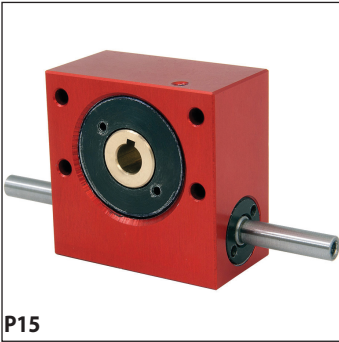
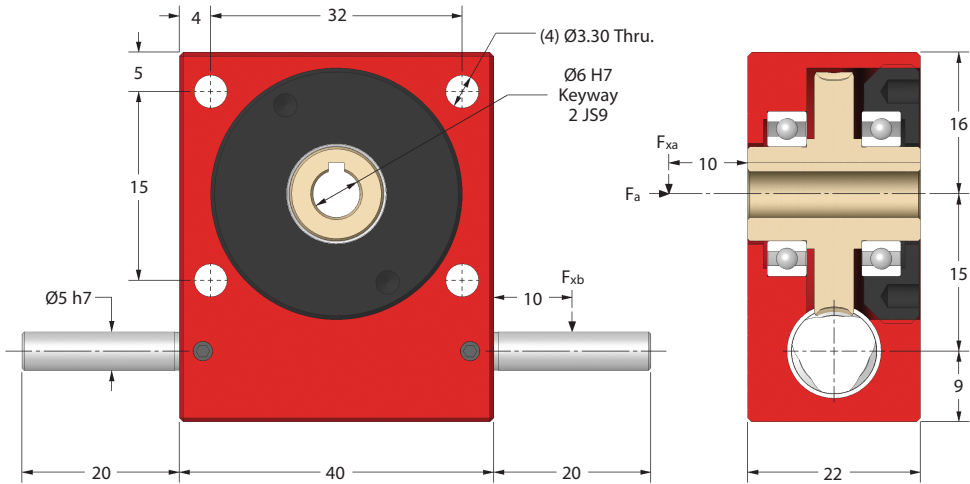


P15**e-cad**
Drawings
Available

GEARBOXES

Precision Worm Gear Reducers

Shaft Input 0.94 – 3.75 Nm **6.66:1 - 80:1****P15**

| Standard ≤30° | Part Number Low Backlash ≤8° | Red. Backlash ≤4° | Ratio | Efficiency at 1000 Rpm | Reflected Inertia at Input (kg.m ²) | Self Locking Output |
|------------------|------------------------------------|----------------------|---------|---------------------------|---|---------------------------|
| P15-6 | P15-6A | P15-6AR | 6.66:1 | 86% | 1.79 x 10 ⁻⁷ | ✘ |
| P15-8 | P15-8A | P15-8AR | 8:1 | 85% | 1.73 x 10 ⁻⁷ | ✘ |
| P15-10 | P15-10A | P15-10AR | 10:1 | 84% | 1.68 x 10 ⁻⁷ | ✘ |
| P15-13 | P15-13A | P15-13AR | 13.33:1 | 78% | 1.65 x 10 ⁻⁷ | ✘ |
| P15-20 | P15-20A | P15-20AR | 20:1 | 71% | 1.62 x 10 ⁻⁷ | ✘ |
| P15-40 | P15-40A | P15-40AR | 40:1 | 60% | 1.61 x 10 ⁻⁷ | ✘ |
| P15-80 | P15-80A | P15-80AR | 80:1 | 32% | 1.60 x 10 ⁻⁷ | ✘ |

Accessories

| | |
|--------|----------------------|
| P20-X | Single Output Shafts |
| P20-DX | Double Output Shafts |
| KK2-20 | Output Key |

Weight: 0.15 kg. Greased for Life: Shell Gadus S5 V42P 2.5.
 F_{xb} at 1000 Rpm: 4 kg. F_{xa} at 1000 Rpm: 8 kg. F_a at 1000 Rpm: 3 kg.

Input Shaft Modifications:

Smaller Diameter, Mill Keyway/Flat, Shorten Shaft Length.
 Circip Groove, Pin Hole.

Testing in your application is necessary.

You will need to assess duty cycles and confirm suitability with your own calculations.

All figures listed are to be used for guidance only.

Output Torque Nm

| Rpm Input | Reduction Ratio | | | | | | |
|--------------|-----------------|------|------|---------|------|------|------|
| | 6.66:1 | 8:1 | 10:1 | 13.33:1 | 20:1 | 40:1 | 80:1 |
| 3000 | 1.05 | 1.13 | 1.20 | 1.28 | 1.43 | 1.58 | 0.94 |
| 2000 | 1.28 | 1.28 | 1.35 | 1.35 | 1.58 | 1.80 | 1.07 |
| 1000 | 1.58 | 1.73 | 1.73 | 1.88 | 2.03 | 2.18 | 1.28 |
| 500 | 2.03 | 2.03 | 2.10 | 2.18 | 2.40 | 2.63 | 1.46 |
| 200 | 2.55 | 2.63 | 2.63 | 2.78 | 2.93 | 3.08 | 1.70 |
| 100 | 2.93 | 2.93 | 3.08 | 3.15 | 3.23 | 3.38 | 1.91 |
| 50 | 3.30 | 3.38 | 3.38 | 3.45 | 3.53 | 3.60 | 2.04 |
| 10 | 3.60 | 3.60 | 3.68 | 3.68 | 3.75 | 3.75 | 2.04 |

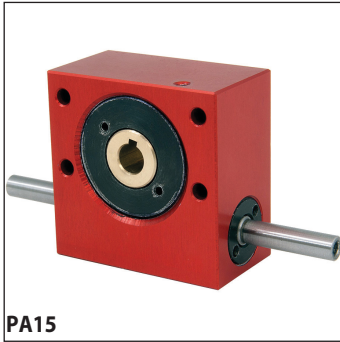
GEARBOXES

Precision Worm Gear Reducers

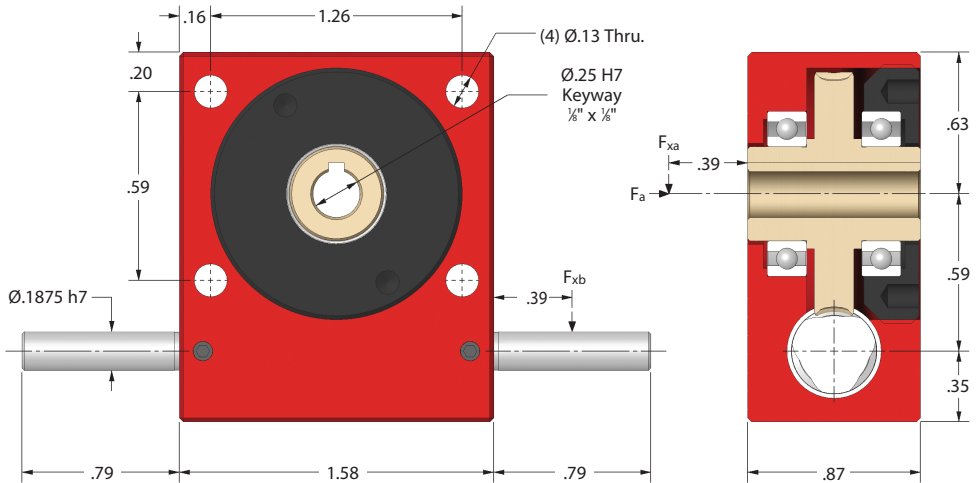
Shaft Input 8.3 – 33.2 lbf.in **6.66:1 - 80:1**

e-cad
Drawings
Available

PA15



PA15



| Standard ≤30' | Part Number | | Ratio | Efficiency at 1000 Rpm | Reflected Inertia at Input (lb.in ²) | Self Locking Output |
|---------------------|----------------------|-----------|---------|---------------------------|--|---------------------------|
| Low Backlash ≤8' | Red. Backlash ≤4' | | | | | |
| PA15-6 | PA15-6A | PA15-6AR | 6.66:1 | 86% | 6.12 x 10 ⁻⁴ | ✘ |
| PA15-8 | PA15-8A | PA15-8AR | 8:1 | 85% | 5.91 x 10 ⁻⁴ | ✘ |
| PA15-10 | PA15-10A | PA15-10AR | 10:1 | 84% | 5.74 x 10 ⁻⁴ | ✘ |
| PA15-13 | PA15-13A | PA15-13AR | 13.33:1 | 78% | 5.64 x 10 ⁻⁴ | ✘ |
| PA15-20 | PA15-20A | PA15-20AR | 20:1 | 71% | 5.54 x 10 ⁻⁴ | ✘ |
| PA15-40 | PA15-40A | PA15-40AR | 40:1 | 60% | 5.50 x 10 ⁻⁴ | ✘ |
| PA15-80 | PA15-80A | PA15-80AR | 80:1 | 32% | 5.47 x 10 ⁻⁴ | ✘ |

Weight: 0.33 lb. Greased for Life: Shell Gadus S5 V42P 2.5.

