

# Type VA3501/3502/3503 Pneumatic Actuator



## Application

Single- or double-acting piston actuator for butterfly valves and other final control elements with rotary closure members

## Operating media

- Dry or lubricated air

## Air supply pressure

- The minimum supply pressure is 2.5 Bar
- The maximum supply pressure is 10 Bar

## Working temperature

- Standard: -20°C ~+80°C
- Low temperature: -40°C ~+80°C
- High temperature: -15°C ~+150°C

## Travel adjustment

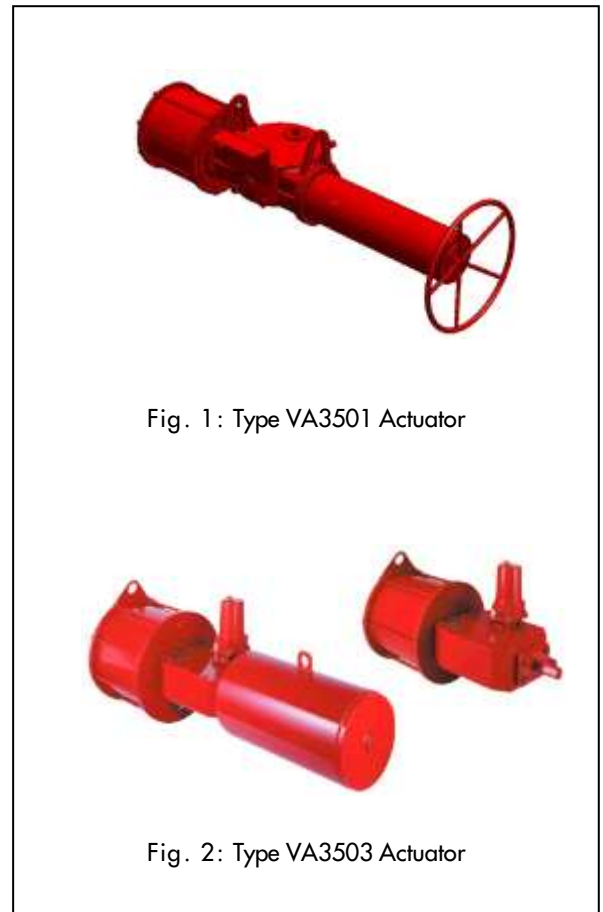
- Have adjustment range of  $\pm 60^\circ$

## Installation

- Either indoor or outdoor

## Special features

- The pinion full conform to the latest standards of ISO5211, NAMUR. The dimensions can be customized and the stainless steel is available. Position indicator with NAMUR is convenient for mounting accessories such as Limit Switch box, Positioner and so on.
- The different materials rubber and PFA encapsulated O-rings can be used in a wider range of temperature and condition. The double O-ring and bearing design ensure the stability and dependability of the cylinder modular.
- Operating Ranges actuators have torque outputs for spring-return models in excess of 110,000 Nm and double-acting models in excess of 240,000 Nm. Operating pressures are: 2.5~10Bar.
- Made from low friction, long-life compound.
- Material, to avoid the direct contact between metals. The maintenance and replacement are easy and convenient.



- No special tools needed for mounting and conversion.
- Various spring cartridges.
- Power transmission without clearance thanks to involute serrations.
- Direction of rotation can be reversed without additional components.
- Special surface treatment method.
- Optional with manual override ( hand wheel ) .

## Further versions

- Stainless steel rotary actuator

Table 1: *Technical data*

|                     |   |
|---------------------|---|
| Air supply pressure | The minimum supply pressure is 2.5 Bar  |
|                     | The maximum supply pressure is 10 Bar   |
| Working temperature | Standard: -20°C ~+80°C                  |
|                     | Low temperature: -40°C ~+80°C           |
|                     | High temperature: -15°C ~+150°C         |
| Travel adjustment   | Have adjustment range of $\pm 60^\circ$ |
| Installation        | Either indoor or outdoor                |

Table 2: *Materials*

|             | Name            | Qty. | Materials    |
|-------------|-----------------|------|--------------|
| Spring      | Flange Cap      | 1    | Carbon Steel |
|             | Spring Seat     | 1    | Carbon Steel |
|             | Spring          | 1    | Spring Steel |
|             | Spring Body     | 1    | Carbon Steel |
|             | Spring Stem     | 1    | Alloy Steel  |
| Centre Body | Bear Seat       | 1    | Carbon Steel |
|             | Screw           | n    | Carbon Steel |
|             | Indicator       | 1    | Carbon Steel |
|             | Screw           | n    | Carbon Steel |
|             | Centre Body Cap | 1    | Ductile Iron |
|             | Yoke            | 1    | Ductile Iron |
|             | Centre Body     | 1    | Ductile Iron |
|             | Cap O-ring      | 1    | Rubber       |
| Cylinder    | Drive Mechanism | 1    | Alloy Steel  |
|             | Cylinder Seat   | 1    | Ductile Iron |
|             | O Ring          | 1    | Rubber       |
|             | Piston          | 1    | Carbon Steel |
|             | Guide Ring      | 1    | Resin        |
|             | Cylinder Body   | 1    | Carbon Steel |
|             | Cylinder Cap    | 1    | Ductile Iron |
|             | Screw           | n    | Carbon Steel |
|             | Screw Nut       | n    | Carbon Steel |

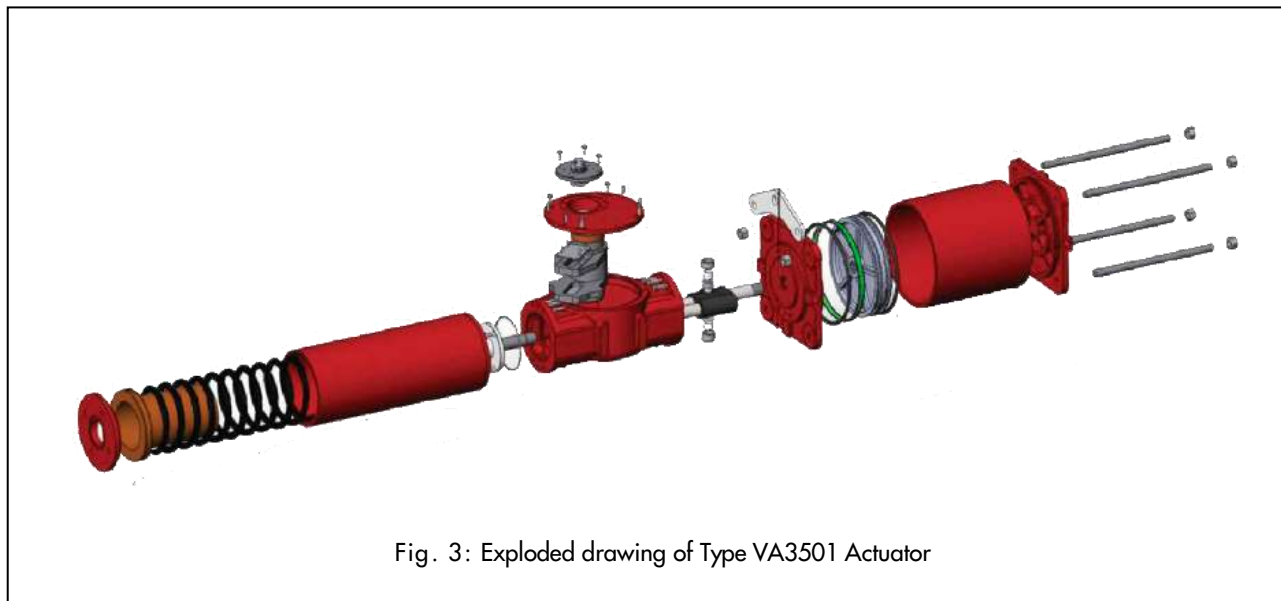


Fig. 3: Exploded drawing of Type VA3501 Actuator

## Output Torque of Pneumatic Actuator

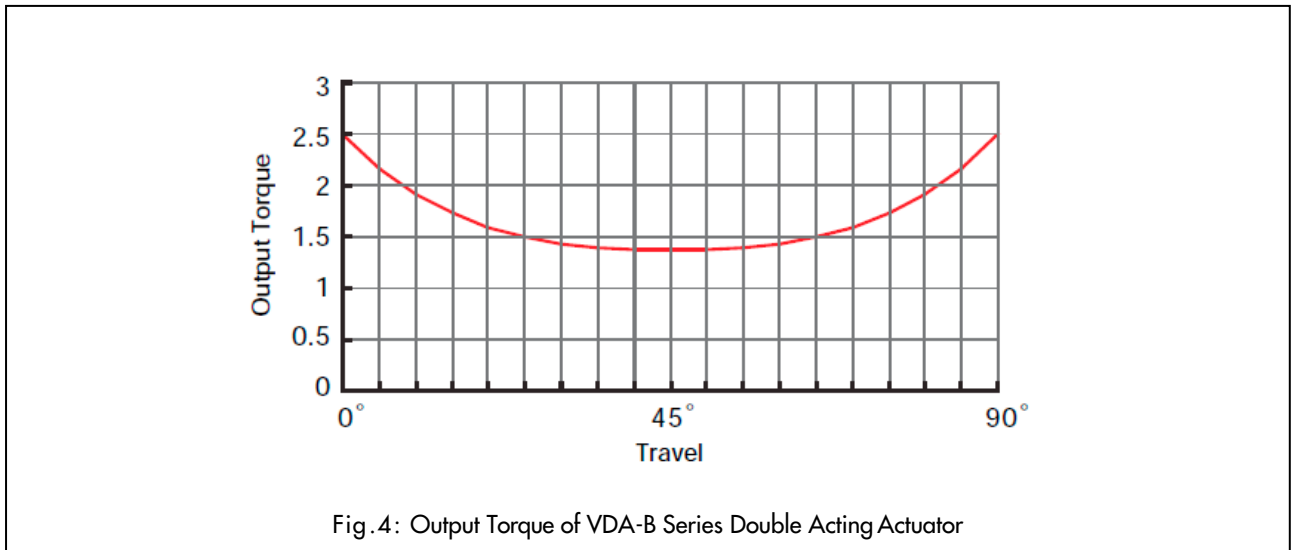


Fig.4: Output Torque of VDA-B Series Double Acting Actuator

Table 3.1: Output Torque of 3503-B Series Double Acting Actuator

Unit: Nm

| Model        | Output Torque (Nm) Air Pressure (Mpa) |        |        |        |        |        |        |        |        |        |        |        |
|--------------|---------------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
|              | 0.35                                  |        |        | 0.4    |        |        | 0.5    |        |        | 0.6    |        |        |
|              | 0°                                    | 45°    | 90°    | 0°     | 45°    | 90°    | 0°     | 45°    | 90°    | 0°     | 45°    | 90°    |
| 3503-B06-201 | 1269                                  | 670    | 1269   | 1451   | 766    | 1451   | 1814   | 958    | 1814   | 2154   | 1138   | 2154   |
| 3503-B08-221 | 2000                                  | 1056   | 2000   | 2286   | 1207   | 2286   | 2857   | 1509   | 2857   | 3428   | 1810   | 3428   |
| 3503-B08-251 | 2599                                  | 1372   | 2599   | 2970   | 1568   | 2970   | 3712   | 1960   | 3712   | 4455   | 2352   | 4455   |
| 3503-B1-281  | 3836                                  | 2026   | 3836   | 4384   | 2315   | 4384   | 5480   | 2894   | 5480   | 6576   | 3473   | 6576   |
| 3503-B1-321  | 5035                                  | 2659   | 5035   | 5754   | 3039   | 5754   | 7193   | 3798   | 7193   | 8631   | 4558   | 8631   |
| 3503-B1-351  | 6039                                  | 3189   | 6039   | 6902   | 3644   | 6902   | 8627   | 4556   | 8627   |        |        |        |
| 3503-B2-351  | 7193                                  | 3798   | 7193   | 8220   | 4341   | 8220   | 10275  | 5426   | 10275  | 12330  | 6511   | 12330  |
| 3503-B2-401  | 9440                                  | 4985   | 9440   | 10789  | 5697   | 10789  | 13486  | 7122   | 13486  | 16184  | 8546   | 16184  |
| 3503-B2-451  | 11988                                 | 6330   | 11988  | 13700  | 7235   | 13700  | 17126  | 9043   | 17126  |        |        |        |
| 3503-B3-451  | 14306                                 | 7555   | 14306  | 16350  | 8634   | 16350  | 20438  | 10792  | 20438  | 24525  | 12951  | 24525  |
| 3503-B3-501  | 17723                                 | 9359   | 17723  | 20255  | 10696  | 20255  | 25318  | 13369  | 25318  | 30382  | 16043  | 30382  |
| 3503-B3-561  | 22297                                 | 11774  | 22297  | 25483  | 13456  | 25483  | 31854  | 16820  | 31854  | 38224  | 20184  | 38224  |
| 3503-B3-601  | 25635                                 | 13537  | 25635  | 29297  | 15470  | 29297  | 36621  | 19338  | 36621  |        |        |        |
| 3503-B4-601  | 30797                                 | 16263  | 30797  | 35197  | 18586  | 35197  | 43996  | 23232  | 43996  | 52796  | 27879  | 52796  |
| 3503-B4-631  | 33986                                 | 17946  | 33986  | 38841  | 20510  | 38841  | 48552  | 25638  | 48552  | 58262  | 30765  | 58262  |
| 3503-B4-502  | 42584                                 | 22487  | 42584  | 48668  | 25699  | 48668  | 60835  | 32124  | 60835  |        |        |        |
| 3503-B4-701  | 42031                                 | 22195  | 42031  | 48036  | 25365  | 48036  | 60044  | 31707  | 60044  |        |        |        |
| 3503-B4-562  | 53576                                 | 28291  | 53576  | 61230  | 32332  | 61230  |        |        |        |        |        |        |
| 3503-B4-801  | 54993                                 | 29039  | 54993  | 62849  | 33188  | 62849  |        |        |        |        |        |        |
| 3503-B5-701  | 50399                                 | 26614  | 50399  | 57599  | 30416  | 57599  | 71999  | 38019  | 71999  | 86399  | 45623  | 86399  |
| 3503-B5-562  | 64145                                 | 33872  | 64145  | 73308  | 38711  | 73308  | 91635  | 48388  | 91635  | 109963 | 58066  | 109963 |
| 3503-B5-801  | 65984                                 | 34843  | 65984  | 75410  | 39820  | 75410  | 94263  | 49776  | 94263  | 113115 | 59731  | 113115 |
| 3503-B5-602  | 73786                                 | 38963  | 73786  | 84327  | 44529  | 84327  | 105409 | 55661  | 105409 | 126491 | 66794  | 126491 |
| 3503-B5-632  | 81454                                 | 43012  | 81454  | 93090  | 49156  | 93090  | 116362 | 61446  | 116362 |        |        |        |
| 3503-B5-901  | 83646                                 | 44169  | 83646  | 95595  | 50479  | 95595  | 119494 | 63099  | 119494 |        |        |        |
| 3503-B5-702  | 100799                                | 53227  | 100799 | 115199 | 60831  | 115199 |        |        |        |        |        |        |
| 3503-B5-1001 | 103386                                | 54593  | 103386 | 118155 | 62392  | 118155 |        |        |        |        |        |        |
| 3503-B6-901  | 112390                                | 59348  | 112390 | 128446 | 67826  | 128446 | 160558 | 84783  | 160558 | 192669 | 101740 | 192669 |
| 3503-B6-702  | 135271                                | 71430  | 135271 | 154596 | 81635  | 154596 | 193245 | 102043 | 193245 | 231894 | 122452 | 231894 |
| 3503-B6-1001 | 138964                                | 73380  | 138964 | 158816 | 83863  | 158816 | 198519 | 104829 | 198519 | 238223 | 125795 | 238223 |
| 3503-B6-802  | 177229                                | 93586  | 177229 | 202547 | 106956 | 202547 | 253184 | 133695 | 253184 |        |        |        |
| 3503-B6-902  | 224781                                | 118696 | 224781 | 256893 | 135653 | 256893 |        |        |        |        |        |        |

