

# Precision Servo Gearboxes

## SureGear® Servo Gearbox Overview

### **PGA In-line Series**

The SureGear PGA series of high-precision servo gear reducers is an excellent choice for applications that require good accuracy and reliability at an exceptional value. This in-line planetary gear reducer has a thread-in mounting style, along with a level of precision and torque capacity that is best in its class. Offered in a concentric shaft design with a maximum seven arc-min backlash rating, the SureGear PGA series is an accurate, high-performance, and cost effective solution for any OEM.

The machining quality of the SureGear PGA helical planetary gears provides a very quiet and more efficient reducer than other competitive products that are similarly priced. The SureGear PGA series easily mates to SureServo motors, and is the perfect solution for applications such as gantries, injection-molding machines, pick-and-place automation, and linear slides.

### **PGB Right-angle Series**

The SureGear PGB series of high-precision right-angle servo gear reducers is an excellent choice for applications that require a more compact footprint.

The PGB right-angle planetary gear reducers offer similar technical specifications to the PGA series in-line gear reducers, and provides the customer with an excellent solution when space and clearance requirements are limited.

Offered with a six arc-min backlash rating for 2-stage and nine arc-min backlash for 3-stage, the SureGear PGB series performs to OEMs' demanding expectations.

### **PGD Hub Style In-line Series**

The SureGear PGD series sets a new standard in applications requiring extremely high-torque ratings and rigidity. The compact design and hub-style output is ideal for equipment that requires high-speed, high-precision indexing movement. The remarkable torsion stiffness and the low backlash of the planetary gearing combine to provide outstanding positioning accuracy.

With a backlash rating less than 3 arc-minutes and exceptional torque handling capabilities, the PGD series offers a high performance robust planetary solution for OEM customers. The PGD reducer is often used for larger indexing applications and dial tables commonly found in packaging and filling equipment and assembly automation systems.

## Features

- Thread-in mounting style
- Best-in-class backlash
- Four gear ratios available (5:1, 10:1, 15:1, 25:1), Two additional for PGD models (35:1 and 50:1)
- Mounting hardware included for attaching to SureServo motors
- Helical-cut planetary gears for quiet operation and reduced vibration
- Right-angle reducer utilizes a spiral bevel gear; motor can be located at a 90° position from the reducer, providing a more compact footprint
- Uncaged needle roller bearings for high rigidity and torque
- Adapter bushing connection for simple and effective attachment to most servo motors
- High-viscosity, anti-separation grease does not migrate away from the gears; no leakage through the seal
- Maintenance free: No need to replace the grease for the life of the unit
- At nominal speed, service life is 20,000 hours
- Can be positioned in any orientation
- IP55 environmental rating
- 5-year warranty



**SureGear  
PGA Gearbox**



**SureGear PGB Gearbox**



**SureGear  
Hub Style PGD Gearbox**



**SureGear  
2-Stage Cutaway View**

## Applications

- Gantry
- Injection-molding machines
- Pick-and-place automation
- Linear slides
- Packaging machines
- Conveyors