F_a at 1000 Rpm: 8.81 lb. F_{xa} at 1000 Rpm: 17.64 lb. F_a at 1000 Rpm: 6.61 lb.

Input Shaft Modifications:

Smaller Diameter, Mill Keyway/Flat, Shorten Shaft Length.
Circlip Groove, Pin Hole.

Testing in your application is necessary.

You will need to assess duty cycles and confirm suitability with your own calculations.

All figures listed are to be used for guidance only.

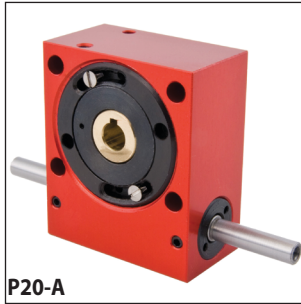
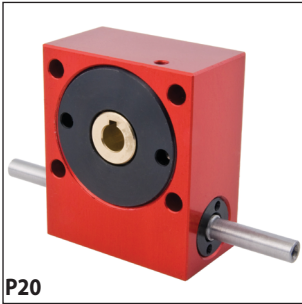
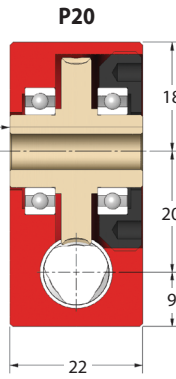
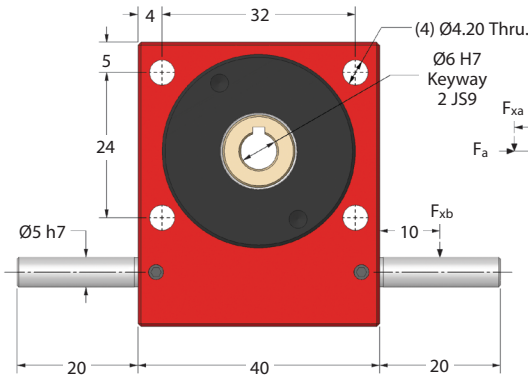
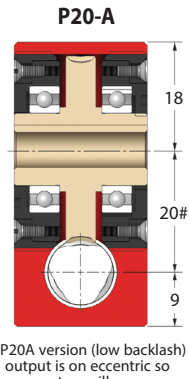
Output Torque lbf.in

| Rpm | Reduction Ratio | | | | | | |
|-------|-----------------|------|------|---------|------|------|------|
| Input | 6.66:1 | 8:1 | 10:1 | 13.33:1 | 20:1 | 40:1 | 80:1 |
| 3000 | 9.3 | 10.0 | 10.6 | 11.3 | 12.7 | 14.0 | 8.3 |
| 2000 | 11.3 | 11.3 | 11.9 | 11.9 | 14.0 | 15.9 | 9.5 |
| 1000 | 14.0 | 15.3 | 15.3 | 16.6 | 18.0 | 19.3 | 11.3 |
| 500 | 18.0 | 18.0 | 18.6 | 19.3 | 21.2 | 23.3 | 12.9 |
| 200 | 22.6 | 23.3 | 23.3 | 24.6 | 25.9 | 27.3 | 15.0 |
| 100 | 25.9 | 25.9 | 27.3 | 27.9 | 28.6 | 29.9 | 16.9 |
| 50 | 29.2 | 29.9 | 29.9 | 30.5 | 31.2 | 31.9 | 18.1 |
| 10 | 31.9 | 31.9 | 32.6 | 32.6 | 33.2 | 33.2 | 18.1 |

P20**e-cad**
Drawings
Available

GEARBOXES

Precision Worm Gear Reducers

Shaft Input 1.25 – 5 Nm **5:1 - 120:1****P20****P20-A****P20****P20-A**

P20A version (low backlash) output is on eccentric so centres will vary

| Standard ≤30' | Part Number Low Backlash ≤8' | Red. Backlash ≤4' | Ratio | Efficiency at 1000 Rpm | Reflected Inertia at Input (kg.m ²) | Self Locking Output |
|------------------|------------------------------------|----------------------|-----------|---|---|---------------------------|
| P20-10 | P20-10A | P20-10AR | 10:1 | 86% | 2.03 x 10 ⁻⁷ | ✘ |
| P20-12 | P20-12A | P20-12AR | 12:1 | 85% | 1.93 x 10 ⁻⁷ | ✘ |
| P20-15 | P20-15A | P20-15AR | 15:1 | 84% | 1.85 x 10 ⁻⁷ | ✘ |
| P20-20 | P20-20A | P20-20AR | 20:1 | 78% | 1.78 x 10 ⁻⁷ | ✘ |
| P20-30 | P20-30A | P20-30AR | 30:1 | 71% | 1.74 x 10 ⁻⁷ | ✘ |
| P20-60 | P20-60A | P20-60AR | 60:1 | 60% | 1.71 x 10 ⁻⁷ | ✓ |
| P20-120 | P20-120A | P20-120AR | 120:1 | 32% | 1.50 x 10 ⁻⁷ | ✓ |
| P20-SP | P20-SPA | P20-SPAR | 5:1-120:1 | Special Ratios : Replace SP with required ratio | | |

Accessories

| | |
|--------|----------------------|
| P20-X | Single Output Shafts |
| P20-DX | Double Output Shafts |
| KK2-20 | Output Key |

Weight: 0.18 kg. Greased for Life: Shell Gadus S5 V42P 2.5.
 F_{xb} at 1000 Rpm: 6 kg. F_{xa} at 1000 Rpm: 12 kg. F_a at 1000 Rpm: 5 kg.

Input Shaft Modifications:

Smaller Diameter, Mill Keyway/Flat, Shorten Shaft Length.
 Circlip Groove, Pin Hole.

Testing in your application is necessary.
 You will need to assess duty cycles and confirm suitability with your own calculations.
 All figures listed are to be used for guidance only.

Output Torque Nm

| Rpm Input | Reduction Ratio | | | | | | |
|--------------|-----------------|------|------|------|------|------|-------|
| | 10:1 | 12:1 | 15:1 | 20:1 | 30:1 | 60:1 | 120:1 |
| 3000 | 1.40 | 1.50 | 1.60 | 1.70 | 1.90 | 2.10 | 1.25 |
| 2000 | 1.70 | 1.70 | 1.80 | 1.80 | 2.10 | 2.40 | 1.42 |
| 1000 | 2.10 | 2.30 | 2.30 | 2.50 | 2.70 | 2.90 | 1.70 |
| 500 | 2.70 | 2.70 | 2.80 | 2.90 | 3.20 | 3.50 | 1.94 |
| 200 | 3.40 | 3.50 | 3.50 | 3.70 | 3.90 | 4.10 | 2.27 |
| 100 | 3.90 | 3.90 | 4.10 | 4.20 | 4.30 | 4.50 | 2.55 |
| 50 | 4.40 | 4.50 | 4.50 | 4.60 | 4.70 | 4.80 | 2.72 |
| 10 | 4.80 | 4.80 | 4.90 | 4.90 | 5.00 | 5.00 | 2.72 |

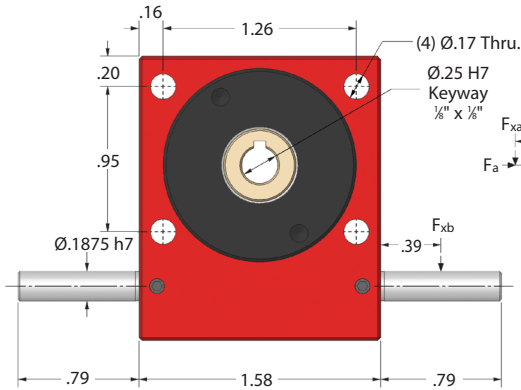
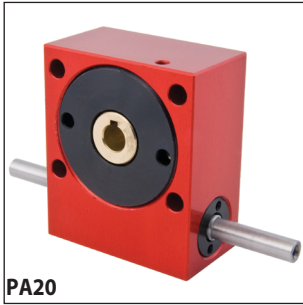
GEARBOXES

