

PUL

High Radial Load Planetary Gearboxes

The PUL series of output shaft inline helical gearbox provide a wide range of performance levels to high positioning accuracy and motion control applications, particularly when high radial loading is required. The performance of this precision planetary gearbox is reinforced based on the PUA series. The maximum radial force is increased by an average of 155%. Frame sizes 60-220 mm with the best level of backlash < 1 arcmin. Taper roller bearings with maximum radial load capacity up to 27800N (PUL-220), and axial load capacity up to 16200N. The PUL gearboxes are specially well suited to work with pinion and rack for linear operation. Commonly adapted in metal cutting machines, wood processing equipment, machine centers and highly dynamic motion control systems. Right angle configuration (PUR) is also available with max. frame size 220 mm.

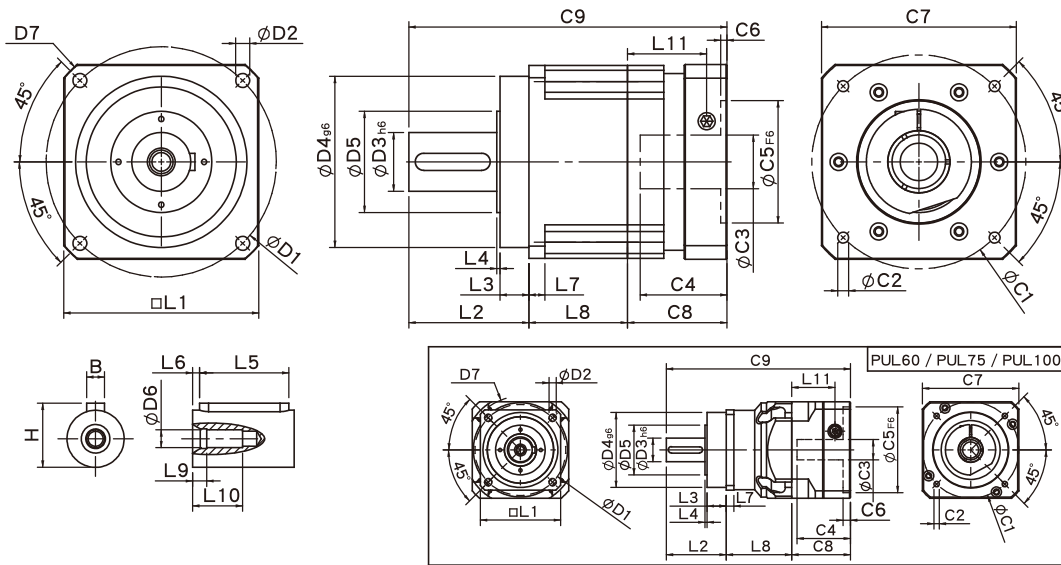


| | |
|---------------------------|-------------------------------------|
| Frame Size (mm) | 60,75, 100, 140, 180, 220 |
| Ratio | 3:1 - 100 : 1 |
| Nominal Input Speed (rpm) | 2,000 - 5,000 |
| Max Input Speed (rpm) | 4,000 - 10,000 |
| Backlash (arc-min) | 1 Stage : 1 - 6 2 Stages : 3 - 8 |
| Noise Level (dBA / 1m) | 58 - 70 |

Features

- ▶ 3 levels of backlash, 6 frame sizes from 60-220 mm.
- ▶ Premium and precision gear design, ratios from 3-100:1.
- ▶ One-piece planet carrier/output shaft, high rigidity and radial load capacity.
- ▶ Taper Roller Bearings deliver radial load capacity as high as 27800 N, and axial capacities up to 16200 N.
- ▶ Hardened and ground gearing, high wear resistance and impact toughness.
- ▶ One-piece ring gear/housing, high precision and torque output.
- ▶ Planets with full needle bearing support.
- ▶ IP65 enclosure and synthetic lubricant, maintenance-free service life.