# Precision Servo Gearboxes

| SureGear® Servo Gearbox Selection |            |                  |                 |                             |       |                             |         |                              |                          |                                         |          |
|-----------------------------------|------------|------------------|-----------------|-----------------------------|-------|-----------------------------|---------|------------------------------|--------------------------|-----------------------------------------|----------|
| Servo Motor                       | Gear Ratio | SureGear Gearbox | Frame Size (mm) | Motor Nominal Output Torque |       | Combo Nominal Output Torque |         | Nominal Output Speed ( rpm ) | Max Output Speed ( rpm ) | Available Load Inertia @ 5:1 Mismatch * |          |
|                                   |            |                  |                 | N·m                         | lb·in | N·m                         | lb·in   |                              |                          | kg·cm2                                  | lb·in·s2 |
| SV2L-201(x)<br>APMC-FAL01xxx      | 5:1        | PGD047-05A1      | 47              | 0.32                        | 2.83  | 1.52                        | 13.44   | 600                          | 1200.00                  | 6.76                                    | 0.006    |
|                                   |            | PGA050-05A1      | 50              |                             |       |                             |         |                              |                          | 6.94                                    | 0.006    |
|                                   |            | PGA070-05A1      | 70              |                             |       | 5.91                        | 0.005   |                              |                          |                                         |          |
|                                   |            | PGB070-05A1      | 70              |                             |       | 1.59**                      | 0.001** |                              |                          |                                         |          |
|                                   | 10:1       | PGD047-10A1      | 47              |                             |       | 3.04                        | 26.89   | 300                          | 600.00                   | 28.15                                   | 0.025    |
|                                   |            | PGA050-10A1      | 50              |                             |       |                             |         |                              |                          | 28.35                                   | 0.025    |
|                                   |            | PGA070-10A1      | 70              |                             |       | 25.75                       | 0.023   |                              |                          |                                         |          |
|                                   |            | PGB070-10A1      | 70              |                             |       | 2.98                        | 26.32   |                              |                          | 8.35**                                  | 0.007**  |
|                                   | 15:1       | PGA050-15A1      | 50              |                             |       | 4.32                        | 38.21   | 200                          | 400.00                   | 62.66                                   | 0.055    |
|                                   |            | PGA070-15A1      | 70              |                             |       |                             |         |                              |                          | 58.16                                   | 0.051    |
|                                   |            | PGB070-15A1      | 70              |                             |       | 4.22                        | 37.36   |                              |                          | 54.11                                   | 0.048    |
|                                   | 25:1       | PGD047-25A1      | 47              |                             |       | 7.20                        | 63.68   | 120                          | 240.00                   | 174.69                                  | 0.155    |
|                                   |            | PGA050-25A1      | 50              |                             |       |                             |         |                              |                          | 174.69                                  | 0.155    |
|                                   |            | PGA070-25A1      | 70              |                             |       | 7.04                        | 62.26   |                              |                          | 162.81                                  | 0.144    |
|                                   |            | PGB070-25A1      | 70              |                             |       |                             |         |                              |                          | 151.56                                  | 0.134    |
|                                   | 50:1       | PGD064-50A1      | 64              |                             |       | 14.40                       | 127.35  | 60                           | 120.00                   | 661.25                                  | 0.585    |
| SV2L-202(x)                       | 5:1        | PGD064-05A2      | 64              | 0.64                        | 5.7   | 3.04                        | 27.08   | 600                          | 1200.00                  | 28.75                                   | 0.025    |
|                                   |            | PGA070-05A2      | 70              |                             |       |                             |         |                              |                          | 29.33                                   | 0.026    |
|                                   |            | PGB070-05A2      | 70              |                             |       | 2.98                        | 26.51   |                              |                          | 25.00                                   | 0.022    |
|                                   | 10:1       | PGD064-10A2      | 64              |                             |       | 6.08                        | 54.15   | 300                          | 600.00                   | 118.80                                  | 0.105    |
|                                   |            | PGA070-10A2      | 70              |                             |       |                             |         |                              |                          | 119.40                                  | 0.106    |
|                                   |            | PGB070-10A2      | 70              |                             |       | 5.95                        | 53.01   |                              |                          | 102.00                                  | 0.090    |
|                                   | 15:1       | PGA070-15A2      | 70              |                             |       | 8.64                        | 76.95   | 200                          | 400.00                   | 268.88                                  | 0.238    |
|                                   |            | PGB070-15A2      | 70              |                             |       |                             |         |                              |                          | 264.83                                  | 0.234    |
|                                   |            | PGB090-15A2      | 90              |                             |       | 8.45                        | 75.24   |                              |                          | 204.75                                  | 0.181    |
|                                   | 25:1       | PGD064-25A2      | 64              |                             |       | 14.40                       | 128.25  | 120                          | 240.00                   | 747.50                                  | 0.662    |
|                                   |            | PGA070-25A2      | 70              |                             |       |                             |         |                              |                          | 748.13                                  | 0.662    |
|                                   |            | PGB070-25A2      | 70              |                             |       | 14.08                       | 125.40  |                              |                          | 736.88                                  | 0.652    |
|                                   |            | PGB090-25A2      | 90              |                             |       |                             |         |                              |                          | 581.25                                  | 0.514    |
|                                   |            | PGD090-25A2      | 90              |                             |       | 14.40                       | 128.25  |                              |                          | 700.00                                  | 0.620    |
|                                   | 50:1       | PGD090-50A2      | 90              |                             |       | 28.80                       | 256.50  | 60                           | 120.00                   | 2875.00                                 | 2.544    |
|                                   |            | PGD110-50A2      | 110             |                             |       |                             |         |                              |                          | 2125.00                                 | 1.881    |
| SV2L-204(x)                       | 5:1        | PGD064-05A2      | 64              | 1.27                        | 11.2  | 6.03                        | 53.20   | 600                          | 1200.00                  | 53.75                                   | 0.048    |
|                                   |            | PGA070-05A2      | 70              |                             |       |                             |         |                              |                          | 54.33                                   | 0.048    |
|                                   |            | PGB070-05A2      | 70              |                             |       | 5.91                        | 52.08   |                              |                          | 50.00                                   | 0.044    |
|                                   | 10:1       | PGD064-10A2      | 64              |                             |       | 12.07                       | 106.40  | 300                          | 600.00                   | 218.80                                  | 0.194    |
|                                   |            | PGA070-10A2      | 70              |                             |       |                             |         |                              |                          | 219.40                                  | 0.194    |
|                                   |            | PGB070-10A2      | 70              |                             |       | 11.81                       | 104.16  |                              |                          | 202.00                                  | 0.179    |
|                                   | 15:1       | PGA070-15A2      | 70              |                             |       | 17.15                       | 151.20  | 200                          | 400.00                   | 493.88                                  | 0.437    |
|                                   |            | PGB070-15A2      | 70              |                             |       |                             |         |                              |                          | 489.83                                  | 0.433    |
|                                   |            | PGB090-15A2      | 90              |                             |       | 16.76                       | 147.84  |                              |                          | 429.75                                  | 0.380    |
|                                   | 25:1       | PGD064-25A2      | 64              |                             |       | 28.58                       | 252.00  | 120                          | 240.00                   | 1372.50                                 | 1.215    |
|                                   |            | PGA070-25A2      | 70              |                             |       |                             |         |                              |                          | 1373.13                                 | 1.215    |
|                                   |            | PGB070-25A2      | 70              |                             |       | 27.94                       | 246.40  |                              |                          | 1361.88                                 | 1.205    |
|                                   |            | PGB090-25A2      | 90              |                             |       |                             |         |                              |                          | 1206.25                                 | 1.068    |
|                                   |            | PGD090-25A2      | 90              |                             |       | 28.58                       | 252.00  |                              |                          | 1325.00                                 | 1.173    |
|                                   | 50:1       | PGD090-50A2      | 90              |                             |       | 57.15                       | 504.00  | 60                           | 120.00                   | 5375.00                                 | 4.757    |
|                                   |            | PGD110-50A2      | 110             |                             |       |                             |         |                              |                          | 4625.00                                 | 4.093    |

\* Available load inertia is calculated based on servo motor inertia using the formula: Available Inertia = (5 x Motor Inertia – Gearbox Inertia) x (Gear Ratio)<sup>2</sup> A 5:1 inertia mismatch is a good target for design purposes. Systems with lower or higher mismatch may be possible, depending on operating conditions.

\*\* This gearbox is NOT a suitable choice at a 5:1 mismatch. If inertia balancing is a selection criteria for your end use, please use a mismatch of 8:1 to 10:1.