Precision Worm Gear Reducers

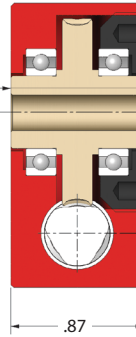
Shaft Input 11.1 – 44.3 lbf.in **5:1 - 120:1**

e-cad
Drawings
Available

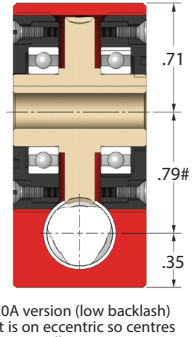
PA20



PA20



PA20-A



| Standard ≤30' | Part Number Low Backlash ≤8' | Red. Backlash ≤4' | Ratio | Efficiency at 1000 Rpm | Reflected Inertia at Input (lb.in ²) | Self Locking Output |
|------------------|------------------------------------|----------------------|-----------|---|--|---------------------------|
| PA20-10 | PA20-10A | PA20-10AR | 10:1 | 86% | 6.94×10^{-4} | ✗ |
| PA20-12 | PA20-12A | PA20-12AR | 12:1 | 85% | 6.60×10^{-4} | ✗ |
| PA20-15 | PA20-15A | PA20-15AR | 15:1 | 84% | 6.32×10^{-4} | ✗ |
| PA20-20 | PA20-20A | PA20-20AR | 20:1 | 78% | 6.08×10^{-4} | ✗ |
| PA20-30 | PA20-30A | PA20-30AR | 30:1 | 71% | 5.95×10^{-4} | ✗ |
| PA20-60 | PA20-60A | PA20-60AR | 60:1 | 60% | 5.84×10^{-4} | ✓ |
| PA20-120 | PA20-120A | PA20-120AR | 120:1 | 32% | 5.13×10^{-4} | ✓ |
| PA20-SP | PA20-SPA | PA20-SPAR | 5:1-120:1 | Special Ratios : Replace SP with required ratio | | |

Weight: 0.40 lb. Greased for Life: Shell Gadus S5 V42P 2.5.
 F_b at 1000 Rpm: 13.23 lb. F_{xa} at 1000 Rpm: 26.46 lb. F_a at 1000 Rpm: 11.02 lb.

Input Shaft Modifications:

Smaller Diameter, Mill Keyway/Flat, Shorten Shaft Length.
 Circlip Groove, Pin Hole.

Testing in your application is necessary.
 You will need to assess duty cycles and confirm suitability with your own calculations.
 All figures listed are to be used for guidance only.

Output Torque lbf.in

| Rpm | Reduction Ratio | | | | | | |
|-------|-----------------|------|------|------|------|------|-------|
| Input | 10:1 | 12:1 | 15:1 | 20:1 | 30:1 | 60:1 | 120:1 |
| 3000 | 12.4 | 13.3 | 14.2 | 15.0 | 16.8 | 18.6 | 11.1 |
| 2000 | 15.0 | 15.0 | 15.9 | 15.9 | 18.6 | 21.2 | 12.6 |
| 1000 | 18.6 | 20.4 | 20.4 | 22.1 | 23.9 | 25.7 | 15.0 |
| 500 | 23.9 | 23.9 | 24.8 | 25.7 | 28.3 | 31.0 | 17.2 |
| 200 | 30.1 | 31.0 | 31.0 | 32.7 | 34.5 | 36.3 | 20.1 |
| 100 | 34.5 | 34.5 | 36.3 | 37.2 | 38.1 | 39.8 | 22.6 |
| 50 | 38.9 | 39.8 | 39.8 | 40.7 | 41.6 | 42.5 | 24.1 |
| 10 | 42.5 | 42.5 | 43.4 | 43.4 | 44.3 | 44.3 | 24.1 |

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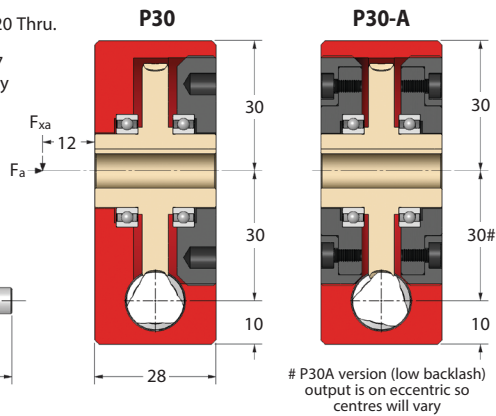
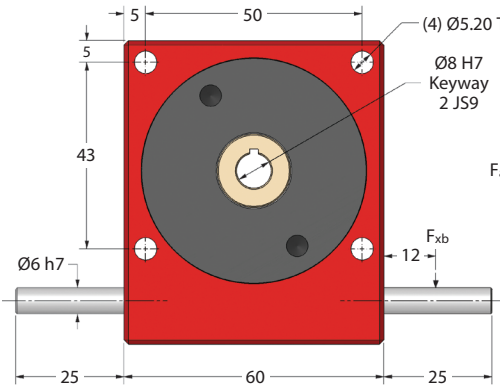
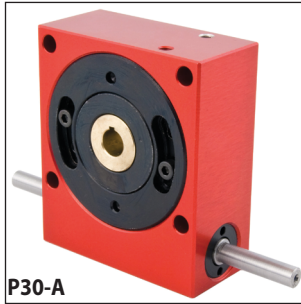
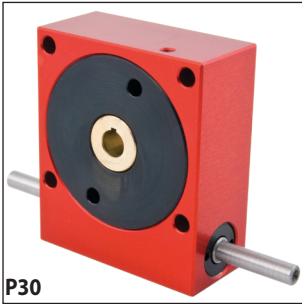
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P30**e-cad**
Drawings
Available

GEARBOXES

Precision Worm Gear Reducers

Shaft Input 2.5 – 8.8 Nm **5:1 - 120:1**

P30A version (low backlash) output is on eccentric so centres will vary

| Standard ≤30' | Part Number | Low Backlash ≤8' | Red. Backlash ≤4' | Ratio | Efficiency at 1000 Rpm | Reflected Inertia at Input (kg.m ²) | Self Locking Output |
|---------------|-------------|------------------|-------------------|---|-------------------------|---|---------------------|
| P30-10 | P30-10A | P30-10AR | 10:1 | 90% | 8.43 x 10 ⁻⁷ | ✗ | |
| P30-12 | P30-12A | P30-12AR | 12:1 | 88% | 7.55 x 10 ⁻⁷ | ✗ | |
| P30-15 | P30-15A | P30-15AR | 15:1 | 86% | 6.92 x 10 ⁻⁷ | ✗ | |
| P30-20 | P30-20A | P30-20AR | 20:1 | 84% | 6.43 x 10 ⁻⁷ | ✗ | |
| P30-30 | P30-30A | P30-30AR | 30:1 | 78% | 6.08 x 10 ⁻⁷ | ✗ | |
| P30-60 | P30-60A | P30-60AR | 60:1 | 70% | 5.87 x 10 ⁻⁷ | ✓ | |
| P30-120 | P30-120A | P30-120AR | 120:1 | 40% | 5.72 x 10 ⁻⁷ | ✓ | |
| P30-SP | P30-SPA | P30-SPAR | 5:1-120:1 | Special Ratios : Replace SP with required ratio | | | |

Accessories

- P30-X Single Output Shafts
- P30-DX Double Output Shafts
- KK2-20 Output Key

Weight: 0.48 kg. Greased for Life: Shell Gadus S5 V42P 2.5.
 F_{xb} at 1000 Rpm: 8 kg. F_{xa} at 1000 Rpm: 20 kg. F_a at 1000 Rpm: 12 kg.

Input Shaft Modifications:

Smaller Diameter, Mill Keyway/Flat, Shorten Shaft Length.
 Circip Groove, Pin Hole.

Testing in your application is necessary.
 You will need to assess duty cycles and confirm suitability with your own calculations.
 All figures listed are to be used for guidance only.

