

# PL(E/F) Series High Precision Planetary Gear Head

## Key Features:

- Low Backlash (as low as 3 arcmin.)
- Low noise (<= 65 dB(A))
- Long life (30,000 Hours)
- High Output Torque
- High Efficiency (96%)
- Life Long Lubrication.
- Easy Motor mounting (custom made mounting configurations)



## Production Number Code for PL Series Gear Head:

80      PLE      40  
①          ②          ③

① Frame Size: 80 = 80mm

② Gear Head Type  
PLE: Round Output Flange Type  
PLF: Square Output Flange Type

③ Reduction Ratio: 40 = 40:1

## Applications:

- Servo Motors
- Stepping Motor
- Brushless DC Motors
- PMDC Motors

# PL(E/F) Series Precision Planetary Gear Head



## Technical Data

| Model               | 40PL(E/F) | 60PL(E/F)                          | 80PL(E/F) | 120PL(E/F) | 160PL(E/F) | Ratio | Stage |   |
|---------------------|-----------|------------------------------------|-----------|------------|------------|-------|-------|---|
| Rated Output Torque | N.m       | 4.5                                | 12        | 40         | 80         | 400   | 3     | 1 |
|                     |           | 6                                  | 16        | 50         | 100        | 450   | 4     |   |
|                     |           | 6                                  | 16        | 50         | 110        | 450   | 5     |   |
|                     |           | 5                                  | 15        | 45         | 120        | 450   | 8     |   |
|                     |           | 5                                  | 15        | 45         | 120        | 305   | 10    |   |
|                     |           | 16.5                               | 44        | 110        | 210        | N/A   | 9     | 2 |
|                     |           | 18                                 | 44        | 120        | 260        | 800   | 12    |   |
|                     |           | 18                                 | 40        | 110        | 230        | 700   | 15    |   |
|                     |           | 20                                 | 44        | 120        | 260        | 800   | 16    |   |
|                     |           | 20                                 | 44        | 120        | 260        | 800   | 20    |   |
|                     |           | 18                                 | 40        | 110        | 230        | 700   | 25    |   |
|                     |           | 20                                 | 44        | 120        | 260        | 800   | 32    |   |
|                     |           | 18                                 | 40        | 110        | 230        | 700   | 40    |   |
|                     |           | 7.5                                | 18        | 50         | 120        | 450   | 64    |   |
|                     |           | 20                                 | 44        | 120        | 260        | N/A   | 60    |   |
|                     |           | 20                                 | 44        | 120        | 260        | N/A   | 80    |   |
|                     |           | 20                                 | 44        | 120        | 260        | N/A   | 100   |   |
|                     |           | 18                                 | 40        | 110        | 230        | N/A   | 120   |   |
|                     |           | 20                                 | 44        | 120        | 260        | N/A   | 160   |   |
|                     |           | 18                                 | 40        | 110        | 230        | N/A   | 200   |   |
| 20                  | 44        | 120                                | 260       | N/A        | 256        |       |       |   |
| 18                  | 40        | 110                                | 230       | N/A        | 320        |       |       |   |
| 7.5                 | 18        | 50                                 | 120       | N/A        | 512        |       |       |   |
| Life                | Hour      | 30,000                             |           |            |            |       |       |   |
| Max. Torque         | N.m       | 2 times of the rated output torque |           |            |            |       |       |   |

| Model                   | 40PL(E/F)     | 60PL(E/F) | 80PL(E/F) | 120PL(E/F) | 160PL(E/F) | Unit | Stage |
|-------------------------|---------------|-----------|-----------|------------|------------|------|-------|
| Permissible Radial Load | 160           | 340       | 650       | 1500       | 4200       | N    |       |
| Permissible Axial Load  | 160           | 450       | 900       | 2100       | 6000       | N    |       |
| Full Load Efficiency    | 96            |           |           |            |            | %    | 1     |
|                         | 94            |           |           |            |            |      | 2     |
|                         | 90            |           |           |            |            |      | 3     |
| Weight                  | 0.4           | 0.9       | 2.1       | 6          | 18         | Kg   | 1     |
|                         | 0.5           | 1.1       | 2.6       | 8          | 22         |      | 2     |
|                         | 0.6           | 1.3       | 3.1       | 9.5        |            |      | 3     |
| Working Temperature     | -25°C ~ +90°C |           |           |            |            | °C   |       |
| Protection Class        | IP54          |           |           |            |            |      |       |
| Lubrication             | Life time     |           |           |            |            |      |       |
| Mounting Orientation    | Any           |           |           |            |            |      |       |

