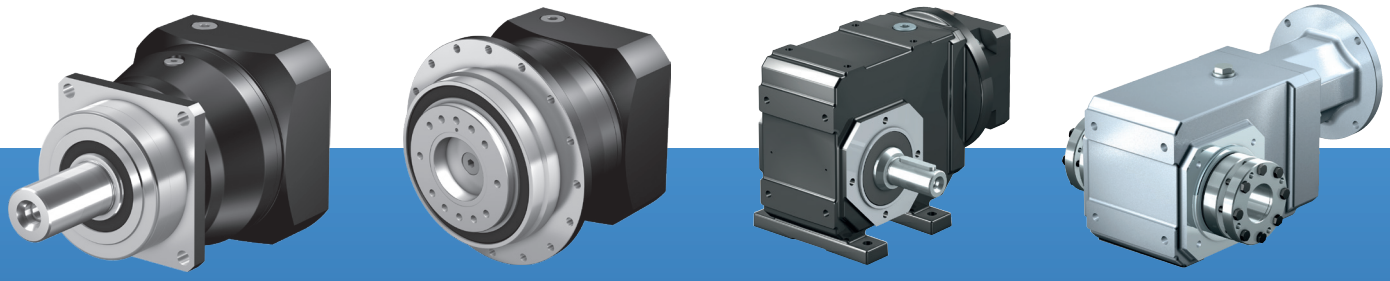
STÖBER

# SERVO GEARBOXES



***Optimize Without Compromise!***

# Servo Gear Units





## Welcome to STOBER!

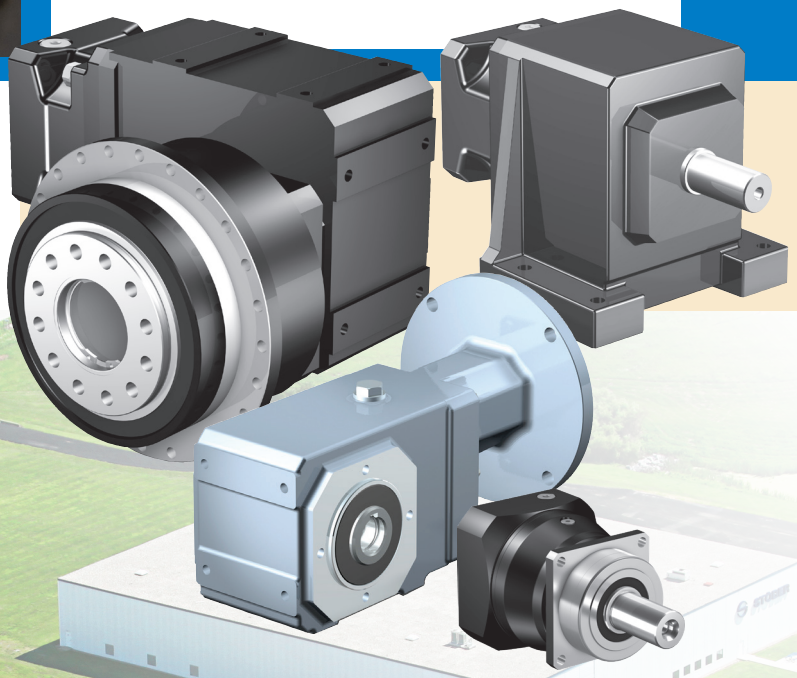
***Thank you for your interest in the servo gear reducers offered by STOBER Drives, Inc.!***

In 1934, the Stöber brothers founded a small shop in Pforzheim, Germany that made machines and repaired engines. Today, STOBER is an international organization with offices in ten countries.