# Precision Servo Gearboxes

| SureGear® Servo Gearbox Selection |            |                             |                 |                             |       |                             |         |                            |                        |                                         |          |
|-----------------------------------|------------|-----------------------------|-----------------|-----------------------------|-------|-----------------------------|---------|----------------------------|------------------------|-----------------------------------------|----------|
| Servo Motor                       | Gear Ratio | SureGear Gearbox            | Frame Size (mm) | Motor Nominal Output Torque |       | Combo Nominal Output Torque |         | Nominal Output Speed (rpm) | Max Output Speed (rpm) | Available Load Inertia @ 5:1 Mismatch * |          |
|                                   |            |                             |                 | N-m                         | lb-in | N-m                         | lb-in   |                            |                        | kg-cm2                                  | lb-in-s2 |
| SV2L-207(x)                       | 5:1        | <a href="#">PGA070-05A3</a> | 70              | 2.39                        | 21.2  | 11.35                       | 100.70  | 600                        | 1200.00                | 186.83                                  | 0.165    |
|                                   |            | <a href="#">PGB090-05A3</a> | 90              |                             |       | 11.11                       | 98.58   |                            |                        | 143.75                                  | 0.127    |
|                                   |            | <a href="#">PGD090-05A3</a> | 90              |                             |       | 11.35                       | 100.70  |                            |                        | 174.25                                  | 0.154    |
|                                   | 10:1       | <a href="#">PGA090-10A3</a> | 90              |                             |       | 22.71                       | 201.40  | 300                        | 600.00                 | 726.00                                  | 0.643    |
|                                   |            | <a href="#">PGB090-10A3</a> | 90              |                             |       | 22.23                       | 197.16  |                            |                        | 586.00                                  | 0.519    |
|                                   |            | <a href="#">PGD090-10A3</a> | 90              |                             |       | 22.71                       | 201.40  |                            |                        | 722.00                                  | 0.639    |
|                                   | 15:1       | <a href="#">PGA090-15A3</a> | 90              |                             |       | 32.27                       | 286.20  | 200                        | 400.00                 | 1669.50                                 | 1.478    |
|                                   |            | <a href="#">PGB090-15A3</a> | 90              |                             |       | 31.55                       | 279.84  |                            |                        | 1622.25                                 | 1.436    |
|                                   |            | <a href="#">PGA090-25A3</a> | 90              |                             |       | 53.78                       | 477.00  |                            |                        | 4643.75                                 | 4.110    |
|                                   | 25:1       | <a href="#">PGB090-25A3</a> | 90              |                             |       | 52.58                       | 466.40  | 120                        | 240.00                 | 4518.75                                 | 3.999    |
|                                   |            | <a href="#">PGD110-25A3</a> | 110             |                             |       | 53.78                       | 477.00  |                            |                        | 4281.25                                 | 3.789    |
|                                   |            | <a href="#">PGD110-50A3</a> | 110             |                             |       | 107.55                      | 954.00  | 60                         | 120.00                 | 17875.00                                | 15.819   |
| SV2L-210(x)                       | 5:1        | <a href="#">PGA090-05A4</a> | 90              | 3.18                        | 28.15 | 15.11                       | 133.69  | 600                        | 1000.00                | 321.25                                  | 0.284    |
|                                   |            | <a href="#">PGB090-05A4</a> | 90              |                             |       | 14.79                       | 130.88  |                            |                        | 286.25                                  | 0.253    |
|                                   |            | <a href="#">PGD090-05A4</a> | 90              |                             |       | 15.11                       | 133.69  |                            |                        | 319.25                                  | 0.283    |
|                                   | 10:1       | <a href="#">PGA090-10A4</a> | 90              |                             |       | 30.21                       | 267.38  | 300                        | 500.00                 | 1296.00                                 | 1.147    |
|                                   |            | <a href="#">PGB090-10A4</a> | 90              |                             |       | 29.57                       | 261.75  |                            |                        | 1156.00                                 | 1.023    |
|                                   |            | <a href="#">PGD090-10A4</a> | 90              |                             |       | 30.21                       | 267.38  |                            |                        | 1292.00                                 | 1.143    |
|                                   | 15:1       | <a href="#">PGA120-15A4</a> | 120             |                             |       | 42.93                       | 379.96  | 200                        | 333.33                 | 2884.50                                 | 2.553    |
|                                   |            | <a href="#">PGB120-15A4</a> | 120             |                             |       | 41.98                       | 371.52  |                            |                        | 2475.00                                 | 2.190    |
|                                   |            | <a href="#">PGD110-25A4</a> | 110             |                             |       | 71.55                       | 633.27  |                            |                        | 7843.75                                 | 6.942    |
|                                   | 25:1       | <a href="#">PGA120-25A4</a> | 120             |                             |       | 69.96                       | 619.20  | 120                        | 200.00                 | 8043.75                                 | 7.119    |
|                                   |            | <a href="#">PGB120-25A4</a> | 120             |                             |       | 143.10                      | 1266.54 |                            |                        | 6918.75                                 | 6.123    |
|                                   |            | <a href="#">PGD110-50A4</a> | 110             |                             |       | 143.10                      | 1266.54 | 60                         | 100.00                 | 32125.00                                | 28.431   |
| SV2M-210(x)                       | 5:1        | <a href="#">PGA090-05A5</a> | 90              | 4.77                        | 42.22 | 22.66                       | 200.54  | 400.00                     | 600.00                 | 1041.25                                 | 0.922    |
|                                   |            | <a href="#">PGD090-05A5</a> | 90              |                             |       | 22.18                       | 196.31  |                            |                        | 1039.25                                 | 0.920    |
|                                   |            | <a href="#">PGB120-05A5</a> | 120             |                             |       | 22.18                       | 196.31  |                            |                        | 925.75                                  | 0.819    |
|                                   | 10:1       | <a href="#">PGA090-10A5</a> | 90              |                             |       | 45.32                       | 401.07  | 200.00                     | 300.00                 | 4176.00                                 | 3.696    |
|                                   |            | <a href="#">PGD110-10A5</a> | 110             |                             |       | 44.36                       | 392.63  |                            |                        | 4172.00                                 | 3.692    |
|                                   |            | <a href="#">PGB120-10A5</a> | 120             |                             |       | 44.36                       | 392.63  |                            |                        | 3759.00                                 | 3.327    |
|                                   | 15:1       | <a href="#">PGA120-15A5</a> | 120             |                             |       | 64.40                       | 569.94  | 133.33                     | 200.00                 | 9364.50                                 | 8.288    |
|                                   |            | <a href="#">PGB120-15A5</a> | 120             |                             |       | 62.96                       | 557.28  |                            |                        | 8955.00                                 | 7.925    |
|                                   |            | <a href="#">PGD110-25A5</a> | 110             |                             |       | 107.33                      | 949.91  |                            |                        | 25843.75                                | 22.872   |
|                                   | 25:1       | <a href="#">PGA120-25A5</a> | 120             |                             |       | 104.94                      | 928.80  | 80.00                      | 120.00                 | 26043.75                                | 23.049   |
|                                   |            | <a href="#">PGB120-25A5</a> | 120             |                             |       | 104.94                      | 928.80  |                            |                        | 24918.75                                | 22.053   |
|                                   |            | <a href="#">PGD110-35A5</a> | 110             |                             |       | 150.26                      | 1329.87 | 57.14                      | 85.71                  | 50653.75                                | 44.829   |

\* Available load inertia is calculated based on servo motor inertia using the formula: Available Inertia = (5 x Motor Inertia – Gearbox Inertia) x (Gear Ratio)<sup>2</sup> A 5:1 inertia mismatch is a good target for design purposes. Systems with lower or higher mismatch may be possible, depending on operating conditions.