Note: Permissible radial and axial load point at middle of the shaft (L4/2) and speed at 100RPM

## PL(E/F) Series Precision Planetary Gear Head



### Technical Data

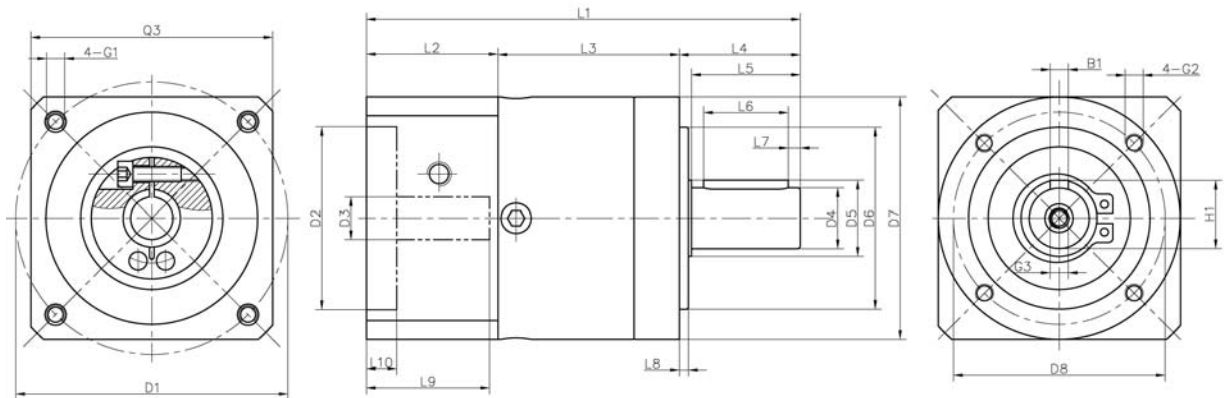
| Model             |                   | 40PL(E/F) | 60PL(E/F) | 80PL(E/F) | 120PL(E/F) | 160PL(E/F) | Ratio |
|-------------------|-------------------|-----------|-----------|-----------|------------|------------|-------|
| Load Inertia      | Kgcm <sup>2</sup> | 0.031     | 0.135     | 0.77      | 2.63       | 12.14      | 3     |
|                   |                   | 0.022     | 0.093     | 0.52      | 1.79       | 7.78       | 4     |
|                   |                   | 0.019     | 0.078     | 0.45      | 1.53       | 6.07       | 5     |
|                   |                   | 0.017     | 0.065     | 0.39      | 1.32       | 4.63       | 8     |
|                   |                   | 0.015     | 0.054     | 0.34      | 1.14       | 3.52       | 10    |
|                   |                   | 0.03      | 0.131     | 0.74      | 2.62       | 12.1       | 9     |
|                   |                   | 0.029     | 0.127     | 0.72      | 2.56       | 12.37      | 12    |
|                   |                   | 0.023     | 0.077     | 0.71      | 2.53       | 12.35      | 15    |
|                   |                   | 0.022     | 0.088     | 0.5       | 1.75       | 7.47       | 16    |
|                   |                   | 0.019     | 0.075     | 0.44      | 1.5        | 6.65       | 20    |
|                   |                   | 0.019     | 0.075     | 0.44      | 1.49       | 5.81       | 25    |
|                   |                   | 0.017     | 0.064     | 0.39      | 1.3        | 4.5        | 32    |
|                   |                   | 0.016     | 0.064     | 0.39      | 1.3        | 4.5        | 40    |
|                   |                   | 0.016     | 0.064     | 0.39      | 1.3        | 4.5        | 64    |
|                   |                   | 0.029     | 0.13      | 0.7       | 2.57       | N/A        | 60    |
|                   |                   | 0.019     | 0.075     | 0.5       | 1.5        | N/A        | 80    |
|                   |                   | 0.019     | 0.075     | 0.44      | 1.49       | N/A        | 100   |
|                   |                   | 0.029     | 0.13      | 0.7       | 2.5        | N/A        | 120   |
|                   |                   | 0.016     | 0.064     | 0.39      | 1.3        | N/A        | 160   |
|                   |                   | 0.016     | 0.064     | 0.39      | 1.3        | N/A        | 200   |
| 0.016             | 0.064             | 0.39      | 1.3       | N/A       | 256        |            |       |
| 0.016             | 0.064             | 0.39      | 1.3       | N/A       | 320        |            |       |
| 0.016             | 0.064             | 0.39      | 1.3       | N/A       | 512        |            |       |
| Model             |                   | 40PL(E/F) | 60PL(E/F) | 80PL(E/F) | 120PL(E/F) | 160PL(E/F) | Stage |
| Backlash (arcmin) | High              | <5        | <3        | <3        | <3         | <3         | 1     |
|                   | Standard          | <10       | <8        | <8        | <8         | <8         |       |
|                   | High              | <8        | <5        | <5        | <5         | <5         | 2     |
|                   | Standard          | <12       | <10       | <10       | <10        | <10        |       |
|                   | High              | <10       | <8        | <8        | <8         | N/A        | 3     |
|                   | Standard          | <15       | <12       | <12       | <12        | N/A        |       |
| Torsion Stiffness | N.m/arcmin        | 0.7       | 1.8       | 4.5       | 12         | 38         |       |
| Noise             | dB(A)             | 55        | 58        | 60        | 65         | 70         |       |
| Max. Input Speed  | RPM               | 10000     | 8000      | 6000      | 6000       | 6000       |       |
| Rated Input speed | RPM               | 4500      | 4000      | 4000      | 3500       | 3000       |       |