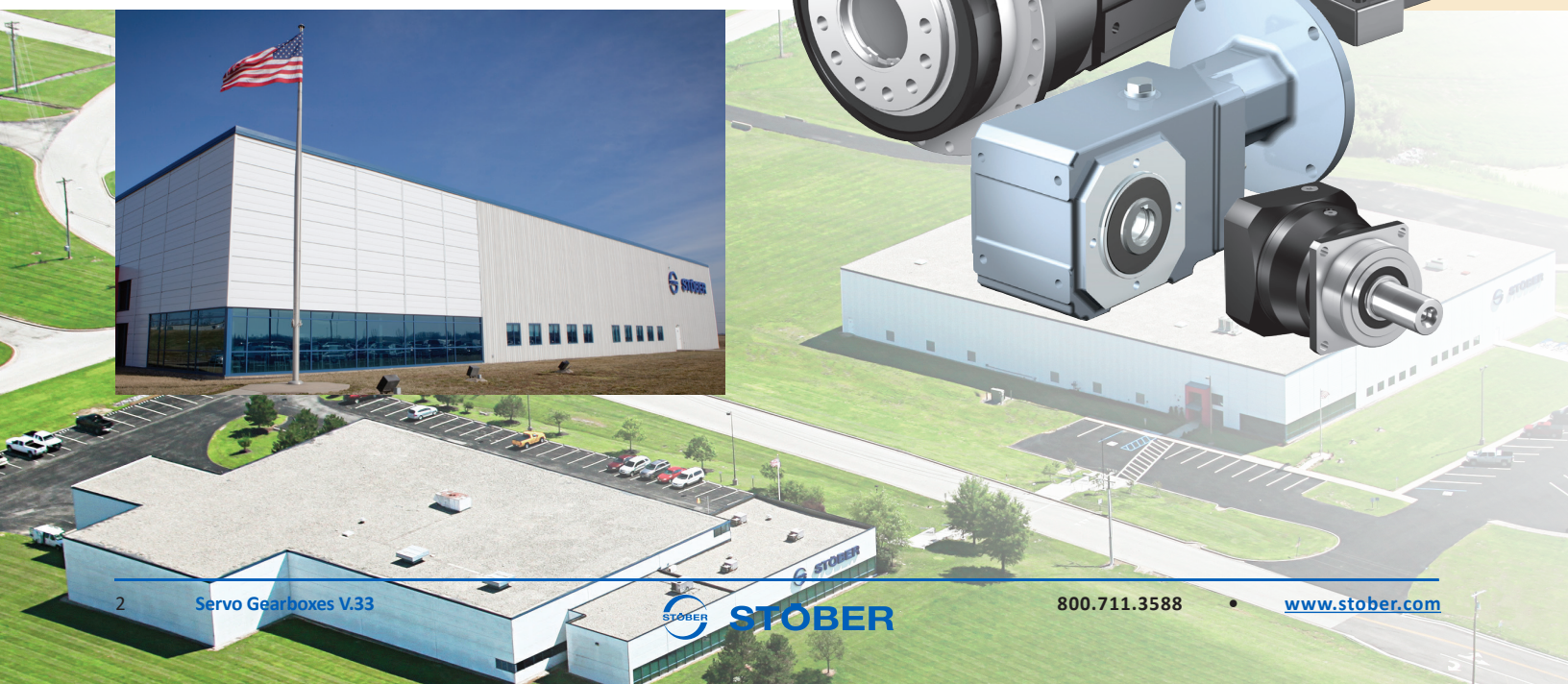
This 80 year heritage has given us expertise in servo gearing for which STOBER is recognized worldwide as the "gold standard." STOBER products are of the highest quality and use only the best components.

This catalog covers our comprehensive servo gearbox products — Servo Precision Planetary and Modular Gearheads. STOBER is recognized across the United States for its solution design, product durability, and service support. We look forward to the opportunity to work with you, and to help with your servo gearing needs.