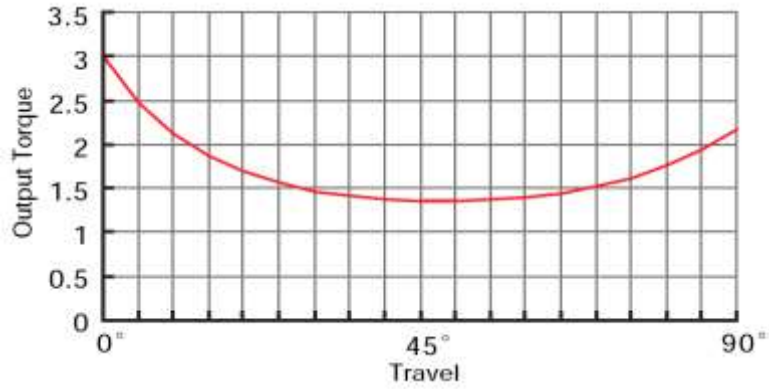


Fig. 5: Output Torque of VDA-C Series Double Acting Actuator

Table 3.2: Output Torque of 3503-C Series Double Acting Actuator

Unit: Nm

| Model        | Output Torque (Nm) Air Pressure (Mpa) |       |        |        |        |        |        |        |        |        |        |       |
|--------------|---------------------------------------|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-------|
|              | 0.35                                  |       |        | 0.4    |        |        | 0.5    |        |        | 0.6    |        |       |
|              | 0°                                    | 45°   | 90°    | 0°     | 45°    | 90°    | 0°     | 45°    | 90°    | 0°     | 45°    | 90°   |
| 3503-C06-201 | 1523                                  | 663   | 1068   | 1741   | 758    | 1220   | 2176   | 948    | 1525   |        |        |       |
| 3503-C08-221 | 2400                                  | 1045  | 1682   | 2743   | 1194   | 1922   | 3428   | 1493   | 2403   | 4114   | 1792   | 2883  |
| 3503-C08-251 | 3118                                  | 1358  | 2185   | 3564   | 1552   | 2498   | 4455   | 1940   | 3122   |        |        |       |
| 3503-C1-281  | 4603                                  | 2005  | 3226   | 5261   | 2291   | 3687   | 6576   | 2864   | 4609   | 7891   | 3436   | 5531  |
| 3503-C1-321  | 6042                                  | 2631  | 4234   | 6905   | 3007   | 4839   | 8631   | 3759   | 6049   |        |        |       |
| 3503-C2-351  | 8631                                  | 3759  | 6049   | 9864   | 4296   | 6913   | 12330  | 5369   | 8642   | 14796  | 6443   | 10370 |
| 3503-C2-401  | 11329                                 | 4933  | 7939   | 12947  | 5638   | 9074   | 16184  | 7047   | 11342  | 19420  | 8457   | 13610 |
| 3503-C2-451  | 14385                                 | 6264  | 10082  | 16441  | 7159   | 11522  |        |        |        |        |        |       |
| 3503-C3-451  | 17168                                 | 7476  | 12032  | 19620  | 8544   | 13750  | 24525  | 10680  | 17188  | 29430  | 12816  | 20626 |
| 3503-C3-501  | 21267                                 | 9261  | 14905  | 24306  | 10584  | 17034  | 30382  | 13230  | 21293  |        |        |       |
| 3503-C3-561  | 26757                                 | 11652 | 18752  | 30579  | 13316  | 21431  |        |        |        |        |        |       |
| 3503-C4-561  | 32146                                 | 13998 | 22529  | 36738  | 15998  | 25747  | 45922  | 19997  | 32184  | 55107  | 23997  | 38621 |
| 3503-C4-601  | 36957                                 | 16093 | 25901  | 42237  | 18392  | 29601  | 52796  | 22990  | 37001  | 63355  | 27589  | 44401 |
| 3503-C4-631  | 40783                                 | 17760 | 28582  | 46610  | 20297  | 32666  | 58262  | 25371  | 40832  |        |        |       |
| 3503-C4-701  | 50437                                 | 21963 | 35348  | 57643  | 25101  | 40398  |        |        |        |        |        |       |
| 3503-C5-701  | 60479                                 | 26336 | 42386  | 69119  | 30099  | 48441  | 86399  | 37623  | 60551  | 103679 | 45148  | 72662 |
| 3503-C5-562  | 76974                                 | 33519 | 53946  | 87970  | 38307  | 61652  | 109963 | 47884  | 77065  | 131955 | 57461  | 92478 |
| 3503-C5-801  | 79181                                 | 34480 | 55492  | 90492  | 39406  | 63420  | 11311  | 49257  | 79275  | 135738 | 59109  | 95130 |
| 3503-C5-602  | 88544                                 | 38557 | 62054  | 101193 | 44065  | 70919  | 126491 | 55082  | 88649  |        |        |       |
| 3503-C5-632  | 97744                                 | 42564 | 68503  | 111708 | 48644  | 78289  |        |        |        |        |        |       |
| 3503-C5-901  | 100375                                | 43709 | 70346  | 114714 | 49954  | 80396  |        |        |        |        |        |       |
| 3503-C6-801  | 106337                                | 46306 | 74525  | 121528 | 52921  | 85171  | 151911 | 66151  | 106464 | 182293 | 79381  | 12775 |
| 3503-C6-901  | 134869                                | 58730 | 94520  | 154136 | 67120  | 108023 | 192669 | 83900  | 135029 | 231203 | 100680 | 16203 |
| 3503-C6-702  | 162326                                | 70686 | 113763 | 185515 | 80784  | 130015 | 231894 | 100981 | 162519 |        |        |       |
| 3503-C6-1001 | 166756                                | 72616 | 116868 | 190579 | 82989  | 133564 | 238223 | 103737 | 166955 |        |        |       |
| 3503-C6-802  | 212675                                | 92611 | 149050 | 243057 | 105842 | 170342 |        |        |        |        |        |       |

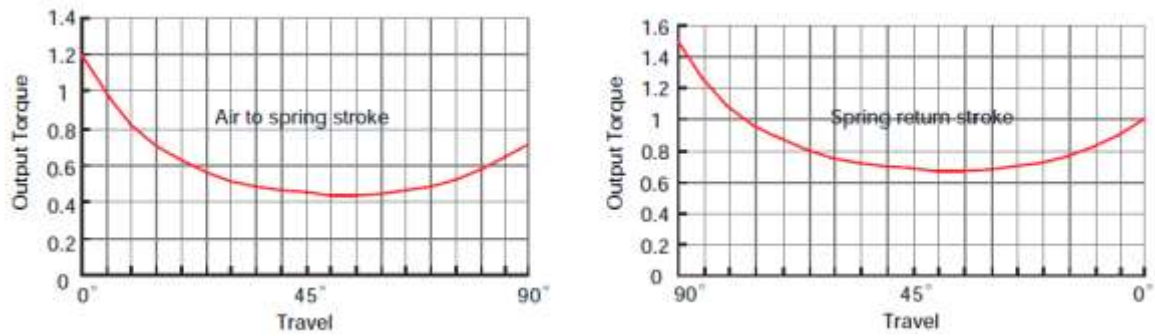


Fig.7: Output Torque of 3501-B Series Actuator with Spring Return (FC)

Table 3.4: Output Torque of 3501-B Series Actuator with Spring Return (FC) Unit: Nm

| Model          | Air to Spring (4Bar) |      |      | Air to Spring (5Bar) |      |      | Air to Spring (6Bar) |      |       | Spring |      |      |
|----------------|----------------------|------|------|----------------------|------|------|----------------------|------|-------|--------|------|------|
|                | 0°                   | 45°  | 90°  | 0°                   | 45°  | 90°  | 0°                   | 45°  | 90°   | 90°    | 45°  | 0°   |
| 3501-B06-201-4 | 934                  | 383  | 549  | 1296                 | 575  | 911  | 1659                 | 766  | 1274  | 902    | 383  | 517  |
| 3501-B06-201-5 |                      |      |      | 1167                 | 479  | 686  | 1530                 | 670  | 1049  | 1128   | 479  | 646  |
| 3501-B06-201-6 |                      |      |      |                      |      |      | 1391                 | 567  | 806   | 1370   | 582  | 785  |
| 3501-B06-221-4 | 1116                 | 452  | 635  | 1557                 | 685  | 1076 | 1997                 | 917  | 1516  | 1128   | 479  | 646  |
| 3501-B06-221-5 |                      |      |      | 1418                 | 582  | 833  | 1858                 | 814  | 1274  | 1370   | 582  | 785  |
| 3501-B06-221-6 |                      |      |      |                      |      |      | 1701                 | 698  | 1000  | 1644   | 698  | 942  |
| 3501-B08-221-4 | 1449                 | 587  | 834  | 2020                 | 889  | 1405 | 2591                 | 1190 | 1976  | 1452   | 620  | 837  |
| 3501-B08-221-5 |                      |      |      | 1830                 | 748  | 1075 | 2401                 | 1049 | 1646  | 1782   | 761  | 1027 |
| 3501-B08-221-6 |                      |      |      |                      |      |      | 2132                 | 850  | 1180  | 2248   | 960  | 1296 |
| 3501-B08-251-4 | 1943                 | 807  | 1188 | 2685                 | 1199 | 1930 | 3428                 | 1591 | 2673  | 1782   | 761  | 1027 |
| 3501-B08-251-5 |                      |      |      | 2416                 | 1000 | 1464 | 3159                 | 1392 | 2207  | 2248   | 960  | 1296 |
| 3501-B08-251-6 |                      |      |      |                      |      |      | 2828                 | 1147 | 1633  | 2822   | 1205 | 1627 |
| 3501-B08-281-4 | 2445                 | 1016 | 1493 | 3381                 | 1509 | 2429 | 4316                 | 2003 | 3364  | 2248   | 960  | 1296 |
| 3501-B08-281-5 |                      |      |      | 3050                 | 1264 | 1855 | 3985                 | 1758 | 2790  | 2822   | 1205 | 1627 |
| 3501-B08-281-6 |                      |      |      |                      |      |      | 3612                 | 1481 | 2142  | 3470   | 1482 | 2000 |
| 3501-B1-281-4  | 2821                 | 1157 | 1670 | 3917                 | 1736 | 2766 | 5013                 | 2315 | 3862  | 2714   | 1158 | 1563 |
| 3501-B1-281-5  |                      |      |      | 3478                 | 1411 | 2004 | 4574                 | 1990 | 3100  | 3476   | 1483 | 2002 |
| 3501-B1-281-6  |                      |      |      |                      |      |      | 4116                 | 1651 | 2305  | 4271   | 1822 | 2460 |
| 3501-B1-321-4  | 3752                 | 1556 | 2278 | 5191                 | 2315 | 3717 | 6629                 | 3075 | 5155  | 3476   | 1483 | 2002 |
| 3501-B1-321-5  |                      |      |      | 4733                 | 1976 | 2922 | 6171                 | 2736 | 4360  | 4271   | 1822 | 2460 |
| 3501-B1-321-6  |                      |      |      |                      |      |      | 5408                 | 2171 | 3034  | 5597   | 2387 | 3223 |
| 3501-B1-351-4  | 4442                 | 1822 | 2631 | 6167                 | 2734 | 4356 | 7892                 | 3645 | 6081  | 4271   | 1822 | 2460 |
| 3501-B1-351-5  |                      |      |      | 5404                 | 2169 | 3030 | 7129                 | 3080 | 4755  | 5597   | 2387 | 3223 |
| 3501-B1-351-6  |                      |      |      |                      |      |      | 6323                 | 2483 | 3356  | 6996   | 2984 | 4029 |
| 3501-B1-401-4  | 5819                 | 2388 | 3445 | 8080                 | 3582 | 5706 | 10340                | 4775 | 7966  | 5597   | 2387 | 3223 |
| 3501-B1-401-5  |                      |      |      | 7274                 | 2985 | 4307 | 9534                 | 4178 | 6567  | 6996   | 2984 | 4029 |
| 3501-B1-401-6  |                      |      |      |                      |      |      | 8729                 | 3581 | 5168  | 8395   | 3581 | 4834 |
| 3501-B2-401-4  | 6943                 | 2848 | 4110 | 9640                 | 4273 | 6807 | 12338                | 5697 | 9505  | 6679   | 2849 | 3846 |
| 3501-B2-401-5  |                      |      |      | 8603                 | 3505 | 5005 | 11301                | 4929 | 7703  | 8481   | 3617 | 4883 |
| 3501-B2-401-6  |                      |      |      |                      |      |      | 10080                | 4024 | 5582  | 10602  | 4522 | 6104 |
| 3501-B2-451-4  | 8817                 | 3618 | 5219 | 12243                | 5426 | 8645 | 15668                | 7235 | 12070 | 8481   | 3617 | 4883 |
| 3501-B2-451-5  |                      |      |      | 11022                | 4521 | 6524 | 14447                | 6330 | 9949  | 10602  | 4522 | 6104 |
| 3501-B2-451-6  |                      |      |      |                      |      |      | 13226                | 5426 | 7829  | 12722  | 5426 | 7325 |

| Model          | Air to Spring (4Bar) |       |       | Air to Spring (5Bar) |       |       | Air to Spring (6Bar) |       |        | Spring |       |       |
|----------------|----------------------|-------|-------|----------------------|-------|-------|----------------------|-------|--------|--------|-------|-------|
|                | 0°                   | 45°   | 90°   | 0°                   | 45°   | 90°   | 0°                   | 45°   | 90°    | 90°    | 45°   | 0°    |
| 3501-B3-451-4  | 10522                | 4317  | 6232  | 14610                | 6475  | 10320 | 18697                | 8634  | 14407  | 10118  | 4317  | 5828  |
| 3501-B3-451-5  |                      |       |       | 13186                | 5420  | 7847  | 17273                | 7579  | 11934  | 12591  | 5372  | 7252  |
| 3501-B3-451-6  |                      |       |       |                      |       |       | 15500                | 6266  | 8857   | 15668  | 6685  | 9025  |
| 3501-B3-501-4  | 13003                | 5324  | 7664  | 18066                | 7997  | 12727 | 23130                | 10671 | 17791  | 12591  | 5372  | 7252  |
| 3501-B3-501-5  |                      |       |       | 16293                | 6684  | 9650  | 21357                | 9358  | 14714  | 15668  | 6685  | 9025  |
| 3501-B3-501-6  |                      |       |       |                      |       |       | 19028                | 7633  | 10671  | 19711  | 8410  | 11354 |
| 3501-B3-561-4  | 16458                | 6771  | 9815  | 22829                | 10135 | 16186 | 29199                | 13499 | 22556  | 15668  | 6685  | 9025  |
| 3501-B3-561-5  |                      |       |       | 20500                | 8410  | 12143 | 26870                | 11774 | 18513  | 19711  | 8410  | 11354 |
| 3501-B3-561-6  |                      |       |       |                      |       |       | 24600                | 10092 | 14570  | 23654  | 10092 | 13624 |
| 3501-B3-631-4  | 20977                | 8662  | 12619 | 29059                | 12930 | 20702 | 37142                | 17198 | 28784  | 19711  | 8410  | 11354 |
| 3501-B3-631-5  |                      |       |       | 26788                | 11248 | 16759 | 34871                | 15516 | 24842  | 23654  | 10092 | 13624 |
| 3501-B3-631-6  |                      |       |       |                      |       |       | 31210                | 12804 | 18486  | 30010  | 12804 | 17286 |
| 3501-B4-631-4  | 24977                | 10255 | 14784 | 34708                | 15383 | 24495 | 44418                | 20510 | 34205  | 24057  | 10255 | 13844 |
| 3501-B4-631-5  |                      |       |       | 31246                | 12819 | 18481 | 40956                | 17946 | 28191  | 30071  | 12819 | 17306 |
| 3501-B4-631-6  |                      |       |       |                      |       |       | 35860                | 14171 | 19335  | 38927  | 16594 | 22402 |
| 3501-B4-701-4  | 30730                | 12546 | 17964 | 42739                | 18888 | 29973 | 54748                | 25229 | 41982  | 30071  | 12819 | 17306 |
| 3501-B4-701-5  |                      |       |       | 37643                | 15113 | 21118 | 49651                | 21454 | 33126  | 38927  | 16594 | 22402 |
| 3501-B4-701-6  |                      |       |       |                      |       |       | 44052                | 17306 | 23396  | 48657  | 20742 | 28002 |
| 3501-B4-801-4  | 40447                | 16594 | 23922 | 56160                | 24891 | 39635 | 71872                | 33188 | 55347  | 38927  | 16594 | 22402 |
| 3501-B4-801-5  |                      |       |       | 50560                | 20743 | 29904 | 66272                | 29040 | 45616  | 48657  | 20742 | 28002 |
| 3501-B4-801-6  |                      |       |       |                      |       |       | 60671                | 24891 | 35884  | 58390  | 24891 | 33603 |
| 3501-B5-801-4  | 48531                | 19910 | 28703 | 67384                | 29865 | 47556 | 86236                | 39820 | 66408  | 46707  | 19910 | 26879 |
| 3501-B5-801-5  |                      |       |       | 60189                | 24536 | 35054 | 79041                | 34491 | 53906  | 59209  | 25240 | 34074 |
| 3501-B5-801-6  |                      |       |       |                      |       |       | 70523                | 28181 | 39104  | 74011  | 31550 | 42592 |
| 3501-B5-901-4  | 61522                | 25240 | 36387 | 85421                | 37860 | 60285 | 109319               | 50479 | 84184  | 59209  | 25240 | 34074 |
| 3501-B5-901-5  |                      |       |       | 76902                | 31550 | 45483 | 100801               | 44169 | 69382  | 74011  | 31550 | 42592 |
| 3501-B5-901-6  |                      |       |       |                      |       |       | 92283                | 37860 | 54580  | 88813  | 37860 | 51110 |
| 3501-B6-801-4  | 65176                | 26739 | 38729 | 90495                | 40108 | 64047 | 115813               | 53478 | 89365  | 62545  | 26739 | 36098 |
| 3501-B6-801-5  |                      |       |       | 80809                | 32934 | 47266 | 106128               | 46304 | 72584  | 79327  | 33913 | 45783 |
| 3501-B6-801-6  |                      |       |       |                      |       |       | 94682                | 37825 | 52752  | 99158  | 42392 | 57229 |
| 3501-B6-901-4  | 82663                | 33913 | 49120 | 114775               | 50870 | 81231 | 146887               | 67826 | 113343 | 79327  | 33913 | 45783 |
| 3501-B6-901-5  |                      |       |       | 103329               | 42392 | 61400 | 135441               | 59348 | 93511  | 99158  | 42392 | 57229 |
| 3501-B6-901-6  |                      |       |       |                      |       |       | 121910               | 49325 | 70067  | 122603 | 52414 | 70759 |
| 3501-B6-1001-4 | 101587               | 41472 | 59657 | 141291               | 62437 | 99361 | 180995               | 83403 | 139065 | 99158  | 42392 | 57229 |
| 3501-B6-1001-5 |                      |       |       | 127760               | 52414 | 75917 | 167464               | 73380 | 115621 | 122603 | 52414 | 70759 |
| 3501-B6-1001-6 |                      |       |       |                      |       |       | 153312               | 62897 | 91100  | 147123 | 62897 | 84911 |

