

# Chicago Valves & Controls



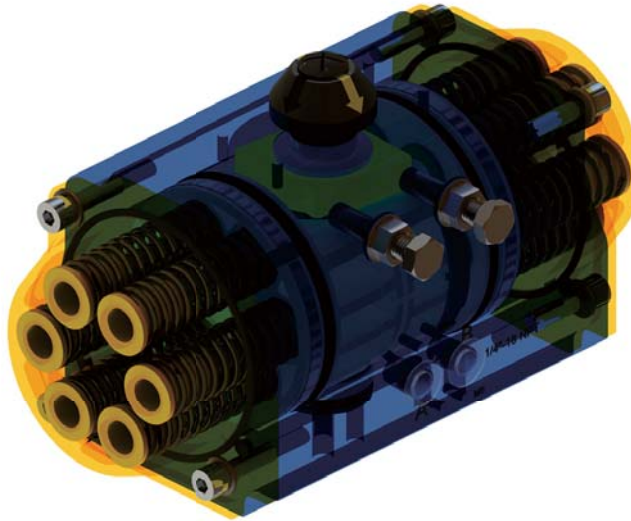
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**SERIES XL**

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**PNEUMATIC ACTUATORS**

## Design & Construction



### **1. Indicator**

Indicator according to VID/VIE3845 is convenient for mounting accessories such as limit switch box, Positioner and etc.

### **2. Pinion**

The design of the nickel-plated alloy steel integrated forging pinion drive is according the NAMUR,ISO5211 and DIN3337 standards. Special standard are available upon request.

### **3. Actuator Body**

High quality aluminum alloy extrusion formed. The surface has been treated by anodized hardening followed by epoxy polyester coating. Other surface treatments are available e.g. PTFE and Nickel plating as well as other colour coatings on request.

### **4. End Cap**

The surface has been treated by anodized hardening followed by epoxy polyester coating. Other surface treatments are available on request e.g. PTFE and Nickel plating as well as other colours on request.

### **5. Piston**

Manufactured from Die-cast aluminum and treated by anodized hardening process. Symmetric mounting of the piston helps to ensure easy maintenance. Reverse action requirements can be achieved by inverting the pistons.

### **6. Adjusting Bolt**

The two independent adjustment bolts can adjust opening and closing of the mounted valve within  $\pm 5^\circ$ .

### **7. Spring**

Preloaded high grade springs with surface epoxy resin painted, which can be demounted conveniently to satisfy different requirements of torque by changing quantity of springs.

### **8. Piston Ring**

Manufactured from low friction long life material POM. Can be easily changed for maintenance purposes.

### **9. O-rings**

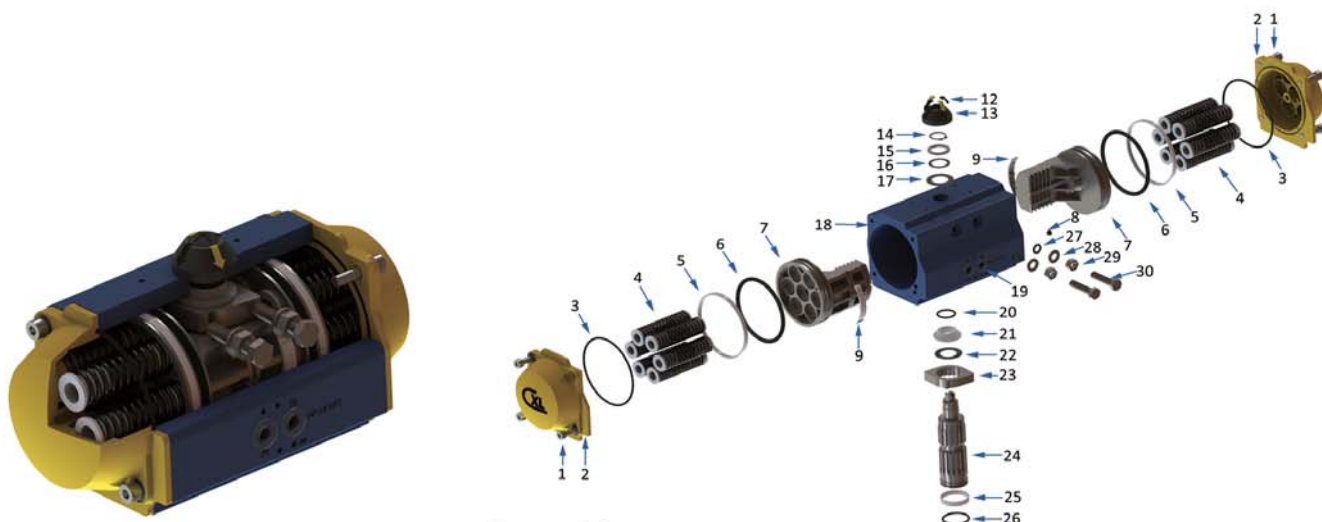
Standard NBR rubber O-rings provide trouble-free operation at standard temperature ranges. For other temperature requirements relevant materials can be offered on request.

