator is designed base on the fact that two situations get one balanced torque, i.e. the numbers of springs are the same as air supply pressure readings each side (4 bar, 4 springs each side), as shown in Fig. C. There are possibilities to get an unbalanced torque in every situation, as shown in Fig. D, by changing the number of springs and air supply pressure(such as six springs each side and 5.5 bar air supply pressure, and vice versa).



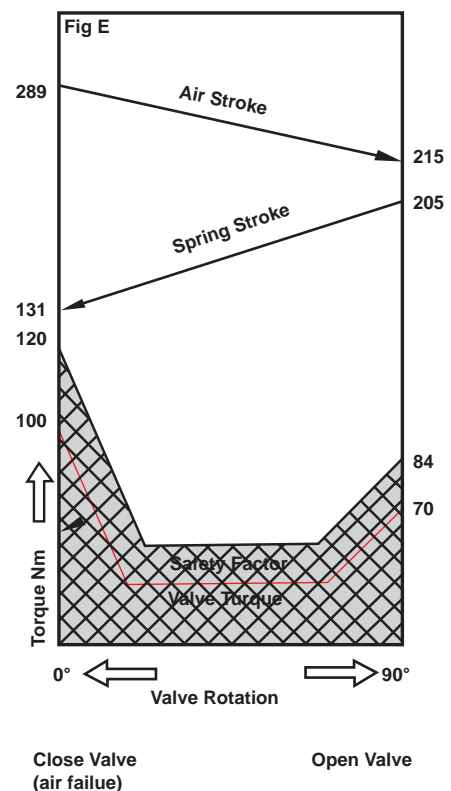
In the application of SR actuator, there are two situations: out of air open or out of air close. The suggested safety factor for spring return actuators under normal working conditions is 20%-25%.

Example (check the technical data sheet):

- Springs closed (out of air).
- Ball valve's output torque=100NM.
- Safety factor (20%)=100×(1+20%)=120NM Air supply pressure= 5 Bar.

The selected actuator is DFS145, therefore it gets the following data (Fig.E):

- Spring stroke 0°=131NM.
- Spring stroke 90°=205NM.
- Air stroke 0°=289NM.
- Air stroke 90°=215NM.



Trouble Shooting

| <i>Trouble Phenomena</i> | <i>CHECKING ITEM</i> | <i>SOLUTION</i> |
|--------------------------------------|--|---|
| Pneumatic Valve Does Not Act. | 1.- DOES THE SOLENOID WORK NORMALLY 2.- IS THE CIRCUIT BURNED 3.- IS THE MANDREL OF THE SOLENOID BLOCKED BY IMPURITY | 1.- REPLACE THE SOLENOID 2.- REPLACE THE CIRCUIT 3.- REMOVE THE IMPURITY STAINLESS STEEL CF8/CF8M |
| | WITH AIR SUPPLYING THE PNEUMATIC ACTUATOR, ARE THE O-RINGS OR THE CYLINDER BROKEN? | REPLACE THE BROKEN O-RINGS AND CYLINDER BODY |
| | IS IMPURITY BLOCKING THE VALVE | CLEAN OUT THE IMPURITY, REPLACE THE BROKEN PARTS |
| | IS THE HANDLE OF THE MANUAL EQUIPMENT AT THE MANUAL STATE? | PUT THE HANDLE TO THE PNEUMATIC STATE |
| Acting Slowly | IS THE AIR SUPPLY PRESSURE INSUFFICIENT? | IMPROVE THE AIR PRESSURE |
| | IS THE OUTPUT TORQUE OF PNEUMATIC ACTUATOR NOT ENOUGH? | SELECT A BIGGER MODEL OF THE PNEUMATIC ACTUATOR |
| | IS THE VALVE STEM OR OTHER PARTS ASSEMBLED TOO TIGHTENED? | REASSEMBLE AND ADJUST THE VALVE |
| | IS THE AIR SUPPLY PIPE BLOCKED MAKING THE AIR FLUX TOO SMALL? | CLEAN OUT THE BLOCK, REPLACE THE FILTER STEM |
| The Feedback Has No Signal | IS THE POWER SHORTED OUT OR STOPPED? | CHECK THE CIRCUITRY |
| | IS THE CAM OF THE FEEDBACK IN THE INCORRECT POSITION? | ADJUST THE CAM TO THE CORRECT POSITION |
| | IS THE JIGGLE ON-OFF BROKEN? | REPLACE THE JIGGLE ON-OFF |