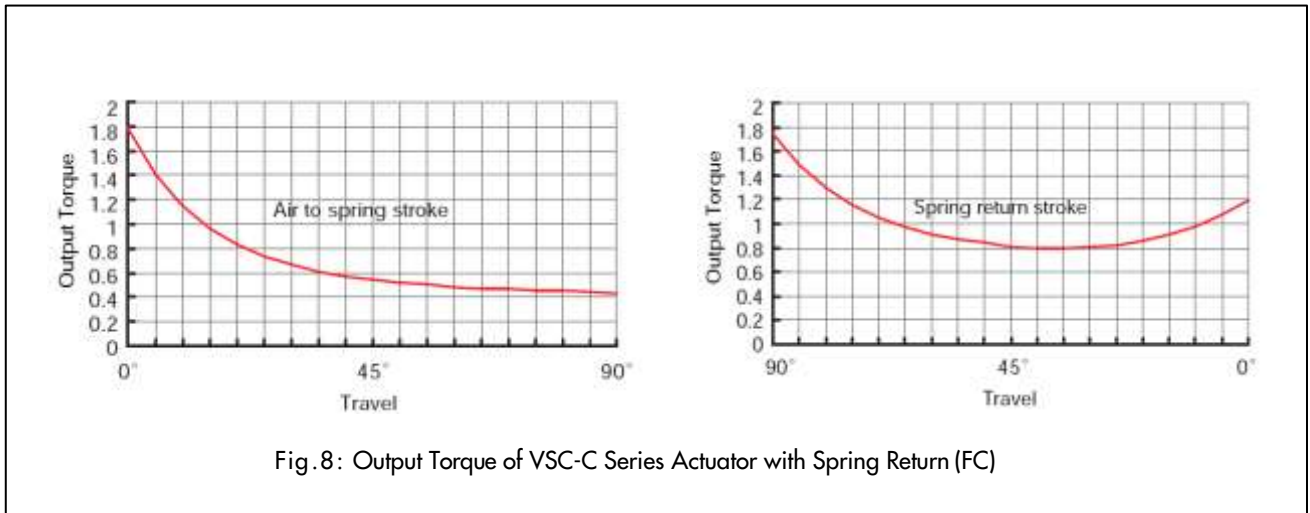


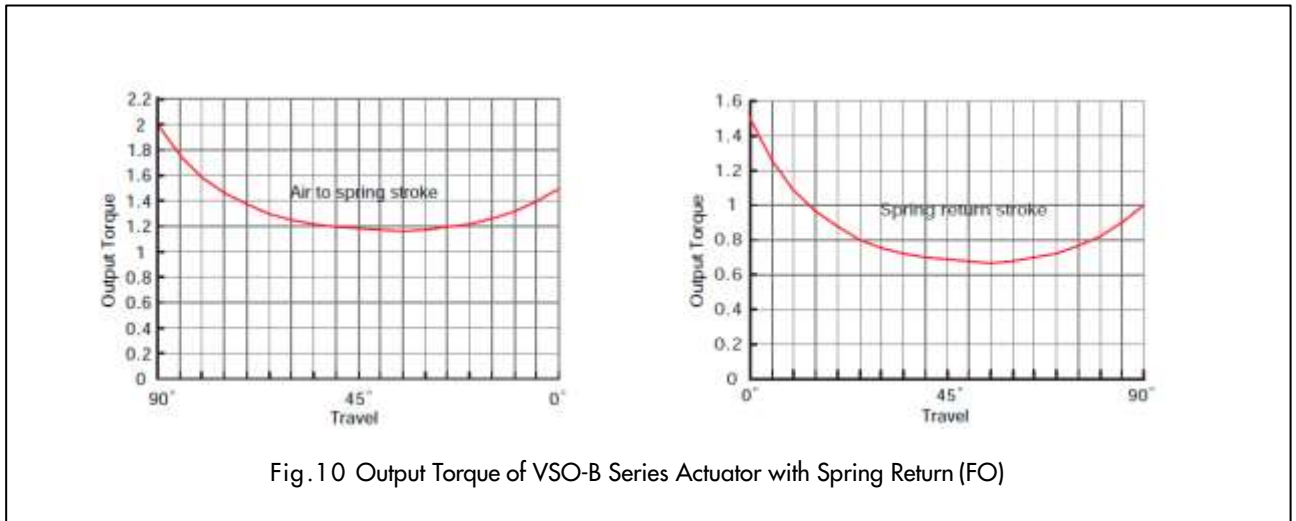
Table 3.5: Output Torque of 3501-C Series Actuator with Spring Return (FC)

Unit: Nm

| Model          | Air to Spring (4Bar) |      |      | Air to Spring (5Bar) |      |      | Air to Spring (6Bar) |      |      | Spring |      |       |
|----------------|----------------------|------|------|----------------------|------|------|----------------------|------|------|--------|------|-------|
|                | 0°                   | 45°  | 90°  | 0°                   | 45°  | 90°  | 0°                   | 45°  | 90°  | 90°    | 45°  | 0°    |
| 3501-C06-201-4 | 870                  | 279  | 305  | 1306                 | 468  | 610  | 1741                 | 658  | 915  | 915    | 479  | 870   |
| 3501-C06-201-5 |                      |      |      | 1088                 | 348  | 381  | 1523                 | 538  | 686  | 1144   | 599  | 1088  |
| 3501-C06-201-6 |                      |      |      |                      |      |      | 1290                 | 409  | 440  | 1390   | 728  | 1322  |
| 3501-C06-221-4 | 1027                 | 322  | 338  | 1556                 | 552  | 708  | 2084                 | 782  | 1079 | 1144   | 599  | 1088  |
| 3501-C06-221-5 |                      |      |      | 1322                 | 423  | 463  | 1851                 | 653  | 833  | 1390   | 728  | 1322  |
| 3501-C06-221-6 |                      |      |      |                      |      |      | 1586                 | 508  | 555  | 1668   | 874  | 1586  |
| 3501-C08-221-4 | 1353                 | 427  | 460  | 2038                 | 725  | 941  | 2724                 | 1024 | 1421 | 1462   | 768  | 1390  |
| 3501-C08-221-5 |                      |      |      | 1680                 | 527  | 564  | 2366                 | 826  | 1045 | 1838   | 966  | 1748  |
| 3501-C08-221-6 |                      |      |      |                      |      |      | 1887                 | 561  | 541  | 2342   | 1230 | 2227  |
| 3501-C08-251-4 | 1816                 | 586  | 659  | 2707                 | 974  | 1284 | 3598                 | 1362 | 1908 | 1838   | 966  | 1748  |
| 3501-C08-251-5 |                      |      |      | 2227                 | 710  | 780  | 3118                 | 1098 | 1404 | 2342   | 1230 | 2227  |
| 3501-C08-251-6 |                      |      |      |                      |      |      | 2606                 | 814  | 865  | 2882   | 1513 | 2740  |
| 3501-C08-281-4 | 2262                 | 725  | 804  | 3385                 | 1213 | 1591 | 4507                 | 1702 | 2377 | 2342   | 1230 | 2227  |
| 3501-C08-281-5 |                      |      |      | 2872                 | 930  | 1051 | 3994                 | 1419 | 1838 | 2882   | 1513 | 2740  |
| 3501-C08-281-6 |                      |      |      |                      |      |      | 3367                 | 1073 | 1179 | 3541   | 1860 | 3367  |
| 3501-C1-281-4  | 2630                 | 839  | 921  | 3946                 | 1411 | 1842 | 5261                 | 1984 | 2764 | 2766   | 1452 | 2630  |
| 3501-C1-281-5  |                      |      |      | 3206                 | 1003 | 1065 | 4521                 | 1576 | 1986 | 3544   | 1861 | 3370  |
| 3501-C1-281-6  |                      |      |      |                      |      |      | 3750                 | 1150 | 1176 | 4355   | 2286 | 4141  |
| 3501-C1-321-4  | 3535                 | 1146 | 1295 | 5261                 | 1898 | 2505 | 6988                 | 2650 | 3715 | 3544   | 1861 | 3370  |
| 3501-C1-321-5  |                      |      |      | 4490                 | 1472 | 1694 | 6217                 | 2224 | 2904 | 4355   | 2286 | 4141  |
| 3501-C1-321-6  |                      |      |      |                      |      |      | 5098                 | 1606 | 1727 | 5532   | 2904 | 5260  |
| 3501-C1-351-4  | 4141                 | 1320 | 1449 | 6211                 | 2222 | 2900 | 8282                 | 3123 | 4351 | 4355   | 2286 | 4141  |
| 3501-C1-351-5  |                      |      |      | 5092                 | 1604 | 1724 | 7163                 | 2506 | 3175 | 5532   | 2904 | 5260  |
| 3501-C1-351-6  |                      |      |      |                      |      |      | 5927                 | 1823 | 1875 | 6832   | 3586 | 6496  |
| 3501-C1-401-4  | 5591                 | 1821 | 2073 | 8303                 | 3002 | 3974 | 11016                | 4184 | 5875 | 5532   | 2904 | 5260  |
| 3501-C1-401-5  |                      |      |      | 7067                 | 2320 | 2674 | 9780                 | 3501 | 4575 | 6832   | 3586 | 6496  |
| 3501-C1-401-6  |                      |      |      |                      |      |      | 8138                 | 2595 | 2848 | 8559   | 4493 | 8138  |
| 3501-C2-401-4  | 6473                 | 2064 | 2266 | 9710                 | 3474 | 4534 | 12947                | 4883 | 6803 | 6808   | 3574 | 6473  |
| 3501-C2-401-5  |                      |      |      | 7963                 | 2509 | 2697 | 11200                | 3919 | 4965 | 8645   | 4538 | 8220  |
| 3501-C2-401-6  |                      |      |      |                      |      |      | 9428                 | 2941 | 3102 | 10508  | 5516 | 9992  |
| 3501-C2-451-4  | 8220                 | 2621 | 2877 | 12330                | 4411 | 5758 | 16441                | 6201 | 8638 | 8645   | 4538 | 8220  |
| 3501-C2-451-5  |                      |      |      | 10559                | 3433 | 3894 | 14669                | 5223 | 6775 | 10508  | 5516 | 9992  |
| 3501-C2-451-6  |                      |      |      |                      |      |      | 12330                | 3932 | 4316 | 12967  | 6807 | 12330 |

| Model          | Air to Spring (4Bar) |       |       | Air to Spring (5Bar) |       |       | Air to Spring (6Bar) |       |        | Spring |       |        |
|----------------|----------------------|-------|-------|----------------------|-------|-------|----------------------|-------|--------|--------|-------|--------|
|                | 0°                   | 45°   | 90°   | 0°                   | 45°   | 90°   | 0°                   | 45°   | 90°    | 90°    | 45°   | 0°     |
| 3501-C3-451-4  | 9810                 | 3127  | 3434  | 14715                | 5263  | 6871  | 19620                | 7399  | 10309  | 10317  | 5417  | 9810   |
| 3501-C3-451-5  |                      |       |       | 12263                | 3909  | 4292  | 17168                | 6045  | 7730   | 12896  | 6771  | 12263  |
| 3501-C3-451-6  |                      |       |       |                      |       |       | 14239                | 4428  | 4650   | 15976  | 8388  | 15191  |
| 3501-C3-501-4  | 12043                | 3813  | 4138  | 18120                | 6459  | 8397  | 24196                | 9105  | 12655  | 12896  | 6771  | 12263  |
| 3501-C3-501-5  |                      |       |       | 15191                | 4842  | 5317  | 21267                | 7489  | 9575   | 15976  | 8388  | 15191  |
| 3501-C3-501-6  |                      |       |       |                      |       |       | 17346                | 5324  | 5452   | 20100  | 10553 | 19112  |
| 3501-C3-561-4  | 15388                | 4928  | 5455  | 23033                | 8257  | 10813 | 30678                | 11586 | 16171  | 15976  | 8388  | 15191  |
| 3501-C3-561-5  |                      |       |       | 19112                | 6092  | 6689  | 26757                | 9421  | 12047  | 20100  | 10553 | 19112  |
| 3501-C3-561-6  |                      |       |       |                      |       |       | 23896                | 7842  | 9039   | 23108  | 12132 | 21973  |
| 3501-C3-631-4  | 19809                | 6396  | 7177  | 29539                | 10633 | 13997 | 39269                | 14870 | 20816  | 20100  | 10553 | 19112  |
| 3501-C3-631-5  |                      |       |       | 23305                | 7191  | 7441  | 33035                | 11428 | 14260  | 26656  | 13995 | 25346  |
| 3501-C3-631-6  |                      |       |       |                      |       |       | 29191                | 9305  | 10217  | 30699  | 16118 | 29191  |
| 3501-C4-631-4  | 21759                | 6584  | 6531  | 33411                | 11658 | 14697 | 45063                | 16732 | 22863  | 26135  | 13712 | 24851  |
| 3501-C4-631-5  |                      |       |       | 29131                | 9297  | 10196 | 40783                | 14371 | 18362  | 30636  | 16074 | 29131  |
| 3501-C4-631-6  |                      |       |       |                      |       |       | 33888                | 10566 | 11110  | 37888  | 19879 | 36027  |
| 3501-C4-701-4  | 28512                | 9027  | 9762  | 42922                | 15302 | 19861 | 57333                | 21578 | 29961  | 30636  | 16074 | 29131  |
| 3501-C4-701-5  |                      |       |       | 36027                | 11497 | 12609 | 50437                | 17773 | 22709  | 37888  | 19879 | 36027  |
| 3501-C4-701-6  |                      |       |       |                      |       |       | 41280                | 12719 | 13078  | 47519  | 24932 | 45184  |
| 3501-C4-801-4  | 39392                | 12963 | 14968 | 58247                | 21173 | 28182 | 77102                | 29384 | 41396  | 37888  | 19879 | 36027  |
| 3501-C4-801-5  |                      |       |       | 49089                | 16120 | 18551 | 67944                | 24331 | 31765  | 47519  | 24932 | 45184  |
| 3501-C4-801-6  |                      |       |       |                      |       |       | 56564                | 18052 | 19798  | 59487  | 31211 | 56564  |
| 3501-C5-801-4  | 45246                | 14438 | 15836 | 67869                | 24289 | 31691 | 90492                | 34141 | 47546  | 47584  | 24968 | 45246  |
| 3501-C5-801-5  |                      |       |       | 55758                | 17606 | 18954 | 78381                | 27457 | 34809  | 60321  | 31651 | 57357  |
| 3501-C5-801-6  |                      |       |       |                      |       |       | 65955                | 20601 | 21742  | 73388  | 38508 | 69783  |
| 3501-C5-901-4  | 57357                | 18302 | 20075 | 86036                | 30791 | 40174 | 114714               | 43279 | 60273  | 60321  | 31651 | 57357  |
| 3501-C5-901-5  |                      |       |       | 73610                | 23934 | 27106 | 102289               | 36423 | 47205  | 73388  | 38508 | 69783  |
| 3501-C5-901-6  |                      |       |       |                      |       |       | 86036                | 27454 | 30113  | 90481  | 47477 | 86036  |
| 3501-C6-801-4  | 60764                | 19336 | 21267 | 91146                | 32566 | 42560 | 121528               | 45796 | 63853  | 63904  | 33585 | 60764  |
| 3501-C6-801-5  |                      |       |       | 74843                | 23555 | 25414 | 105225               | 36785 | 46707  | 81050  | 42596 | 77068  |
| 3501-C6-801-6  |                      |       |       |                      |       |       | 88036                | 27284 | 28630  | 99127  | 52097 | 94257  |
| 3501-C6-901-4  | 77068                | 24524 | 26974 | 115602               | 41304 | 53980 | 154136               | 58084 | 80985  | 81050  | 42596 | 77068  |
| 3501-C6-901-5  |                      |       |       | 98413                | 31803 | 35902 | 136946               | 48583 | 62908  | 99127  | 52097 | 94257  |
| 3501-C6-901-6  |                      |       |       |                      |       |       | 113847               | 35815 | 38615  | 123420 | 64864 | 117357 |
| 3501-C6-1001-4 | 96322                | 30893 | 34437 | 143967               | 51640 | 67828 | 191611               | 72387 | 101219 | 99127  | 52097 | 94257  |
| 3501-C6-1001-5 |                      |       |       | 120867               | 38872 | 43535 | 168511               | 59620 | 76926  | 123420 | 64864 | 117357 |
| 3501-C6-1001-6 |                      |       |       |                      |       |       | 142934               | 45483 | 50027  | 150319 | 79001 | 142934 |