### **10. Air Connection**

Conforms to NAMUR standards

### **11. All stop parts are manufactured from SS304.**

## Explode View



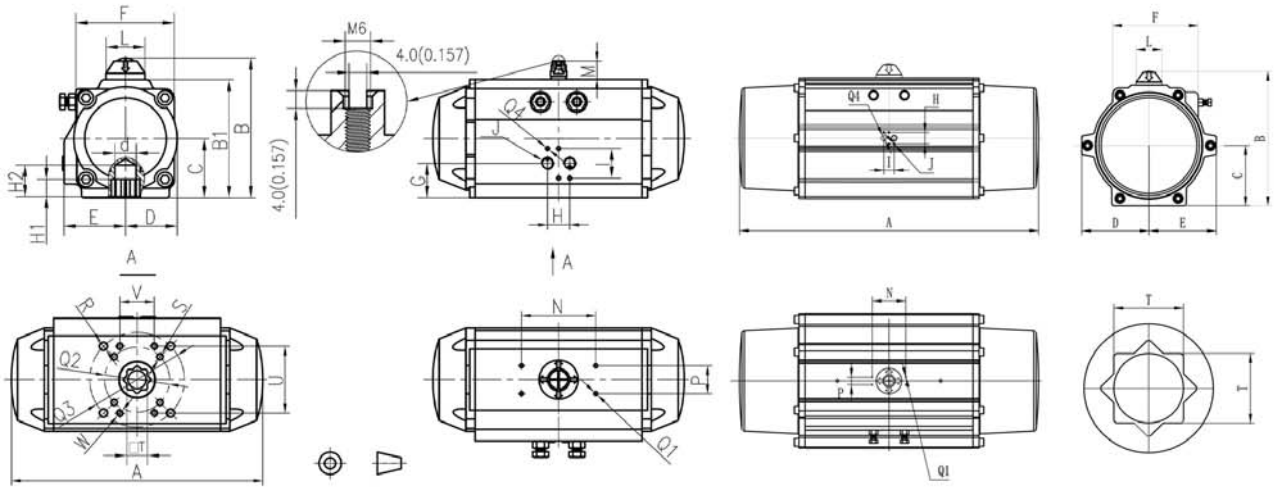
### Parts List

| No.  | Part Description           | Q.TY | Materials                        | Surface Treated                       | Optional Material       |
|------|----------------------------|------|----------------------------------|---------------------------------------|-------------------------|
| 1    | Socket Head Screw          | 8    | SUS 304                          |                                       |                         |
| 2    | End Cap Seal               | 2    | AL380 ≤ DFS 200<br>WCB ≥ DFS 240 | Anode Hardening<br>+Polyester Coating | CF8/CF8M                |
| 3 *  | "O"ring ( Cylinder Head )  | 2    | NBR Rubber                       |                                       | Viton / Silicone Rubber |
| 4    | Spring                     | 2-12 | Spring Steel                     | Epoxy resin Coating                   |                         |
| 5 *  | Piston Ring                | 2    | POM                              |                                       |                         |
| 6 *  | "O"Ring (Piston)           | 2    | NBR Rubber                       |                                       | Viton / Silicone Rubber |
| 7    | Piston                     | 2    | AL380                            | Anode Hardening                       |                         |
| 8    | Stopper                    | 2    | NBR Rubber                       |                                       | Viton / Silicone Rubber |
| 9 *  | Guide Ring                 | 2    | PA6                              |                                       |                         |
| 11   | Indicator Bolt             | 1    | ABS                              |                                       |                         |
| 12   | Indicator Arrowhead        | 4    | ABS                              |                                       |                         |
| 13   | Indicator                  | 1    | ABS                              |                                       |                         |
| 14   | Snap Ring                  | 1    | Stainless Steel                  |                                       |                         |
| 15   | Washer                     | 1    | SUS 304                          |                                       |                         |
| 16 * | Disc Bearing               | 1    | POM                              |                                       |                         |
| 17   | Washer                     | 1    | SUS 304                          |                                       |                         |
| 18   | Body                       | 1    | AL6063-T6                        | Anode Hardening<br>+Polyester Coating | CF8/CF8M                |
| 19   | Plug                       | 2    | PVC                              |                                       |                         |
| 20 * | "O"Ring (Pinion Top)       | 1    | NBR Rubber                       |                                       | Viton / Silicone Rubber |
| 21 * | Bearing ( pinion Top )     | 1    | POM                              |                                       |                         |
| 22   | Disc Bearing               | 1    | SUS 304                          |                                       |                         |
| 23   | Stroke Adjustment Stop     | 1    | SAE 1020                         | Nickel Plated                         | CF8/CF8M                |
| 24   | Pinion Shaft               | 1    | SAE 1045                         | Nickel Plated                         | SUS304/SUS316           |
| 25 * | Bearing(Pinion Bottom )    | 1    | POM                              |                                       |                         |
| 26 * | "O" ring ( pinion bottom ) | 1    | NBR Rubber                       |                                       | Viton / Silicone Rubber |
| 27 * | "O"Ring ( Adjusting Bolt ) | 2    | NBR Rubber                       |                                       | Viton / Silicone Rubber |
| 28   | Metal Washer               | 2    | SUS 304                          |                                       |                         |
| 29   | Nut                        | 2    | SUS 304                          |                                       |                         |
| 30   | Adjusting Bolt             | 2    | SUS 304                          |                                       |                         |

\* Part Typically Supplied in Service Kits



## Dimensions



Imperial Unit Inch

| Model Size | XL040   | XL050   | XL063   | XL075   | XL085   | XL100   | XL115   | XL125   | XL145   | XL160   | XL180   | XL200   | XL240   | XL265   | XL300   | XL350   | XL400   |