# Precision Servo Gearboxes

| SureGear® Servo Gearbox Selection |            |                             |                 |                             |        |                             |         |                              |                          |                                         |          |
|-----------------------------------|------------|-----------------------------|-----------------|-----------------------------|--------|-----------------------------|---------|------------------------------|--------------------------|-----------------------------------------|----------|
| Servo Motor                       | Gear Ratio | SureGear Gearbox            | Frame Size (mm) | Motor Nominal Output Torque |        | Combo Nominal Output Torque |         | Nominal Output Speed ( rpm ) | Max Output Speed ( rpm ) | Available Load Inertia @ 5:1 Mismatch * |          |
|                                   |            |                             |                 | N-m                         | lb-in  | N-m                         | lb-in   |                              |                          | kg-cm2                                  | lb-in-s2 |
| SV2M-215(x)                       | 5:1        | <a href="#">PGA090-05A5</a> | 90              | 7.16                        | 63.37  | 34.01                       | 301.01  | 400.00                       | 600.00                   | 1390.00                                 | 1.230    |
|                                   |            | <a href="#">PGD090-05A5</a> | 90              |                             |        |                             |         |                              |                          | 1388.00                                 | 1.228    |
|                                   |            | <a href="#">PGB120-05A5</a> | 120             |                             |        | 33.29                       | 294.68  |                              |                          | 1274.50                                 | 1.128    |
|                                   | 10:1       | <a href="#">PGA090-10A5</a> | 90              |                             |        | 68.02                       | 602.03  | 200.00                       | 300.00                   | 5571.00                                 | 4.930    |
|                                   |            | <a href="#">PGD110-10A5</a> | 110             |                             |        | 66.59                       | 589.35  |                              |                          | 5154.00                                 | 4.561    |
|                                   |            | <a href="#">PGB120-10A5</a> | 120             |                             |        | 96.66                       | 855.51  |                              |                          | 12503.25                                | 11.065   |
|                                   | 15:1       | <a href="#">PGA120-15A5</a> | 120             |                             |        | 94.51                       | 836.50  | 133.33                       | 200.00                   | 12093.75                                | 10.703   |
|                                   |            | <a href="#">PGB120-15A5</a> | 120             |                             |        |                             |         |                              |                          | 34562.50                                | 30.588   |
|                                   |            | <a href="#">PGD110-25A5</a> | 110             |                             |        | 161.10                      | 1425.86 |                              |                          | 80.00                                   | 120.00   |
|                                   | 25:1       | <a href="#">PGA120-25A5</a> | 120             |                             |        | 157.52                      | 1394.17 |                              |                          | 33637.50                                | 29.769   |
|                                   |            | <a href="#">PGB120-25A5</a> | 120             |                             |        |                             |         |                              |                          |                                         |          |
|                                   |            | <a href="#">PGD110-35A5</a> | 110             |                             |        | 225.54                      | 1996.20 | 57.14                        | 85.71                    | 67742.50                                | 59.952   |
| SV2M-220(x)                       | 5:1        | <a href="#">PGD110-05A6</a> | 110             | 9.55                        | 84.52  | 45.36                       | 401.49  | 400.00                       | 600.00                   | 4280.00                                 | 3.788    |
|                                   |            | <a href="#">PGA120-05A6</a> | 120             |                             |        |                             |         |                              |                          | 4297.50                                 | 3.803    |
|                                   |            | <a href="#">PGB120-05A6</a> | 120             |                             |        | 44.41                       | 393.04  |                              |                          | 4212.00                                 | 3.728    |
|                                   |            | <a href="#">PGB155-05A6</a> | 155             |                             |        |                             |         |                              |                          | 3914.75                                 | 3.465    |
|                                   | 10:1       | <a href="#">PGD110-10A6</a> | 110             |                             |        | 90.73                       | 802.98  | 200.00                       | 300.00                   | 17240.00                                | 15.257   |
|                                   |            | <a href="#">PGA120-10A6</a> | 120             |                             |        |                             |         |                              |                          | 17255.00                                | 15.271   |
|                                   |            | <a href="#">PGB120-10A6</a> | 120             |                             |        | 88.82                       | 786.08  |                              |                          | 16904.00                                | 14.960   |
|                                   |            | <a href="#">PGB155-10A6</a> | 155             |                             |        |                             |         |                              |                          | 15884.00                                | 14.057   |
|                                   | 15:1       | <a href="#">PGA155-15A6</a> | 155             |                             |        | 128.93                      | 1141.08 | 133.33                       | 200.00                   | 38745.00                                | 34.289   |
|                                   |            | <a href="#">PGB155-15A6</a> | 155             |                             |        | 126.06                      | 1115.73 |                              |                          | 37597.50                                | 33.274   |
|                                   | 25:1       | <a href="#">PGA155-25A6</a> | 155             |                             |        | 214.88                      | 1901.80 | 80.00                        | 120.00                   | 107750.00                               | 95.359   |
|                                   |            | <a href="#">PGB155-25A6</a> | 155             |                             |        | 210.10                      | 1859.54 |                              |                          | 104593.75                               | 92.565   |
| SV2M-230(x)                       | 5:1        | <a href="#">PGD110-05A6</a> | 110             | 17.55                       | 155.33 | 83.36                       | 737.80  | 340.00                       | 600.00                   | 6817.50                                 | 6.033    |
|                                   |            | <a href="#">PGA120-05A6</a> | 120             |                             |        |                             |         |                              |                          | 6835.00                                 | 6.049    |
|                                   |            | <a href="#">PGB120-05A6</a> | 120             |                             |        | 81.61                       | 722.31  |                              |                          | 6749.50                                 | 5.973    |
|                                   |            | <a href="#">PGB155-05A6</a> | 155             |                             |        |                             |         |                              |                          | 6452.25                                 | 5.710    |
|                                   | 10:1       | <a href="#">PGD110-10A6</a> | 110             |                             |        | 166.73                      | 1475.68 | 170.00                       | 300.00                   | 27390.00                                | 24.240   |
|                                   |            | <a href="#">PGA120-10A6</a> | 120             |                             |        |                             |         |                              |                          | 27405.00                                | 24.253   |
|                                   |            | <a href="#">PGB120-10A6</a> | 120             |                             |        | 163.22                      | 1444.62 |                              |                          | 27054.00                                | 23.943   |
|                                   |            | <a href="#">PGB155-10A6</a> | 155             |                             |        |                             |         |                              |                          | 26034.00                                | 23.040   |
|                                   | 15:1       | <a href="#">PGA155-15A6</a> | 155             |                             |        | 236.93                      | 2097.01 | 113.33                       | 200.00                   | 61582.50                                | 54.501   |
|                                   |            | <a href="#">PGB155-15A6</a> | 155             |                             |        | 231.66                      | 2050.36 |                              |                          | 60435.00                                | 53.485   |
|                                   | 25:1       | <a href="#">PGA155-25A6</a> | 155             |                             |        | 394.88                      | 3494.98 | 68.00                        | 120.00                   | 171187.50                               | 151.501  |
|                                   |            | <a href="#">PGB155-25A6</a> | 155             |                             |        | 386.10                      | 3417.27 |                              |                          | 168031.25                               | 148.708  |