*Peter Feil, General Manager, STOBER Drives, Inc.*

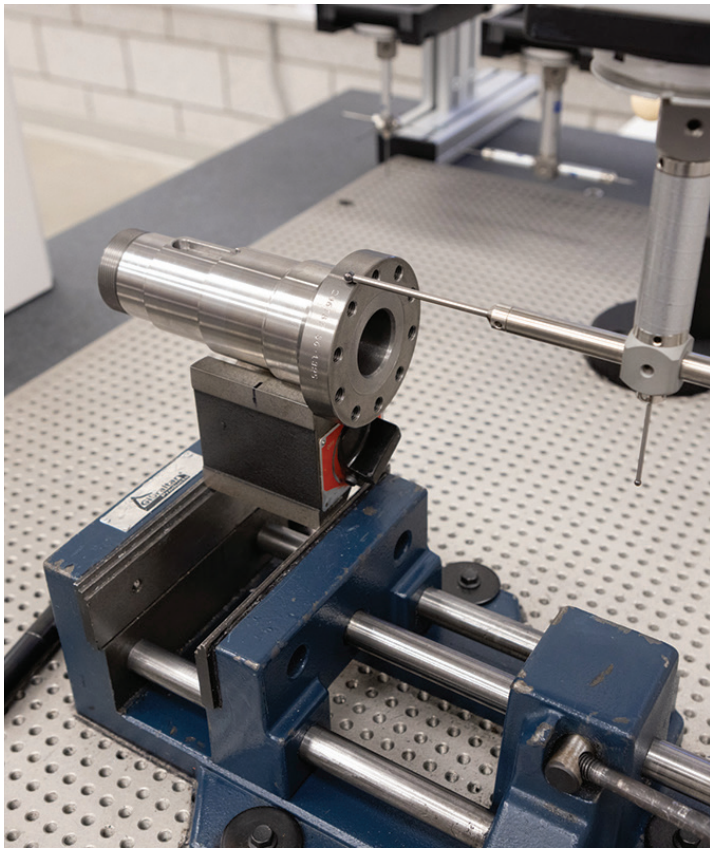


*STOBER Drives Inc. was founded in 1991. Our Maysville, Kentucky campus includes 85,000 square feet of sales and service offices, assembly, manufacturing, and warehousing space for German-engineered STOBER products for 1 day shipment nationwide.*



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*All manufactured components are inspected before being released to assembly. Our quality inspection team ensures every part meets tolerances and is in spec.*

## Unsurpassed:

STOBER products are designed and built to perform for the toughest applications. Reliability, adaptability and maintainability are our focus, and durability is truly our trademark.

**Solution Designs** that build quality around every requirement.

**Product Durability** that enhances the reliability and life of every application.

**Service Support** that is empowered to meet and exceed client expectations.













*STOBER Serviced Industries:*

*Beverage*
*Food Processing*
*Packaging*
*Machine Tool*
*Robotics*
*Material Handling*
*Semiconductor*
*Printing*
*Converting and many others...*

# Servo Gear Units

## The Best you Can Buy...

At STOBER, offering the best is not a buzz word — it is our passion and way of life. We offer the best product, provided by the best people and processes, and backed by the best service.

Why is STOBER considered the industry Gold Standard? Our products are backed with superior service, outstanding quality, and the STOBER guarantee.

- STOBER gearheads survive in the toughest environments, providing long life under extreme conditions. Their high reliability and durability saves non-productive downtime and cost
- Our product reliability is backed by one of the best warranties in the industry
- We build and ship in 1 day saving you inventory hassle and cost
- Adapts to *any* servo motor

## The Servo Gear Difference

STOBER has the highest performing custom solutions when space, precision, speed, and/or longevity really matter

- Options for every application
- Most precise and stiffest solution on the market (backlash down to less than 1 arc minute)
- Most compact solution on the market when paired with a geared motor
- Coolest running
- Mounting flexibility
- More ration option to choose from
- Quieter

*** Noise Level**

If a planetary is loud — something is WRONG!

STOBER Servo planetary = 60 dB(A)
Convention spur gear planetary = 70-72 dB(A)

Bottom line: 1 conventional gearhead produces the same noise level as 16 STOBER planetary gearheads with HeliCamber™ gearing

## Striving Harder to Deliver the Best Gear Solutions

STOBER Drives has been assembling products at our Maysville, Kentucky facility for over twenty years. Our expertise in the production and assembly of low-backlash gear units produces products that comply with the highest quality standards.

But, we don't remain satisfied with the status quo. We are continuously improving our modern machining production center including numerous recent acquisitions to improve our manufacture time and to ensure maximum quality levels.