|------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| A          | 4.29    | 5.83    | 6.26    | 8.39    | 9.80    | 10.67   | 12.40   | 13.62   | 16.22   | 17.44   | 19.37   | 21.54   | 24.17   | 28.70   | 33.03   | 35.43   | 45.59   |
| B          | 2.95    | 3.58    | 4.21    | 4.88    | 5.43    | 5.87    | 6.89    | 7.48    | 8.27    | 9.06    | 10.00   | 10.91   | 13.62   | 15.28   | 16.06   | 18.11   | 20.35   |
| C          | 1.10    | 1.34    | 1.65    | 2.01    | 2.28    | 2.52    | 2.87    | 3.11    | 3.46    | 3.86    | 4.33    | 4.80    | 5.75    | 6.57    | 7.01    | 8.07    | 9.21    |
| D          | 1.06    | 1.14    | 1.42    | 1.73    | 1.93    | 2.20    | 2.52    | 2.72    | 3.15    | 3.46    | 3.90    | 4.29    | 5.16    | 5.79    | 6.38    | 7.44    | 10.24   |
| E          | 1.30    | 1.61    | 1.85    | 2.09    | 2.24    | 2.60    | 3.03    | 3.23    | 3.62    | 3.86    | 4.17    | 4.41    | 5.16    | 5.79    | 6.81    | 7.68    | 10.24   |
| F          | 2.36    | 2.09    | 2.60    | 3.23    | 3.62    | 4.17    | 4.76    | 5.12    | 5.87    | 6.30    | 7.09    | 7.80    | 9.09    | 10.00   | 11.42   | 13.23   | 13.03   |
| G          | 1.10    | 1.02    | 1.18    | 1.14    | 1.26    | 1.46    | 1.46    | 1.81    | 2.09    | 2.05    | 2.36    | 2.60    | 2.76    | 3.54    | 3.35    | 3.62    | 9.17    |
| H          | 0.94    | 0.94    | 0.94    | 0.94    | 0.94    | 0.94    | 0.94    | 0.94    | 0.94    | 0.94    | 0.94    | 0.94    | 1.57    | 1.57    | 1.57    | 1.57    | 1.57    |
| I          | 1.26    | 1.26    | 1.26    | 1.26    | 1.26    | 1.26    | 1.26    | 1.26    | 1.26    | 1.26    | 1.26    | 1.26    | 1.77    | 1.77    | 1.77    | 1.77    | 1.77    |
| J          | NPT1/8" | NPT1/4" | NPT1/4" | NPT1/4" | NPT1/4" | NPT1/4" | NPT1/4" | NPT1/4" | NPT1/4" | NPT1/4" | NPT1/4" | NPT1/4" | NPT3/8" | NPT3/8" | NPT1/2" | NPT1/2" | NPT1/2" |
| L          | φ 1.18  | φ 1.57  | φ 1.57  | φ 1.57  | φ 1.57  | φ 1.57  | φ 2.36  | φ 2.36  | φ 2.36  | φ 2.36  | φ 3.15  | φ 3.15  | φ 3.15  | φ 3.15  | φ 3.15  | φ 2.95  | φ 2.95  |
| M          | 0.79    | 0.79    | 0.79    | 0.79    | 0.79    | 0.79    | 1.18    | 1.18    | 1.18    | 1.18    | 1.18    | 1.18    | 1.97    | 1.97    | 1.97    | 1.97    | 1.97    |
| N          | 1.61    | 3.15    | 3.15    | 3.15    | 3.15    | 3.15    | 3.15    | 3.15    | 3.15    | 3.15    | 5.12    | 5.12    | 5.12    | 5.12    | 5.12    | 5.12    | 5.12    |
| P          | 1.18    | 1.18    | 1.18    | 1.18    | 1.18    | 1.18    | 1.18    | 1.18    | 1.18    | 1.18    | 1.18    | 1.18    | 1.18    | 1.18    | 1.18    | 1.18    | 1.18    |
| Q1         | M5      | M5      | M5      | M5      | M5      | M5      | M5      | M5      | M5      | M5      | M5      | M5      | M5      | M5      | M5      | M5      | M5      |
| Q2         | F03     | F03     | F05     | F05     | F05     | F07     | F07     | F10     | F10     | F10     | F10     | F10     | F12     | -       | -       | -       | F25     |
| Q3         | F05     | F05     | -       | F07     | F07     | F10     | F10     | -       | F12     | F12     | F14     | F14     | F16     | F16     | F16     | F25     | -       |
| Q4         | M5      | M5      | M5      | M5      | M5      | M5      | M5      | M5      | M5      | M5      | M5      | M5      | M6      | M6      | M6      | M6      | M6      |
| R          | 4-M6    | 4-M6    | -       | 4-M8    | 4-M8    | 4-M10   | 4-M10   | -       | 4-M12   | 4-M12   | 4-M16   | 4-M16   | 4-M20   | 4-M20   | 4-M20   | 8-M16   | -       |
| S          | 4-M5    | 4-M5    | 4-M6    | 4-M6    | 4-M6    | 4-M8    | 4-M8    | 4-M10   | 4-M10   | 4-M10   | 4-M10   | 4-M10   | 4-M12   | -       | -       | -       | 8-M16   |
| T          | 0.35    | 0.67    | 0.67    | 0.87    | 0.87    | 0.87    | 0.87    | 1.42    | 1.42    | 1.42    | 1.42    | 1.42    | 1.81    | 1.81    | 1.81    | 2.17    | 2.17    |
| H1         | 0.43    | 0.47    | 0.63    | 0.75    | 0.75    | 0.91    | 0.91    | 1.14    | 1.14    | 1.14    | 1.65    | 1.65    | 1.97    | 1.97    | 1.97    | 2.36    | 2.36    |
| d          | -       | φ 0.56  | φ 0.56  | φ 0.77  | φ 0.77  | φ 0.91  | φ 0.91  | φ 1.42  | φ 1.42  | φ 1.42  | φ 1.50  | φ 1.50  | φ 1.89  | φ 1.89  | φ 1.89  | φ 2.17  | φ 2.17  |
| H2         | -       | 1.26    | 1.34    | 1.34    | 1.34    | 1.89    | 1.89    | 2.56    | 2.56    | 2.56    | 3.62    | 3.62    | 3.62    | 3.62    | 3.62    | 3.94    | 3.94    |
| U          | -       | -       | -       | -       | -       | 2.83    | 2.83    | 2.83    | 2.83    | 2.83    | 3.90    | 3.90    | -       | -       | -       | -       | -       |
| V          | -       | -       | -       | -       | -       | 1.46    | 1.46    | 1.46    | 1.46    | 1.46    | 2.09    | 2.09    | -       | -       | -       | -       | -       |
| W          | -       | -       | -       | -       | -       | M8      | M8      | M8      | M8      | M8      | M10     | M10     | -       | -       | -       | -       | -       |