\* Available load inertia is calculated based on servo motor inertia using the formula: Available Inertia = (5 x Motor Inertia – Gearbox Inertia) x (Gear Ratio)<sup>2</sup> A 5:1 inertia mismatch is a good target for design purposes. Systems with lower or higher mismatch may be possible, depending on operating conditions.

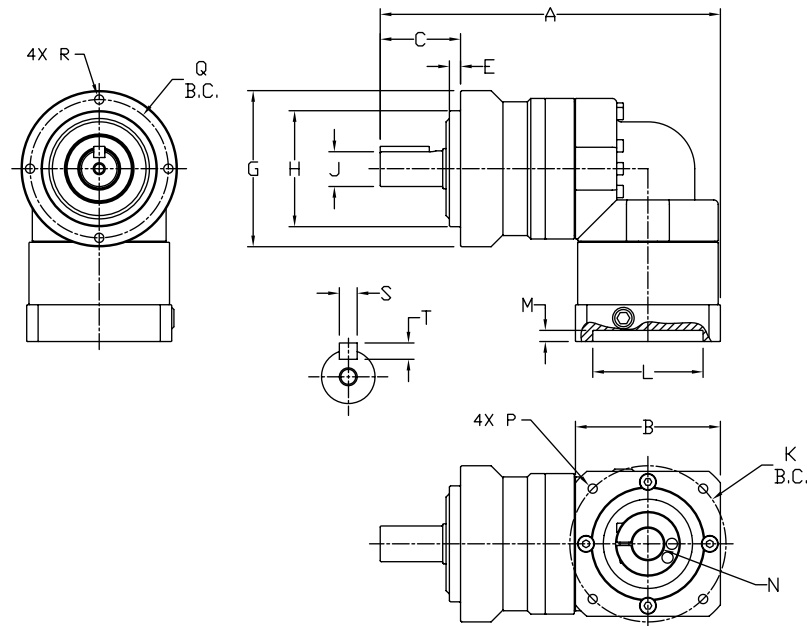


# Precision Servo Gearboxes

## Pricing & Specifications – Right-Angle Shaft PGB Series

| SureGear® Precision Servo Gearboxes – Right-Angle Shaft PGB Series |            |                 |       |           |                                        |                                           |                                        |                    |                           |                        |                                |                                |                            |                |                          |                         |                      |                                          |      |                   |
|--------------------------------------------------------------------|------------|-----------------|-------|-----------|----------------------------------------|-------------------------------------------|----------------------------------------|--------------------|---------------------------|------------------------|--------------------------------|--------------------------------|----------------------------|----------------|--------------------------|-------------------------|----------------------|------------------------------------------|------|-------------------|
| Part Number                                                        | Price      | Frame Size (mm) | Ratio | Reduction | Nominal Output Torque<br>(N·m [lb-in]) | Max. Acceleration Torque<br>(N·m [lb-in]) | Emergency Stop Torque<br>(N·m [lb-in]) | Backlash (arc-min) | Nominal Input Speed (rpm) | Max. Input Speed (rpm) | Allowable Radial Load (N [lb]) | Allowable Thrust Load (N [lb]) | Moment of Inertia (kg·cm2) | Efficiency (%) | Max. Housing Temperature | Approx Weight (kg [lb]) | Environmental Rating | Fits SureServo Servo Motor<br>(SV & SV2) |      |                   |
| <a href="#">PGB070-05A1</a>                                        | \$788.00   | 70              | 5:1   | double    | 22 [195]                               | 40 [354]                                  | 80 [708]                               | 6                  | 3000                      | 6000                   | 510 [115]                      | 390 [88]                       | 0.250                      | 93             | 90 °C<br>[194 °F]        | 1.9 [4.2]               | IP55                 | SV(2)L-201(B)                            |      |                   |
| <a href="#">PGB070-10A1</a>                                        | \$788.00   |                 | 10:1  | double    | 16 [142]                               | 32 [283]                                  | 65 [575]                               | 6                  |                           |                        | 640 [144]                      | 530 [119]                      | 0.230                      | 93             |                          | 1.9 [4.2]               |                      |                                          |      |                   |
| <a href="#">PGB070-15A1</a>                                        | \$997.00   |                 | 15:1  | triple    | 16 [142]                               | 32 [283]                                  | 65 [575]                               | 9                  |                           |                        | 740 [166]                      | 630 [142]                      | 0.073                      | 88             |                          | 1.7 [3.7]               |                      |                                          |      |                   |
| <a href="#">PGB070-25A1</a>                                        | \$997.00   |                 | 25:1  | triple    | 24 [212]                               | 45 [398]                                  | 90 [797]                               | 9                  |                           |                        | 870 [196]                      | 790 [178]                      | 0.071                      | 88             |                          | 1.7 [3.7]               |                      |                                          |      |                   |
| <a href="#">PGB070-05A2</a>                                        | \$788.00   |                 | 5:1   | double    | 22 [195]                               | 40 [354]                                  | 80 [708]                               | 6                  |                           |                        | 510 [115]                      | 390 [88]                       | 0.320                      | 93             |                          | 1.9 [4.2]               | IP55                 | SV(2)L-202(B)<br>SV(2)L-204(B)           |      |                   |
| <a href="#">PGB070-10A2</a>                                        | \$788.00   |                 | 10:1  | double    | 16 [142]                               | 32 [283]                                  | 65 [575]                               | 6                  |                           |                        | 640 [144]                      | 530 [119]                      | 0.300                      | 93             |                          | 1.9 [4.2]               |                      |                                          |      |                   |
| <a href="#">PGB070-15A2</a>                                        | \$997.00   |                 | 15:1  | triple    | 16 [142]                               | 32 [283]                                  | 65 [575]                               | 9                  |                           |                        | 740 [166]                      | 630 [142]                      | 0.118                      | 88             |                          | 1.7 [3.7]               | IP55                 | SV(2)L-202(B)                            |      |                   |
| <a href="#">PGB070-25A2</a>                                        | \$997.00   |                 | 25:1  | triple    | 24 [212]                               | 45 [398]                                  | 90 [797]                               | 9                  |                           |                        | 870 [196]                      | 790 [178]                      | 0.115                      | 88             |                          | 1.7 [3.7]               |                      |                                          |      |                   |
| <a href="#">PGB090-15A2</a>                                        | \$1,217.00 | 90              | 15:1  | triple    | 45 [398]                               | 65 [575]                                  | 170 [1505]                             | 9                  |                           |                        | 1400 [314]                     | 1900 [427]                     | 0.410                      | 88             | 90 °C<br>[194 °F]        | 4.3 [9.5]               | IP55                 | SV(2)L-202(B)<br>SV(2)L-204(B)           |      |                   |
| <a href="#">PGB090-25A2</a>                                        | \$1,217.00 |                 | 25:1  | triple    | 65 [575]                               | 110 [974]                                 | 220 [1947]                             | 9                  |                           |                        | 1600 [360]                     | 2200 [495]                     | 0.400                      | 88             |                          | 4.3 [9.5]               |                      |                                          |      |                   |
| <a href="#">PGB090-05A3</a>                                        | \$932.00   |                 | 5:1   | double    | 65 [575]                               | 90 [797]                                  | 220 [1947]                             | 6                  |                           |                        | 960 [216]                      | 1200 [270]                     | 2.130                      | 93             |                          | 4.9 [10.8]              |                      |                                          | IP55 | SV(2)L-207(B)     |
| <a href="#">PGB090-10A3</a>                                        | \$932.00   |                 | 10:1  | double    | 45 [398]                               | 65 [575]                                  | 170 [1505]                             | 6                  |                           |                        | 1200 [270]                     | 1600 [360]                     | 2.020                      | 93             |                          | 4.9 [10.8]              |                      |                                          |      |                   |