Output Torque Nm

| Rpm Input | Reduction Ratio | | | | | | |
|-----------|-----------------|------|------|------|------|------|-------|
| | 10:1 | 12:1 | 15:1 | 20:1 | 30:1 | 60:1 | 120:1 |
| 3000 | 2.5 | 2.5 | 2.6 | 2.7 | 3.0 | 3.5 | 3.4 |
| 2000 | 2.8 | 2.9 | 3.0 | 3.2 | 3.6 | 4.1 | 3.7 |
| 1000 | 3.5 | 3.7 | 4.0 | 4.2 | 4.5 | 5.0 | 4.6 |
| 500 | 4.6 | 4.7 | 4.9 | 5.1 | 5.3 | 5.8 | 5.4 |
| 200 | 5.4 | 5.6 | 5.7 | 5.9 | 6.2 | 6.6 | 6.4 |
| 100 | 6.0 | 6.0 | 6.5 | 6.5 | 7.0 | 7.5 | 6.7 |
| 50 | 7.5 | 7.8 | 8.0 | 8.3 | 8.3 | 8.6 | 6.7 |
| 10 | 8.0 | 8.0 | 8.3 | 8.5 | 8.5 | 8.8 | 6.7 |

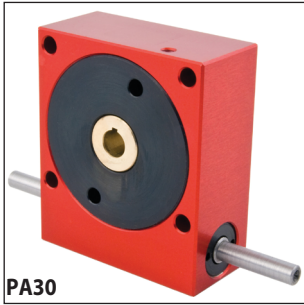
GEARBOXES

Precision Worm Gear Reducers

Shaft Input 22.1 – 77.9 lbf.in **5:1 - 120:1**

e-cad
Drawings
Available

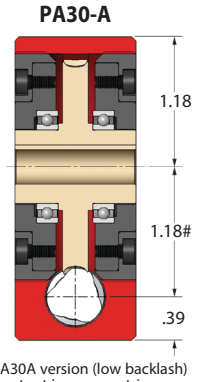
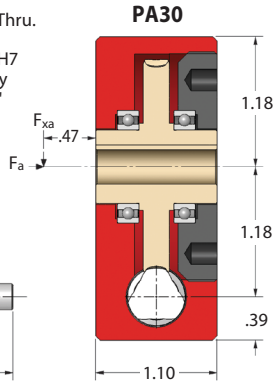
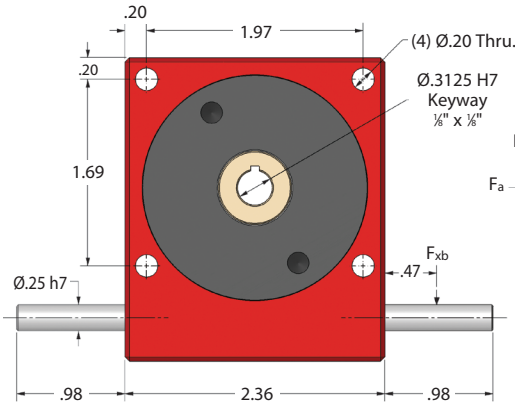
PA30



PA30



PA30-A



PA30A version (low backlash) output is on eccentric so centres will vary

| Standard ≤30' | Part Number | Low Backlash ≤8' | Red. Backlash ≤4' | Ratio | Efficiency at 1000 Rpm | Reflected Inertia at Input (lb.in ²) | Self Locking Output |
|---------------|-------------|------------------|-------------------|-----------|---|--|---------------------|
| PA30-10 | PA30-10A | PA30-10AR | | 10:1 | 90% | 2.88 x 10 ⁻³ | ✗ |
| PA30-12 | PA30-12A | PA30-12AR | | 12:1 | 88% | 2.58 x 10 ⁻³ | ✗ |
| PA30-15 | PA30-15A | PA30-15AR | | 15:1 | 86% | 2.36 x 10 ⁻³ | ✗ |
| PA30-20 | PA30-20A | PA30-20AR | | 20:1 | 84% | 2.20 x 10 ⁻³ | ✗ |
| PA30-30 | PA30-30A | PA30-30AR | | 30:1 | 78% | 2.08 x 10 ⁻³ | ✗ |
| PA30-60 | PA30-60A | PA30-60AR | | 60:1 | 70% | 2.01 x 10 ⁻³ | ✓ |
| PA30-120 | PA30-120A | PA30-120AR | | 120:1 | 40% | 1.95 x 10 ⁻³ | ✓ |
| PA30-SP | PA30-SPA | PA30-SPAR | | 5:1-120:1 | Special Ratios : Replace SP with required ratio | | |

Weight: 1.06 lb. Greased for Life: Shell Gadus S5 V42P 2.5.

F_{ib} at 1000 Rpm: 17.64 lb. F_{ia} at 1000 Rpm: 44.09 lb. F_a at 1000 Rpm: 26.46 lb.

Input Shaft Modifications:

Smaller Diameter, Mill Keyway/Flat, Shorten Shaft Length.
Circlip Groove, Pin Hole.

Testing in your application is necessary.

You will need to assess duty cycles and confirm suitability with your own calculations.

All figures listed are to be used for guidance only.

Output Torque lbf.in

| Rpm | Reduction Ratio | | | | | | |
|-------|-----------------|------|------|------|------|------|-------|
| Input | 10:1 | 12:1 | 15:1 | 20:1 | 30:1 | 60:1 | 120:1 |
| 3000 | 22.1 | 22.1 | 23.0 | 23.9 | 26.6 | 31.0 | 30.1 |
| 2000 | 24.8 | 25.7 | 26.6 | 28.3 | 31.9 | 36.3 | 32.7 |
| 1000 | 31.0 | 32.7 | 35.4 | 37.2 | 39.8 | 44.3 | 40.7 |
| 500 | 40.7 | 41.6 | 43.4 | 45.1 | 46.9 | 51.3 | 47.8 |
| 200 | 47.8 | 49.6 | 50.4 | 52.2 | 54.9 | 58.4 | 56.6 |
| 100 | 53.1 | 53.1 | 57.5 | 57.5 | 62.0 | 66.4 | 59.3 |
| 50 | 66.4 | 69.0 | 70.8 | 73.5 | 73.5 | 76.1 | 59.3 |
| 10 | 70.8 | 70.8 | 73.5 | 75.2 | 75.2 | 77.9 | 59.3 |

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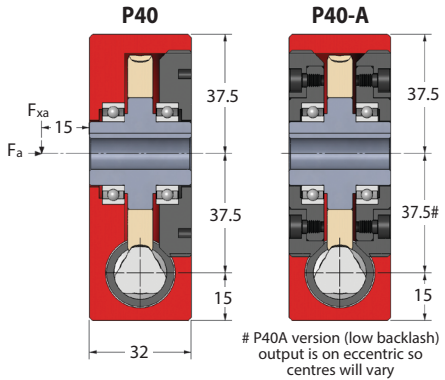
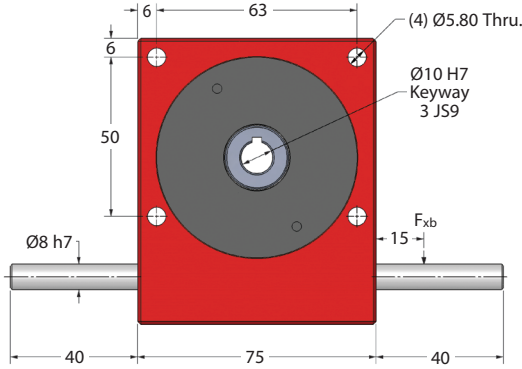
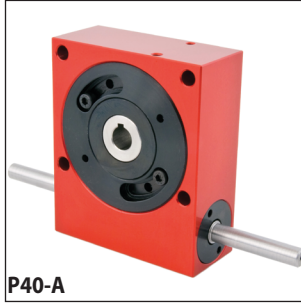
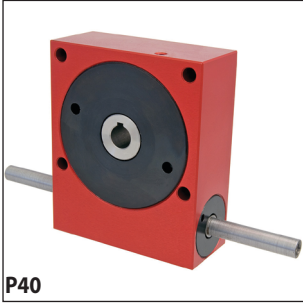
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P40**e-cad**
Drawings
Available

GEARBOXES

Precision Worm Gear Reducers

Shaft Input 5 – 18 Nm **5:1 - 120:1**

| Standard ≤30' | Part Number Low Backlash ≤8' | Red. Backlash ≤4' | Ratio | Efficiency at 1000 Rpm | Reflected Inertia at Input (kg.m ²) | Self Locking Output |
|------------------|------------------------------------|----------------------|-----------|---|---|---------------------------|
| P40-10 | P40-10A | P40-10AR | 10:1 | 89% | 2.94 x 10 ⁻⁶ | ✗ |
| P40-12 | P40-12A | P40-12AR | 12:1 | 87% | 2.69 x 10 ⁻⁶ | ✗ |
| P40-15 | P40-15A | P40-15AR | 15:1 | 85% | 2.49 x 10 ⁻⁶ | ✗ |
| P40-20 | P40-20A | P40-20AR | 20:1 | 83% | 2.33 x 10 ⁻⁶ | ✗ |
| P40-30 | P40-30A | P40-30AR | 30:1 | 76% | 2.22 x 10 ⁻⁶ | ✗ |
| P40-60 | P40-60A | P40-60AR | 60:1 | 65% | 2.15 x 10 ⁻⁶ | ✓ |
| P40-120 | P40-120A | P40-120AR | 120:1 | 41% | 2.10 x 10 ⁻⁶ | ✓ |
| P40-SP | P40-SPA | P40-SPAR | 5:1-120:1 | Special Ratios : Replace SP with required ratio | | |

Accessories

| | |
|--------|----------------------|
| P40-X | Single Output Shafts |
| P40-DX | Double Output Shafts |
| KK3-20 | Output Key |

Weight: 0.92 kg. Greased for Life: Shell Gadus S5 V42P 2.5.
 F_{xb} at 1000 Rpm: 10 kg. F_{xa} at 1000 Rpm: 30 kg. F_a at 1000 Rpm: 20 kg.