PUL Single Stage Dimensions



Specifications

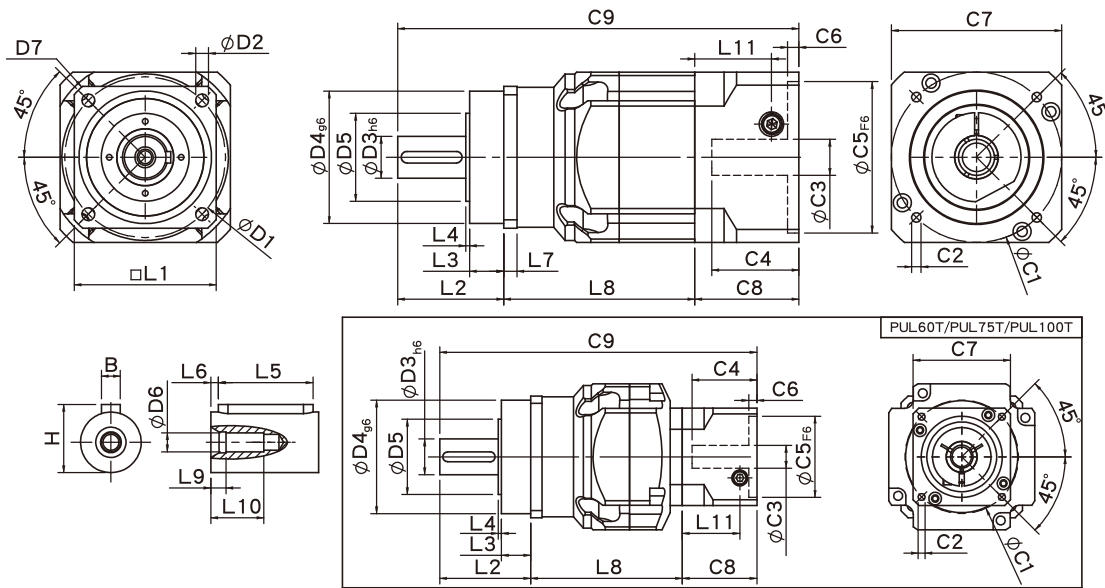
Unit:mm

| Dimensions | PUL60 | PUL75 | PUL100 | PUL140 | PUL180 | PUL220 |
|-------------------|---------|----------|-------------|----------|-----------|-----------|
| D1 | 68 | 85 | 120 | 165 | 215 | 250 |
| D2 | 5.5 | 6.8 | 9 | 11 | 13 | 17 |
| D3 _{h6} | 16 | 22 | 32 | 40 | 55 | 75 |
| D4 _{g6} | 60 | 70 | 90 | 130 | 160 | 180 |
| D5 | 34.6 | 46.4 | 59.6 | 79.2 | 94.5 | 114.4 |
| D6 | M5x0.8P | M8x1.25P | M12x1.75P | M16x2.0P | M20x2.5P | M20x2.5P |
| D7 | 80 | 100 | 138 | 186 | 239 | 292 |
| L1 | 62 | 76 | 105 | 142 | 180 | 220 |
| L2 | 48.5 | 56 | 88 | 112 | 112 | 138 |
| L3 | 18.5 | 18 | 28 | 27 | 27 | 30 |
| L4 | 1.5 | 2 | 2 | 3 | 3 | 3 |
| L5 | 25 | 32 | 40 | 60 | 70 | 90 |
| L6 | 2 | 2 | 5 | 5 | 6 | 7 |
| L7 | 6 | 7 | 10 | 12 | 15 | 20 |
| L8 | 44 | 61 | 46 | 64.5 | 92 | 111 |
| L9 | 4 | 4.5 | 6 | 6 | 8 | 15 |
| L10 | 16.5 | 20.5 | 30 | 38 | 48 | 42 |
| L11 | 35.5 | 40.5 | 41.8 | 70 | 74 | 96 |
| C1 ² | 70 | 90 | 115 | 165 | 200 | 235 |
| C2 ² | M5x0.8P | M6x1.0P | M8x1.25P | M10x1.5P | M12x1.75P | M12x1.75P |
| C3 ² | ≤14/≤19 | ≤19/≤24 | ≤24/≤32/≤38 | ≤35/≤38 | ≤50 | ≤55 |
| C4 ² | 37 | 47 | 51 | 66.7 | 81 | 112 |
| C5 ^{2F6} | 50 | 70 | 95 | 130 | 114.3 | 200 |
| C6 ² | 4 | 6 | 6 | 5.5 | 6 | 6 |
| C7 ² | 60 | 90 | 115 | 140 | 182 | 220 |
| C8 ² | 46 | 55 | 58 | 87.2 | 93 | 120 |
| C9 ² | 138.5 | 172 | 192 | 263.7 | 297 | 369 |
| B | 5 | 6 | 10 | 12 | 16 | 20 |
| H | 18 | 24.5 | 35 | 43 | 59 | 79.5 |

* C1~C9 are motor specific dimensions (metric std shown). Size may vary according to motor flange.