| <a href="#">PGB090-15A3</a>                                        | \$1,217.00 |                 | 15:1  | triple    | 45 [398]                               | 65 [575]                                  | 170 [1505]                             | 9                  |                           |                        | 1400 [314]                     | 1900 [427]                     | 0.600                      | 88             |                          | 4.3 [9.5]               | IP55                 | SV(2)L-207(B)                            |      |                   |
| <a href="#">PGB090-25A3</a>                                        | \$1,217.00 |                 | 25:1  | triple    | 65 [575]                               | 110 [974]                                 | 220 [1947]                             | 9                  |                           |                        | 1600 [360]                     | 2200 [495]                     | 0.590                      | 88             |                          | 4.3 [9.5]               |                      |                                          |      |                   |
| <a href="#">PGB090-05A4</a>                                        | \$932.00   |                 | 5:1   | double    | 65 [575]                               | 90 [797]                                  | 220 [1947]                             | 6                  |                           |                        | 960 [216]                      | 1200 [270]                     | 4.260                      | 93             |                          | 4.9 [10.8]              | IP55                 | SV(2)L-210(B)                            |      |                   |
| <a href="#">PGB090-10A4</a>                                        | \$932.00   |                 | 10:1  | double    | 45 [398]                               | 65 [575]                                  | 170 [1505]                             | 6                  |                           |                        | 1200 [270]                     | 1600 [360]                     | 4.150                      | 93             |                          | 4.9 [10.8]              |                      |                                          |      |                   |
| <a href="#">PGB120-15A4</a>                                        | \$1,512.00 | 120             | 15:1  | triple    | 110 [974]                              | 200 [1770]                                | 450 [3983]                             | 9                  |                           |                        | 2300 [517]                     | 3000 [674]                     | 4.700                      | 88             | 90 °C<br>[194 °F]        | 10 [22]                 | IP55                 | SV(2)L-210(B)                            |      |                   |
| <a href="#">PGB120-25A4</a>                                        | \$1,512.00 |                 | 25:1  | triple    | 150 [1328]                             | 300 [2655]                                | 550 [4868]                             | 9                  |                           |                        | 2700 [607]                     | 3700 [832]                     | 4.640                      | 88             |                          | 10 [22]                 |                      |                                          |      |                   |
| <a href="#">PGB120-05A5</a>                                        | \$1,217.00 |                 | 5:1   | double    | 120 [1062]                             | 240 [2124]                                | 500 [4425]                             | 6                  |                           |                        | 1600 [360]                     | 1900 [427]                     | 6.610                      | 93             |                          | 10.2 [22.5]             |                      |                                          | IP55 | SV(2)<br>M-210(B) |
| <a href="#">PGB120-10A5</a>                                        | \$1,217.00 |                 | 10:1  | double    | 110 [974]                              | 200 [1770]                                | 450 [3983]                             | 6                  |                           |                        | 2000 [450]                     | 2500 [562]                     | 6.050                      | 93             |                          | 10.2 [22.5]             |                      |                                          |      |                   |
| <a href="#">PGB120-15A5</a>                                        | \$1,512.00 |                 | 15:1  | triple    | 110 [974]                              | 200 [1770]                                | 450 [3983]                             | 9                  |                           |                        | 2300 [517]                     | 3000 [674]                     | 4.700                      | 88             |                          | 10 [22]                 | IP55                 | SV(2)M-220(B)<br>SV(2)M-230(B)           |      |                   |
| <a href="#">PGB120-25A5</a>                                        | \$1,512.00 |                 | 25:1  | triple    | 150 [1328]                             | 300 [2655]                                | 550 [4868]                             | 9                  |                           |                        | 2700 [607]                     | 3700 [832]                     | 4.640                      | 88             |                          | 10 [22]                 |                      |                                          |      |                   |
| <a href="#">PGB120-05A6</a>                                        | \$1,217.00 |                 | 5:1   | double    | 120 [1062]                             | 240 [2124]                                | 500 [4425]                             | 6                  |                           |                        | 1600 [360]                     | 1900 [427]                     | 13.690                     | 93             |                          | 10.2 [22.5]             | IP55                 | SV(2)M-220(B)<br>SV(2)M-230(B)           |      |                   |
| <a href="#">PGB120-10A6</a>                                        | \$1,217.00 |                 | 10:1  | double    | 110 [974]                              | 200 [1770]                                | 450 [3983]                             | 6                  |                           |                        | 2000 [450]                     | 2500 [562]                     | 13.120                     | 93             |                          | 10.2 [22.5]             |                      |                                          |      |                   |
| <a href="#">PGB155-15A6</a>                                        | \$1,770.00 | 155             | 15:1  | triple    | 200 [1770]                             | 400 [3540]                                | 750 [6638]                             | 9                  | 2000                      | 4000                   | 5400 [1214]                    | 4900 [1102]                    | 15.070                     | 88             | 90 °C<br>[194 °F]        | 20.4 [45.0]             | IP55                 | SV(2)M-220(B)                            |      |                   |
| <a href="#">PGB155-25A6</a>                                        | \$1,770.00 |                 | 25:1  | triple    | 300 [2655]                             | 600 [5310]                                | 1100 [9736]                            | 9                  |                           |                        | 6400 [1439]                    | 6100 [1371]                    | 14.820                     | 88             |                          | 20.4 [45.0]             |                      |                                          |      |                   |
| <a href="#">PGB155-05A6</a>                                        | \$1,401.00 |                 | 5:1   | double    | 200 [1770]                             | 400 [3540]                                | 1100 [9736]                            | 6                  |                           |                        | 3800 [854]                     | 3000 [674]                     | 21.280                     | 93             |                          | 19.8 [43.7]             | IP55                 | SV(2)M-220(B)<br>SV(2)M-230(B)           |      |                   |
| <a href="#">PGB155-10A6</a>                                        | \$1,401.00 |                 | 10:1  | double    | 200 [1770]                             | 400 [3540]                                | 750 [6638]                             | 6                  |                           |                        | 4700 [1057]                    | 4100 [922]                     | 19.030                     | 93             |                          | 19.8 [43.7]             |                      |                                          |      |                   |