Note: Load Inertia varies with different shaft length and diameter.

Note: Noise tested @ 1.0 m, no load input speed of 3000RPM.

# PLE Series Precision Planetary Gear Head – (Round Output Flange)

## Mechanical Dimensions:



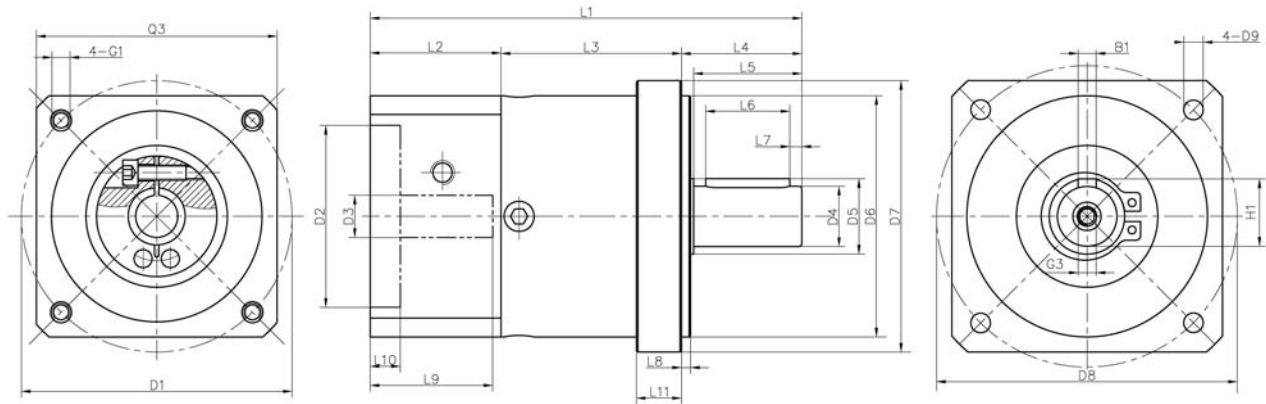
Unit (单位): mm

| Model               | 40PLE  |       |     | 60PLE |      |       | 80PLE |       |      | 120PLE |       |     | 160PLE |       |
|---------------------|--------|-------|-----|-------|------|-------|-------|-------|------|--------|-------|-----|--------|-------|
| Stage               | 1      | 2     | 3   | 1     | 2    | 3     | 1     | 2     | 3    | 1      | 2     | 3   | 1      | 2     |
| L1=Total Length     | 93.5   | 106.5 | 119 | 113   | 126  | 138.5 | 143.5 | 161.5 | 179  | 191.7  | 221.5 | 249 | 285.5  | 335   |
| L3=Head Length      | 39     | 52    | 64  | 46.5  | 59.5 | 72    | 60    | 78    | 95.5 | 73.7   | 101.5 | 129 | 104    | 153.5 |
| Output side         |        |       |     |       |      |       |       |       |      |        |       |     |        |       |
| L4=Shaft Length     | 26     |       |     | 35    |      |       | 40    |       |      | 55     |       |     | 87     |       |
| L5=Usable Length    | 24     |       |     | 30.5  |      |       | 36    |       |      | 50     |       |     | 82     |       |
| L6=Keyway Length.   | 16     |       |     | 25    |      |       | 28    |       |      | 40     |       |     | 70     |       |
| L7=Key to Shaft end | 2.5    |       |     | 2.5   |      |       | 4     |       |      | 5      |       |     | 5      |       |
| L8=Pilot Height     | 2      |       |     | 3     |      |       | 3     |       |      | 4      |       |     | 5      |       |
| D4=Shaft Diameter   | Φ10 h7 |       |     | Φ14h7 |      |       | Φ20h7 |       |      | Φ25h7  |       |     | Φ40 h7 |       |
| D5=Base Diameter    | Φ12    |       |     | Φ17   |      |       | Φ25   |       |      | Φ35    |       |     | Φ55    |       |
| D6=Pilot Diameter   | Φ26    |       |     | Φ40   |      |       | Φ60   |       |      | Φ80    |       |     | Φ130   |       |