* Specification subject to change without notice.

PUL Double Stage Dimensions-1



Specifications

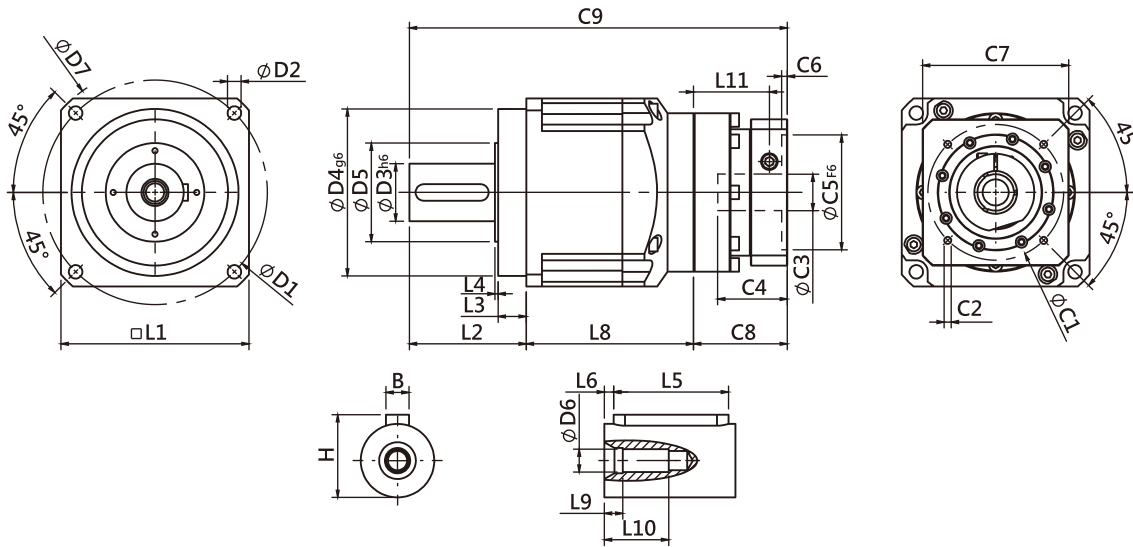
Unit:mm

| Dimensions | PUL60/PUL60T | | PUL75/PUL75T | | PUL100T |
|-------------------|--------------|---------|--------------|---------|-----------|
| D1 | 68 | | 85 | | 120 |
| D2 | 5.5 | | 6.8 | | 9 |
| D3 _{h6} | 16 | | 22 | | 32 |
| D4 _{g6} | 60 | | 70 | | 90 |
| D5 | 34.6 | | 46.4 | | 59.6 |
| D6 | M5x0.8P | | M8x1.25P | | M12x1.75P |
| D7 | 80 | | 100 | | 138 |
| L1 | 62 | | 76 | | 105 |
| L2 | 48.5 | | 56 | | 88 |
| L3 | 18.5 | | 18 | | 28 |
| L4 | 1.5 | | 2 | | 2 |
| L5 | 25 | | 32 | | 40 |
| L6 | 2 | | 2 | | 5 |
| L7 | 6 | | 7 | | 10 |
| L8 | 77 | 72.5 | 101 | 93.5 | 88.5 |
| L9 | 4 | | 4.5 | | 6 |
| L10 | 16.5 | | 20.5 | | 30 |
| L11 | 35.5 | 29 | 40.5 | 35.5 | 40.5 |
| C1 ² | 70 | 46 | 90 | 70 | 90 |
| C2 ² | M5x0.8P | M4x0.7P | M6x1.0P | M5x0.8P | M6x1.0P |
| C3 ² | ≤14/≤19 | ≤8/≤11 | ≤19/≤24 | ≤14/≤19 | ≤19/≤24 |
| C4 ² | 37 | 27 | 47 | 37 | 47 |
| C5 ^{2F6} | 50 | 30 | 70 | 50 | 70 |
| C6 ² | 4 | 4 | 6 | 4 | 6 |
| C7 ² | 60 | 42.6 | 90 | 60 | 90 |
| C8 ² | 46 | 38.5 | 55 | 46 | 55 |
| C9 ² | 171.5 | 159.5 | 212 | 195.5 | 231.5 |
| B | 5 | | 6 | | 10 |
| H | 18 | | 24.5 | | 35 |

* C1~C9 are motor specific dimensions (metric std shown). Size may vary according to motor flange.