Input Shaft Modifications:

Smaller Diameter, Mill Keyway/Flat, Shorten Shaft Length.
 Circip Groove, Pin Hole.

Testing in your application is necessary.
 You will need to assess duty cycles and confirm suitability with your own calculations.
 All figures listed are to be used for guidance only.

Output Torque Nm

| Rpm Input | Reduction Ratio | | | | | | |
|--------------|-----------------|------|------|------|------|------|-------|
| | 10:1 | 12:1 | 15:1 | 20:1 | 30:1 | 60:1 | 120:1 |
| 3000 | 5.0 | 5.2 | 5.4 | 5.6 | 6.4 | 7.2 | 6.5 |
| 2000 | 5.5 | 5.8 | 6.2 | 6.6 | 7.3 | 8.0 | 7.2 |
| 1000 | 7.1 | 7.5 | 8.0 | 8.2 | 9.0 | 10.0 | 8.7 |
| 500 | 8.9 | 9.1 | 9.6 | 10.0 | 10.5 | 11.4 | 10.2 |
| 200 | 11.6 | 11.9 | 12.3 | 12.5 | 13.5 | 14.2 | 11.7 |
| 100 | 13.4 | 13.6 | 14.1 | 14.6 | 15.3 | 16.0 | 12.3 |
| 50 | 15.1 | 15.5 | 16.2 | 16.4 | 17.3 | 17.6 | 12.3 |
| 10 | 17.6 | 17.6 | 17.6 | 17.7 | 17.8 | 18.0 | 12.3 |

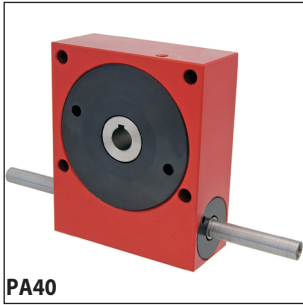
GEARBOXES

Precision Worm Gear Reducers

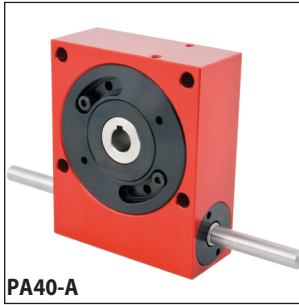
Shaft Input 44.3 – 159.3 lbf.in **5:1 - 120:1**

e-cad
Drawings
Available

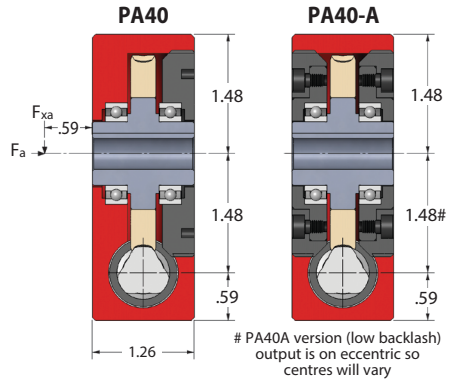
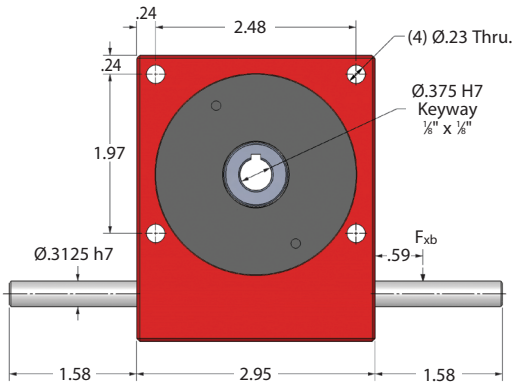
PA40



PA40



PA40-A



| Standard $\leq 30'$ | Part Number Low Backlash $\leq 8'$ | Red. Backlash $\leq 4'$ | Ratio | Efficiency at 1000 Rpm | Reflected Inertia at Input (lb.in ²) | Self Locking Output |
|---------------------|---------------------------------------|-------------------------|-----------|---|--|---------------------|
| PA40-10 | PA40-10A | PA40-10AR | 10:1 | 89% | 1.00×10^{-2} | ✗ |
| PA40-12 | PA40-12A | PA40-12AR | 12:1 | 87% | 9.19×10^{-3} | ✗ |
| PA40-15 | PA40-15A | PA40-15AR | 15:1 | 85% | 8.51×10^{-3} | ✗ |
| PA40-20 | PA40-20A | PA40-20AR | 20:1 | 83% | 7.96×10^{-3} | ✗ |
| PA40-30 | PA40-30A | PA40-30AR | 30:1 | 76% | 7.59×10^{-3} | ✗ |
| PA40-60 | PA40-60A | PA40-60AR | 60:1 | 65% | 7.35×10^{-3} | ✓ |
| PA40-120 | PA40-120A | PA40-120AR | 120:1 | 41% | 7.18×10^{-3} | ✓ |
| PA40-SP | PA40-SPA | PA40-SPAR | 5:1-120:1 | Special Ratios : Replace SP with required ratio | | |

Weight: 2.03 lb. Greased for Life: Shell Gadus S5 V42P 2.5.
 F_{xb} at 1000 Rpm: 22.05 lb. F_{xa} at 1000 Rpm: 66.14 lb. F_a at 1000 Rpm: 44.09 lb.

Input Shaft Modifications:

Smaller Diameter, Mill Keyway/Flat, Shorten Shaft Length.
 Circlip Groove, Pin Hole.

Testing in your application is necessary.
 You will need to assess duty cycles and confirm suitability with your own calculations.
 All figures listed are to be used for guidance only.

Output Torque lbf.in

| Rpm | Reduction Ratio | | | | | | |
|-------|-----------------|-------|-------|-------|-------|-------|-------|
| Input | 10:1 | 12:1 | 15:1 | 20:1 | 30:1 | 60:1 | 120:1 |
| 3000 | 44.3 | 46.0 | 47.8 | 49.6 | 56.6 | 63.7 | 57.5 |
| 2000 | 48.7 | 51.3 | 54.9 | 58.4 | 64.6 | 70.8 | 63.7 |
| 1000 | 62.8 | 66.4 | 70.8 | 72.6 | 79.7 | 88.5 | 77.0 |
| 500 | 78.8 | 80.5 | 85.0 | 88.5 | 92.9 | 100.9 | 90.3 |
| 200 | 102.7 | 105.3 | 108.9 | 110.6 | 119.5 | 125.7 | 103.6 |
| 100 | 118.6 | 120.4 | 124.8 | 129.2 | 135.4 | 141.6 | 108.9 |
| 50 | 133.6 | 137.2 | 143.4 | 145.2 | 153.1 | 155.8 | 108.9 |
| 10 | 155.8 | 155.8 | 155.8 | 156.7 | 157.5 | 159.3 | 108.9 |