| D7=Head Diameter    | Φ40    |       |     | Φ60   |      |       | Φ80   |       |      | Φ115   |       |     | Φ160   |       |
| D8=Mounting Dia.    | Φ34    |       |     | Φ52   |      |       | Φ70   |       |      | Φ100   |       |     | Φ145   |       |
| B1=Key Width        | 3      |       |     | 5     |      |       | 6     |       |      | 8      |       |     | 12     |       |
| H1=Key Height       | 11.2   |       |     | 16    |      |       | 22.5  |       |      | 28     |       |     | 43     |       |
| G2=Mounting Screw   | M4x6   |       |     | M5x8  |      |       | M6x10 |       |      | M10x16 |       |     | M12x20 |       |
| G3=Center Screw     | M3x9   |       |     | M5x12 |      |       | M6x16 |       |      | M10x22 |       |     | M12x25 |       |
| Input Side          |        |       |     |       |      |       |       |       |      |        |       |     |        |       |
| L2=Endbell Length   | 24.3   |       |     | 31.5  |      |       | 43.5  |       |      | 63     |       |     | 25     |       |
| L9=Motor shaft L    | 25     |       |     | 30    |      |       | 40    |       |      | 55     |       |     | 79     |       |
| L10=Pilot Depth     | 6      |       |     | 10    |      |       | 10    |       |      | 12     |       |     | 12     |       |
| D1=Mounting Dia.    | 46     |       |     | Φ70   |      |       | Φ90   |       |      | Φ145   |       |     | Φ200   |       |
| D2=Pilot Diameter   | Φ30 H7 |       |     | Φ50H7 |      |       | Φ70H7 |       |      | Φ110H7 |       |     | Φ114.3 |       |
| D3=Shaft Diameter   | Φ8     |       |     | Φ14   |      |       | Φ19   |       |      | Φ24    |       |     | Φ35    |       |
| G1=Mounting Screw   | M4x10  |       |     | M5x15 |      |       | M6x15 |       |      | M8x22  |       |     | M12x25 |       |
| Q3=Endbell Size     | □40    |       |     | □60   |      |       | □80   |       |      | □130   |       |     | □175   |       |

Note: Input dimensions can be changed to match front end-bell & shaft dimensions of the desired motor