Unit: Nm

Table 3.7: *Output Torque of 3502-B Series Actuator with Spring Return (FO)*

| Model          | Air to Spring (4Bar) |      |      | Air to Spring (5Bar) |      |      | Air to Spring (6Bar) |      |       | Spring |      |      |
|----------------|----------------------|------|------|----------------------|------|------|----------------------|------|-------|--------|------|------|
|                | 90°                  | 45°  | 0°   | 90°                  | 45°  | 0°   | 90°                  | 45°  | 0°    | 0°     | 45°  | 90°  |
| 3502-B06-201-4 | 934                  | 383  | 549  | 1296                 | 575  | 911  | 1659                 | 766  | 1274  | 902    | 383  | 517  |
| 3502-B06-201-5 |                      |      |      | 1167                 | 479  | 686  | 1530                 | 670  | 1049  | 1128   | 479  | 646  |
| 3502-B06-201-6 |                      |      |      |                      |      |      | 1391                 | 567  | 806   | 1370   | 582  | 785  |
| 3502-B06-221-4 | 1116                 | 452  | 635  | 1557                 | 685  | 1076 | 1997                 | 917  | 1516  | 1128   | 479  | 646  |
| 3502-B06-221-5 |                      |      |      | 1418                 | 582  | 833  | 1858                 | 814  | 1274  | 1370   | 582  | 785  |
| 3502-B06-221-6 |                      |      |      |                      |      |      | 1701                 | 698  | 1000  | 1644   | 698  | 942  |
| 3502-B08-221-4 | 1449                 | 587  | 834  | 2020                 | 889  | 1405 | 2591                 | 1190 | 1976  | 1452   | 620  | 837  |
| 3502-B08-221-5 |                      |      |      | 1830                 | 748  | 1075 | 2401                 | 1049 | 1646  | 1782   | 761  | 1027 |
| 3502-B08-221-6 |                      |      |      |                      |      |      | 2132                 | 850  | 1180  | 2248   | 960  | 1296 |
| 3502-B08-251-4 | 1943                 | 807  | 1188 | 2685                 | 1199 | 1930 | 3428                 | 1591 | 2673  | 1782   | 761  | 1027 |
| 3502-B08-251-5 |                      |      |      | 2416                 | 1000 | 1464 | 3159                 | 1392 | 2207  | 2248   | 960  | 1296 |
| 3502-B08-251-6 |                      |      |      |                      |      |      | 2828                 | 1147 | 1633  | 2822   | 1205 | 1627 |
| 3502-B08-281-4 | 2445                 | 1016 | 1493 | 3381                 | 1509 | 2429 | 4316                 | 2003 | 3364  | 2248   | 960  | 1296 |
| 3502-B08-281-5 |                      |      |      | 3050                 | 1264 | 1855 | 3985                 | 1758 | 2790  | 2822   | 1205 | 1627 |
| 3502-B08-281-6 |                      |      |      |                      |      |      | 3612                 | 1481 | 2142  | 3470   | 1482 | 2000 |
| 3502-B1-281-4  | 2821                 | 1157 | 1670 | 3917                 | 1736 | 2766 | 5013                 | 2315 | 3862  | 2714   | 1158 | 1563 |
| 3502-B1-281-5  |                      |      |      | 3478                 | 1411 | 2004 | 4574                 | 1990 | 3100  | 3476   | 1483 | 2002 |
| 3502-B1-281-6  |                      |      |      |                      |      |      | 4116                 | 1651 | 2305  | 4271   | 1822 | 2460 |
| 3502-B1-321-4  | 3752                 | 1556 | 2278 | 5191                 | 2315 | 3717 | 6629                 | 3075 | 5155  | 3476   | 1483 | 2002 |
| 3502-B1-321-5  |                      |      |      | 4733                 | 1976 | 2922 | 6171                 | 2736 | 4360  | 4271   | 1822 | 2460 |
| 3502-B1-321-6  |                      |      |      |                      |      |      | 5408                 | 2171 | 3034  | 5597   | 2387 | 3223 |
| 3502-B1-351-4  | 4442                 | 1822 | 2631 | 6167                 | 2734 | 4356 | 7892                 | 3645 | 6081  | 4271   | 1822 | 2460 |
| 3502-B1-351-5  |                      |      |      | 5404                 | 2169 | 3030 | 7129                 | 3080 | 4755  | 5597   | 2387 | 3223 |
| 3502-B1-351-6  |                      |      |      |                      |      |      | 6323                 | 2483 | 3356  | 6996   | 2984 | 4029 |
| 3502-B1-401-4  | 5819                 | 2388 | 3445 | 8080                 | 3582 | 5706 | 10340                | 4775 | 7966  | 5597   | 2387 | 3223 |
| 3502-B1-401-5  |                      |      |      | 7274                 | 2985 | 4307 | 9534                 | 4178 | 6567  | 6996   | 2984 | 4029 |
| 3502-B1-401-6  |                      |      |      |                      |      |      | 8729                 | 3581 | 5168  | 8395   | 3581 | 4834 |
| 3502-B2-401-4  | 6943                 | 2848 | 4110 | 9640                 | 4273 | 6807 | 12338                | 5697 | 9505  | 6679   | 2849 | 3846 |
| 3502-B2-401-5  |                      |      |      | 8603                 | 3505 | 5005 | 11301                | 4929 | 7703  | 8481   | 3617 | 4883 |
| 3502-B2-401-6  |                      |      |      |                      |      |      | 10080                | 4024 | 5582  | 10602  | 4522 | 6104 |
| 3502-B2-451-4  | 8817                 | 3618 | 5219 | 12243                | 5426 | 8645 | 15668                | 7235 | 12070 | 8481   | 3617 | 4883 |

|               |  |       |      |      |       |      |      |       |      |      |
|---------------|--|-------|------|------|-------|------|------|-------|------|------|
| 3502-B2-451-5 |  | 11022 | 4521 | 6524 | 14447 | 6330 | 9949 | 10602 | 4522 | 6104 |
| 3502-B2-451-6 |  |       |      |      | 13226 | 5426 | 7829 | 12722 | 5426 | 7325 |

| Model          | Air to Spring (4Bar) |       |       | Air to Spring (5Bar) |       |       | Air to Spring (6Bar) |       |        | Spring |       |       |
|----------------|----------------------|-------|-------|----------------------|-------|-------|----------------------|-------|--------|--------|-------|-------|
|                | 90°                  | 45°   | 0°    | 90°                  | 45°   | 0°    | 90°                  | 45°   | 0°     | 0°     | 45°   | 90°   |
| 3502-B3-451-4  | 10522                | 4317  | 6232  | 14610                | 6475  | 10320 | 18697                | 8634  | 14407  | 10118  | 4317  | 5828  |
| 3502-B3-451-5  |                      |       |       | 13186                | 5420  | 7847  | 17273                | 7579  | 11934  | 12591  | 5372  | 7252  |
| 3502-B3-451-6  |                      |       |       |                      |       |       | 15500                | 6266  | 8857   | 15668  | 6685  | 9025  |
| 3502-B3-501-4  | 13003                | 5324  | 7664  | 18066                | 7997  | 12727 | 23130                | 10671 | 17791  | 12591  | 5372  | 7252  |
| 3502-B3-501-5  |                      |       |       | 16293                | 6684  | 9650  | 21357                | 9358  | 14714  | 15668  | 6685  | 9025  |
| 3502-B3-501-6  |                      |       |       |                      |       |       | 19028                | 7633  | 10671  | 19711  | 8410  | 11354 |
| 3502-B3-561-4  | 16458                | 6771  | 9815  | 22829                | 10135 | 16186 | 29199                | 13499 | 22556  | 15668  | 6685  | 9025  |
| 3502-B3-561-5  |                      |       |       | 20500                | 8410  | 12143 | 26870                | 11774 | 18513  | 19711  | 8410  | 11354 |
| 3502-B3-561-6  |                      |       |       |                      |       |       | 24600                | 10092 | 14570  | 23654  | 10092 | 13624 |
| 3502-B3-631-4  | 20977                | 8662  | 12619 | 29059                | 12930 | 20702 | 37142                | 17198 | 28784  | 19711  | 8410  | 11354 |
| 3502-B3-631-5  |                      |       |       | 26788                | 11248 | 16759 | 34871                | 15516 | 24842  | 23654  | 10092 | 13624 |
| 3502-B3-631-6  |                      |       |       |                      |       |       | 31210                | 12804 | 18486  | 30010  | 12804 | 17286 |
| 3502-B4-631-4  | 24997                | 10255 | 14784 | 34708                | 15383 | 24495 | 44418                | 20510 | 34205  | 24057  | 10255 | 13844 |
| 3502-B4-631-5  |                      |       |       | 31246                | 12819 | 18481 | 40956                | 17946 | 28191  | 30071  | 12819 | 17306 |
| 3502-B4-631-6  |                      |       |       |                      |       |       | 35860                | 14171 | 19335  | 38927  | 16594 | 22402 |
| 3502-B4-701-4  | 30730                | 12546 | 17964 | 42739                | 18888 | 29973 | 54748                | 25229 | 41982  | 30071  | 12819 | 17306 |
| 3502-B4-701-5  |                      |       |       | 37643                | 15113 | 21118 | 49651                | 21454 | 33126  | 38927  | 16594 | 22402 |
| 3502-B4-701-6  |                      |       |       |                      |       |       | 44052                | 17306 | 23396  | 48657  | 20742 | 28002 |
| 3502-B4-801-4  | 40447                | 16594 | 23922 | 56160                | 24891 | 39635 | 71872                | 33188 | 55347  | 38927  | 16594 | 22402 |
| 3502-B4-801-5  |                      |       |       | 50560                | 20743 | 29904 | 66272                | 29040 | 45616  | 48657  | 20742 | 28002 |
| 3502-B4-801-6  |                      |       |       |                      |       |       | 60671                | 24891 | 35884  | 58390  | 24891 | 33603 |
| 3502-B5-801-4  | 48531                | 19910 | 28703 | 67384                | 29865 | 47556 | 86236                | 39820 | 66408  | 46707  | 19910 | 26879 |
| 3502-B5-801-5  |                      |       |       | 60189                | 24536 | 35054 | 79041                | 34491 | 53906  | 59209  | 25240 | 34074 |
| 3502-B5-801-6  |                      |       |       |                      |       |       | 70523                | 28181 | 39104  | 74011  | 31550 | 42592 |
| 3502-B5-901-4  | 61522                | 25240 | 36387 | 85421                | 37860 | 60285 | 109319               | 50479 | 84184  | 59209  | 25240 | 34074 |
| 3502-B5-901-5  |                      |       |       | 76902                | 31550 | 45483 | 100801               | 44169 | 69382  | 74011  | 31550 | 42592 |
| 3502-B5-901-6  |                      |       |       |                      |       |       | 92283                | 37860 | 54580  | 88813  | 37860 | 51110 |
| 3502-B6-801-4  | 65176                | 26739 | 38729 | 90495                | 40108 | 64047 | 115813               | 53478 | 89365  | 62545  | 26739 | 36098 |
| 3502-B6-801-5  |                      |       |       | 80809                | 32934 | 47266 | 106128               | 46304 | 72584  | 79327  | 33913 | 45783 |
| 3502-B6-801-6  |                      |       |       |                      |       |       | 94682                | 37825 | 52752  | 99158  | 42392 | 57229 |
| 3502-B6-901-4  | 82663                | 33913 | 49120 | 114775               | 50870 | 81231 | 146887               | 67826 | 113343 | 79327  | 33913 | 45783 |
| 3502-B6-901-5  |                      |       |       | 103329               | 42392 | 61400 | 135441               | 59348 | 93511  | 99158  | 42392 | 57229 |
| 3502-B6-901-6  |                      |       |       |                      |       |       | 121910               | 49325 | 70067  | 122603 | 52414 | 70759 |
| 3502-B6-1001-4 | 101587               | 41472 | 59657 | 141291               | 62437 | 99361 | 180995               | 83403 | 139065 | 99158  | 42392 | 57229 |
| 3502-B6-1001-5 |                      |       |       | 127760               | 52414 | 75917 | 167464               | 73380 | 115621 | 122603 | 52414 | 70759 |
| 3502-B6-1001-6 |                      |       |       |                      |       |       | 153312               | 62897 | 91100  | 147123 | 62897 | 84911 |

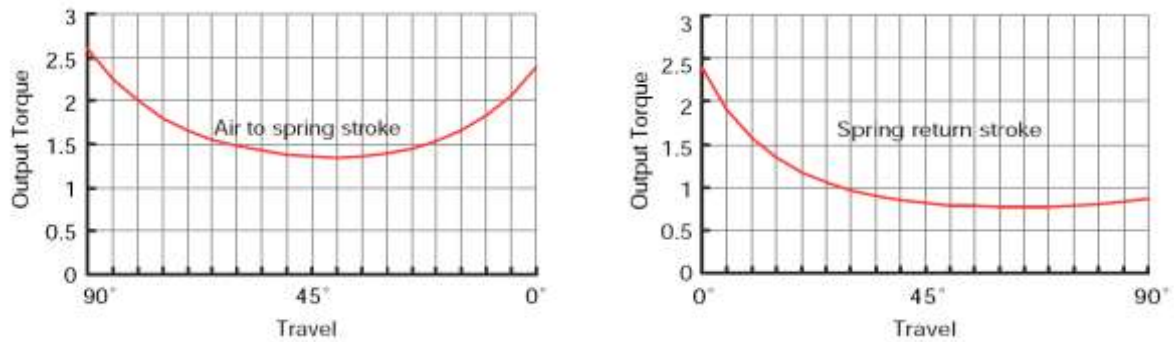


Fig.11 : Output Torque of VSO-C Series Actuator with Spring Return (FO)

Unit: Nm

Table 3.8: Output Torque of 3502-C Series Actuator with Spring Return (FO)

| Model          | Air to Spring (4Bar) |      |      | Air to Spring (5Bar) |      |       | Air to Spring (6Bar) |      |       | Spring |      |      |
|----------------|----------------------|------|------|----------------------|------|-------|----------------------|------|-------|--------|------|------|
|                | 90°                  | 45°  | 0°   | 90°                  | 45°  | 0°    | 90°                  | 45°  | 0°    | 0°     | 45°  | 90°  |
| 3502-C06-201-4 | 915                  | 471  | 870  | 1221                 | 660  | 1306  | 1526                 | 850  | 1741  | 870    | 287  | 305  |
| 3502-C06-201-5 |                      |      |      | 1144                 | 589  | 1088  | 1449                 | 778  | 1523  | 1088   | 359  | 381  |
| 3502-C06-201-6 |                      |      |      |                      |      |       | 1368                 | 701  | 1290  | 1322   | 436  | 463  |
| 3502-C06-221-4 | 1101                 | 562  | 1027 | 1472                 | 792  | 1556  | 1843                 | 1023 | 2084  | 1088   | 359  | 381  |
| 3502-C06-221-5 |                      |      |      | 1390                 | 715  | 1322  | 1761                 | 945  | 1851  | 1322   | 436  | 463  |
| 3502-C06-221-6 |                      |      |      |                      |      |       | 1668                 | 858  | 1586  | 1586   | 523  | 555  |
| 3502-C08-221-4 | 1436                 | 735  | 1353 | 1916                 | 1033 | 2038  | 2397                 | 1332 | 2724  | 1390   | 459  | 487  |
| 3502-C08-221-5 |                      |      |      | 1798                 | 921  | 1699  | 2278                 | 1220 | 2385  | 1729   | 572  | 605  |
| 3502-C08-221-6 |                      |      |      |                      |      |       | 2104                 | 1055 | 1887  | 2227   | 736  | 780  |
| 3502-C08-251-4 | 1892                 | 980  | 1835 | 2517                 | 1368 | 2726  | 3141                 | 1756 | 3617  | 1729   | 572  | 605  |
| 3502-C08-251-5 |                      |      |      | 2342                 | 1204 | 2227  | 2967                 | 1591 | 3118  | 2227   | 736  | 780  |
| 3502-C08-251-6 |                      |      |      |                      |      |       | 2787                 | 1422 | 2606  | 2740   | 906  | 959  |
| 3502-C08-281-4 | 2367                 | 1219 | 2262 | 3153                 | 1707 | 3385  | 3940                 | 2196 | 4507  | 2227   | 736  | 780  |
| 3502-C08-281-5 |                      |      |      | 2974                 | 1538 | 2872  | 3761                 | 2027 | 3994  | 2740   | 906  | 959  |
| 3502-C08-281-6 |                      |      |      |                      |      |       | 3541                 | 1819 | 3367  | 3367   | 1113 | 1179 |
| 3502-C1-281-4  | 2766                 | 1422 | 2630 | 3688                 | 1994 | 3946  | 4610                 | 2567 | 5261  | 2630   | 869  | 921  |
| 3502-C1-281-5  |                      |      |      | 3429                 | 1750 | 3205  | 4351                 | 2322 | 4520  | 3371   | 1114 | 1180 |
| 3502-C1-281-6  |                      |      |      |                      |      |       | 4051                 | 2039 | 3663  | 4228   | 1397 | 1480 |
| 3502-C1-321-4  | 3659                 | 1893 | 3534 | 4869                 | 2645 | 5260  | 6079                 | 3396 | 6987  | 3371   | 1114 | 1180 |
| 3502-C1-321-5  |                      |      |      | 4569                 | 2361 | 4403  | 5779                 | 3113 | 6130  | 4228   | 1397 | 1480 |
| 3502-C1-321-6  |                      |      |      |                      |      |       | 5404                 | 2759 | 5058  | 5300   | 1751 | 1855 |
| 3502-C1-351-4  | 4324                 | 2209 | 4054 | 5776                 | 3111 | 6124  | 7227                 | 4013 | 8195  | 4228   | 1397 | 1480 |
| 3502-C1-351-5  |                      |      |      | 5400                 | 2757 | 5052  | 6851                 | 3658 | 7123  | 5300   | 1751 | 1855 |
| 3502-C1-351-6  |                      |      |      |                      |      |       | 6432                 | 3263 | 5926  | 6497   | 2147 | 2274 |
| 3502-C1-401-4  | 5750                 | 2974 | 5551 | 7651                 | 4155 | 8263  | 9552                 | 5336 | 10976 | 5300   | 1751 | 1855 |
| 3502-C1-401-5  |                      |      |      | 7232                 | 3759 | 7066  | 9133                 | 4941 | 9779  | 6497   | 2147 | 2274 |
| 3502-C1-401-6  |                      |      |      |                      |      |       | 8559                 | 4398 | 8138  | 8138   | 2689 | 2848 |
| 3502-C2-401-4  | 6808                 | 3499 | 6473 | 9076                 | 4908 | 9710  | 11345                | 6318 | 12947 | 6473   | 2139 | 2266 |
| 3502-C2-401-5  |                      |      |      | 8487                 | 4352 | 8028  | 10756                | 5762 | 11264 | 8156   | 2695 | 2855 |
| 3502-C2-401-6  |                      |      |      |                      |      |       | 10110                | 5153 | 9420  | 10000  | 3304 | 3500 |
| 3502-C2-451-4  | 8667                 | 4464 | 8285 | 11548                | 6254 | 12395 | 14429                | 8044 | 16505 | 8156   | 2695 | 2855 |
| 3502-C2-451-5  |                      |      |      | 10903                | 5645 | 10551 | 13783                | 7435 | 14661 | 10000  | 3304 | 3500 |
| 3502-C2-451-6  |                      |      |      |                      |      |       | 12967                | 6665 | 12330 | 12330  | 4074 | 4316 |