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

# Weight & Air Consumption

## Imperial Unit Inch

| Data  | Body Diameter | Air Consumption Per Stroke Actual Volume/L |        | Opening Time DA | Closing Time DA | Approximate Weight-DA | Approximate Weight - Spring |
|-------|---------------|--------------------------------------------|--------|-----------------|-----------------|-----------------------|-----------------------------|
| Model | Φ (In)        | CCW (L)                                    | CW (L) | S ( sec. )      | S ( sec. )      | lb                    | lb                          |
| XL040 | 1.57          | 0.032                                      | 0.068  | 0.14            | 0.16            | 1.53                  | small 0.0110<br>big 0.0250  |
| XL050 | 1.97          | 0.08                                       | 0.13   | 0.17            | 0.19            | 2.38                  | 0.0186                      |
| XL063 | 2.48          | 0.15                                       | 0.25   | 0.19            | 0.22            | 3.42                  | 0.0313                      |
| XL075 | 2.95          | 0.30                                       | 0.48   | 0.23            | 0.27            | 6.06                  | 0.0763                      |
| XL085 | 3.46          | 0.50                                       | 0.73   | 0.33            | 0.35            | 8.33                  | 0.1202                      |
| XL100 | 3.94          | 0.75                                       | 1.08   | 0.42            | 0.48            | 11.68                 | 0.1687                      |
| XL115 | 4.53          | 1.19                                       | 1.8    | 0.72            | 0.93            | 18.5                  | 0.2337                      |
| XL125 | 4.92          | 1.55                                       | 2.18   | 0.84            | 1.09            | 21.89                 | 0.3426                      |
| XL145 | 5.71          | 2.40                                       | 3.55   | 1.32            | 1.42            | 31.08                 | 0.5090                      |
| XL160 | 6.30          | 3.20                                       | 4.72   | 1.6             | 2.0             | 40.45                 | 0.6812                      |
| XL180 | 7.09          | 4.30                                       | 6.80   | 2               | 2.4             | 55.12                 | 1.0803                      |
| XL200 | 7.87          | 5.87                                       | 9.53   | 2.7             | 3.5             | 77.16                 | 2.0900                      |
| XL240 | 9.45          | 10                                         | 15     | 3.5             | 4.5             | 138.89                | 3.7808                      |
| XL265 | 10.63         | 15                                         | 23     | 4.5             | 5.0             | 174.16                | 5.2425                      |
| XL300 | 11.81         | 21.1                                       | 30.5   | 8.8             | 12.7            | 299.39                | 6.8343                      |
| XL350 | 13.780        | 30.8                                       | 44.4   | 13              | 19              | 516.54                | 10.362                      |
| XL400 | 15.75         | 48.3                                       | 69.6   | 20              | 29              | 745.16                | 18.761                      |

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

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

## Output Torque of Double Acting Actuator(inch)

Imperial unit in-lb :

| Output Torque of Double Acting Actuator |       |       |       |       |       |        |        |
|-----------------------------------------|-------|-------|-------|-------|-------|--------|--------|
| Air Pressure<br>Model                   | 40PSI | 60PSI | 70PSI | 80PSI | 90PSI | 100PSI | 120PSI |
| XL040                                   | 41    | 64    | 77    | 89    | 101   | 113    | 137    |
| XL050                                   | 77    | 110   | 135   | 155   | 174   | 201    | 243    |
| XL063                                   | 130   | 197   | 245   | 275   | 311   | 340    | 421    |
| XL075                                   | 277   | 430   | 500   | 559   | 632   | 702    | 833    |
| XL085                                   | 431   | 641   | 752   | 870   | 970   | 1081   | 1328   |
| XL100                                   | 623   | 952   | 1085  | 1261  | 1419  | 1604   | 1959   |
| XL115                                   | 1050  | 1556  | 1837  | 2095  | 2362  | 2625   | 3149   |
| XL125                                   | 1327  | 1923  | 2289  | 2664  | 3003  | 3357   | 4047   |
| XL145                                   | 1872  | 2884  | 3588  | 4102  | 4862  | 5145   | 6317   |
| XL160                                   | 2849  | 4120  | 4784  | 5549  | 6180  | 6871   | 8331   |
| XL180                                   | 3622  | 5557  | 6492  | 7529  | 8331  | 9278   | 11325  |
| XL200                                   | 5087  | 7690  | 9037  | 10344 | 11536 | 12748  | 15390  |
| XL240                                   | 8709  | 13138 | 15248 | 17492 | 19684 | 21869  | 26230  |
| XL265                                   | 14203 | 21240 | 24772 | 28413 | 32044 | 35577  | 42755  |
| XL300                                   | 17865 | 26798 | 31443 | 35738 | 40201 | 44663  | 53595  |
| XL350                                   | 26086 | 39130 | 45862 | 52173 | 58695 | 65215  | 78251  |
| XL400                                   | 40891 | 61322 | 71881 | 81775 | 91993 | 102213 | 122654 |