How to Order

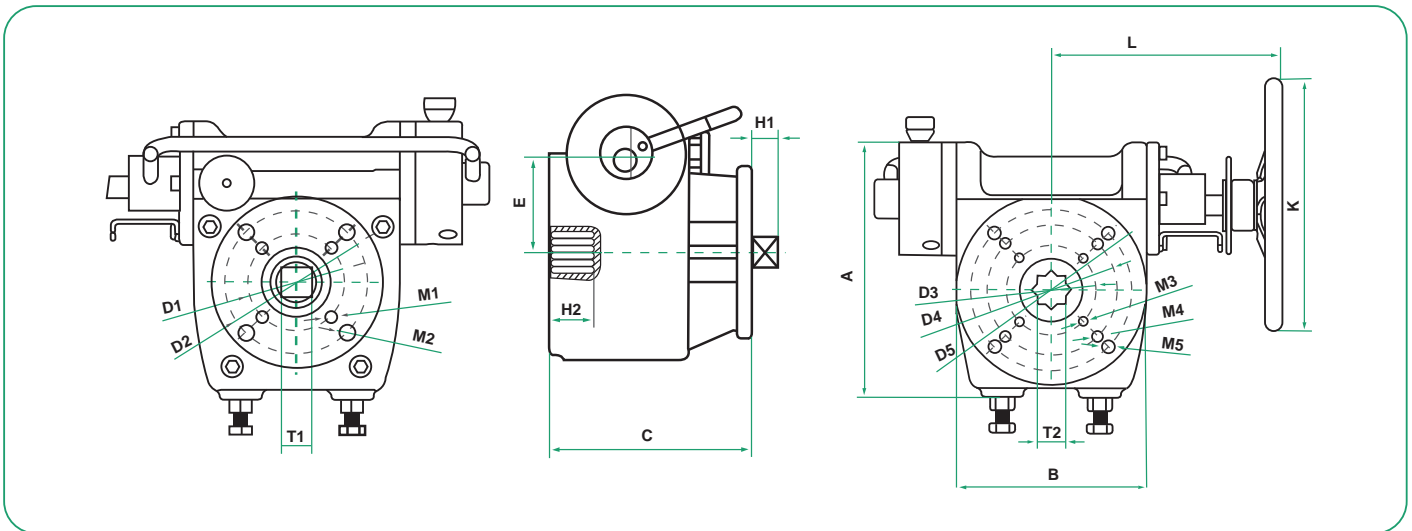
| <i>ACTUATOR MODEL</i> | <i>TYPE</i> | <i>ISO 5211</i> |
|-----------------------|------------------|-----------------|
| ARP0006 | D: DOUBLE ACTING | F049 |
| ARP0010 | | F04059 |
| ARP0017 | | F0517 |
| ARP0031 | | F0517 |
| ARP0063 | | F050722 |
| ARP0098 | | F050722 |
| ARP0142 | | F071022 |
| ARP0236 | | F071022 |
| ARP0300 | S: SPRING RETURN | F1036 |
| ARP0462 | | F101236 |
| ARP0625 | | F101236 |
| ARP0848 | | F101436 |
| ARP1165 | | F101436 |
| ARP1970 | | F121646 |
| ARP3200 | | F1646 |
| ARP4025 | | F1646 |
| ARP5876 | | F2555 |
| DFS9210 | | F2555 |

DFM Series Declutchable Manual Override Gear Operator



Features / Design

- High-strength, high-output torque.
- Built in one body, IP67 solid weatherproof sealing.
- Mounting base standard, ISO 211.
- Patented Pneumatic-Hand shift safety device.
- Self-lubricated bearing for worm & worm gear.
- WCB body surface treated by phosphating, epoxy & V polyester coating.
- Yellow & black color.