## Dimensions – Right-Angle Shaft PGB Series



**SureGear PGB Series Right-Angle Shaft Gearboxes Dimension Drawing**

| SureGear® Precision Servo Gearbox Dimensions – Right-Angle Shaft PGA Series ( dimensions = mm [in] ) |                  |                 |                |                |                   |                   |                  |                   |                   |               |                    |             |                   |            |                |               |
|------------------------------------------------------------------------------------------------------|------------------|-----------------|----------------|----------------|-------------------|-------------------|------------------|-------------------|-------------------|---------------|--------------------|-------------|-------------------|------------|----------------|---------------|
| Part Number                                                                                          | A                | B               | C              | E              | G                 | H                 | J                | K                 | L                 | M             | N                  | P           | Q                 | R          | S              | T             |
| PGB070-05A1                                                                                          | 151.5<br>[5.96]  | 52.0<br>[2.05]  | 36.0<br>[1.42] | 5.0<br>[0.20]  | Ø70.0<br>[Ø2.76]  | Ø52.0<br>[Ø2.05]  | Ø16.0<br>[Ø0.63] | Ø46.0<br>[Ø1.81]  | Ø30.0<br>[Ø1.18]  | 5.0<br>[0.20] | Ø8.0<br>[Ø0.31]    | M4-0.7x9    | Ø62.0<br>[Ø2.44]  | M5-0.8x10  | 5.0<br>[0.20]  | 5.0<br>[0.20] |
| PGB070-10A1                                                                                          |                  | 65.0<br>[2.56]  |                |                |                   |                   |                  | Ø70.0<br>[Ø2.76]  | Ø50.0<br>[Ø1.97]  |               | Ø14.0<br>[Ø0.55]   | M5-0.8x11   |                   |            |                |               |
| PGB070-05A2                                                                                          |                  | 65.0<br>[2.56]  |                |                |                   |                   |                  | Ø70.0<br>[Ø2.76]  | Ø50.0<br>[Ø1.97]  |               | Ø14.0<br>[Ø0.55]   | M5-0.8x11   |                   |            |                |               |
| PGB070-15A1                                                                                          | 158.0<br>[6.22]  | 52.0<br>[2.05]  | 36.0<br>[1.42] | 5.0<br>[0.20]  | Ø70.0<br>[Ø2.76]  | Ø52.0<br>[Ø2.05]  | Ø16.0<br>[Ø0.63] | Ø46.0<br>[Ø1.81]  | Ø30.0<br>[Ø1.18]  | 5.0<br>[0.20] | Ø8.0<br>[Ø0.31]    | M4-0.7x9    | Ø62.0<br>[Ø2.44]  | M5-0.8x10  | 5.0<br>[0.20]  | 5.0<br>[0.20] |
| PGB070-25A1                                                                                          | 163.5<br>[6.44]  | 65.0<br>[2.56]  |                |                |                   |                   |                  | Ø70.0<br>[Ø2.76]  | Ø50.0<br>[Ø1.97]  |               | Ø14.0<br>[Ø0.55]   | M5-0.8x11   |                   |            |                |               |
| PGB070-15A2                                                                                          | 163.5<br>[6.44]  | 65.0<br>[2.56]  |                |                |                   |                   |                  | Ø70.0<br>[Ø2.76]  | Ø50.0<br>[Ø1.97]  |               | Ø14.0<br>[Ø0.55]   | M5-0.8x11   |                   |            |                |               |
| PGB090-15A2                                                                                          | 204.5<br>[8.05]  | 80.0<br>[3.15]  | 46.0<br>[1.81] | 7.0<br>[0.28]  | Ø90.0<br>[Ø3.54]  | Ø68.0<br>[Ø2.68]  | Ø22.0<br>[Ø0.87] | Ø90.0<br>[Ø3.54]  | Ø70.0<br>[Ø2.76]  | 6.0<br>[0.24] | Ø19.0<br>[Ø0.75]   | M6-1.0x13   | Ø80.0<br>[Ø3.15]  | M6-1.0x12  | 6.0<br>[0.24]  | 6.0<br>[0.24] |
| PGB090-05A3                                                                                          | 205.5<br>[8.09]  |                 |                |                |                   |                   |                  | Ø90.0<br>[Ø3.54]  | Ø70.0<br>[Ø2.76]  |               | Ø19.0<br>[Ø0.75]   | M6-1.0x13   |                   |            |                |               |
| PGB090-10A3                                                                                          | 210.5<br>[8.29]  |                 |                |                |                   |                   |                  | Ø90.0<br>[Ø3.54]  | Ø70.0<br>[Ø2.76]  |               | Ø19.0<br>[Ø0.75]   | M6-1.0x13   |                   |            |                |               |
| PGB090-15A3                                                                                          | 210.5<br>[8.29]  | 100.0<br>[3.94] | 70.0<br>[2.76] | 9.0<br>[0.35]  | Ø120.0<br>[Ø4.72] | Ø90.0<br>[Ø3.54]  | Ø32.0<br>[Ø1.26] | Ø115.0<br>[Ø4.53] | Ø95.0<br>[Ø3.74]  | 8.0<br>[0.31] | Ø22.0 *<br>[Ø0.87] | M8-1.25x17  | Ø108.0<br>[Ø4.25] | M8-1.25x16 | 10.0<br>[0.39] | 8.0<br>[0.31] |
| PGB090-05A4                                                                                          | 205.5<br>[8.09]  |                 |                |                |                   |                   |                  | Ø115.0<br>[Ø4.53] | Ø95.0<br>[Ø3.74]  |               |                    |             |                   |            |                |               |
| PGB090-10A4                                                                                          | 205.5<br>[8.09]  |                 |                |                |                   |                   |                  | Ø115.0<br>[Ø4.53] | Ø95.0<br>[Ø3.74]  |               |                    |             |                   |            |                |               |
| PGB120-15A4                                                                                          | 272.0<br>[10.71] | 130.0<br>[5.12] | 70.0<br>[2.76] | 9.0<br>[0.35]  | Ø120.0<br>[Ø4.72] | Ø90.0<br>[Ø3.54]  | Ø32.0<br>[Ø1.26] | Ø145.0<br>[Ø5.71] | Ø110.0<br>[Ø4.33] | 8.0<br>[0.31] | Ø22.0 *<br>[Ø0.87] | M8-1.25x17  | Ø108.0<br>[Ø4.25] | M8-1.25x16 | 10.0<br>[0.39] | 8.0<br>[0.31] |
| PGB120-05A5                                                                                          | 266.0<br>[10.47] |                 |                |                |                   |                   |                  | Ø145.0<br>[Ø5.71] | Ø110.0<br>[Ø4.33] |               |                    |             |                   |            |                |               |
| PGB120-10A5                                                                                          | 272.0<br>[10.71] |                 |                |                |                   |                   |                  | Ø145.0<br>[Ø5.71] | Ø110.0<br>[Ø4.33] |               |                    |             |                   |            |                |               |
| PGB120-15A5                                                                                          | 272.0<br>[10.71] | 180.0<br>[7.09] | 97.0<br>[3.82] | 12.0<br>[0.47] | Ø155.0<br>[Ø6.10] | Ø120.0<br>[Ø4.72] | Ø40.0<br>[Ø1.57] | Ø200.0<br>[Ø7.87] | Ø114.0<br>[Ø4.50] | 8.0<br>[0.31] | Ø35.0 *<br>[Ø1.38] | M12-1.75x25 | Ø140.0<br>[Ø5.51] | M10-1.5x20 | 12.0<br>[0.47] | 8.0<br>[0.31] |
| PGB120-05A6                                                                                          | 268.5<br>[10.57] |                 |                |                |                   |                   |                  | Ø200.0<br>[Ø7.87] | Ø114.0<br>[Ø4.50] |               |                    |             |                   |            |                |               |
| PGB120-10A6                                                                                          | 272.0<br>[10.71] |                 |                |                |                   |                   |                  | Ø200.0<br>[Ø7.87] | Ø114.0<br>[Ø4.50] |               |                    |             |                   |            |                |               |
| PGB155-05A6                                                                                          | 341.0<br>[13.43] | 180.0<br>[7.09] | 97.0<br>[3.82] | 12.0<br>[0.47] | Ø155.0<br>[Ø6.10] | Ø120.0<br>[Ø4.72] | Ø40.0<br>[Ø1.57] | Ø200.0<br>[Ø7.87] | Ø114.0<br>[Ø4.50] | 8.0<br>[0.31] | Ø35.0 *<br>[Ø1.38] | M12-1.75x25 | Ø140.0<br>[Ø5.51] | M10-1.5x20 | 12.0<br>[0.47] | 8.0<br>[0.31] |
| PGB155-10A6                                                                                          | 364.0<br>[14.33] |                 |                |                |                   |                   |                  | Ø200.0<br>[Ø7.87] | Ø114.0<br>[Ø4.50] |               |                    |             |                   |            |                |               |
| PGB155-15A6                                                                                          | 364.0<br>[14.33] |                 |                |                |                   |                   |                  | Ø200.0<br>[Ø7.87] | Ø114.0<br>[Ø4.50] |               |                    |             |                   |            |                |               |