# PLF Series Precision Planetary Gear Head – (Square Output Flange)

## Mechanical Dimensions:



Unit (单位): mm

| Model                | 40PLF  |       |     | 60PLF |      |       | 80PLF |       |      | 120PLF |       |     | 160PLF   |       |
|----------------------|--------|-------|-----|-------|------|-------|-------|-------|------|--------|-------|-----|----------|-------|
| Stage                | 1      | 2     | 3   | 1     | 2    | 3     | 1     | 2     | 3    | 1      | 2     | 3   | 1        | 2     |
| L1=Total Length      | 93.5   | 106.5 | 119 | 113   | 126  | 138.5 | 143.5 | 161.5 | 179  | 191.7  | 221.5 | 249 | 285.5    | 335   |
| L3=Head Length       | 39     | 52    | 64  | 46.5  | 59.5 | 72    | 60    | 78    | 95.5 | 73.7   | 101.5 | 129 | 104      | 153.5 |
| <b>Output side</b>   |        |       |     |       |      |       |       |       |      |        |       |     |          |       |
| L4=Shaft Length      | 26     |       |     | 35    |      |       | 40    |       |      | 55     |       |     | 87       |       |
| L5=Usable Length     | 24     |       |     | 30.5  |      |       | 36    |       |      | 50     |       |     | 82       |       |
| L6=Keyway Length     | 16     |       |     | 25    |      |       | 28    |       |      | 40     |       |     | 70       |       |
| L7=Key to Shaft end  | 2.5    |       |     | 2.5   |      |       | 4     |       |      | 5      |       |     | 5        |       |
| L8=Pilot Height      | 2      |       |     | 3     |      |       | 3     |       |      | 4      |       |     | 5        |       |
| L11=Endbell Length   | 6      |       |     | 8     |      |       | 10    |       |      | 15     |       |     | 15       |       |
| D4=Shaft Diameter    | Φ10 h7 |       |     | Φ14h7 |      |       | Φ20h7 |       |      | Φ25h7  |       |     | Φ40 h7   |       |
| D5=Base Diameter     | Φ12    |       |     | Φ17   |      |       | Φ25   |       |      | Φ35    |       |     | Φ55      |       |
| D6=Pilot Diameter    | Φ26    |       |     | Φ50   |      |       | Φ80   |       |      | Φ110   |       |     | Φ130     |       |
| D7=Head Diameter     | □45    |       |     | □60   |      |       | □90   |       |      | □120   |       |     | □175     |       |
| D8=Mounting Cir Dia. | Φ50    |       |     | Φ70   |      |       | Φ100  |       |      | Φ130   |       |     | Φ185     |       |
| B1=Key Width         | Φ3.5   |       |     | Φ5.5  |      |       | Φ6.5  |       |      | Φ8.5   |       |     | Φ11      |       |
| H1=Key Height        | 3      |       |     | 5     |      |       | 6     |       |      | 8      |       |     | 12       |       |
| G2=Mounting Screw    | 11.2   |       |     | 16    |      |       | 22.5  |       |      | 28     |       |     | 43       |       |
| G3=Center Screw      | M3x9   |       |     | M5x12 |      |       | M6x16 |       |      | M10x22 |       |     | M12x25   |       |
| <b>Input Side</b>    |        |       |     |       |      |       |       |       |      |        |       |     |          |       |
| L2=Endbell Length    | 24.3   |       |     | 31.5  |      |       | 43.5  |       |      | 63     |       |     | 25       |       |
| L9=Motor shaft L     | 25     |       |     | 30    |      |       | 40    |       |      | 55     |       |     | 79       |       |
| L10=Pilot Depth      | 6      |       |     | 10    |      |       | 10    |       |      | 12     |       |     | 12       |       |
| D1=Mounting Cir Dia. | Φ46    |       |     | Φ70   |      |       | Φ90   |       |      | Φ145   |       |     | 200      |       |
| D2=Pilot Diameter    | Φ30 H7 |       |     | Φ50H7 |      |       | Φ70H7 |       |      | Φ110H7 |       |     | Φ114.3H7 |       |
| D3=Shaft Diameter    | Φ8     |       |     | Φ14   |      |       | Φ19   |       |      | Φ24    |       |     | Φ35      |       |
| G1=Mounting Screw    | M4x10  |       |     | M5x15 |      |       | M6x15 |       |      | M8x22  |       |     | M12x25   |       |
| Q3=Endbell Size      | □40    |       |     | □60   |      |       | □80   |       |      | □130   |       |     | □175     |       |

Note: Input dimensions can be changed to match front end-bell & shaft dimensions of the desired motor