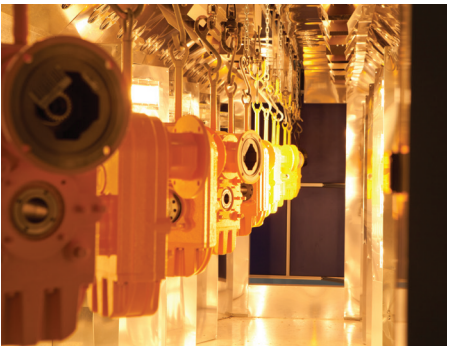
All reducer components (gears, covers, material, etc.) are backed by a five year warranty. Normal wear items (oil seals, bearings, etc.) are covered for two years.

**Purpose:** Deliver peace of mind in the demanding world of motion

**Vision:** The gold standard for perfect motion

**Mission:** Seeking the best; operating with integrity; serving others, growth through learning

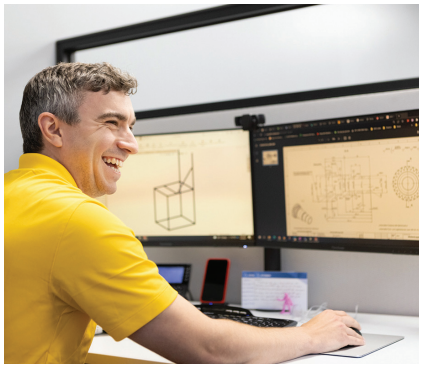






*Assembly stages of "F" Series gearheads: Paint curing oven allows for one day assembly and higher paint durability (left); units awaiting final inspection prior to shipment (right).*







## Key STOBER Numbers

Passionate about providing fast delivery and exceptional support

**1** day shipping

**1** hour quoting

**3** rings or less when you call in — we answer the phone, not an automated switchboard!

**100%** inspected and tested during assembly for seal pressure test and ratio verification. STOBER also observes the reducer for any abnormal noise or vibrations during testing

**5** year warranty

**24/7** customer service

## Service Support for a Lifetime

We stand behind every drive we sell, which is why our service support is also the gold standard in the industry:

We are a trusted extension of your engineering team with unmatched expertise across design, manufacturing, and assembly.

Our easy order method insures you maintain a single contact throughout the process. And, your service representatives are directly responsible for your account. After the sale, our products are easy to install, but if you do have a question or a problem, we provide application and installation support anywhere in the US. With over 80 years gearing & 30 years motor and electronics experience, we have the expertise to solve your most difficult problems.

**Application Support Programs**

- For support during normal business hours: call 800-711-3588 or email sales@stober.com
- 24/7 emergency customer service hotline: 606.563.6035
- Consultative product support team available via phone or live chat on our website
- Application Sizing Software
- Online web tools: CAD and configurator
- On-site training available
- Emergency shipments available 24/7

***STOBER Staff Team Members***
*Facing page: Wayne Gingerich, Assembler 2012*
*From top, left to right: Blake Thayer, Product Engineer Team Leader 2018*
*Nathan Landreth, Industrial Engineer, 2012, Robby Cooper, Machinist, 2012*

# The Servo Gear Unit Difference

*The following outlines some of our quality standards and unique STOBER features that set Servo gearheads apart from all others...*

## Food and Corrosion Resistant Duty

**P PKX PK C F K/KL KSS**

Lifetime lubrication; double output seals (where possible); maintenance free design; stainless output bushing, shaft, or bore — finish is USDA approved for food processing and handling; heat cured.

**KSS for extreme high pressure food washdown!**

- IP69K certified for extreme high pressure food washdown (sprayed at close distance at 100 bars or 1,450 PSI)
- Certified against dust and water ingress
- 304 stainless steel cast housing

## Explosion Proof

**P PH PHQ PKX PHKX C F K**

ATEX is often used in process control and converting where unstable gases and dust can be found

ATEX is a directive consisting of two European directives describing equipment or work environment allowed in an environment with an explosive atmosphere. ATEX derives its name from the ATmospheres EXplosible.

Please consult our product support team for assistance selecting an ATEX gearbox.