* Specification subject to change without notice.

PUL Double Stage Dimensions-2



Specifications

Unit:mm

| Dimensions | PUL140T | PUL180T | PUL220T |
|-------------------|-------------|----------|-----------|
| D1 | 165 | 215 | 250 |
| D2 | 11 | 13 | 17 |
| D3 _{h6} | 40 | 55 | 75 |
| D4 _{g6} | 130 | 160 | 180 |
| D5 | 79.2 | 94.5 | 114.4 |
| D6 | M16x2.0P | M20x2.5P | M20x2.5P |
| D7 | 186 | 239 | 292 |
| L1 | 142 | 180 | 220 |
| L2 | 112 | 112 | 138 |
| L3 | 27 | 27 | 30 |
| L4 | 3 | 3 | 3 |
| L5 | 60 | 70 | 90 |
| L6 | 5 | 6 | 7 |
| L7 | 12 | 15 | 20 |
| L8 | 120 | 160.2 | 202 |
| L9 | 6 | 8 | 15 |
| L10 | 38 | 48 | 42 |
| L11 | 41.8 | 72.6 | 74 |
| C1 ² | 130 | 130 | 200 |
| C2 ² | M8x1.25P | M8x1.25P | M12x1.75P |
| C3 ² | ≤24/≤32/≤38 | ≤35/≤38 | ≤50 |
| C4 ² | 51 | 66.7 | 81 |
| C5 ^{2F6} | 110 | 110 | 114.3 |
| C6 ² | 6 | 5.5 | 6 |
| C7 ² | 115 | 140 | 180 |
| C8 ² | 58 | 89.8 | 93 |
| C9 ² | 290 | 362 | 433 |
| B | 12 | 16 | 20 |
| H | 43 | 59 | 79.5 |

* C1~C9 are motor specific dimensions (metric std shown). Size may vary according to motor flange.

* Specification subject to change without notice.