| Model          | Air to Spring (4Bar) |       |       | Air to Spring (5Bar) |       |        | Air to Spring (6Bar) |       |        | Spring |       |       |
|----------------|----------------------|-------|-------|----------------------|-------|--------|----------------------|-------|--------|--------|-------|-------|
|                | 90°                  | 45°   | 0°    | 90°                  | 45°   | 0°     | 90°                  | 45°   | 0°     | 0°     | 45°   | 90°   |
| 3502-C3-451-4  | 10317                | 5302  | 9810  | 13755                | 7438  | 14715  | 17192                | 9574  | 19620  | 9810   | 3242  | 3434  |
| 3502-C3-451-5  |                      |       |       | 12896                | 6627  | 12263  | 16334                | 8763  | 17168  | 12263  | 4052  | 4292  |
| 3502-C3-451-6  |                      |       |       |                      |       |        | 15309                | 7796  | 14239  | 15191  | 5020  | 5317  |
| 3502-C3-501-4  | 12742                | 6532  | 12043 | 17001                | 9178  | 18120  | 21259                | 11824 | 24196  | 12263  | 4052  | 4292  |
| 3502-C3-501-5  |                      |       |       | 15976                | 8210  | 15191  | 20234                | 10856 | 21267  | 15191  | 5020  | 5317  |
| 3502-C3-501-6  |                      |       |       |                      |       |        | 19144                | 9826  | 18152  | 18307  | 6050  | 6407  |
| 3502-C3-561-4  | 16114                | 8296  | 15388 | 21472                | 11625 | 23033  | 26830                | 14954 | 30678  | 15191  | 5020  | 5317  |
| 3502-C3-561-5  |                      |       |       | 20381                | 10595 | 19917  | 25739                | 13924 | 27562  | 18307  | 6050  | 6407  |
| 3502-C3-561-6  |                      |       |       |                      |       |        | 24456                | 12713 | 23896  | 21973  | 7261  | 7690  |
| 3502-C3-631-4  | 19587                | 9687  | 16948 | 26406                | 13924 | 26678  | 33225                | 18161 | 36408  | 21973  | 7261  | 7690  |
| 3502-C3-631-5  |                      |       |       | 25225                | 12810 | 23305  | 32044                | 17047 | 33035  | 25346  | 8376  | 8871  |
| 3502-C3-631-6  |                      |       |       |                      |       |        | 30699                | 15776 | 29191  | 29191  | 9646  | 10217 |
| 3502-C4-631-4  | 23968                | 12090 | 21759 | 32134                | 17164 | 33411  | 40300                | 22239 | 45063  | 24851  | 8206  | 8698  |
| 3502-C4-631-5  |                      |       |       | 30375                | 15505 | 28386  | 38542                | 20579 | 40038  | 29876  | 9866  | 10457 |
| 3502-C4-631-6  |                      |       |       |                      |       |        | 36389                | 18548 | 33888  | 36027  | 11897 | 12609 |
| 3502-C4-701-4  | 29941                | 15235 | 27767 | 40041                | 21511 | 42177  | 50140                | 27786 | 56588  | 29876  | 9866  | 10457 |
| 3502-C4-701-5  |                      |       |       | 37888                | 19480 | 36027  | 47988                | 25755 | 50437  | 36027  | 11897 | 12609 |
| 3502-C4-701-6  |                      |       |       |                      |       |        | 44783                | 22731 | 41280  | 45184  | 14921 | 15814 |
| 3502-C4-801-4  | 40247                | 20945 | 39392 | 53461                | 29156 | 58247  | 66675                | 37366 | 77102  | 36027  | 11897 | 12609 |
| 3502-C4-801-5  |                      |       |       | 50256                | 26132 | 49090  | 63470                | 34342 | 67945  | 45184  | 14921 | 15814 |
| 3502-C4-801-6  |                      |       |       |                      |       |        | 59487                | 30584 | 56564  | 56564  | 18679 | 19798 |
| 3502-C5-801-4  | 47584                | 24463 | 45246 | 63439                | 34314 | 67869  | 79294                | 44165 | 90492  | 45246  | 14943 | 15836 |
| 3502-C5-801-5  |                      |       |       | 59200                | 30314 | 55758  | 75055                | 40166 | 78381  | 57357  | 18943 | 20075 |
| 3502-C5-801-6  |                      |       |       |                      |       |        | 70706                | 36062 | 65956  | 69782  | 23046 | 24424 |
| 3502-C5-901-4  | 60321                | 31011 | 57357 | 80420                | 43499 | 86036  | 100518               | 55987 | 114714 | 57357  | 18943 | 20075 |
| 3502-C5-901-5  |                      |       |       | 76071                | 39396 | 73611  | 96170                | 51884 | 102290 | 69782  | 23046 | 24424 |
| 3502-C5-901-6  |                      |       |       |                      |       |        | 90481                | 46516 | 86036  | 86036  | 28414 | 30113 |
| 3502-C6-801-4  | 63904                | 32823 | 60764 | 85197                | 46054 | 91146  | 106489               | 59284 | 121528 | 60764  | 20097 | 21267 |
| 3502-C6-801-5  |                      |       |       | 79490                | 40661 | 74843  | 100783               | 53891 | 105225 | 77068  | 25490 | 26974 |
| 3502-C6-801-6  |                      |       |       |                      |       |        | 94040                | 47519 | 85958  | 96335  | 31862 | 33717 |
| 3502-C6-901-4  | 81050                | 41630 | 77068 | 108055               | 58410 | 115602 | 135061               | 75190 | 154136 | 77068  | 25490 | 26974 |
| 3502-C6-901-5  |                      |       |       | 101312               | 52038 | 96335  | 128318               | 68818 | 134869 | 96335  | 31862 | 33717 |
| 3502-C6-901-6  |                      |       |       |                      |       |        | 120346               | 61284 | 112092 | 119112 | 39396 | 41689 |
| 3502-C6-1001-4 | 99847                | 51127 | 94244 | 133238               | 71875 | 141889 | 166629               | 92622 | 189533 | 96335  | 31862 | 33717 |
| 3502-C6-1001-5 |                      |       |       | 125266               | 64341 | 119112 | 158657               | 85089 | 166756 | 119112 | 39396 | 41689 |
| 3502-C6-1001-6 |                      |       |       |                      |       |        | 150319               | 77210 | 142934 | 142934 | 47275 | 50027 |

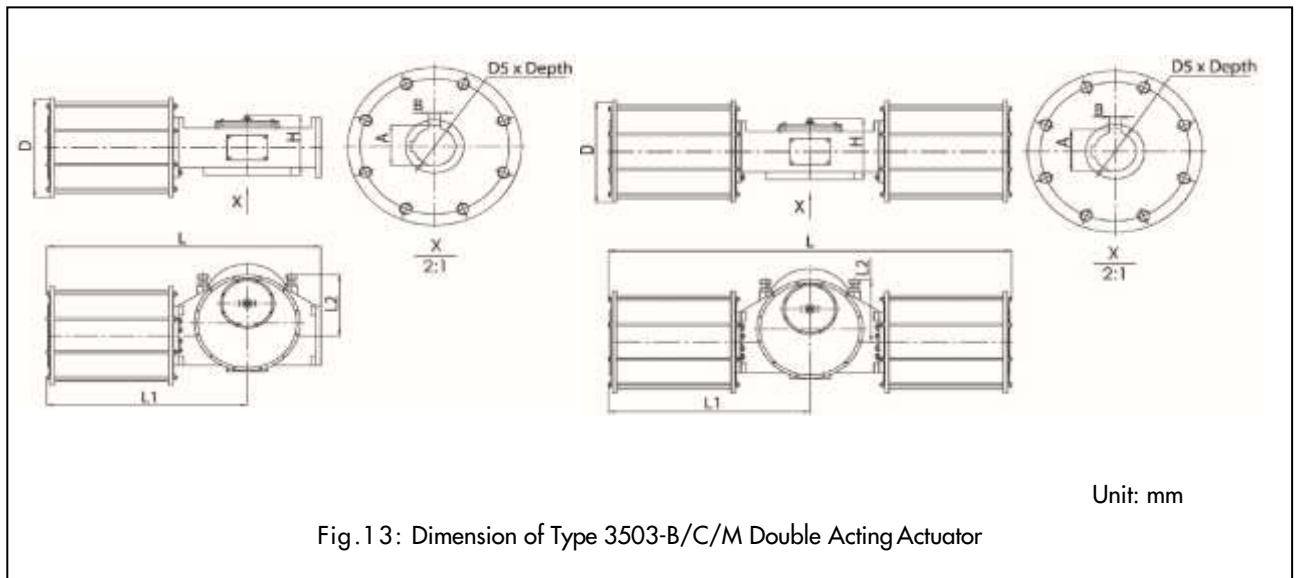


Table 4.1: Dimension of 3503-B/C Series Double Acting Actuator

| Model          | L    | L1   | L2  | H   | D       | D5xDepth | A     | B  | Connecting Flange | Air Connection |
|----------------|------|------|-----|-----|---------|----------|-------|----|-------------------|----------------|
|                |      |      |     |     |         |          |       |    | ISO5211           |                |
|                | mm   |      |     |     |         |          |       |    |                   |                |
| 3503-B/C06-201 | 675  | 505  | 180 | 212 | 225*225 | Ø48*65   | 51.8  | 14 | F14               | 3/8"G(NPT)     |
| 3503-B/C08-221 | 815  | 605  | 200 | 237 | 250*250 | Ø60*100  | 64.4  | 18 | F16               | 1/2"G(NPT)     |
| 3503-B08-251   | 815  | 605  | 200 | 237 | 280*280 | Ø60*100  | 64.4  | 18 | F16               | 1/2"G(NPT)     |
| 3503-B/C1-281  | 925  | 680  | 225 | 246 | 310*310 | Ø72*120  | 76.9  | 20 | F25/F16           | 1/2"G(NPT)     |
| 3503-B/C1-321  | 905  | 660  | 225 | 246 | Ø395    | Ø72*120  | 76.9  | 20 | F25/F16           | 1/2"G(NPT)     |
| 3503-B1-351    | 905  | 660  | 225 | 246 | Ø430    | Ø72*120  | 76.9  | 20 | F25/F16           | 3/4"G(NPT)     |
| 3503-B/C2-351  | 1055 | 775  | 285 | 269 | Ø430    | Ø100*150 | 106.4 | 28 | F30/F25           | 3/4"G(NPT)     |
| 3503-B/C2-401  | 1055 | 775  | 285 | 269 | Ø500    | Ø100*150 | 106.4 | 28 | F30/F25           | 1"G(NPT)       |
| 3503-B/C2-451  | 1055 | 775  | 285 | 269 | Ø550    | Ø100*150 | 106.4 | 28 | F30/F25           | 1"G(NPT)       |
| 3503-B/C3-451  | 1250 | 915  | 330 | 310 | Ø550    | Ø160*200 | 169.4 | 40 | F35/F30           | 1"G(NPT)       |
| 3503-B/C3-501  | 1250 | 915  | 330 | 310 | Ø600    | Ø160*200 | 169.4 | 40 | F35/F30           | 1 1/4"G(NPT)   |
| 3503-B/C3-561  | 1250 | 915  | 330 | 310 | Ø660    | Ø160*200 | 169.4 | 40 | F35/F30           | 1 1/4"G(NPT)   |
| 3503-B3-601    | 1250 | 915  | 330 | 310 | Ø700    | Ø160*200 | 169.4 | 40 | F35/F30           | 1 1/4"G(NPT)   |
| 3503-B/C4-561  | 1450 | 1050 | 412 | 340 | Ø660    | Ø180*220 | 190.4 | 45 | F40               | 1 1/4"G(NPT)   |
| 3503-B/C4-601  | 1450 | 1050 | 412 | 340 | Ø700    | Ø180*220 | 190.4 | 45 | F40               | 1 1/4"G(NPT)   |
| 3503-B/C4-631  | 1450 | 1050 | 412 | 340 | Ø730    | Ø180*220 | 190.4 | 45 | F40               | 1 1/2"G(NPT)   |
| 3503-B/C4-701  | 1450 | 1050 | 412 | 340 | Ø810    | Ø180*220 | 190.4 | 45 | F40               | 1 1/2"G(NPT)   |
| 3503-B4-801    | 1450 | 1050 | 412 | 340 | Ø910    | Ø180*220 | 190.4 | 45 | F40               | 1 1/2"G(NPT)   |
| 3503-B/C4-502  | 2120 | 1050 | 412 | 340 | Ø600    | Ø180*220 | 190.4 | 45 | F40               | 1 1/4"G(NPT)   |
| 3503-B4-562    | 2120 | 1050 | 412 | 340 | Ø660    | Ø180*220 | 190.4 | 45 | F40               | 1 1/4"G(NPT)   |
| 3503-B/C5-701  | 1690 | 1230 | 486 | 420 | Ø810    | Ø220*250 | 231.4 | 50 | F48/F40           | 1 1/2"G(NPT)   |
| 3503-B/C5-801  | 1690 | 1230 | 486 | 420 | Ø910    | Ø220*250 | 231.4 | 50 | F48/F40           | 1 1/2"G(NPT)   |
| 3503-B/C5-901  | 1690 | 1230 | 486 | 420 | Ø1010   | Ø220*250 | 231.4 | 50 | F48/F40           | 2"G(NPT)       |
| 3503-B5-1001   | 1690 | 1230 | 486 | 420 | Ø1110   | Ø220*250 | 231.4 | 50 | F48/F40           | 2"G(NPT)       |
| 3503-B/C5-562  | 2456 | 1230 | 486 | 420 | Ø660    | Ø220*250 | 231.4 | 50 | F48/F40           | 1 1/4"G(NPT)   |
| 3503-B/C5-602  | 2456 | 1230 | 486 | 420 | Ø700    | Ø220*250 | 231.4 | 50 | F48/F40           | 1 1/4"G(NPT)   |
| 3503-B/C5-632  | 2456 | 1230 | 486 | 420 | Ø730    | Ø220*250 | 231.4 | 50 | F48/F40           | 1 1/2"G(NPT)   |
| 3503-B5-702    | 2456 | 1230 | 486 | 420 | Ø810    | Ø220*250 | 231.4 | 50 | F48/F40           | 1 1/2"G(NPT)   |

|                |      |      |     |     |       |          |       |    |         |              |
|----------------|------|------|-----|-----|-------|----------|-------|----|---------|--------------|
| 3503-C6-801    | 2145 | 1555 | 658 | 490 | Ø910  | Ø280*320 | 292.4 | 63 | F60/F48 | 1 1/2"G(NPT) |
| 3503-B/C6-901  | 2145 | 1555 | 658 | 490 | Ø1010 | Ø280*320 | 292.4 | 63 | F60/F48 | 2"G(NPT)     |
| 3503-B/C6-1001 | 2145 | 1555 | 658 | 490 | Ø1110 | Ø280*320 | 292.4 | 63 | F60/F48 | 2"G(NPT)     |
| 3503-B/C6-702  | 3100 | 1555 | 658 | 490 | Ø810  | Ø280*320 | 292.4 | 63 | F60/F48 | 1 1/2"G(NPT) |
| 3503-B/C6-802  | 3100 | 1555 | 658 | 490 | Ø910  | Ø280*320 | 292.4 | 63 | F60/F48 | 1 1/2"G(NPT) |
| 3503-B6-902    | 3100 | 1555 | 658 | 490 | Ø1010 | Ø280*320 | 292.4 | 63 | F60/F48 | 2"G(NPT)     |