## Large Input Planetary

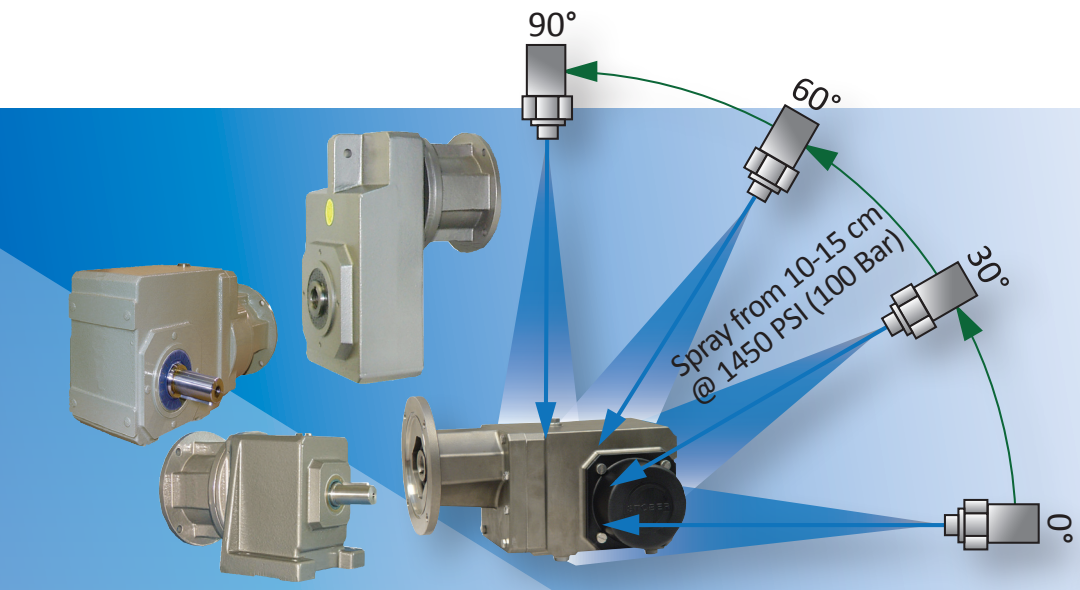
**P PE PH PHQ KS**

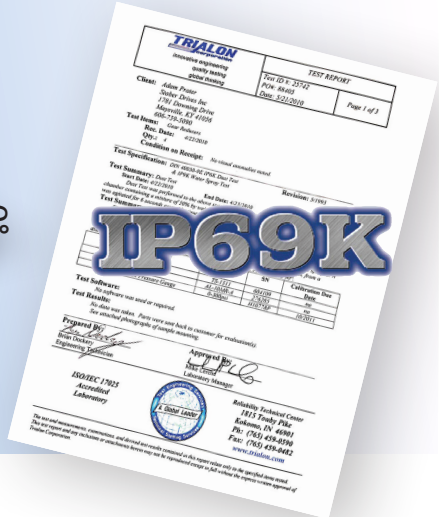
Equipping a Servo gearhead with the large input option allows a larger shaft diameter motor to be used, keeping gearhead size and cost down! This input is ideal for inertia matching.

## Spiral Groove Hollow Bore

**F K KL KS KSS**

The inside diameter on our hollow bore units feature a spiral (rifle) bore design providing an anti-seize lubricating groove. This enables the Servo gearhead to slide off freely when servicing without damage to the output shaft. With conventional smooth-surface hollow bore designs, any anti-seize lubricant applied during installation of the output shaft has no where to go except out the other end. Invariably, these designs will seize, making it necessary to cut off the output shaft when servicing.