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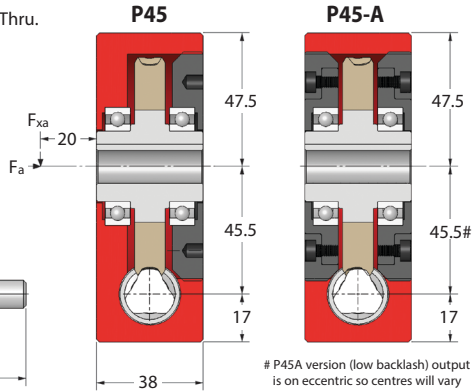
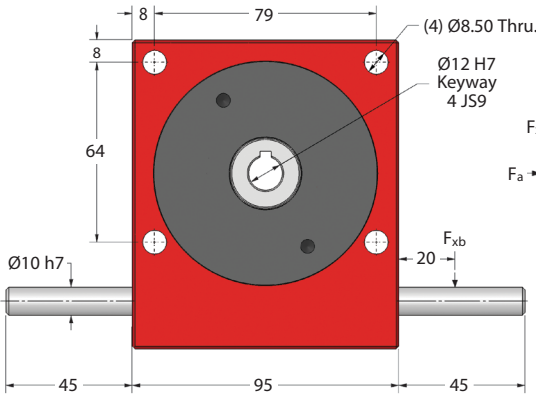
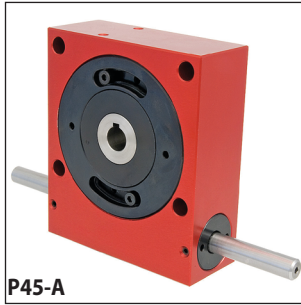
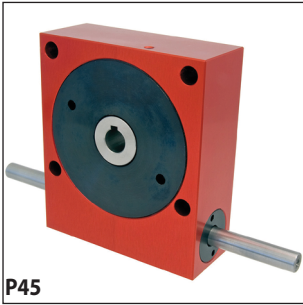
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P45**e-cad**
Drawings
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GEARBOXES

Precision Worm Gear Reducers

Shaft Input 10.3 – 40 Nm **5:1 - 120:1**

| Standard ≤30' | Part Number Low Backlash ≤8' | Part Number Red. Backlash ≤4' | Ratio | Efficiency at 1000 Rpm | Reflected Inertia at Input (kg.m ²) | Self Locking Output |
|------------------|------------------------------------|-------------------------------------|-----------|---|---|---------------------------|
| P45-10 | P45-10A | P45-10AR | 10:1 | 90% | 6.15 x 10 ⁻⁶ | ✘ |
| P45-12 | P45-12A | P45-12AR | 12:1 | 89% | 5.32 x 10 ⁻⁶ | ✘ |
| P45-15 | P45-15A | P45-15AR | 15:1 | 86% | 4.64 x 10 ⁻⁶ | ✘ |
| P45-20 | P45-20A | P45-20AR | 20:1 | 85% | 4.11 x 10 ⁻⁶ | ✘ |
| P45-30 | P45-30A | P45-30AR | 30:1 | 78% | 3.73 x 10 ⁻⁶ | ✘ |
| P45-60 | P45-60A | P45-60AR | 60:1 | 67% | 3.51 x 10 ⁻⁶ | ✓ |
| P45-120 | P45-120A | P45-120AR | 120:1 | 47% | 2.88 x 10 ⁻⁶ | ✓ |
| P45-SP | P45-SPA | P45-SPAR | 5:1-120:1 | Special Ratios : Replace SP with required ratio | | |

Accessories

| | |
|--------|----------------------|
| P45-X | Single Output Shafts |
| P45-DX | Double Output Shafts |
| KK4-25 | Output Key |

Weight: 1.70 kg. Greased for Life: Shell Gadus S5 V42P 2.5.
 F_{xb} at 1000 Rpm: 12 kg. F_{xa} at 1000 Rpm: 45 kg. F_a at 1000 Rpm: 30 kg.

Input Shaft Modifications:

Smaller Diameter, Mill Keyway/Flat, Shorten Shaft Length.
 Circlip Groove, Pin Hole.

Testing in your application is necessary.
 You will need to assess duty cycles and confirm suitability with your own calculations.
 All figures listed are to be used for guidance only.

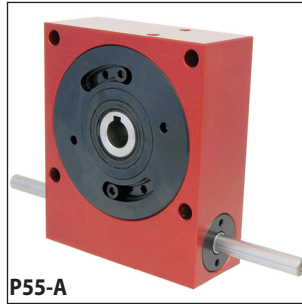
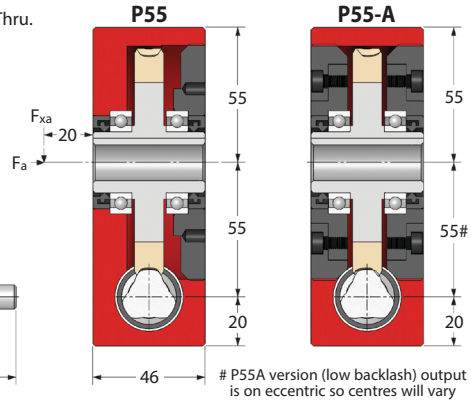
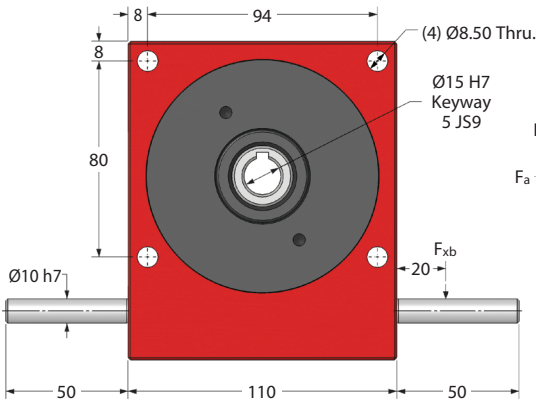
Output Torque Nm

| Rpm Input | Reduction Ratio | | | | | | |
|--------------|-----------------|------|------|------|------|------|-------|
| | 10:1 | 12:1 | 15:1 | 20:1 | 30:1 | 60:1 | 120:1 |
| 3000 | 10.3 | 10.8 | 11.3 | 12.2 | 13.2 | 14.7 | 10.8 |
| 2000 | 11.7 | 12.2 | 12.7 | 13.2 | 14.7 | 17.1 | 12.7 |
| 1000 | 14.7 | 15.2 | 16.2 | 17.1 | 18.1 | 20.6 | 14.3 |
| 500 | 19.1 | 19.6 | 20.6 | 21.6 | 22.5 | 24.5 | 17.5 |
| 200 | 24.4 | 25.5 | 26.4 | 27.0 | 28.9 | 30.0 | 20.6 |
| 100 | 28.3 | 28.9 | 29.4 | 30.3 | 31.8 | 33.8 | 22.8 |
| 50 | 32.3 | 32.8 | 33.8 | 34.3 | 34.5 | 35.2 | 23.0 |
| 10 | 39.9 | 39.9 | 39.9 | 40.0 | 40.0 | 40.0 | 23.0 |

P55**e-cad**
Drawings
Available

GEARBOXES

Precision Worm Gear Reducers

Shaft Input 13.4 – 57 Nm **5:1 - 120:1****P55****P55-A**

| Standard ≤30' | Part Number Low Backlash ≤8' | Red. Backlash ≤4' | Ratio | Efficiency at 1000 Rpm | Reflected Inertia at Input (kg.m ²) | Self Locking Output |
|------------------|------------------------------------|----------------------|-----------|---|---|---------------------------|
| P55-10 | P55-10A | P55-10AR | 10:1 | 89% | 1.35 x 10 ⁻⁵ | ✘ |
| P55-12 | P55-12A | P55-12AR | 12:1 | 88% | 1.13 x 10 ⁻⁵ | ✘ |
| P55-15 | P55-15A | P55-15AR | 15:1 | 86% | 9.81 x 10 ⁻⁶ | ✘ |
| P55-20 | P55-20A | P55-20AR | 20:1 | 84% | 8.63 x 10 ⁻⁶ | ✘ |
| P55-30 | P55-30A | P55-30AR | 30:1 | 78% | 7.79 x 10 ⁻⁶ | ✘ |
| P55-60 | P55-60A | P55-60AR | 60:1 | 69% | 7.23 x 10 ⁻⁶ | ✓ |
| P55-120 | P55-120A | P55-120AR | 120:1 | 47% | 7.04 x 10 ⁻⁶ | ✓ |
| P55-SP | P55-SPA | P55-SPAR | 5:1-120:1 | Special Ratios : Replace SP with required ratio | | |

Accessories

| | |
|--------|----------------------|
| P55-X | Single Output Shafts |
| P55-DX | Double Output Shafts |
| KK5-30 | Output Key |

Weight: 2.40 kg. Greased for Life: Shell Gadus S5 V42P 2.5.
 F_{xb} at 1000 Rpm: 14 kg. F_{xa} at 1000 Rpm: 60 kg. F_a at 1000 Rpm: 40 kg.