Dimensions

| MODEL | A | B | C | D1 | D2 | D3.D4.D5 | E | L | M1 | M2 | T1 | T2 | H1 | H2 | K | J | APPLICABLE ACTUATORS | INPUT TORQUE | OUTPUT TORQUE |
|---------|-----|-----|-------|------|------|-------------|-------|-----|-----|-------|-------|----|----|-----|------|---------|----------------------|--------------|---------------|
| AMO0150 | 120 | 100 | 104 | φ50 | φ70 | F05.F07 | 44.5 | 114 | φ7 | 4-φ9 | 17 | 17 | 14 | 25 | φ160 | 1/4"NPT | DFS032-085 | 17N.m | 150N.m |
| AMO0200 | 120 | 100 | 104 | φ50 | φ70 | F05.F07 | 44.5 | 120 | φ7 | 4-φ9 | 17 | 17 | 14 | 25 | φ200 | 1/4"NPT | DFS075-100 | 22N.m | 200N.m |
| AMO0600 | 192 | 148 | 145 | φ70 | φ102 | F07.F10.F12 | 71 | 175 | φ9 | 4-φ11 | 22 | 27 | 19 | 30 | φ200 | 1/4"NPT | DFS100-145 | 42N.m | 600N.m |
| AMO0900 | 192 | 148 | 145 | φ70 | φ102 | F07.F10.F12 | 71 | 178 | φ9 | 4-φ11 | 27 | 27 | 19 | 30 | φ250 | 1/4"NPT | DFS145-160 | 70N.m | 900N.m |
| AMO1200 | 192 | 148 | 145 | φ70 | φ102 | F07.F10.F12 | 71 | 181 | φ9 | 4-φ11 | 27 | 27 | 19 | 30 | φ300 | 1/4"NPT | DFS154-180 | 96N.m | 1200N.m |
| AMO1600 | 260 | 196 | 191.5 | φ102 | φ125 | F10.F12 | 107.5 | 268 | φ11 | 4-φ13 | 36 | 36 | 34 | 40 | φ350 | 1/4"NPT | DFS160-200 | 80N.m | 1600N.m |
| AMO2000 | 260 | 196 | 191.5 | φ102 | φ125 | F10.F12 | 107.5 | 272 | φ11 | 4-φ13 | 36 | 36 | 34 | 40 | 400 | 1/4"NPT | DFS200-240 | 100N.m | 2000N.m |
| AMO3300 | 334 | 255 | 181 | φ165 | - | F12.F16 | 123 | 272 | φ22 | - | 46 | 46 | 45 | 176 | φ600 | 1/4"NPT | DFS240-265 | 190N.m | 3300N.m |
| AMO4000 | 334 | 255 | 181 | φ165 | - | F12.F16 | 123 | 275 | φ22 | - | 46 | 46 | 45 | 176 | φ700 | 1/4"NPT | DFS265-300 | 230N.m | 4000N.m |
| AMO7000 | 389 | 297 | 249 | φ165 | φ254 | F16.F25 | 156 | 418 | φ22 | 8-φ13 | 46/55 | 46 | 45 | 196 | φ500 | 1/2"NPT | DFS350-400 | 110N.m | 7000N.m |

Material List

| No. | PART DESTINATION | QTY | MATERIALS |
|------|------------------|-----|-----------|
| 1 | BODY | 1 | WCB |
| 2 | ADJUST BOLT | 2 | 304 |
| 3 | O RING | 1 | NBR |
| 4 | BEARING | 1 | POM |
| 5 | BEARING | 1 | POM |
| 6 | POSITIONING UNIT | 1 | 45 |
| 7 | SHAFT | 1 | 45 |
| 8 | WASHER | 1 | POM |
| 9 | BEARING | 1 | POM |
| 10 | O RING | 1 | NBR |
| 11 | O RING | 1 | NBR |
| 12 | CAP | 1 | WCB |
| 13 | SCREW | 4 | 304 |
| 14 | SCREW | 6 | 304 |
| 15 | CAP | 1 | 45 |
| *15A | AIR SHIFT VALVE | 1 | 45 |
| *16 | CAP | 1 | AL380 |
| 17 | O RING | 2 | NBR |

| No. | PART DESTINATION | QTY | MATERIALS |
|-----|------------------------|-----|-----------|
| 18 | O RING | 1 | NBR |
| 19 | O RING | 2 | NBR |
| 20 | ECCENTRIC AXLE BEARING | 2 | POM |
| 21 | BOLT | 1 | 304 |
| 22 | ECCENTRIC HALF AXLE | 1 | 45 |
| 23 | BEARING | 2 | CU |
| 24 | THRUST BALL BEARING | 2 | STEEL |
| 25 | WORM SHAFT | 1 | 45 |
| 26 | ECCENTRIC HALF AXLE | 1 | 45 |
| 27 | SHIFT HANDLE | 1 | 45 |
| 28 | O RING | 1 | NBR |
| 29 | CAP | 1 | 45 |
| 30 | SCREW | 4 | 304 |
| 31 | HAND WHEEL | 6 | 20 |
| 32 | WASHER | 1 | 20 |
| 33 | BOLT | 1 | 304 |
| *34 | LOCK DISC | 1 | 45 |
| *35 | LOCK BRACKET | 1 | 45 |