Unit: mm

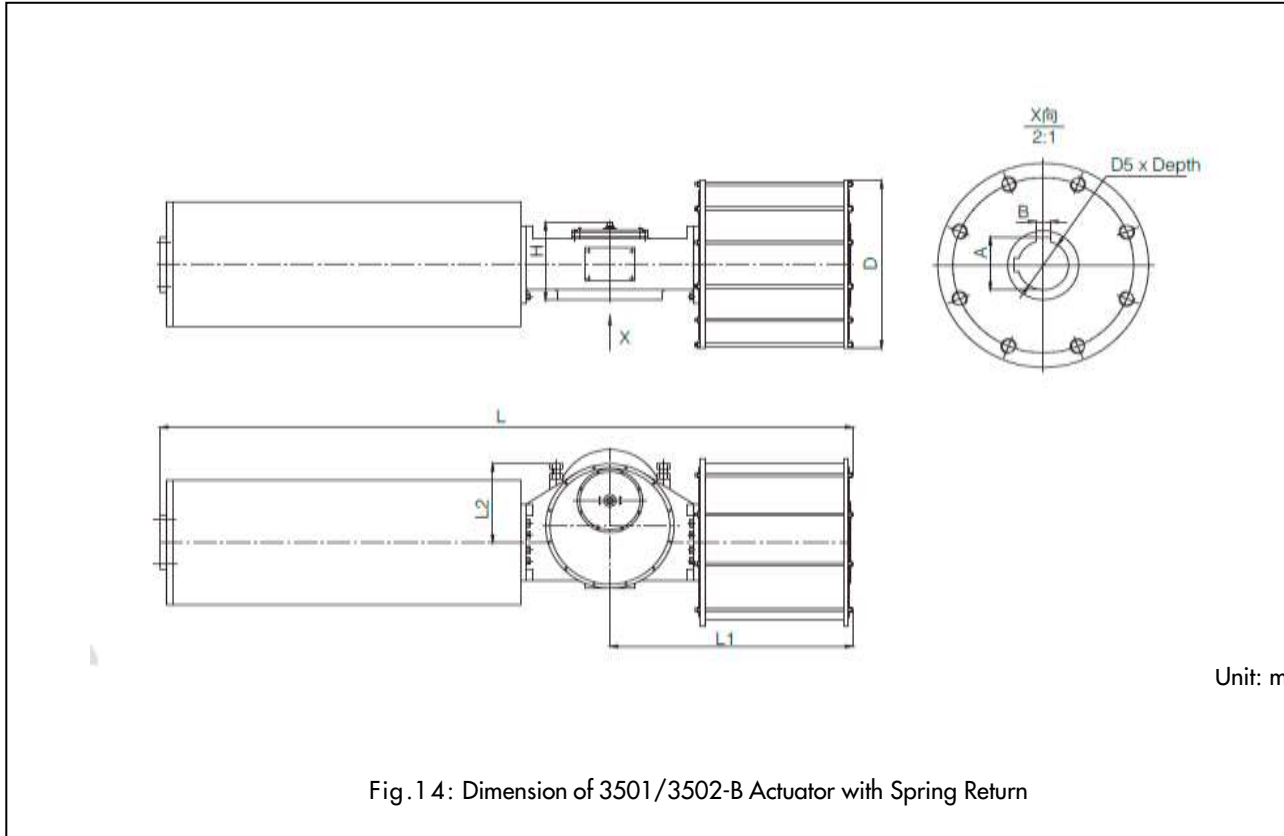


Fig.1 4: Dimension of 3501/3502-B Actuator with Spring Return

Table 4.3: Dimension of 3501/3502-B Actuator with Spring Return

| Model               | L    | L1  | L2  | H   | D    | D5xDepth | A    | B  | Connecting Flange | Air Connection |
|---------------------|------|-----|-----|-----|------|----------|------|----|-------------------|----------------|
|                     |      |     |     |     |      |          |      |    | ISO5211           |                |
| mm                  |      |     |     |     |      |          |      |    |                   |                |
| 3501/3502-B06-201-4 | 1304 | 505 | 180 | 214 | Ø225 | Ø48x65   | 51.8 | 14 | F14               | 3/8"G(NPT)     |
| 3501/3502-B06-201-5 | 1354 | 505 | 180 | 214 | Ø225 | Ø48x65   | 51.8 | 14 | F14               | 3/8"G(NPT)     |
| 3501/3502-B06-201-6 | 1374 | 505 | 180 | 214 | Ø225 | Ø48x65   | 51.8 | 14 | F14               | 3/8"G(NPT)     |
| 3501/3502-B06-221-4 | 1354 | 515 | 180 | 214 | Ø250 | Ø48x65   | 51.8 | 14 | F14               | 1/2"G(NPT)     |
| 3501/3502-B06-221-5 | 1374 | 515 | 180 | 214 | Ø250 | Ø48x65   | 51.8 | 14 | F14               | 1/2"G(NPT)     |
| 3501/3502-B06-221-6 | 1324 | 515 | 180 | 214 | Ø250 | Ø48x65   | 51.8 | 14 | F14               | 1/2"G(NPT)     |
| 3501/3502-B08-221-4 | 1458 | 605 | 200 | 238 | Ø250 | Ø60x100  | 64.4 | 18 | F16               | 1/2"G(NPT)     |
| 3501/3502-B08-221-5 | 1488 | 605 | 200 | 238 | Ø250 | Ø60x100  | 64.4 | 18 | F16               | 1/2"G(NPT)     |
| 3501/3502-B08-221-6 | 1528 | 605 | 200 | 238 | Ø250 | Ø60x100  | 64.4 | 18 | F16               | 1/2"G(NPT)     |
| 3501/3502-B08-251-4 | 1488 | 605 | 200 | 238 | Ø280 | Ø60x100  | 64.4 | 18 | F16               | 1/2"G(NPT)     |
| 3501/3502-B08-251-5 | 1528 | 605 | 200 | 238 | Ø280 | Ø60x100  | 64.4 | 18 | F16               | 1/2"G(NPT)     |
| 3501/3502-B08-251-6 | 1528 | 605 | 200 | 238 | Ø280 | Ø60x100  | 64.4 | 18 | F16               | 1/2"G(NPT)     |
| 3501/3502-B08-281-4 | 1528 | 605 | 200 | 238 | Ø310 | Ø60x100  | 64.4 | 18 | F16               | 1/2"G(NPT)     |
| 3501/3502-B08-281-5 | 1528 | 605 | 200 | 238 | Ø310 | Ø60x100  | 64.4 | 18 | F16               | 1/2"G(NPT)     |
| 3501/3502-B08-281-6 | 1558 | 605 | 200 | 238 | Ø310 | Ø60x100  | 64.4 | 18 | F16               | 1/2"G(NPT)     |
| 3501/3502-B1-281-4  | 1660 | 680 | 225 | 245 | Ø310 | Ø72x120  | 76.9 | 20 | F25/F16           | 1/2"G(NPT)     |
| 3501/3502-B1-281-5  | 1690 | 680 | 225 | 245 | Ø310 | Ø72x120  | 76.9 | 20 | F25/F16           | 1/2"G(NPT)     |
| 3501/3502-B1-281-6  | 1710 | 680 | 225 | 245 | Ø310 | Ø72x120  | 76.9 | 20 | F25/F16           | 1/2"G(NPT)     |
| 3501/3502-B1-321-4  | 1670 | 660 | 225 | 245 | Ø395 | Ø72x120  | 76.9 | 20 | F25/F16           | 1/2"G(NPT)     |



| 3501/3502-B1-321-5  | 1690 | 660  | 225 | 245 | Ø395  | Ø72x120  | 76.9  | 20 | F25/F16           | 1/2"G(NPT)     |
|---------------------|------|------|-----|-----|-------|----------|-------|----|-------------------|----------------|
| 3501/3502-B1-321-6  | 1710 | 660  | 225 | 245 | Ø395  | Ø72x120  | 76.9  | 20 | F25/F16           | 1/2"G(NPT)     |
| 3501/3502-B1-351-4  | 1690 | 660  | 225 | 245 | Ø430  | Ø72x120  | 76.9  | 20 | F25/F16           | 3/4"G(NPT)     |
| 3501/3502-B1-351-5  | 1710 | 660  | 225 | 245 | Ø430  | Ø72x120  | 76.9  | 20 | F25/F16           | 3/4"G(NPT)     |
| 3501/3502-B1-351-6  | 1730 | 660  | 225 | 245 | Ø430  | Ø72x120  | 76.9  | 20 | F25/F16           | 3/4"G(NPT)     |
| 3501/3502-B1-401-4  | 1710 | 660  | 225 | 245 | Ø500  | Ø72x120  | 76.9  | 20 | F25/F16           | 1"G(NPT)       |
| 3501/3502-B1-401-5  | 1730 | 660  | 225 | 245 | Ø500  | Ø72x120  | 76.9  | 20 | F25/F16           | 1"G(NPT)       |
| 3501/3502-B1-401-6  | 1770 | 660  | 225 | 245 | Ø500  | Ø72x120  | 76.9  | 20 | F25/F16           | 1"G(NPT)       |
| Model               | L    | L1   | L2  | H   | D     | D5xDepth | A     | B  | Connecting Flange | Air Connection |
|                     | mm   |      |     |     |       |          |       |    | ISO5211           |                |
| 3501/3502-B2-401-4  | 1915 | 775  | 285 | 269 | Ø500  | Ø100x150 | 106.4 | 28 | F30/F25           | 1"G(NPT)       |
| 3501/3502-B2-401-5  | 1965 | 775  | 285 | 269 | Ø500  | Ø100x150 | 106.4 | 28 | F30/F25           | 1"G(NPT)       |
| 3501/3502-B2-401-6  | 2025 | 775  | 285 | 269 | Ø500  | Ø100x150 | 106.4 | 28 | F30/F25           | 1"G(NPT)       |
| 3501/3502-B2-451-4  | 1965 | 775  | 285 | 269 | Ø550  | Ø100x150 | 106.4 | 28 | F30/F25           | 1"G(NPT)       |
| 3501/3502-B2-451-5  | 2025 | 775  | 285 | 269 | Ø550  | Ø100x150 | 106.4 | 28 | F30/F25           | 1"G(NPT)       |
| 3501/3502-B2-451-6  | 2045 | 775  | 285 | 269 | Ø550  | Ø100x150 | 106.4 | 28 | F30/F25           | 1"G(NPT)       |
| 3501/3502-B3-451-4  | 2223 | 915  | 345 | 310 | Ø550  | Ø160x200 | 169.4 | 40 | F35/F30           | 1"G(NPT)       |
| 3501/3502-B3-451-5  | 2243 | 915  | 345 | 310 | Ø550  | Ø160x200 | 169.4 | 40 | F35/F30           | 1"G(NPT)       |
| 3501/3502-B3-451-6  | 2263 | 915  | 345 | 310 | Ø550  | Ø160x200 | 169.4 | 40 | F35/F30           | 1"G(NPT)       |
| 3501/3502-B3-501-4  | 2243 | 915  | 345 | 310 | Ø600  | Ø160x200 | 169.4 | 40 | F35/F30           | 1 1/4"G(NPT)   |
| 3501/3502-B3-501-5  | 2263 | 915  | 345 | 310 | Ø600  | Ø160x200 | 169.4 | 40 | F35/F30           | 1 1/4"G(NPT)   |
| 3501/3502-B3-501-6  | 2323 | 915  | 345 | 310 | Ø600  | Ø160x200 | 169.4 | 40 | F35/F30           | 1 1/4"G(NPT)   |
| 3501/3502-B3-561-4  | 2263 | 915  | 345 | 310 | Ø660  | Ø160x200 | 169.4 | 40 | F35/F30           | 1 1/4"G(NPT)   |
| 3501/3502-B3-561-5  | 2323 | 915  | 345 | 310 | Ø660  | Ø160x200 | 169.4 | 40 | F35/F30           | 1 1/4"G(NPT)   |
| 3501/3502-B3-561-6  | 2383 | 915  | 345 | 310 | Ø660  | Ø160x200 | 169.4 | 40 | F35/F30           | 1 1/4"G(NPT)   |
| 3501/3502-B3-631-4  | 2383 | 915  | 345 | 310 | Ø730  | Ø160x200 | 169.4 | 40 | F35/F30           | 1 1/2"G(NPT)   |
| 3501/3502-B3-631-5  | 2383 | 915  | 345 | 310 | Ø730  | Ø160x200 | 169.4 | 40 | F35/F30           | 1 1/2"G(NPT)   |
| 3501/3502-B3-631-6  | 2423 | 915  | 345 | 310 | Ø730  | Ø160x200 | 169.4 | 40 | F35/F30           | 1 1/2"G(NPT)   |
| 3501/3502-B4-631-4  | 2784 | 1050 | 412 | 340 | Ø730  | Ø180x220 | 190.4 | 45 | F40               | 1 1/2"G(NPT)   |
| 3501/3502-B4-631-5  | 2784 | 1050 | 412 | 340 | Ø730  | Ø180x220 | 190.4 | 45 | F40               | 1 1/2"G(NPT)   |
| 3501/3502-B4-631-6  | 2924 | 1050 | 412 | 340 | Ø730  | Ø180x220 | 190.4 | 45 | F40               | 1 1/2"G(NPT)   |
| 3501/3502-B4-701-4  | 2784 | 1050 | 412 | 340 | Ø810  | Ø180x220 | 190.4 | 45 | F40               | 1 1/2"G(NPT)   |
| 3501/3502-B4-701-5  | 2924 | 1050 | 412 | 340 | Ø810  | Ø180x220 | 190.4 | 45 | F40               | 1 1/2"G(NPT)   |
| 3501/3502-B4-701-6  | 3014 | 1050 | 412 | 340 | Ø810  | Ø180x220 | 190.4 | 45 | F40               | 1 1/2"G(NPT)   |
| 3501/3502-B4-801-4  | 2924 | 1050 | 412 | 340 | Ø910  | Ø180x220 | 190.4 | 45 | F40               | 1 1/2"G(NPT)   |
| 3501/3502-B4-801-5  | 3014 | 1050 | 412 | 340 | Ø910  | Ø180x220 | 190.4 | 45 | F40               | 1 1/2"G(NPT)   |
| 3501/3502-B4-801-6  | 3100 | 1050 | 412 | 340 | Ø910  | Ø180x220 | 190.4 | 45 | F40               | 1 1/2"G(NPT)   |
| 3501/3502-B5-801-4  | 3273 | 1230 | 486 | 420 | Ø910  | Ø220x250 | 231.4 | 50 | F48/F40           | 1 1/2"G(NPT)   |
| 3501/3502-B5-801-5  | 3333 | 1230 | 486 | 420 | Ø910  | Ø220x250 | 231.4 | 50 | F48/F40           | 1 1/2"G(NPT)   |
| 3501/3502-B5-801-6  | 3453 | 1230 | 486 | 420 | Ø910  | Ø220x250 | 231.4 | 50 | F48/F40           | 1 1/2"G(NPT)   |
| 3501/3502-B5-901-4  | 3333 | 1230 | 486 | 420 | Ø1010 | Ø220x250 | 231.4 | 50 | F48/F40           | 2"G(NPT)       |
| 3501/3502-B5-901-5  | 3453 | 1230 | 486 | 420 | Ø1010 | Ø220x250 | 231.4 | 50 | F48/F40           | 2"G(NPT)       |
| 3501/3502-B5-901-6  | 3613 | 1230 | 486 | 420 | Ø1010 | Ø220x250 | 231.4 | 50 | F48/F40           | 2"G(NPT)       |
| 3501/3502-B6-801-4  | 4070 | 1555 | 658 | 490 | Ø910  | Ø280x320 | 292.4 | 63 | F60/F48           | 1 1/2"G(NPT)   |
| 3501/3502-B6-801-5  | 4200 | 1555 | 658 | 490 | Ø910  | Ø280x320 | 292.4 | 63 | F60/F48           | 1 1/2"G(NPT)   |
| 3501/3502-B6-801-6  | 4260 | 1555 | 658 | 490 | Ø910  | Ø280x320 | 292.4 | 63 | F60/F48           | 1 1/2"G(NPT)   |
| 3501/3502-B6-901-4  | 4200 | 1555 | 658 | 490 | Ø1010 | Ø280x320 | 292.4 | 63 | F60/F48           | 2"G(NPT)       |
| 3501/3502-B6-901-5  | 4260 | 1555 | 658 | 490 | Ø1010 | Ø280x320 | 292.4 | 63 | F60/F48           | 2"G(NPT)       |
| 3501/3502-B6-901-6  | 4320 | 1555 | 658 | 490 | Ø1010 | Ø280x320 | 292.4 | 63 | F60/F48           | 2"G(NPT)       |
| 3501/3502-B6-1001-4 | 4260 | 1555 | 658 | 490 | Ø1110 | Ø280x320 | 292.4 | 63 | F60/F48           | 2"G(NPT)       |
| 3501/3502-B6-1001-5 | 4320 | 1555 | 658 | 490 | Ø1110 | Ø280x320 | 292.4 | 63 | F60/F48           | 2"G(NPT)       |
| 3501/3502-B6-1001-6 | 4380 | 1555 | 658 | 490 | Ø1110 | Ø280x320 | 292.4 | 63 | F60/F48           | 2"G(NPT)       |

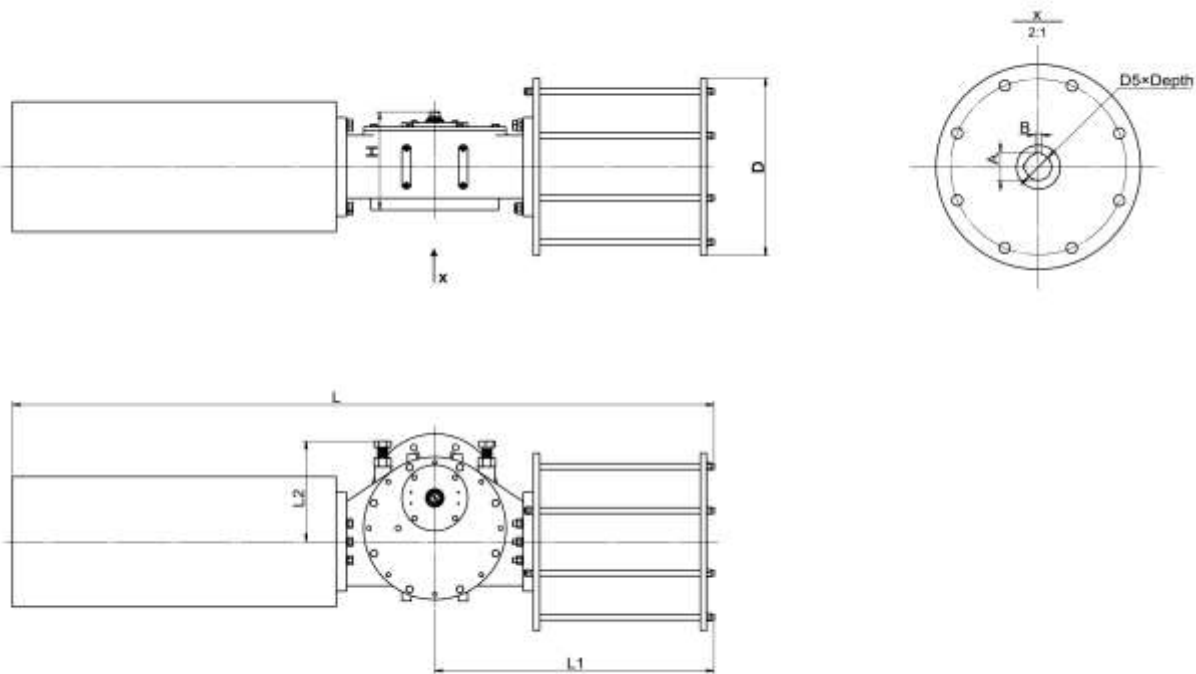


Fig.1 5: Dimension of 3501-C Series Actuator with Spring Return (FC)