## Output Torque of Spring Return Actuator(inch)

Imperial unit in-lb:

| Model \ Size | Springs Qty | Output Torque of Spring Return Actuator |            |            |            |            |            |            |            |            |            |        |      |        |      | Spring Return |     |
|--------------|-------------|-----------------------------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|--------|------|--------|------|---------------|-----|
|              |             | 40PSI                                   |            | 60PSI      |            | 70PSI      |            | 80PSI      |            | 90PSI      |            | 100PSI |      | 120PSI |      | START         | END |
|              |             | START                                   | END        | START      | END        | START      | END        | START      | END        | START      | END        | START  | END  | START  | END  |               |     |
| XL040        | 2           |                                         |            |            |            | 51         | 33         | 62         | 45         | 73         | 56         | 87     | 69   | 110    | 93   | 44            | 27  |
|              | 4           |                                         |            |            |            |            |            |            |            | 55         | 21         | 70     | 34   | 92     | 58   | 80            | 44  |
| XL050        | 5           | 53                                      | 39         | 82         | 67         | 109        | 95         | 129        | 114        | 146        | 131        | 174    | 160  | 215    | 200  | 42            | 27  |
|              | 6           | <b>46</b>                               | <b>31</b>  | 75         | 58         | 103        | 86         | 122        | 105        | 139        | 122        | 167    | 151  | 208    | 190  | 50            | 34  |
|              | 7           | 41                                      | 23         | 69         | 49         | 97         | 78         | 115        | 96         | 133        | 113        | 161    | 142  | 201    | 181  | 59            | 40  |
|              | 8           |                                         |            | <b>61</b>  | <b>38</b>  | 90         | 68         | 108        | 86         | 125        | 103        | 154    | 133  | 194    | 171  | 69            | 47  |
|              | 9           |                                         |            | 55         | 30         | 84         | 61         | 102        | 78         | 119        | 94         | 148    | 125  | 188    | 163  | 77            | 53  |
|              | 10          |                                         |            |            |            | <b>78</b>  | <b>53</b>  | 96         | 70         | 113        | 86         | 142    | 117  | 181    | 155  | 85            | 59  |
|              | 11          |                                         |            |            |            | 71         | 44         | <b>89</b>  | <b>60</b>  | 105        | 76         | 135    | 107  | 174    | 145  | 95            | 66  |
| XL063        | 12          |                                         |            |            |            | 64         | 34         | 82         | 51         | <b>98</b>  | <b>66</b>  | 128    | 98   | 167    | 135  | 104           | 73  |
|              | 5           | 84                                      | 60         | 145        | 118        | 197        | 172        | 225        | 199        | 259        | 233        | 290    | 265  | 369    | 342  | 76            | 50  |
|              | 6           | <b>75</b>                               | <b>46</b>  | 135        | 102        | 187        | 156        | 215        | 183        | 249        | 216        | 281    | 249  | 359    | 326  | 92            | 60  |
|              | 7           | 66                                      | 31         | 125        | 85         | 178        | 141        | 205        | 167        | 239        | 200        | 271    | 234  | 349    | 309  | 108           | 70  |
|              | 8           |                                         |            | <b>114</b> | <b>70</b>  | 167        | 127        | 194        | 153        | 228        | 185        | 261    | 220  | 338    | 295  | 122           | 81  |
|              | 9           |                                         |            | 103        | 54         | 157        | 112        | 184        | 137        | 217        | 168        | 250    | 204  | 327    | 278  | 138           | 91  |
|              | 10          |                                         |            | 92         | 38         | <b>147</b> | <b>97</b>  | 173        | 121        | 206        | 152        | 240    | 188  | 316    | 262  | 154           | 102 |
|              | 11          |                                         |            |            |            | 138        | 81         | <b>163</b> | <b>105</b> | 196        | 135        | 230    | 173  | 306    | 245  | 170           | 112 |
| XL075        | 12          |                                         |            |            |            | 128        | 67         | 154        | 90         | <b>186</b> | <b>120</b> | 221    | 158  | 296    | 230  | 185           | 121 |
|              | 5           | 183                                     | 130        | 325        | 266        | 402        | 346        | 457        | 399        | 526        | 467        | 602    | 545  | 728    | 668  | 159           | 102 |
|              | 6           | <b>167</b>                              | <b>102</b> | 307        | 233        | 385        | 316        | 439        | 368        | 508        | 435        | 584    | 514  | 710    | 636  | 190           | 119 |
|              | 7           | 149                                     | 73         | 287        | 201        | 366        | 286        | 420        | 337        | 488        | 403        | 565    | 484  | 689    | 604  | 221           | 139 |
|              | 8           |                                         |            | <b>266</b> | <b>169</b> | 346        | 256        | 399        | 306        | 467        | 371        | 545    | 453  | 668    | 572  | 252           | 159 |
|              | 9           |                                         |            | 246        | 137        | 328        | 226        | 381        | 275        | 448        | 339        | 527    | 423  | 649    | 540  | 283           | 178 |
|              | 10          |                                         |            | 226        | 105        | <b>309</b> | <b>197</b> | 361        | 244        | 428        | 307        | 507    | 392  | 629    | 508  | 314           | 197 |
|              | 11          |                                         |            |            |            | 291        | 167        | <b>342</b> | <b>213</b> | 407        | 275        | 488    | 362  | 609    | 476  | 345           | 217 |
| XL085        | 12          |                                         |            |            |            | 272        | 137        | 322        | 182        | <b>387</b> | <b>243</b> | 469    | 331  | 589    | 444  | 376           | 236 |
|              | 5           | 278                                     | 187        | 469        | 366        | 591        | 496        | 703        | 604        | 798        | 696        | 917    | 820  | 1155   | 1053 | 266           | 166 |
|              | 6           | <b>248</b>                              | <b>140</b> | 435        | 313        | 560        | 446        | 670        | 552        | 764        | 643        | 885    | 769  | 1122   | 1000 | 317           | 199 |
|              | 7           | 218                                     | 93         | 401        | 260        | 528        | 396        | 637        | 501        | 731        | 590        | 853    | 718  | 1088   | 947  | 368           | 232 |
|              | 8           |                                         |            | <b>368</b> | <b>207</b> | 497        | 347        | 605        | 449        | 698        | 536        | 821    | 668  | 1055   | 894  | 419           | 264 |
|              | 9           |                                         |            | 335        | 154        | 467        | 297        | 574        | 398        | 665        | 483        | 790    | 617  | 1022   | 840  | 471           | 296 |
|              | 10          |                                         |            | 301        | 101        | <b>435</b> | <b>248</b> | 541        | 346        | 631        | 430        | 758    | 567  | 988    | 787  | 522           | 328 |
|              | 11          |                                         |            |            |            | 403        | 198        | <b>508</b> | <b>295</b> | 597        | 377        | 725    | 516  | 954    | 734  | 573           | 361 |
| XL100        | 12          |                                         |            |            |            | 372        | 149        | 475        | 243        | <b>563</b> | <b>324</b> | 693    | 466  | 920    | 681  | 625           | 394 |
|              | 5           | 418                                     | 305        | 722        | 595        | 871        | 752        | 1038       | 914        | 1189       | 1062       | 1385   | 1264 | 1729   | 1602 | 345           | 222 |
|              | 6           | <b>377</b>                              | <b>241</b> | 676        | 523        | 827        | 684        | 993        | 844        | 1143       | 990        | 1341   | 1195 | 1683   | 1530 | 415           | 267 |
|              | 7           | 335                                     | 177        | 629        | 450        | 784        | 617        | 947        | 774        | 1096       | 917        | 1297   | 1127 | 1636   | 1458 | 485           | 312 |
|              | 8           |                                         |            | <b>582</b> | <b>378</b> | 740        | 549        | 902        | 704        | 1049       | 845        | 1252   | 1058 | 1589   | 1385 | 555           | 358 |
|              | 9           |                                         |            | 536        | 306        | 696        | 482        | 857        | 634        | 1002       | 773        | 1208   | 989  | 1543   | 1313 | 625           | 403 |
|              | 10          |                                         |            | 490        | 234        | <b>654</b> | <b>415</b> | 812        | 565        | 957        | 701        | 1164   | 921  | 1497   | 1241 | 694           | 447 |
|              | 11          |                                         |            |            |            | 610        | 348        | <b>767</b> | <b>494</b> | 910        | 629        | 1120   | 852  | 1450   | 1169 | 764           | 492 |
|              | 12          |                                         |            |            |            | 566        | 280        | 721        | 424        | <b>862</b> | <b>557</b> | 1074   | 783  | 1403   | 1097 | 834           | 538 |