\* Dimension with supplied bushing

NOTE: See our website: [www.AutomationDirect.com](http://www.AutomationDirect.com) for complete engineering drawings.



# Precision Servo Gearboxes

## SureGear® Servo Gearbox Replacement Parts



| SureGear® Precision Servo Gearboxes – Replacement Parts |         |                                                                                                                                         |
|---------------------------------------------------------|---------|-----------------------------------------------------------------------------------------------------------------------------------------|
| Part Number                                             | Price   | Description                                                                                                                             |
| <b><u>PG050-KEY</u></b>                                 | \$4.50  | Output Shaft Key, replacement, 4 x 4 x 14 mm, for SureGear PGA050 series gearboxes.                                                     |
| <b><u>PG070-KEY</u></b>                                 | \$4.50  | Output Shaft Key, replacement, 5 x 5 x 22 mm, for SureGear PGA070 and PGB070 series gearboxes.                                          |
| <b><u>PG090-KEY</u></b>                                 | \$4.50  | Output Shaft Key, replacement, 6 x 6 x 28 mm, for SureGear PGA090 and PGB090 series gearboxes.                                          |
| <b><u>PG120-KEY</u></b>                                 | \$4.50  | Output Shaft Key, replacement, 10 x 8 x 45 mm, for SureGear PGA120 and PGB120 series gearboxes.                                         |
| <b><u>PG155-KEY</u></b>                                 | \$4.50  | Output Shaft Key, replacement, 12 x 8 x 65 mm, for SureGear PGA155 and PGB155 series gearboxes.                                         |
| <b><u>PGA4-A5-BUSH</u></b>                              | \$22.50 | Input Shaft Bushing, replacement, 28 x 22 x 30.5 mm, for all SureGear gearboxes using SV(2)L-210(B) and SV(2)M-210(B) SureServo motors. |
| <b><u>PGA6-BUSH</u></b>                                 | \$22.50 | Input Shaft Bushing, replacement, 38 x 35 x 36 mm, for all SureGear gearboxes using SV(2)M-220(B) and SV(2)M-230(B) SureServo motors.   |