Table 4.4: Dimension of 3501-C Series Actuator with Spring Return (FC)

| Model           | L    | L1  | L2  | H   | D    | D5xDepth | A    | B  | Connecting Flange | Air Connection |
|-----------------|------|-----|-----|-----|------|----------|------|----|-------------------|----------------|
|                 |      |     |     |     |      |          |      |    | ISO5211           |                |
| mm              |      |     |     |     |      |          |      |    |                   |                |
| 3501-C06-201- 4 | 1323 | 505 | 180 | 214 | Ø225 | Ø48x65   | 51.8 | 14 | F14               | 3/8"G(NPT)     |
| 3501-C06-201- 5 | 1343 | 505 | 180 | 214 | Ø225 | Ø48x65   | 51.8 | 14 | F14               | 3/8"G(NPT)     |
| 3501-C06-201- 6 | 1383 | 505 | 180 | 214 | Ø225 | Ø48x65   | 51.8 | 14 | F14               | 3/8"G(NPT)     |
| 3501-C06-221- 4 | 1343 | 515 | 180 | 214 | Ø250 | Ø48x65   | 51.8 | 14 | F14               | 1/2"G(NPT)     |
| 3501-C06-221- 5 | 1383 | 515 | 180 | 214 | Ø250 | Ø48x65   | 51.8 | 14 | F14               | 1/2"G(NPT)     |
| 3501-C06-221- 6 | 1423 | 515 | 180 | 214 | Ø250 | Ø48x65   | 51.8 | 14 | F14               | 1/2"G(NPT)     |
| 3501-C08-221- 4 | 1487 | 605 | 200 | 238 | Ø250 | Ø60x100  | 64.4 | 18 | F16               | 1/2"G(NPT)     |
| 3501-C08-221- 5 | 1507 | 605 | 200 | 238 | Ø250 | Ø60x100  | 64.4 | 18 | F16               | 1/2"G(NPT)     |
| 3501-C08-221- 6 | 1527 | 605 | 200 | 238 | Ø250 | Ø60x100  | 64.4 | 18 | F16               | 1/2"G(NPT)     |
| 3501-C08-251- 4 | 1507 | 605 | 200 | 238 | Ø280 | Ø60x100  | 64.4 | 18 | F16               | 1/2"G(NPT)     |
| 3501-C08-251- 5 | 1527 | 605 | 200 | 238 | Ø280 | Ø60x100  | 64.4 | 18 | F16               | 1/2"G(NPT)     |
| 3501-C08-251- 6 | 1567 | 605 | 200 | 238 | Ø280 | Ø60x100  | 64.4 | 18 | F16               | 1/2"G(NPT)     |
| 3501-C08-281- 4 | 1527 | 605 | 200 | 238 | Ø310 | Ø60x100  | 64.4 | 18 | F16               | 1/2"G(NPT)     |
| 3501-C08-281- 5 | 1567 | 605 | 200 | 238 | Ø310 | Ø60x100  | 64.4 | 18 | F16               | 1/2"G(NPT)     |
| 3501-C08-281- 6 | 1597 | 605 | 200 | 238 | Ø310 | Ø60x100  | 64.4 | 18 | F16               | 1/2"G(NPT)     |
| 3501-C1-281- 4  | 1740 | 680 | 225 | 246 | Ø310 | Ø72x120  | 76.9 | 20 | F25/F16           | 1/2"G(NPT)     |
| 3501-C1-281- 5  | 1720 | 680 | 225 | 246 | Ø310 | Ø72x120  | 76.9 | 20 | F25/F16           | 1/2"G(NPT)     |
| 3501-C1-281- 6  | 1720 | 680 | 225 | 246 | Ø310 | Ø72x120  | 76.9 | 20 | F25/F16           | 1/2"G(NPT)     |
| 3501-C1-321- 4  | 1700 | 660 | 225 | 246 | Ø395 | Ø72x120  | 76.9 | 20 | F25/F16           | 1/2"G(NPT)     |



|               |      |     |     |     |      |         |      |    |         |            |
|---------------|------|-----|-----|-----|------|---------|------|----|---------|------------|
| 3501-C1-321-5 | 1700 | 660 | 225 | 246 | Ø395 | Ø72x120 | 76.9 | 20 | F25/F16 | 1/2"G(NPT) |
| 3501-C1-321-6 | 1720 | 660 | 225 | 246 | Ø395 | Ø72x120 | 76.9 | 20 | F25/F16 | 1/2"G(NPT) |
| 3501-C1-351-4 | 1700 | 660 | 225 | 246 | Ø430 | Ø72x120 | 76.9 | 20 | F25/F16 | 3/4"G(NPT) |
| 3501-C1-351-5 | 1720 | 660 | 225 | 246 | Ø430 | Ø72x120 | 76.9 | 20 | F25/F16 | 3/4"G(NPT) |
| 3501-C1-351-6 | 1800 | 660 | 225 | 246 | Ø430 | Ø72x120 | 76.9 | 20 | F25/F16 | 3/4"G(NPT) |
| 3501-C1-401-4 | 1720 | 660 | 225 | 246 | Ø500 | Ø72x120 | 76.9 | 20 | F25/F16 | 1"G(NPT)   |
| 3501-C1-401-5 | 1750 | 660 | 225 | 246 | Ø500 | Ø72x120 | 76.9 | 20 | F25/F16 | 1"G(NPT)   |
| 3501-C1-401-6 | 1762 | 660 | 225 | 246 | Ø500 | Ø72x120 | 76.9 | 20 | F25/F16 | 1"G(NPT)   |

| Model          | L    | L1   | L2  | H   | D     | D5xDepth | A     | B  | Connecting Flange | Air Connection |
|----------------|------|------|-----|-----|-------|----------|-------|----|-------------------|----------------|
|                | mm   |      |     |     |       |          |       |    | ISO5211           |                |
| 3501-C2-401-4  | 1961 | 775  | 285 | 267 | Ø500  | Ø100x150 | 106.4 | 28 | F30/F25           | 1"G(NPT)       |
| 3501-C2-401-5  | 1961 | 775  | 285 | 267 | Ø500  | Ø100x150 | 106.4 | 28 | F30/F25           | 1"G(NPT)       |
| 3501-C2-401-6  | 1991 | 775  | 285 | 267 | Ø500  | Ø100x150 | 106.4 | 28 | F30/F25           | 1"G(NPT)       |
| 3501-C2-451-4  | 1961 | 775  | 285 | 267 | Ø550  | Ø100x150 | 106.4 | 28 | F30/F25           | 1"G(NPT)       |
| 3501-C2-451-5  | 1991 | 775  | 285 | 267 | Ø550  | Ø100x150 | 106.4 | 28 | F30/F25           | 1"G(NPT)       |
| 3501-C2-451-6  | 2041 | 775  | 285 | 267 | Ø550  | Ø100x150 | 106.4 | 28 | F30/F25           | 1"G(NPT)       |
| 3501-C3-451-4  | 2231 | 915  | 345 | 310 | Ø550  | Ø160x200 | 169.4 | 40 | F35/F30           | 1"G(NPT)       |
| 3501-C3-451-5  | 2251 | 915  | 345 | 310 | Ø550  | Ø160x200 | 169.4 | 40 | F35/F30           | 1"G(NPT)       |
| 3501-C3-451-6  | 2351 | 915  | 345 | 310 | Ø550  | Ø160x200 | 169.4 | 40 | F35/F30           | 1"G(NPT)       |
| 3501-C3-501-4  | 2251 | 915  | 345 | 310 | Ø600  | Ø160x200 | 169.4 | 40 | F35/F30           | 1 1/4"G(NPT)   |
| 3501-C3-501-5  | 2351 | 915  | 345 | 310 | Ø600  | Ø160x200 | 169.4 | 40 | F35/F30           | 1 1/4"G(NPT)   |
| 3501-C3-501-6  | 2401 | 915  | 345 | 310 | Ø600  | Ø160x200 | 169.4 | 40 | F35/F30           | 1 1/4"G(NPT)   |
| 3501-C3-561-4  | 2351 | 915  | 345 | 310 | Ø660  | Ø160x200 | 169.4 | 40 | F35/F30           | 1 1/4"G(NPT)   |
| 3501-C3-561-5  | 2401 | 915  | 345 | 310 | Ø660  | Ø160x200 | 169.4 | 40 | F35/F30           | 1 1/4"G(NPT)   |
| 3501-C3-561-6  | 2451 | 915  | 345 | 310 | Ø660  | Ø160x200 | 169.4 | 40 | F35/F30           | 1 1/4"G(NPT)   |
| 3501-C3-631-4  | 2401 | 915  | 345 | 310 | Ø730  | Ø160x200 | 169.4 | 40 | F35/F30           | 1 1/2"G(NPT)   |
| 3501-C3-631-5  | 2511 | 915  | 345 | 310 | Ø730  | Ø160x200 | 169.4 | 40 | F35/F30           | 1 1/2"G(NPT)   |
| 3501-C3-631-6  | 2591 | 915  | 345 | 310 | Ø730  | Ø160x200 | 169.4 | 40 | F35/F30           | 1 1/2"G(NPT)   |
| 3501-C4-631-4  | 2751 | 1050 | 412 | 340 | Ø730  | Ø180x220 | 190.4 | 45 | F40               | 1 1/2"G(NPT)   |
| 3501-C4-631-5  | 2831 | 1050 | 412 | 340 | Ø730  | Ø180x220 | 190.4 | 45 | F40               | 1 1/2"G(NPT)   |
| 3501-C4-631-6  | 2911 | 1050 | 412 | 340 | Ø730  | Ø180x220 | 190.4 | 45 | F40               | 1 1/2"G(NPT)   |
| 3501-C4-701-4  | 2831 | 1050 | 412 | 340 | Ø810  | Ø180x220 | 190.4 | 45 | F40               | 1 1/2"G(NPT)   |
| 3501-C4-701-5  | 2911 | 1050 | 412 | 340 | Ø810  | Ø180x220 | 190.4 | 45 | F40               | 1 1/2"G(NPT)   |
| 3501-C4-701-6  | 2951 | 1050 | 412 | 340 | Ø810  | Ø180x220 | 190.4 | 45 | F40               | 1 1/2"G(NPT)   |
| 3501-C4-801-4  | 2911 | 1050 | 412 | 340 | Ø910  | Ø180x220 | 190.4 | 45 | F40               | 1 1/2"G(NPT)   |
| 3501-C4-801-5  | 2951 | 1050 | 412 | 340 | Ø910  | Ø180x220 | 190.4 | 45 | F40               | 1 1/2"G(NPT)   |
| 3501-C4-801-6  | 3121 | 1050 | 412 | 340 | Ø910  | Ø180x220 | 190.4 | 45 | F40               | 1 1/2"G(NPT)   |
| 3501-C5-801-4  | 3273 | 1230 | 486 | 420 | Ø910  | Ø220x250 | 231.4 | 50 | F48/F40           | 1 1/2"G(NPT)   |
| 3501-C5-801-5  | 3493 | 1230 | 486 | 420 | Ø910  | Ø220x250 | 231.4 | 50 | F48/F40           | 1 1/2"G(NPT)   |
| 3501-C5-801-6  | 3613 | 1230 | 486 | 420 | Ø910  | Ø220x250 | 231.4 | 50 | F48/F40           | 1 1/2"G(NPT)   |
| 3501-C5-901-4  | 3493 | 1230 | 486 | 420 | Ø1010 | Ø220x250 | 231.4 | 50 | F48/F40           | 2"G(NPT)       |
| 3501-C5-901-5  | 3613 | 1230 | 486 | 420 | Ø1010 | Ø220x250 | 231.4 | 50 | F48/F40           | 2"G(NPT)       |
| 3501-C5-901-6  | 3773 | 1230 | 486 | 420 | Ø1010 | Ø220x250 | 231.4 | 50 | F48/F40           | 2"G(NPT)       |
| 3501-C6-801-4  | 4050 | 1555 | 658 | 490 | Ø910  | Ø280x320 | 292.4 | 63 | F60/F48           | 1 1/2"G(NPT)   |
| 3501-C6-801-5  | 4310 | 1555 | 658 | 490 | Ø910  | Ø280x320 | 292.4 | 63 | F60/F48           | 1 1/2"G(NPT)   |
| 3501-C6-801-6  | 4320 | 1555 | 658 | 490 | Ø910  | Ø280x320 | 292.4 | 63 | F60/F48           | 1 1/2"G(NPT)   |
| 3501-C6-901-4  | 4310 | 1555 | 658 | 490 | Ø1010 | Ø280x320 | 292.4 | 63 | F60/F48           | 2"G(NPT)       |
| 3501-C6-901-5  | 4320 | 1555 | 658 | 490 | Ø1010 | Ø280x320 | 292.4 | 63 | F60/F48           | 2"G(NPT)       |
| 3501-C6-901-6  | 4430 | 1555 | 658 | 490 | Ø1010 | Ø280x320 | 292.4 | 63 | F60/F48           | 2"G(NPT)       |
| 3501-C6-1001-4 | 4320 | 1555 | 658 | 490 | Ø1110 | Ø280x320 | 292.4 | 63 | F60/F48           | 2"G(NPT)       |
| 3501-C6-1001-5 | 4430 | 1555 | 658 | 490 | Ø1110 | Ø280x320 | 292.4 | 63 | F60/F48           | 2"G(NPT)       |
| 3501-C6-1001-6 | 4600 | 1555 | 658 | 490 | Ø1110 | Ø280x320 | 292.4 | 63 | F60/F48           | 2"G(NPT)       |

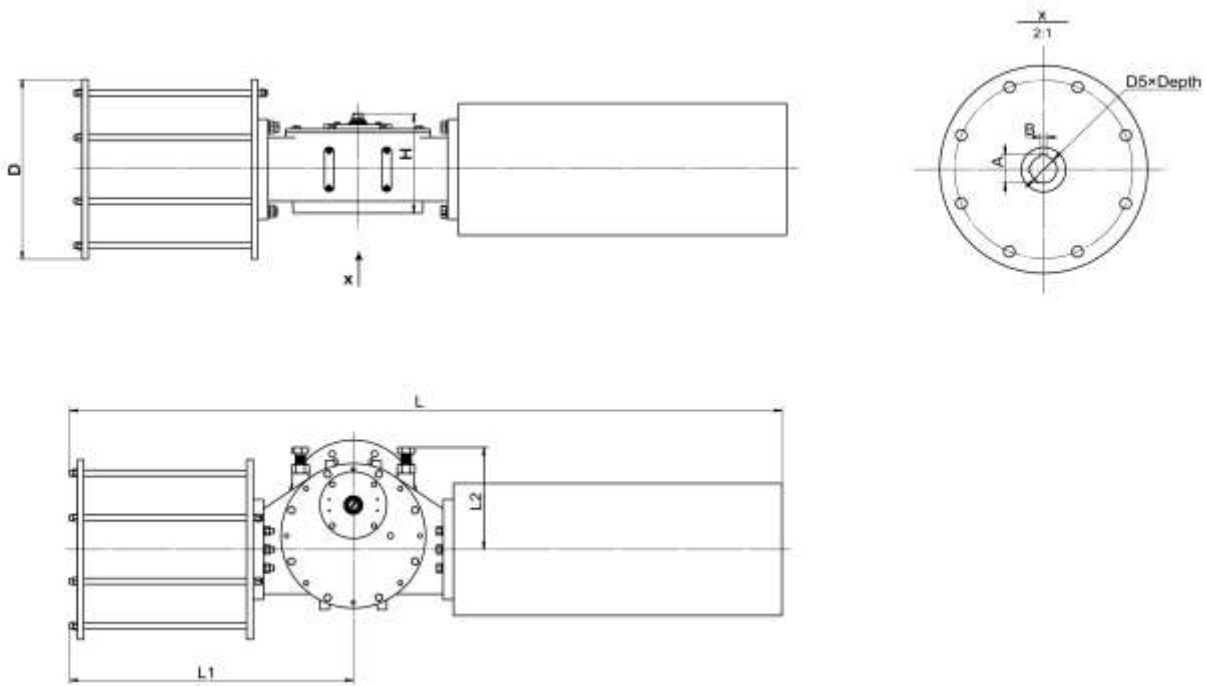


Fig.1 6: Dimension of 3502-C Series Actuator with Spring Return (FO)

Table 4.5: Dimension of 3502-C Series Actuator with Spring Return (FO)

| Model           | L    | L1  | L2  | H   | D    | D5xDepth | A    | B  | Connecting Flange | Air Connection |
|-----------------|------|-----|-----|-----|------|----------|------|----|-------------------|----------------|
|                 |      |     |     |     |      |          |      |    | ISO5211           |                |
| mm              |      |     |     |     |      |          |      |    |                   |                |
| 3502-C06-201- 4 | 1348 | 505 | 180 | 214 | Ø225 | Ø48x65   | 51.8 | 14 | F14               | 3/8"G(NPT)     |
| 3502-C06-201- 5 | 1298 | 505 | 180 | 214 | Ø225 | Ø48x65   | 51.8 | 14 | F14               | 3/8"G(NPT)     |
| 3502-C06-201- 6 | 1328 | 505 | 180 | 214 | Ø225 | Ø48x65   | 51.8 | 14 | F14               | 3/8"G(NPT)     |
| 3502-C06-221- 4 | 1298 | 515 | 180 | 214 | Ø250 | Ø48x65   | 51.8 | 14 | F14               | 1/2"G(NPT)     |
| 3502-C06-221- 5 | 1328 | 515 | 180 | 214 | Ø250 | Ø48x65   | 51.8 | 14 | F14               | 1/2"G(NPT)     |
| 3502-C06-221- 6 | 1348 | 515 | 180 | 214 | Ø250 | Ø48x65   | 51.8 | 14 | F14               | 1/2"G(NPT)     |
| 3502-C08-221- 4 | 1487 | 605 | 200 | 238 | Ø250 | Ø60x100  | 64.4 | 18 | F16               | 1/2"G(NPT)     |
| 3502-C08-221- 5 | 1487 | 605 | 200 | 238 | Ø250 | Ø60x100  | 64.4 | 18 | F16               | 1/2"G(NPT)     |
| 3502-C08-221- 6 | 1487 | 605 | 200 | 238 | Ø250 | Ø60x100  | 64.4 | 18 | F16               | 1/2"G(NPT)     |
| 3502-C08-251- 4 | 1487 | 605 | 200 | 238 | Ø280 | Ø60x100  | 64.4 | 18 | F16               | 1/2"G(NPT)     |
| 3502-C08-251- 5 | 1487 | 605 | 200 | 238 | Ø280 | Ø60x100  | 64.4 | 18 | F16               | 1/2"G(NPT)     |
| 3502-C08-251- 6 | 1507 | 605 | 200 | 238 | Ø280 | Ø60x100  | 64.4 | 18 | F16               | 1/2"G(NPT)     |
| 3502-C08-281- 4 | 1487 | 605 | 200 | 238 | Ø310 | Ø60x100  | 64.4 | 18 | F16               | 1/2"G(NPT)     |
| 3502-C08-281- 5 | 1507 | 605 | 200 | 238 | Ø310 | Ø60x100  | 64.4 | 18 | F16               | 1/2"G(NPT)     |
| 3502-C08-281- 6 | 1537 | 605 | 200 | 238 | Ø310 | Ø60x100  | 64.4 | 18 | F16               | 1/2"G(NPT)     |
| 3502-C1-281- 4  | 1680 | 680 | 225 | 246 | Ø310 | Ø72x120  | 76.9 | 20 | F25/F16           | 1/2"G(NPT)     |
| 3502-C1-281- 5  | 1680 | 680 | 225 | 246 | Ø310 | Ø72x120  | 76.9 | 20 | F25/F16           | 1/2"G(NPT)     |
| 3502-C1-281- 6  | 1680 | 680 | 225 | 246 | Ø310 | Ø72x120  | 76.9 | 20 | F25/F16           | 1/2"G(NPT)     |
| 3502-C1-321- 4  | 1660 | 660 | 225 | 246 | Ø395 | Ø72x120  | 76.9 | 20 | F25/F16           | 1/2"G(NPT)     |
| 3502-C1-281- 5  | 1660 | 660 | 225 | 246 | Ø395 | Ø72x120  | 76.9 | 20 | F25/F16           | 1/2"G(NPT)     |
| 3502-C1-281- 6  | 1710 | 660 | 225 | 246 | Ø395 | Ø72x120  | 76.9 | 20 | F25/F16           | 1/2"G(NPT)     |
| 3502-C1-351- 4  | 1660 | 660 | 225 | 246 | Ø430 | Ø72x120  | 76.9 | 20 | F25/F16           | 3/4"G(NPT)     |
| 3502-C1-351- 5  | 1710 | 660 | 225 | 246 | Ø430 | Ø72x120  | 76.9 | 20 | F25/F16           | 3/4"G(NPT)     |
| 3502-C1-351- 6  | 1710 | 660 | 225 | 246 | Ø430 | Ø72x120  | 76.9 | 20 | F25/F16           | 3/4"G(NPT)     |
| 3502-C1-401- 4  | 1710 | 660 | 225 | 246 | Ø500 | Ø72x120  | 76.9 | 20 | F25/F16           | 1"G(NPT)       |
| 3502-C1-401- 5  | 1710 | 660 | 225 | 246 | Ø500 | Ø72x120  | 76.9 | 20 | F25/F16           | 1"G(NPT)       |
| 3502-C1-401- 6  | 1730 | 660 | 225 | 246 | Ø500 | Ø72x120  | 76.9 | 20 | F25/F16           | 1"G(NPT)       |