Input Shaft Modifications:

Smaller Diameter, Mill Keyway/Flat, Shorten Shaft Length.
 Circlip Groove, Pin Hole.

Testing in your application is necessary.
 You will need to assess duty cycles and confirm suitability with your own calculations.
 All figures listed are to be used for guidance only.

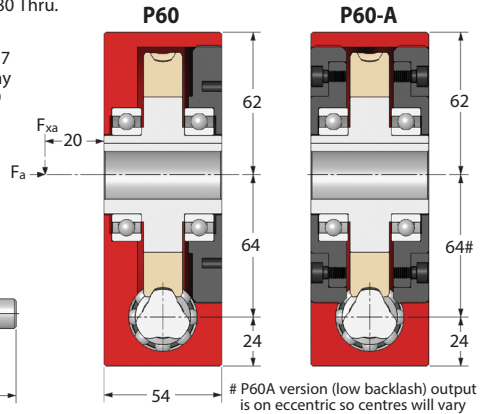
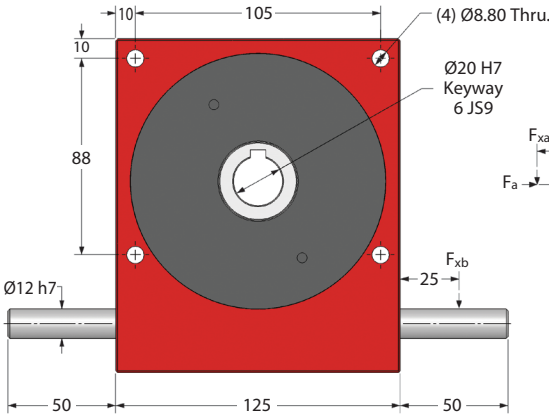
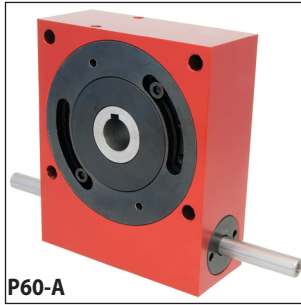
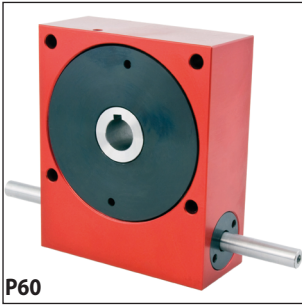
Output Torque Nm

| Rpm Input | Reduction Ratio | | | | | | |
|--------------|-----------------|------|------|------|------|------|-------|
| | 10:1 | 12:1 | 15:1 | 20:1 | 30:1 | 60:1 | 120:1 |
| 3000 | 13.4 | 14.0 | 14.8 | 16.2 | 17.6 | 20.4 | 18.0 |
| 2000 | 16.2 | 16.9 | 18.3 | 19.1 | 20.4 | 23.9 | 20.0 |
| 1000 | 21.1 | 22.5 | 23.2 | 24.6 | 25.3 | 28.8 | 25.0 |
| 500 | 27.4 | 28.1 | 28.8 | 30.2 | 31.6 | 35.1 | 30.0 |
| 200 | 34.4 | 35.1 | 36.5 | 37.9 | 39.3 | 42.1 | 36.0 |
| 100 | 40.0 | 41.4 | 42.1 | 42.8 | 44.9 | 46.3 | 38.0 |
| 50 | 45.6 | 46.3 | 47.7 | 48.4 | 49.8 | 50.5 | 38.0 |
| 10 | 56.8 | 56.8 | 56.8 | 57.0 | 57.0 | 57.0 | 38.0 |

P60**e-cad**
Drawings
Available

GEARBOXES

Precision Worm Gear Reducers

Shaft Input 30 – 118 Nm **5:1 - 120:1**

| Standard ≤30' | Part Number Low Backlash ≤8' | Red. Backlash ≤4' | Ratio | Efficiency at 1000 Rpm | Reflected Inertia at Input (kg.m ²) | Self Locking Output |
|------------------|------------------------------------|----------------------|-----------|---|---|---------------------------|
| P60-10 | P60-10A | P60-10AR | 10:1 | 90% | 2.93×10^{-5} | ✘ |
| P60-12 | P60-12A | P60-12AR | 12:1 | 89% | 2.46×10^{-5} | ✘ |
| P60-15 | P60-15A | P60-15AR | 15:1 | 85% | 2.08×10^{-5} | ✘ |
| P60-20 | P60-20A | P60-20AR | 20:1 | 85% | 1.78×10^{-5} | ✘ |
| P60-30 | P60-30A | P60-30AR | 30:1 | 78% | 1.57×10^{-5} | ✘ |
| P60-60 | P60-60A | P60-60AR | 60:1 | 68% | 1.44×10^{-5} | ✓ |
| P60-120 | P60-120A | P60-120AR | 120:1 | 45% | 9.54×10^{-6} | ✓ |
| P60-SP | P60-SPA | P60-SPAR | 5:1-120:1 | Special Ratios : Replace SP with required ratio | | |

Accessories

| | |
|--------|----------------------|
| P60-X | Single Output Shafts |
| P60-DX | Double Output Shafts |
| KK6-30 | Output Key |

Weight: 4.10 kg. Greased for Life: Shell Gadus S5 V42P 2.5.
 F_{xb} at 1000 Rpm: 16 kg. F_{xa} at 1000 Rpm: 70 kg. F_a at 1000 Rpm: 50 kg.

Input Shaft Modifications:

Smaller Diameter, Mill Keyway/Flat, Shorten Shaft Length.
 Circlip Groove, Pin Hole.

Testing in your application is necessary.
 You will need to assess duty cycles and confirm suitability with your own calculations.
 All figures listed are to be used for guidance only.

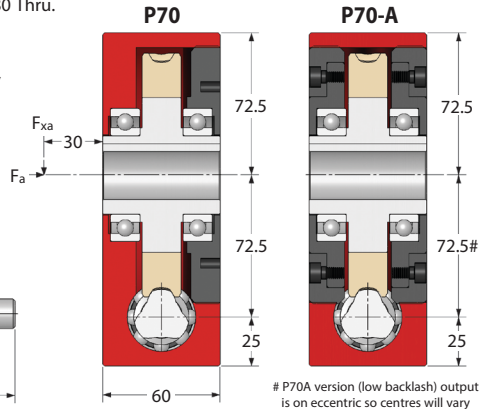
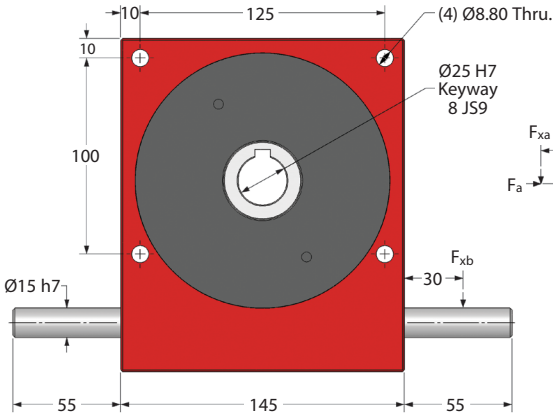
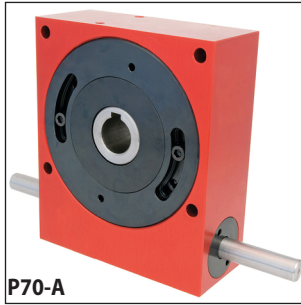
Output Torque Nm

| Rpm Input | Reduction Ratio | | | | | | |
|--------------|-----------------|------|------|------|------|------|-------|
| | 10:1 | 12:1 | 15:1 | 20:1 | 30:1 | 60:1 | 120:1 |
| 3000 | 30 | 31 | 33 | 35 | 38 | 44 | 27 |
| 2000 | 33 | 36 | 39 | 41 | 44 | 50 | 32 |
| 1000 | 45 | 47 | 50 | 54 | 58 | 64 | 39 |
| 500 | 58 | 60 | 62 | 65 | 69 | 73 | 47 |
| 200 | 77 | 78 | 80 | 84 | 88 | 94 | 55 |
| 100 | 88 | 89 | 91 | 94 | 97 | 105 | 61 |
| 50 | 100 | 102 | 104 | 105 | 107 | 110 | 66 |
| 10 | 113 | 114 | 115 | 116 | 116 | 118 | 66 |

P70**e-cad**
Drawings
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GEARBOXES