# Output Torque of Spring Return Actuator(inch)

Imperial unit in-lb:

| Size<br>Model | Springs<br>Qty | Output Torque of Spring Return Actuator |             |             |             |             |             |             |             |             |             |        |      |        |       | Spring Return |      |
|---------------|----------------|-----------------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------|------|--------|-------|---------------|------|
|               |                | 40PSI                                   |             | 60PSI       |             | 70PSI       |             | 80PSI       |             | 90PSI       |             | 100PSI |      | 120PSI |       | START         | END  |
|               |                | START                                   | END         | START       | END         | START       | END         | START       | END         | START       | END         | START  | END  | START  | END   |               |      |
| XL115         | 5              | 716                                     | 513         | 1199        | 970         | 1487        | 1273        | 1731        | 1509        | 1987        | 1758        | 2267   | 2049 | 2774   | 2554  | 584           | 363  |
|               | 6              | <b>651</b>                              | <b>407</b>  | 1126        | 851         | 1418        | 1162        | 1660        | 1403        | 1913        | 1648        | 2197   | 1936 | 2701   | 2435  | 699           | 434  |
|               | 7              | 586                                     | 301         | 1053        | 732         | 1350        | 1051        | 1589        | 1287        | 1831        | 1520        | 2127   | 1822 | 2628   | 2307  | 814           | 504  |
|               | 8              |                                         |             | <b>970</b>  | <b>613</b>  | 1273        | 940         | 1518        | 1172        | 1758        | 1401        | 2049   | 1709 | 2554   | 2188  | 929           | 584  |
|               | 9              |                                         |             | 897         | 494         | 1205        | 829         | 1447        | 1048        | 1685        | 1282        | 1979   | 1596 | 2472   | 2069  | 1044          | 655  |
|               | 10             |                                         |             |             |             | <b>1136</b> | <b>718</b>  | 1367        | 932         | 1611        | 1163        | 1910   | 1482 | 2399   | 1950  | 1159          | 726  |
|               | 11             |                                         |             |             |             | 1068        | 607         | <b>1296</b> | <b>817</b>  | 1538        | 1044        | 1840   | 1369 | 2325   | 1831  | 1274          | 797  |
|               | 12             |                                         |             |             |             |             |             | 1225        | 701         | <b>1456</b> | <b>925</b>  | 1761   | 1256 | 2243   | 1712  | 1389          | 867  |
| XL125         | 5              | 911                                     | 667         | 1456        | 1181        | 1854        | 1598        | 2211        | 1944        | 2536        | 2261        | 2912   | 2651 | 3580   | 3305  | 717           | 451  |
|               | 6              | <b>826</b>                              | <b>529</b>  | 1360        | 1025        | 1765        | 1453        | 2117        | 1793        | 2440        | 2106        | 2821   | 2502 | 3484   | 3149  | 867           | 544  |
|               | 7              | 741                                     | 399         | 1263        | 879         | 1675        | 1316        | 2024        | 1651        | 2344        | 1959        | 2729   | 2363 | 3387   | 3003  | 1009          | 637  |
|               | 8              |                                         |             | <b>1163</b> | <b>723</b>  | 1581        | 1171        | 1926        | 1500        | 2243        | 1804        | 2633   | 2215 | 3287   | 2847  | 1159          | 735  |
|               | 9              |                                         |             | 1067        | 568         | 1491        | 1025        | 1833        | 1349        | 2147        | 1648        | 2542   | 2066 | 3191   | 2692  | 1310          | 827  |
|               | 10             |                                         |             |             |             | <b>1401</b> | <b>880</b>  | 1740        | 1198        | 2051        | 1492        | 2450   | 1918 | 3094   | 2536  | 1460          | 920  |
|               | 11             |                                         |             |             |             | 1312        | 743         | <b>1647</b> | <b>1056</b> | 1955        | 1346        | 2359   | 1779 | 2998   | 2390  | 1602          | 1013 |
|               | 12             |                                         |             |             |             | 1218        | 598         | 1549        | 906         | <b>1854</b> | <b>1190</b> | 2263   | 1630 | 2898   | 2234  | 1752          | 1111 |
| XL145         | 5              | 1213                                    | 838         | 2142        | 1721        | 2897        | 2504        | 3382        | 2974        | 4120        | 3699        | 4438   | 4037 | 5576   | 5154  | 1124          | 717  |
|               | 6              | <b>1074</b>                             | <b>627</b>  | 1987        | 1483        | 2751        | 2281        | 3231        | 2743        | 3964        | 3461        | 4290   | 3810 | 5420   | 4916  | 1354          | 867  |
|               | 7              | 936                                     | 415         | 1831        | 1245        | 2606        | 2059        | 3081        | 2512        | 3809        | 3223        | 4142   | 3584 | 5264   | 4678  | 1584          | 1018 |
|               | 8              |                                         |             | <b>1685</b> | <b>1007</b> | 2469        | 1837        | 2939        | 2282        | 3662        | 2985        | 4002   | 3357 | 5118   | 4440  | 1814          | 1159 |
|               | 9              |                                         |             | 1529        | 778         | 2324        | 1624        | 2788        | 2060        | 3506        | 2756        | 3854   | 3139 | 4962   | 4211  | 2036          | 1310 |
|               | 10             |                                         |             | 1373        | 540         | <b>2179</b> | <b>1401</b> | 2637        | 1829        | 3351        | 2518        | 3706   | 2912 | 4806   | 3973  | 2266          | 1460 |
|               | 11             |                                         |             |             |             | 2042        | 1179        | <b>2495</b> | <b>1598</b> | 3204        | 2280        | 3566   | 2686 | 4660   | 3735  | 2496          | 1602 |
|               | 12             |                                         |             |             |             | 1905        | 957         | 2353        | 1367        | <b>3058</b> | <b>2042</b> | 3427   | 2459 | 4514   | 3497  | 2726          | 1743 |
| XL160         | 5              | 1953                                    | 1506        | 3113        | 2609        | 3845        | 3375        | 4572        | 4084        | 5173        | 4669        | 5912   | 5432 | 7324   | 6821  | 1460          | 974  |
|               | 6              | <b>1766</b>                             | <b>1237</b> | 2902        | 2307        | 3649        | 3093        | 4368        | 3791        | 4962        | 4367        | 5711   | 5144 | 7114   | 6518  | 1752          | 1177 |
|               | 7              | 1579                                    | 960         | 2692        | 1996        | 3452        | 2803        | 4164        | 3489        | 4752        | 4056        | 5511   | 4848 | 6903   | 6207  | 2053          | 1381 |
|               | 8              |                                         |             | <b>2481</b> | <b>1694</b> | 3256        | 2521        | 3959        | 3196        | 4541        | 3754        | 5310   | 4560 | 6692   | 5905  | 2345          | 1584 |
|               | 9              |                                         |             | 2280        | 1382        | 3068        | 2230        | 3764        | 2894        | 4340        | 3442        | 5118   | 4264 | 6491   | 5594  | 2646          | 1779 |
|               | 10             |                                         |             | 2069        | 1080        | <b>2871</b> | <b>1948</b> | 3560        | 2601        | 4129        | 3140        | 4918   | 3976 | 6280   | 5292  | 2938          | 1982 |
|               | 11             |                                         |             |             |             | 2675        | 1658        | <b>3356</b> | <b>2299</b> | 3918        | 2829        | 4717   | 3680 | 6070   | 4980  | 3239          | 2186 |
|               | 12             |                                         |             |             |             | 2487        | 1376        | 3160        | 2006        | <b>3717</b> | <b>2527</b> | 4525   | 3392 | 5868   | 4678  | 3531          | 2381 |
| XL180         | 5              | 2352                                    | 1676        | 4129        | 3369        | 5161        | 4452        | 6143        | 5407        | 6903        | 6143        | 7917   | 7193 | 9897   | 9137  | 2115          | 1381 |
|               | 6              | <b>2091</b>                             | <b>1294</b> | 3836        | 2939        | 4888        | 4050        | 5859        | 4989        | 6610        | 5713        | 7638   | 6784 | 9604   | 8707  | 2531          | 1664 |
|               | 7              | 1831                                    | 911         | 3543        | 2509        | 4614        | 3649        | 5575        | 4572        | 6317        | 5283        | 7359   | 6374 | 9311   | 8276  | 2947          | 1947 |
|               | 8              |                                         |             | <b>3250</b> | <b>2069</b> | 4341        | 3238        | 5291        | 4146        | 6024        | 4843        | 7080   | 5955 | 9018   | 7837  | 3372          | 2230 |
|               | 9              |                                         |             | 2966        | 1639        | 4076        | 2837        | 5016        | 3729        | 5740        | 4413        | 6810   | 5545 | 8734   | 7407  | 3788          | 2505 |
|               | 10             |                                         |             | 2673        | 1208        | <b>3802</b> | <b>2435</b> | 4732        | 3311        | 5447        | 3983        | 6531   | 5136 | 8441   | 6976  | 4204          | 2788 |
|               | 11             |                                         |             |             |             | 3538        | 2034        | <b>4457</b> | <b>2894</b> | 5164        | 3552        | 6260   | 4726 | 8157   | 6546  | 4620          | 3062 |
|               | 12             |                                         |             |             |             | 3264        | 1632        | 4173        | 2477        | <b>4871</b> | <b>3122</b> | 5981   | 4316 | 7864   | 6116  | 5036          | 3345 |
| XL200         | 5              | 3328                                    | 2498        | 5713        | 4779        | 7195        | 6323        | 8425        | 7519        | 9558        | 8624        | 10864  | 9975 | 13412  | 12479 | 2814          | 1912 |
|               | 6              | <b>2987</b>                             | <b>1986</b> | 5328        | 4202        | 6836        | 5785        | 8052        | 6960        | 9173        | 8047        | 10498  | 9425 | 13028  | 11902 | 3372          | 2283 |
|               | 7              | 2645                                    | 1473        | 4944        | 3625        | 6477        | 5247        | 7679        | 6401        | 8789        | 7471        | 10132  | 8876 | 12643  | 11325 | 3929          | 2655 |
|               | 8              |                                         |             | <b>4559</b> | <b>3058</b> | 6118        | 4717        | 7306        | 5850        | 8404        | 6903        | 9766   | 8336 | 12259  | 10757 | 4478          | 3027 |
|               | 9              |                                         |             | 4166        | 2490        | 5751        | 4187        | 6925        | 5300        | 8011        | 6335        | 9391   | 7795 | 11865  | 10190 | 5027          | 3407 |
|               | 10             |                                         |             | 3772        | 1913        | <b>5383</b> | <b>3649</b> | 6543        | 4741        | 7617        | 5759        | 9016   | 7246 | 11471  | 9613  | 5584          | 3788 |
|               | 11             |                                         |             |             |             | 5024        | 3119        | <b>6170</b> | <b>4190</b> | 7233        | 5191        | 8649   | 6705 | 11087  | 9045  | 6133          | 4160 |
|               | 12             |                                         |             |             |             | 4657        | 2581        | 5788        | 3631        | <b>6839</b> | <b>4614</b> | 8275   | 6156 | 10693  | 8469  | 6691          | 4540 |