| Model         | L    | L1   | L2  | H   | D     | D5xDepth | A     | B  | Connecting Flange | Air Connection |
|---------------|------|------|-----|-----|-------|----------|-------|----|-------------------|----------------|
|               | mm   |      |     |     |       |          |       |    | ISO5211           |                |
| 3502-C2-401-4 | 1898 | 775  | 285 | 269 | Ø500  | Ø100x150 | 106.4 | 28 | F30/F25           | 1"G(NPT)       |
| 3502-C2-401-5 | 1928 | 775  | 285 | 269 | Ø500  | Ø100x150 | 106.4 | 28 | F30/F25           | 1"G(NPT)       |
| 3502-C2-401-6 | 1948 | 775  | 285 | 269 | Ø500  | Ø100x150 | 106.4 | 28 | F30/F25           | 1"G(NPT)       |
| 3502-C2-451-4 | 1928 | 775  | 285 | 269 | Ø550  | Ø100x150 | 106.4 | 28 | F30/F25           | 1"G(NPT)       |
| 3502-C2-451-5 | 1948 | 775  | 285 | 269 | Ø550  | Ø100x150 | 106.4 | 28 | F30/F25           | 1"G(NPT)       |
| 3502-C2-451-6 | 1948 | 775  | 285 | 269 | Ø550  | Ø100x150 | 106.4 | 28 | F30/F25           | 1"G(NPT)       |
| 3502-C3-451-4 | 2143 | 915  | 345 | 310 | Ø550  | Ø160x200 | 169.4 | 40 | F35/F30           | 1"G(NPT)       |
| 3502-C3-451-5 | 2193 | 915  | 345 | 310 | Ø550  | Ø160x200 | 169.4 | 40 | F35/F30           | 1"G(NPT)       |
| 3502-C3-451-6 | 2193 | 915  | 345 | 310 | Ø550  | Ø160x200 | 169.4 | 40 | F35/F30           | 1"G(NPT)       |
| 3502-C3-501-4 | 2193 | 915  | 345 | 310 | Ø600  | Ø160x200 | 169.4 | 40 | F35/F30           | 1 1/4"G(NPT)   |
| 3502-C3-501-5 | 2193 | 915  | 345 | 310 | Ø600  | Ø160x200 | 169.4 | 40 | F35/F30           | 1 1/4"G(NPT)   |
| 3502-C3-501-6 | 2243 | 915  | 345 | 310 | Ø600  | Ø160x200 | 169.4 | 40 | F35/F30           | 1 1/4"G(NPT)   |
| 3502-C3-561-4 | 2193 | 915  | 345 | 310 | Ø660  | Ø160x200 | 169.4 | 40 | F35/F30           | 1 1/4"G(NPT)   |
| 3502-C3-561-5 | 2243 | 915  | 345 | 310 | Ø660  | Ø160x200 | 169.4 | 40 | F35/F30           | 1 1/4"G(NPT)   |
| 3502-C3-561-6 | 2273 | 915  | 345 | 310 | Ø660  | Ø160x200 | 169.4 | 40 | F35/F30           | 1 1/4"G(NPT)   |
| 3502-C3-631-4 | 2273 | 915  | 345 | 310 | Ø730  | Ø160x200 | 169.4 | 40 | F35/F30           | 1 1/2"G(NPT)   |
| 3502-C3-631-5 | 2323 | 915  | 345 | 310 | Ø730  | Ø160x200 | 169.4 | 40 | F35/F30           | 1 1/2"G(NPT)   |
| 3502-C3-631-6 | 2373 | 915  | 345 | 310 | Ø730  | Ø160x200 | 169.4 | 40 | F35/F30           | 1 1/2"G(NPT)   |
| 3502-C4-631-4 | 2667 | 1050 | 412 | 340 | Ø730  | Ø180x220 | 190.4 | 45 | F40               | 1 1/2"G(NPT)   |
| 3502-C4-631-5 | 2693 | 1050 | 412 | 340 | Ø730  | Ø180x220 | 190.4 | 45 | F40               | 1 1/2"G(NPT)   |
| 3502-C4-631-6 | 2763 | 1050 | 412 | 340 | Ø730  | Ø180x220 | 190.4 | 45 | F40               | 1 1/2"G(NPT)   |
| 3502-C4-701-4 | 2693 | 1050 | 412 | 340 | Ø810  | Ø180x220 | 190.4 | 45 | F40               | 1 1/2"G(NPT)   |
| 3502-C4-701-5 | 2763 | 1050 | 412 | 340 | Ø810  | Ø180x220 | 190.4 | 45 | F40               | 1 1/2"G(NPT)   |
| 3502-C4-701-6 | 2843 | 1050 | 412 | 340 | Ø810  | Ø180x220 | 190.4 | 45 | F40               | 1 1/2"G(NPT)   |
| 3502-C4-801-4 | 2763 | 1050 | 412 | 340 | Ø910  | Ø180x220 | 190.4 | 45 | F40               | 1 1/2"G(NPT)   |
| 3502-C4-801-5 | 2843 | 1050 | 412 | 340 | Ø910  | Ø180x220 | 190.4 | 45 | F40               | 1 1/2"G(NPT)   |
| 3502-C4-801-6 | 2973 | 1050 | 412 | 340 | Ø910  | Ø180x220 | 190.4 | 45 | F40               | 1 1/2"G(NPT)   |
| 3502-C5-801-4 | 3176 | 1230 | 486 | 420 | Ø910  | Ø220x250 | 231.4 | 50 | F48/F40           | 1 1/2"G(NPT)   |
| 3502-C5-801-5 | 3236 | 1230 | 486 | 420 | Ø910  | Ø220x250 | 231.4 | 50 | F48/F40           | 1 1/2"G(NPT)   |
| 3502-C5-801-6 | 3296 | 1230 | 486 | 420 | Ø910  | Ø220x250 | 231.4 | 50 | F48/F40           | 1 1/2"G(NPT)   |
| 3502-C5-901-4 | 3236 | 1230 | 486 | 420 | Ø1010 | Ø220x250 | 231.4 | 50 | F48/F40           | 2"G(NPT)       |
| 3502-C5-901-5 | 3296 | 1230 | 486 | 420 | Ø1010 | Ø220x250 | 231.4 | 50 | F48/F40           | 2"G(NPT)       |
| 3502-C5-901-6 | 3386 | 1230 | 486 | 420 | Ø1010 | Ø220x250 | 231.4 | 50 | F48/F40           | 2"G(NPT)       |

Table 5.1: *Weights of 3503-B/C Series Double Acting Actuator*

|        |    |                |                |               |               |               |               |
|--------|----|----------------|----------------|---------------|---------------|---------------|---------------|
| Model  |    | 3503-B/C06-201 | 3503-B/C08-221 | 3503-B08-251  | 3503-B/C1-281 | 3503-B/C1-321 | 3503-B1-351   |
| Weight | kg | 108            | 132            | 144           | 180           | 204           | 216           |
| Model  |    | 3503-B/C2-351  | 3503-B/C2-401  | 3503-B/C2-451 | 3503-B/C3-451 | 3503-B/C3-501 | 3503-B/C3-561 |
| Weight | kg | 276            | 300            | 348           | 504           | 552           | 600           |
| Model  |    | 3503-B3-601    | 3503-C4-561    | 3503-B/C4-601 | 3503-B/C4-631 | 3503-B/C4-701 | 3503-B4-801   |
| Weight | kg | 708            | 840            | 948           | 996           | 1218          | 1404          |
| Model  |    | 3503-B/C4-502  | 3503-B4-562    | 3503-B/C5-701 | 3503-B/C5-801 | 3503-B/C5-901 | 3503-B5-1001  |
| Weight | kg | 1116           | 1260           | 1584          | 1788          | 2040          | 2316          |
| Model  |    | 3503-B/C5-562  | 3503-B/C5-602  | 3503-B/C5-632 | 3503-B5-702   | 3503-C6-801   | 3503-B/C6-901 |
| Weight | kg | 1620           | 1860           | 1956          | 2460          | 2544          | 2886          |
| Model  |    | 3503-B/C6-1001 | 3503-B/C6-702  | 3503-B/C6-802 | 3503-B6-902   |               |               |
| Weight | kg | 3120           | 3408           | 3696          | 4380          |               |               |

Table 5.3: *Weights of 3501/3502-B/C Series Spring Return Actuator*

|        |    |                        |                        |                        |
|--------|----|------------------------|------------------------|------------------------|
| Model  |    | 3501/3502-B/C06-201- 4 | 3501/3502-B/C06-201- 5 | 3501/3502-B/C06-201- 6 |
| Weight | kg | 164                    | 162                    | 168                    |
| Model  |    | 3501/3502-B/C06-221- 4 | 3501/3502-B/C06-221- 5 | 3501/3502-B/C06-221- 6 |
| Weight | kg | 162                    | 168                    | 178                    |
| Model  |    | 3501/3502-B/C08-221- 4 | 3501/3502-B/C08-221- 5 | 3501/3502-B/C08-221- 6 |
| Weight | kg | 240                    | 250                    | 276                    |
| Model  |    | 3501/3502-B/C08-251- 4 | 3501/3502-B/C08-251- 5 | 3501/3502-B/C08-251- 6 |
| Weight | kg | 244                    | 252                    | 260                    |
| Model  |    | 3501/3502-B/C08-281- 4 | 3501/3502-B/C08-281- 5 | 3501/3502-B/C08-281- 6 |
| Weight | kg | 264                    | 272                    | 283                    |
| Model  |    | 3501/3502-B/C1-281- 4  | 3501/3502-B/C1-281- 5  | 3501/3502-B/C1-281- 6  |
| Weight | kg | 288                    | 300                    | 306                    |
| Model  |    | 3501/3502-B/C1-321- 4  | 3501/3502-B/C1-321- 5  | 3501/3502-B/C1-321- 6  |
| Weight | kg | 324                    | 330                    | 342                    |
| Model  |    | 3501/3502-B/C1-351- 4  | 3501/3502-B/C1-351- 5  | 3501/3502-B/C1-351- 6  |
| Weight | kg | 342                    | 354                    | 378                    |
| Model  |    | 3501/3502-B/C1-401- 4  | 3501/3502-B/C1-401- 5  | 3501/3502-B/C1-401- 6  |
| Weight | kg | 378                    | 402                    | 420                    |
| Model  |    | 3501/3502-B/C2-401- 4  | 3501/3502-B/C2-401- 5  | 3501/3502-B/C2-401- 6  |
| Weight | kg | 492                    | 516                    | 540                    |
| Model  |    | 3501/3502-B/C2-451- 4  | 3501/3502-B/C2-451- 5  | 3501/3502-B/C2-451- 6  |
| Weight | kg | 564                    | 588                    | 600                    |
| Model  |    | 3501/3502-B/C3-451- 4  | 3501/3502-B/C3-451- 5  | 3501/3502-B/C3-451- 6  |
| Weight | kg | 720                    | 840                    | 864                    |
| Model  |    | 3501/3502-B/C3-501- 4  | 3501/3502-B/C3-501- 5  | 3501/3502-B/C3-501- 6  |
| Weight | kg | 888                    | 912                    | 948                    |
| Model  |    | 3501/3502-B/C3-561- 4  | 3501/3502-B/C3-561- 5  | 3501/3502-B/C3-561- 6  |
| Weight | kg | 960                    | 996                    | 1008                   |
| Model  |    | 3501/3502-B/C3-631- 4  | 3501/3502-B/C3-631- 5  | 3501/3502-B/C3-631- 6  |
| Weight | kg | 1164                   | 1344                   | 1416                   |
| Model  |    | 3501/3502-B/C4-631- 4  | 3501/3502-B/C4-631- 5  | 3501/3502-B/C4-631- 6  |
| Weight | kg | 1536                   | 1572                   | 1668                   |
| Model  |    | 3501/3502-B/C4-701- 4  | 3501/3502-B/C4-701- 5  | 3501/3502-B/C4-701- 6  |

|        |    |                        |                        |                        |
|--------|----|------------------------|------------------------|------------------------|
| Weight | kg | 1794                   | 1890                   | 2178                   |
| Model  |    | 3501-B/C4-801- 4       | 3501-B/C4-801- 5       | 3501-B/C4-801- 6       |
| Weight | kg | 2076                   | 2364                   | 2544                   |
| Model  |    | 3502-B/C4-801- 4       | 3502-B/C4-801- 5       | 3502-B/C4-801- 6       |
| Weight | kg | 1794                   | 1890                   | 2178                   |
| Model  |    | 3501-B/C5-801- 4       | 3501-B/C5-801- 5       | 3501-B/C5-801- 6       |
| Weight | kg | 2628                   | 2818                   | 3004                   |
| Model  |    | 3502-B/C5-801- 4       | 3502-B/C5-801- 5       | 3502-B/C5-801- 6       |
| Weight | kg | 1794                   | 1890                   | 2178                   |
| Model  |    | 3501/3502-B/C5-901- 4  | 3501/3502-B/C5-901- 5  | 3501/3502-B/C5-901- 6  |
| Weight | kg | 3250                   | 3436                   | 3455                   |
| Model  |    | 3501/3502-B/C6-801- 4  | 3501/3502-B/C6-801- 5  | 3501/3502-B/C6-801- 6  |
| Weight | kg | 3744                   | 3804                   | 4044                   |
| Model  |    | 3501/3502-B/C6-901- 4  | 3501/3502-B/C6-901- 5  | 3501/3502-B/C6-901- 6  |
| Weight | kg | 4146                   | 4386                   | 4806                   |
| Model  |    | 3501/3502-B/C6-1001- 4 | 3501/3502-B/C6-1001- 5 | 3501/3502-B/C6-1001- 6 |
| Weight | kg | 4620                   | 5040                   | 5160                   |

## How to Order

|                 |    |      |     |     |   |    |      |   |   |
|-----------------|----|------|-----|-----|---|----|------|---|---|
| Actuator Type   | VA | 3501 | C06 | 201 | 4 | HM | None | L | N |
| Specification=> | 1  | 2    | 3   | 4   | 5 | 6  | 7    | 8 | 9 |

The following details are required on ordering:

### 1. Series of Actuator

VA

### 2. Actuator Type

3501 Single Acting Actuator and Failure Close

3502 Single Acting Actuator and Failure Open

3503 Double Acting Actuator

### 3. Centre Body

C1, C2, C3, C4, C5, C6, C06,

C08

B1, B2, B3, B4, B5, B6, B06, B08

M1、M2、M3、M4、M5、M6、M7

#### 4. Specifications of Cylinder

|     |         |     |       |
|-----|---------|-----|-------|
| 201 | 200mm*1 | 200 | 223mm |
| 501 | 500mm*1 | 250 | 280mm |
| 601 | 600mm*1 | 300 | 332mm |

#### 5. Spring Code

1、2、3、4、5、6

#### 6. Handwheel

|       |                            |
|-------|----------------------------|
| HM    | hydraulic manual override  |
| MS    | jack screw manual override |
| MG    | gearbox manual override    |
| MW    | worm gear manual override  |
| Blank | without handwheel          |

#### 7. Travel

|      |                |
|------|----------------|
| None | 0~90° Rotation |
| 75   | 0~75° Rotation |
| 80   | 0~80° Rotation |

#### 8. Temperature

|      |                                  |
|------|----------------------------------|
| None | Normal Temperature - 20°C~+80°C; |
| L    | Low Temperature - 40°C~+80°C     |
| H    | High Temperature - 15°C~+150°C   |

#### 9. Custom-tailor

None

Specifications subject to change without notice