Precision Worm Gear Reducers

Shaft Input 38 – 164 Nm **5:1 - 120:1**

| Standard ≤30' | Part Number Low Backlash ≤8' | Red. Backlash ≤4' | Ratio | Efficiency at 1000 Rpm | Reflected Inertia at Input (kg.m ²) | Self Locking Output |
|------------------|------------------------------------|----------------------|-----------|---|---|---------------------------|
| P70-10 | P70-10A | P70-10AR | 10:1 | 90% | 6.04×10^{-5} | ✘ |
| P70-12 | P70-12A | P70-12AR | 12:1 | 89% | 5.03×10^{-5} | ✘ |
| P70-15 | P70-15A | P70-15AR | 15:1 | 86% | 4.21×10^{-5} | ✘ |
| P70-20 | P70-20A | P70-20AR | 20:1 | 85% | 3.57×10^{-5} | ✘ |
| P70-30 | P70-30A | P70-30AR | 30:1 | 78% | 3.11×10^{-5} | ✘ |
| P70-60 | P70-60A | P70-60AR | 60:1 | 67% | 2.84×10^{-5} | ✓ |
| P70-120 | P70-120A | P70-120AR | 120:1 | 50% | 2.48×10^{-5} | ✓ |
| P70-SP | P70-SPA | P70-SPAR | 5:1-120:1 | Special Ratios : Replace SP with required ratio | | |

Accessories

| | |
|----------|----------------------|
| P70-X | Single Output Shafts |
| P70-DX | Double Output Shafts |
| KK8-7-40 | Output Key |

Weight: 6.40 kg. Greased for Life: Shell Gadus S5 V42P 2.5.
 F_{xb} at 1000 Rpm: 20 kg. F_{xa} at 1000 Rpm: 80 kg. F_a at 1000 Rpm: 60 kg.

Input Shaft Modifications:

Smaller Diameter, Mill Keyway/Flat, Shorten Shaft Length.
 Circip Groove, Pin Hole.

Testing in your application is necessary.
 You will need to assess duty cycles and confirm suitability with your own calculations.
 All figures listed are to be used for guidance only.

Output Torque Nm

| Rpm Input | Reduction Ratio | | | | | | |
|--------------|-----------------|------|------|------|------|------|-------|
| | 10:1 | 12:1 | 15:1 | 20:1 | 30:1 | 60:1 | 120:1 |
| 3000 | 38 | 40 | 42 | 45 | 50 | 56 | 38 |
| 2000 | 47 | 49 | 53 | 55 | 61 | 69 | 46 |
| 1000 | 61 | 65 | 67 | 71 | 73 | 83 | 55 |
| 500 | 77 | 81 | 83 | 87 | 91 | 100 | 66 |
| 200 | 99 | 101 | 105 | 107 | 113 | 121 | 77 |
| 100 | 115 | 119 | 121 | 123 | 129 | 133 | 86 |
| 50 | 129 | 133 | 137 | 139 | 144 | 146 | 90 |
| 10 | 160 | 160 | 160 | 164 | 164 | 164 | 90 |

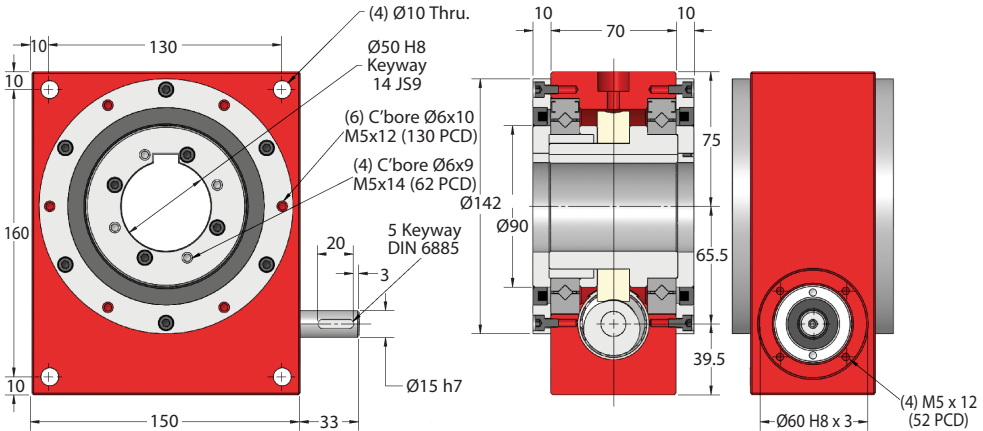
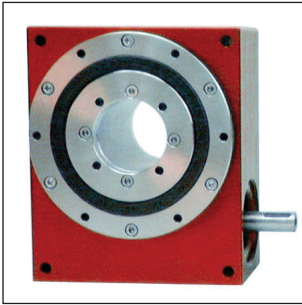
P80

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Drawings
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GEARBOXES

Precision Worm Wheel Drive

Crossed Roller Design



| Part Number | Ratio | Helix Angle | No. of Starts On Worm | Max. Input Speed Rpm | Max. Output Speed Rpm | Efficiency at 1000 Rpm Input | Self Locking Output | Backlash at Output Arc/min |
|-------------|-------|-------------|-----------------------|----------------------|-----------------------|------------------------------|---------------------|----------------------------|
| P80-50A | 50:1 | 3°42' | 1 | 1800 | 36 | 62% | ✓ | ≤6' |

| Part Number | Complete Assemblies: Description |
|-------------|----------------------------------|
|-------------|----------------------------------|

P80-STEP-ASSY

Includes Adapter Plate for NEMA34
MJT-40C-RD-12.7x15 Coupling and fixing screws

Material

Casing: Aluminum.

WormTeeth: Induction hardened. 50 HRC ground.

Wheel: Aluminum Bronze (≤6 arc/min backlash).

Bearings: Output: Crossed rollers (Precision). Input: Tapered rollers.

Gearbox filled with grease.

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GEARBOXES

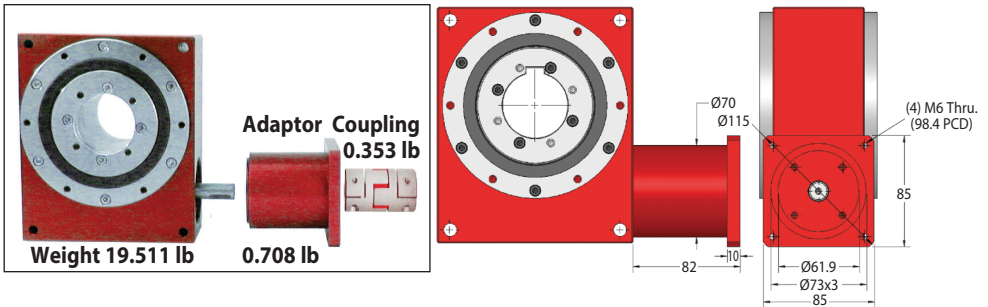
Precision Worm Wheel Drive

Crossed Roller Design

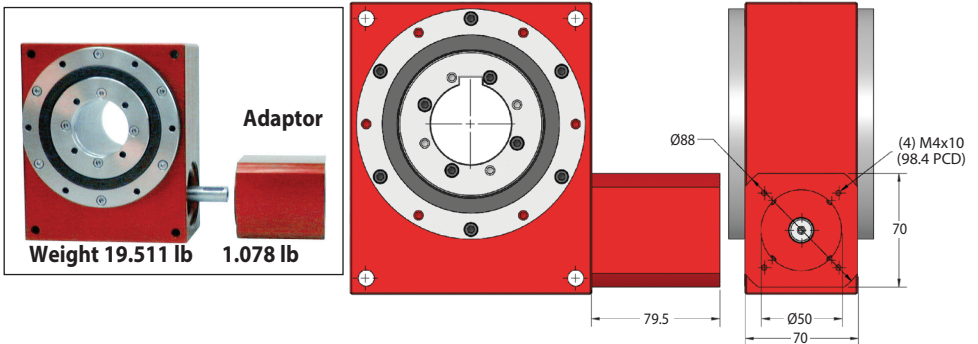
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P80

P80-STEP-ASSY



P80-SERVO-ASSY



Gearbox Torque Table

| Input Speed Rpm | Allowable Torque at Output (lbf-in) |
|--------------------|--|
| 30 | 1013.1 |
| 100 | 856.22 |
| 300 | 693.99 |
| 600 | 592.47 |
| 900 | 526.53 |
| 1200 | 479.71 |
| 1800 | 420.76 |

Load Capacity on output at 30 Rpm output speed