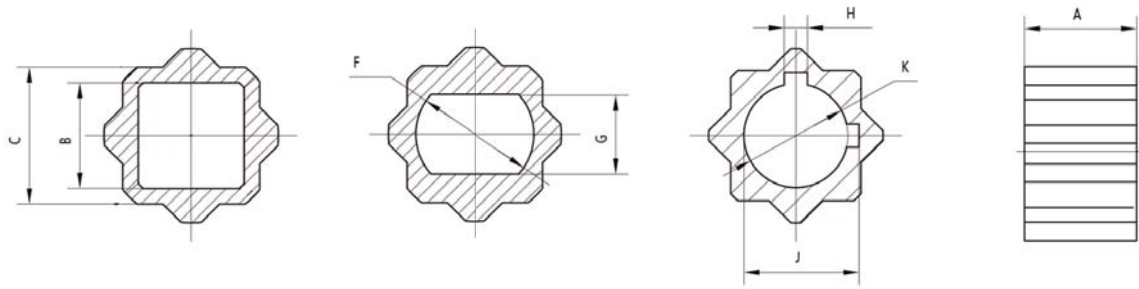


## Output Torque of Spring Return Actuator(inch)

Imperial unit in-lb:

| Size<br>Model | Springs<br>Qty | Output Torque of Spring Return Actuator |              |              |              |              |              |              |              |              |              |        |       |        |       | Spring Return |       |
|---------------|----------------|-----------------------------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------|-------|--------|-------|---------------|-------|
|               |                | 40PSI                                   |              | 60PSI        |              | 70PSI        |              | 80PSI        |              | 90PSI        |              | 100PSI |       | 120PSI |       | START         | END   |
|               |                | START                                   | END          | START        | END          | START        | END          | START        | END          | START        | END          | START  | END   | START  | END   |               |       |
| XL240         | 5              | 5737                                    | 4419         | 9796         | 8313         | 12134        | 10749        | 14249        | 12811        | 16342        | 14859        | 18685  | 17273 | 22888  | 21405 | 4664          | 3230  |
|               | 6              | <b>5135</b>                             | <b>3564</b>  | 9119         | 7352         | 11501        | 9852         | 13592        | 11878        | 15665        | 13898        | 18040  | 16357 | 22210  | 20444 | 5593          | 3885  |
|               | 7              | 4541                                    | 2694         | 8450         | 6372         | 10878        | 8938         | 12944        | 10929        | 14996        | 12936        | 17395  | 15450 | 21524  | 19482 | 6540          | 4531  |
|               | 8              |                                         |              | <b>7736</b>  | <b>5402</b>  | 10245        | 8032         | 12287        | 9987         | 14319        | 11975        | 16758  | 14535 | 20846  | 18521 | 7478          | 5186  |
|               | 9              |                                         |              | 7123         | 4449         | 9639         | 7143         | 11656        | 9064         | 13669        | 11014        | 16113  | 13628 | 20160  | 17560 | 8399          | 5814  |
|               | 10             |                                         |              | 6445         | 3506         | <b>9006</b>  | <b>6263</b>  | 11000        | 8150         | 12991        | 10052        | 15459  | 12713 | 19491  | 16589 | 9310          | 6469  |
|               | 11             |                                         |              |              |              | 8374         | 5358         | <b>10343</b> | <b>7209</b>  | 12314        | 9100         | 14823  | 11788 | 18814  | 15637 | 10248         | 7124  |
|               | 12             |                                         |              |              |              | 7742         | 4426         | 9686         | 6241         | <b>11636</b> | <b>8148</b>  | 14169  | 10882 | 18127  | 14667 | 11213         | 7779  |
| XL265         | 5              | 9790                                    | 7690         | 16278        | 13916        | 20149        | 17944        | 23597        | 21307        | 27081        | 24719        | 30849  | 28599 | 37793  | 35431 | 7080          | 4797  |
|               | 6              | <b>8887</b>                             | <b>6429</b>  | 15298        | 12479        | 19217        | 16577        | 22629        | 19886        | 26083        | 23254        | 29898  | 27204 | 36795  | 33966 | 8452          | 5779  |
|               | 7              | 8016                                    | 5119         | 14319        | 11041        | 18286        | 15210        | 21742        | 18466        | 22613        | 21789        | 28948  | 25809 | 35797  | 32501 | 9877          | 6726  |
|               | 8              |                                         |              | <b>13339</b> | <b>9567</b>  | 17355        | 13843        | 20685        | 17045        | 24087        | 20324        | 27997  | 24414 | 34799  | 31036 | 11284         | 7655  |
|               | 9              |                                         |              | 12359        | 8111         | 16423        | 12475        | 19726        | 15625        | 23089        | 18860        | 27047  | 23019 | 33709  | 29571 | 12744         | 8673  |
|               | 10             |                                         |              | 11297        | 6628         | <b>15492</b> | <b>11108</b> | 18759        | 14204        | 22091        | 17395        | 26097  | 21624 | 32803  | 28106 | 14125         | 9611  |
|               | 11             |                                         |              |              |              | 14560        | 9741         | <b>17791</b> | <b>12784</b> | 21094        | 15930        | 25146  | 20229 | 31805  | 26642 | 15523         | 10558 |
|               | 12             |                                         |              |              |              | 13672        | 8459         | 16823        | 11364        | <b>20096</b> | <b>14465</b> | 24196  | 18833 | 30807  | 25177 | 16904         | 11505 |
| XL300         | 5              | 11857                                   | 8854         | 20041        | 16662        | 25147        | 21994        | 29181        | 25905        | 33444        | 30066        | 38225  | 35008 | 46838  | 43460 | 9797          | 6531  |
|               | 6              | <b>10661</b>                            | <b>7064</b>  | 18695        | 14648        | 23891        | 20115        | 27876        | 23952        | 32098        | 28051        | 36943  | 33089 | 45492  | 41445 | 11744         | 7832  |
|               | 7              | 9464                                    | 5265         | 17349        | 12625        | 22635        | 18226        | 26571        | 21990        | 30752        | 26028        | 35662  | 31162 | 44146  | 39422 | 13700         | 9133  |
|               | 8              |                                         |              | <b>16003</b> | <b>10602</b> | 21379        | 16338        | 25266        | 20028        | 29406        | 24005        | 34380  | 29236 | 42800  | 37399 | 15656         | 10434 |
|               | 9              |                                         |              | 14648        | 8578         | 20115        | 14449        | 23952        | 18066        | 28051        | 21982        | 33089  | 27309 | 41445  | 35376 | 17612         | 11744 |
|               | 10             |                                         |              | 13302        | 6555         | <b>18858</b> | <b>12561</b> | 22647        | 16104        | 26706        | 19958        | 31808  | 25382 | 40100  | 33352 | 19567         | 13045 |
|               | 11             |                                         |              |              |              | 17602        | 10672        | <b>21342</b> | <b>14142</b> | 25360        | 17935        | 30526  | 23455 | 38754  | 31329 | 21523         | 14346 |
|               | 12             |                                         |              |              |              |              |              | 20071        | 12247        | <b>24525</b> | <b>16701</b> | 28993  | 21169 | 37912  | 30088 | 23481         | 15657 |
| XL350         | 5              | 17326                                   | 12947        | 29278        | 24353        | 36683        | 32086        | 42613        | 37837        | 48843        | 43917        | 55829  | 51138 | 68398  | 63473 | 14284         | 9523  |
|               | 6              | <b>15576</b>                            | <b>10327</b> | 27310        | 21405        | 34846        | 29334        | 40704        | 34978        | 46874        | 40969        | 53954  | 48331 | 66430  | 60525 | 17134         | 11425 |
|               | 7              | 13834                                   | 7707         | 25351        | 18457        | 33017        | 26583        | 38805        | 32120        | 44915        | 38021        | 52089  | 45523 | 64471  | 57577 | 19983         | 13319 |
|               | 8              |                                         |              | <b>23382</b> | <b>15509</b> | 31180        | 23832        | 36896        | 29261        | 42947        | 35073        | 50214  | 42715 | 62502  | 54629 | 22833         | 15222 |
|               | 9              |                                         |              | 21414        | 12561        | 29343        | 21080        | 34987        | 26402        | 40979        | 32126        | 48339  | 39908 | 60534  | 51681 | 25683         | 17125 |
|               | 10             |                                         |              | 19446        | 9613         | <b>27506</b> | <b>18329</b> | 33078        | 23544        | 39010        | 29178        | 46465  | 37100 | 58566  | 48733 | 28532         | 19028 |
|               | 11             |                                         |              |              |              | 25677        | 15577        | <b>31179</b> | <b>20685</b> | 37051        | 26230        | 44599  | 34293 | 56606  | 45785 | 31382         | 20921 |
|               | 12             |                                         |              |              |              |              |              | 29333        | 17915        | <b>35840</b> | <b>24422</b> | 42370  | 30952 | 55387  | 43969 | 34244         | 22826 |
| XL400         | 5              | 27189                                   | 20337        | 45913        | 38205        | 57524        | 50329        | 66823        | 59348        | 76583        | 68874        | 87532  | 80191 | 107244 | 99535 | 22346         | 14895 |
|               | 6              | <b>24446</b>                            | <b>16227</b> | 42828        | 33581        | 54644        | 46014        | 63831        | 54864        | 73498        | 64251        | 84594  | 75787 | 104158 | 94912 | 26816         | 17877 |
|               | 7              | 21712                                   | 12117        | 39752        | 28958        | 51773        | 41699        | 60848        | 50381        | 70422        | 59628        | 81664  | 71384 | 101082 | 90288 | 31285         | 20851 |
|               | 8              |                                         |              | <b>36666</b> | <b>24334</b> | 48894        | 37384        | 57856        | 45898        | 67336        | 55004        | 78726  | 66981 | 97997  | 85665 | 35754         | 23833 |
|               | 9              |                                         |              | 33590        | 19711        | 46022        | 33068        | 54873        | 41415        | 64260        | 50381        | 75796  | 62578 | 94921  | 81042 | 40223         | 26807 |
|               | 10             |                                         |              | 30505        | 15088        | <b>43143</b> | <b>28753</b> | 51882        | 36931        | 61175        | 45758        | 72858  | 58175 | 91836  | 76418 | 44693         | 29789 |
|               | 11             |                                         |              |              |              | 40263        | 24438        | <b>48890</b> | <b>32448</b> | 58090        | 41134        | 69919  | 53771 | 88750  | 71795 | 49162         | 32772 |
|               | 12             |                                         |              |              |              |              |              | 45907        | 27965        | <b>55013</b> | <b>36511</b> | 66990  | 49368 | 85674  | 67172 | 53631         | 35745 |