PUL Specifications

| Specifications | Stage | Ratio | PUL60 | PUL75 | PUL100 | PUL140 | PUL180 | PUL220 | |
|----------------------------------|---------------------------|--------------------|--|--------------------------------------|----------------|------------|--------------|------------|------------|
| Nominal Output Torque T_{2N} | 1 | 3 | 53 | 145 | 180 | 340 | 580 | 1100 | |
| | | 4 | 55 | 150 | 240 | 500 | 1100 | 1700 | |
| | | 5 | 54 | 140 | 290 | 600 | 1200 | 2000 | |
| | | 6 | 46 | 135 | 280 | 560 | 1100 | 1850 | |
| | | 7 | 44 | 125 | 270 | 530 | 1100 | 1750 | |
| | | 8 | 41 | 110 | 240 | 480 | 1000 | 1550 | |
| | | 9 | 37 | 95 | 220 | 430 | 900 | 1500 | |
| | | 10 | 37 | 95 | 220 | 430 | 900 | 1450 | |
| | | 2 | 15 | 53 | 145 | 180 | 520 | 1200 | 2000 |
| | | | 20 | 55 | 150 | 240 | 600 | 1200 | 2000 |
| | 25 | | 54 | 140 | 290 | 600 | 1200 | 2000 | |
| | 30 | | 54 | 140 | 290 | 600 | 1200 | 2000 | |
| | 35 | | 54 | 140 | 290 | 600 | 1200 | 2000 | |
| | 40 | | 54 | 140 | 290 | 600 | 1200 | 2000 | |
| | 45 | | 54 | 140 | 290 | 600 | 1200 | 2000 | |
| | 50 | | 54 | 140 | 290 | 600 | 1200 | 2000 | |
| | 60 | | 46 | 135 | 280 | 560 | 1200 | 1850 | |
| | 70 | | 44 | 125 | 270 | 530 | 1100 | 1750 | |
| | 80 | 41 | 110 | 240 | 480 | 1000 | 1550 | | |
| | 90 | 37 | 95 | 220 | 430 | 900 | 1500 | | |
| 100 | 37 | 95 | 220 | 430 | 900 | 1450 | | | |
| Emergency Stop Torque T_{2NOT} | N•m | | (3.0 times of Nominal Output Torque) (*Max. Output Torque T_{2B} =60% of Emergency Stop Torque) | | | | | | |
| Nominal Input Speed n_{1N} | rpm | 1,2 | 3-100 | 5000 | 4000 | 4000 | 3000 | 3000 | 2000 |
| Max. Input Speed n_{1max} | rpm | 1,2 | 3-100 | 10000 | 8000 | 8000 | 6000 | 6000 | 4000 |
| Micro Backlash P0 | arcmin | 1 2 | 3-10 12-100 | ≤ 2 ≤ 4 | ≤ 2 ≤ 4 | ≤ 1 ≤ 3 | ≤ 1 ≤ 3 | ≤ 1 ≤ 3 | ≤ 1 ≤ 3 |
| Precision Backlash P1 | arcmin | 1 2 | 3-10 12-100 | ≤ 4 ≤ 6 | ≤ 4 ≤ 6 | ≤ 3 ≤ 5 | ≤ 3 ≤ 5 | ≤ 3 ≤ 5 | ≤ 3 ≤ 5 |
| Standard Backlash P2 | arcmin | 1 2 | 3-10 12-100 | ≤ 6 ≤ 8 | ≤ 6 ≤ 8 | ≤ 5 ≤ 7 | ≤ 5 ≤ 7 | ≤ 5 ≤ 7 | ≤ 5 ≤ 7 |
| Torsional Rigidity | $\frac{N\cdot m}{arcmin}$ | 1,2 | 3-100 | 7 | 14 | 25 | 50 | 150 | 220 |
| Max. Radial Load F_{2rB}^{-1} | N | 1,2 | 3-100 | 4130 | 5220 | 10650 | 17600 | 22000 | 27800 |
| Max. Axial Load F_{2aB}^{-1} | N | 1,2 | 3-100 | 2500 | 3300 | 5700 | 11300 | 14000 | 16200 |
| Operating Temp. | °C | | 3-100 | -10°C ~ +90°C | | | | | |
| Service Life | hr | | 3-100 | 30,000 (15,000 Continuous Operation) | | | | | |
| Efficiency | % | 1 2 | 3-10 12-100 | ≥ 97% ≥ 94% | | | | | |
| Weight | kg | 1 2 | 3-10 12-100 | 1.8 2.4/2.0 | 4.0 5.7/4.5 | 6.7 8.2 | 15.1 17.5 | 30.8 37 | 55 68.5 |
| Mounting Position | - | 1,2 | 3-100 | Any Direction | | | | | |
| Noise Level ² | dBA/1m | 1,2 | 3-100 | 58 | 60 | 63 | 65 | 67 | 70 |
| Protection Class | - | 1,2 | 3-100 | IP65 | | | | | |
| Lubrication | - | 1,2 | 3-100 | Synthetic Lubricant | | | | | |
| Inertia (J1) | | | | | | | | | |
| Stage | Ratio | unit | PUL60 | PUL75 | PUL100 | PUL140 | PUL180 | PUL220 | |
| 1 | 3 | kg•cm ² | 0.23 | 0.97 | 2.35 | 10.00 | 30.50 | 79.50 | |
| | 4 | | 0.18 | 0.67 | 1.66 | 7.17 | 25.86 | 58.21 | |
| | 5 | | 0.17 | 0.65 | 1.50 | 6.52 | 23.63 | 54.36 | |
| | 6/7/8 | | 0.14 | 0.60 | 1.45 | 6.17 | 22.92 | 54.12 | |
| | 9/10 | | 0.14 | 0.58 | 1.41 | 6.1 | 22.73 | 53.98 | |
| Stage | Ratio | | PUL60(T) | PUL75(T) | PUL100T | PUL140T | PUL180T | PUL220T | |
| 2 | 15/20 | | 0.17 (0.02) | 0.65 (0.17) | 0.65 | 1.50 | 6.52 | 30.50 | |
| | 25/30/35/40 | | 0.14 (0.02) | 0.60 (0.14) | 0.60 | 1.45 | 6.17 | 22.92 | |
| | 45/50/60/70/80/90/100 | | 0.14 (0.02) | 0.58 (0.14) | 0.58 | 1.41 | 6.10 | 22.73 | |

* 1. Applied to the output shaft center at 100 rpm.

* 2. Environment noise level 30 dB; distance 1m; measured under free loading with input speed 3000 rpm; ratio = 10 (1-stage) or ratio = 100 (2-stage).

※The above figures/specifications are subject to change without prior notice.

Products due to human error, natural disasters or other factors lead to poor or damaged, will not be covered under warranty.