## CXL INSERTS



| Model           | Insert Code | Insert Shape | Unit     | Insert Size | A           | B           | C           | F           | G           | H          | J           | K          |
|-----------------|-------------|--------------|----------|-------------|-------------|-------------|-------------|-------------|-------------|------------|-------------|------------|
| 050             | A           | Square       | in<br>mm | 0.354<br>9  | 0.472<br>12 | 0.354<br>9  | 0.669<br>17 |             |             |            |             |            |
|                 | B*          | Square       | in<br>mm | 0.433<br>11 | 0.472<br>12 | 0.433<br>11 | 0.669<br>17 |             |             |            |             |            |
|                 | C           | Square       | in<br>mm | 0.551<br>14 | 0.472<br>12 | 0.551<br>14 | 0.669<br>17 |             |             |            |             |            |
|                 | G           | Flat         | in<br>mm | 0.378<br>10 | 0.472<br>12 |             | 0.669<br>17 | 0.567<br>14 | 0.378<br>10 |            |             |            |
| 063             | A           | Square       | in<br>mm | 0.354<br>9  | 0.63<br>16  | 0.354<br>9  | 0.669<br>17 |             |             |            |             |            |
|                 | B*          | Square       | in<br>mm | 0.433<br>11 | 0.63<br>16  | 0.433<br>11 | 0.669<br>17 |             |             |            |             |            |
|                 | C           | Square       | in<br>mm | 0.551<br>14 | 0.63<br>16  | 0.551<br>14 | 0.669<br>17 |             |             |            |             |            |
|                 | G           | Flat         | in<br>mm | 0.378<br>10 | 0.63<br>16  |             | 0.669<br>17 | 0.567<br>14 | 0.378<br>10 |            |             |            |
| 075&085         | A           | Square       | in<br>mm | 0.354<br>9  | 0.709<br>18 | 0.354<br>9  | 0.866<br>22 |             |             |            |             |            |
|                 | B           | Square       | in<br>mm | 0.433<br>11 | 0.709<br>18 | 0.433<br>11 | 0.866<br>22 |             |             |            |             |            |
|                 | C*          | Square       | in<br>mm | 0.551<br>14 | 0.709<br>18 | 0.551<br>14 | 0.866<br>22 |             |             |            |             |            |
|                 | D           | Square       | in<br>mm | 0.669<br>17 | 0.709<br>18 | 0.669<br>17 | 0.866<br>22 |             |             |            |             |            |
|                 | G           | Flat         | in<br>mm | 0.378<br>10 | 0.709<br>18 |             | 0.866<br>22 | 0.567<br>14 | 0.378<br>10 |            |             |            |
|                 | H           | Flat         | in<br>mm | 0.441<br>11 | 0.709<br>18 |             | 0.866<br>22 | 0.63<br>16  | 0.441<br>11 |            |             |            |
|                 | I           | Flat         | in<br>mm | 0.503<br>13 | 0.709<br>18 |             | 0.866<br>22 | 0.756<br>19 | 0.503<br>13 |            |             |            |
| 100&115         | B           | Square       | in<br>mm | 0.433<br>11 | 0.906<br>23 | 0.433<br>11 | 0.866<br>22 |             |             |            |             |            |
|                 | C           | Square       | in<br>mm | 0.551<br>14 | 0.906<br>23 | 0.551<br>14 | 0.866<br>22 |             |             |            |             |            |
|                 | D*          | Square       | in<br>mm | 0.669<br>17 | 0.906<br>23 | 0.669<br>17 | 0.866<br>22 |             |             |            |             |            |
|                 | G           | Flat         | in<br>mm | 0.378<br>10 | 0.906<br>23 |             | 0.866<br>22 | 0.567<br>14 | 0.378<br>10 |            |             |            |
|                 | H           | Flat         | in<br>mm | 0.441<br>11 | 0.906<br>23 |             | 0.866<br>22 | 0.63<br>16  | 0.441<br>11 |            |             |            |
|                 | I           | Flat         | in<br>mm | 0.503<br>13 | 0.906<br>23 |             | 0.866<br>22 | 0.756<br>19 | 0.503<br>13 |            |             |            |
| 125,<br>145&160 | C           | Square       | in<br>mm | 0.551<br>14 | 1.142<br>29 | 0.551<br>14 | 1.417<br>36 |             |             |            |             |            |
|                 | D           | Square       | in<br>mm | 0.669<br>17 | 1.142<br>29 | 0.669<br>17 | 1.417<br>36 |             |             |            |             |            |
|                 | E           | Square       | in<br>mm | 0.866<br>22 | 1.142<br>29 | 0.866<br>22 | 1.417<br>36 |             |             |            |             |            |
|                 | F*          | Square       | in<br>mm | 1.063<br>27 | 1.142<br>29 | 1.063<br>27 | 1.417<br>36 |             |             |            |             |            |
|                 | G           | Flat         | in<br>mm | 0.378<br>10 | 1.142<br>29 |             | 1.417<br>36 | 0.567<br>14 | 0.378<br>10 |            |             |            |
|                 | H           | Flat         | in<br>mm | 0.441<br>11 | 1.142<br>29 |             | 1.417<br>36 | 0.63<br>16  | 0.441<br>11 |            |             |            |
|                 | I           | Flat         | in<br>mm | 0.503<br>13 | 1.142<br>29 |             | 1.417<br>36 | 0.756<br>19 | 0.503<br>13 |            |             |            |
|                 | J           | Flat         | in<br>mm | 0.628<br>16 | 1.142<br>29 |             | 1.417<br>36 | 0.882<br>22 | 0.628<br>16 |            |             |            |
|                 | K           | Round        | in<br>mm | 1.13<br>29  | 1.142<br>29 |             | 1.417<br>36 |             |             | 0.252<br>6 | 1.252<br>32 | 1.13<br>29 |
| 180&200         | E           | Square       | in<br>mm | 0.866<br>22 | 1.654<br>42 | 0.866<br>22 | 1.417<br>36 |             |             |            |             |            |
|                 | F*          | Square       | in<br>mm | 1.063<br>27 | 1.654<br>42 | 1.063<br>27 | 1.417<br>36 |             |             |            |             |            |
|                 | J           | Flat         | in<br>mm | 0.628<br>16 | 1.654<br>42 |             | 1.417<br>36 | 0.882<br>22 | 0.628<br>16 |            |             |            |
|                 | K           | Round        | in<br>mm | 1.13<br>29  | 1.654<br>42 |             | 1.417<br>36 |             |             | 0.252<br>6 | 1.252<br>32 | 1.13<br>29 |

\* STANDARD INSERT



## CV ACTUATION SIZING GUIDE

The seat material used, media, temperature, frequency of operation and critical application of the valve's operation are all important factors in calculating the actuation needs of a given valve. The information provided below should be considered as a guide only and must be adjusted according to experience and judgement. Proper actuator selection is required to prevent valve or process equipment damage as well as proper valve operation.

### Valve Torque

The torque requirements of Quarter Turn Valves will vary depending on several factors.

- **Seat design and material**

The seat friction force depends on the seat material and the applicable service factor multipliers shown in the chart below.

- **Stem Seal**

Torque results from the stem contact with stem seals and the type of packing materials affect torque. Stem seal torque needs to be considered as a percentage of overall torque especially in small valve sizes.

### Service Conditions To Consider

- **Differential Pressure** Minimum and maximum pressures
- **Frequency of Operation**
- **Media Influence Slurries** dry gases, oils
- **Temperatures** Minimum and maximums
- **Cycle Time** Line hammer, process requirements
- **Instrument Air Supply** Peak demand pressure availability

### Media and Service Factors

To establish minimum torque requirements, multiply valve torque by the following application media and service factors.

| Media Factors                                                     | Multiplier   | Service Factor                                | Multiplier |
|-------------------------------------------------------------------|--------------|-----------------------------------------------|------------|
| Clean particle free, non-lubricating (water, alcohol or solvents) | 1.00         | Simple On and Off Operations                  | 1.00       |
| Slurries or heavily corroded and contaminated systems             | 1.80         | Throttling                                    | 1.20       |
| Gas or saturated steam, clean and wet                             | 1.00         | Positioner Control                            | 1.50       |
| Gas or superheated steam, clean and dry                           | 1.30         | Once per day session                          | 1.20       |
| Gas, dirty unfiltered e.g. natural gas, chlorine                  | 1.20 to 1.50 | Once every two days or more or plant critical | 1.50       |

# HOW TO ORDER

| Actuator Model | Action |               | No. of Springs | Insert Options | Options |                                 |
|----------------|--------|---------------|----------------|----------------|---------|---------------------------------|
| XL040          | DA     | Double Acting | 5              | 1              | P1      | High temperature actuator 300°F |
| XL050          |        |               | 6              | 2              | P2      | Low temperature actuator -40°F  |
| XL063          |        |               | 7              | 3              | P3      | Electroless Nickel Treatment    |
| XL075          |        |               | 8              | 4              | P4      | Epoxy Coating                   |
| XL085          | SR     | Spring Return | 9              | 5              | P5      | 3 Position Actuator             |
| XL100          |        |               | 10             | 6              | P6      | Actuator Locking Device         |
| XL115          |        |               | 11             | 7              | P7      | Reverse Rotation                |
| XL125          |        |               | 12             | 8              | P8      | 180° Actuator                   |
| XL145          |        |               |                |                |         |                                 |
| XL160          |        |               |                |                |         |                                 |
| XL180          |        |               |                |                |         |                                 |
| XL200          |        |               |                |                |         |                                 |
| XL240          |        |               |                |                |         |                                 |
| XL265          |        |               |                |                |         |                                 |
| XL300          |        |               |                |                |         |                                 |
| XL350          |        |               |                |                |         |                                 |
| XL400          |        |               |                |                |         |                                 |

Insert : See standard insert chart