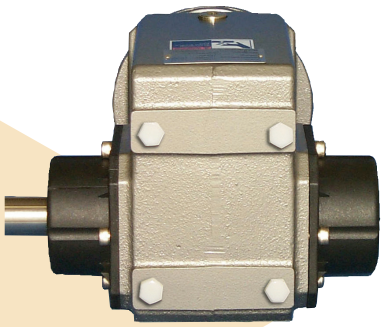

*Above: KSS Servo Gearheads are IP69K certified to withstand frequent pressure cleaning operations typical in the food industry and elsewhere. Other STOBER products, including C, F and K Series, are optionally available with IP69K compliant protection.*

## Wobble Free Bushing

**F K KL KSS**

The STOBER "Wobble Free" bushing is a unique (U.S. Patent Number 5,496,127), bushing system which can be supplied on a single side or double sides. Each case size can be provided with a variety of bushing bores. The unit is selected based on torque rating, output speed or ratio, and the shaft size of the driven equipment.

- A distinct support side and a clamp side, the dual tapered cones will overcome a wide range of tolerances normally found with standard shaft materials. No shaft key necessary.
- Many unit sizes can be supplied with output covers on one or both sides which protect the seals and also cover the rotating bushing
- The reducer output bore can be changed any time by changing the bushing kit
- The quill, all bushing parts, and hardware can be supplied stainless steel to provide corrosion resistance for washdown applications



### Double Sided Bushing:

This unique design allows the unit to be mounted on the shaft from either side of the reducer by reversing the clamp side and support side bushings. The clamp side is determined by the customer but is usually the easily accessible outside bushing.

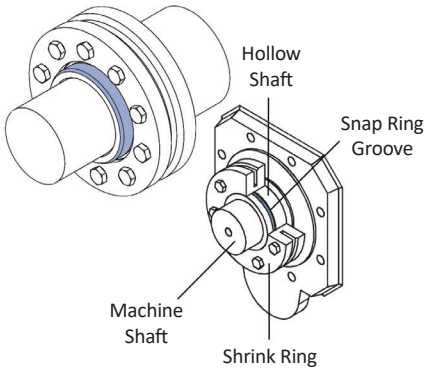
The double sided bushing is not installed into the unit at assembly, but with easy-to-follow installation instructions, the unit and bushing can be mounted on the machinery quickly – without any special tools.

### Single Sided Bushing :

The single sided bushing is assembled at the time of the order. The bushing side extension must be specified by the customer before assembly. The bushing is installed into the unit for shipping and is not interchangeable once the unit is assembled.

## Shrink Ring Connection

**F K KL KS**




F, K, KL and KS Series gearheads with a hollow bore can be connected to a finished machine drive shaft by frictional engagement through compression of a shrink ring on the hollow shaft.

This shaft-hub connection is totally free of backlash. Because of its self-centering property, it can transmit high torques and axial thrusts with great accuracy.

Gear units supplied with a shrink ring, are shipped with the ring installed on the hollow shaft end, ready for assembly.

## See page 291 for More Servo Gearhead Compatible Products...

**EZ Series Servo Motors** available to fit all Servo gearheads

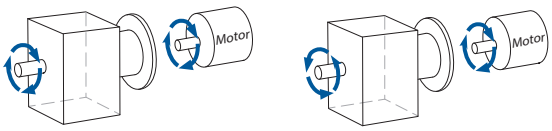
**Rack and Pinion** Servo gearhead systems are a ready to install engineered solution for precision automation applications requiring forces up to 122 kN (27,400 lbs.) with linear backlash as low as 7 µm

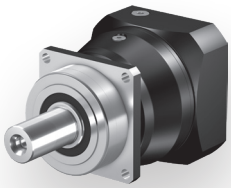


**ServoStop** automatic, electrically-actuated integrated holding brake used in place of a servo motor brake for dynamic safety braking, or in conjunction with the servo motor brake for redundancy in safety applications

# Servo Gear Units

## Inline & Offset Inline Gearheads



### P — Shaft Output *

STOBER P Series is the cornerstone of most of our inline family of precision planetary gearheads. They are the most accurate and efficient planetary gearheads available. HeliCamber® gear technology provides minimum wear, low backlash and low noise.

- 3:1 to 100:1
- Up to 2,483 Nm torque (nom)
- Up to 8,000 RPM input speed
- Backlash: <3 arc min
- Reduced Backlash: <1 arc min



### PH/PHQ — Flange Output*

STOBER PH family geaheads offer a rotating flange output version of the P Series.

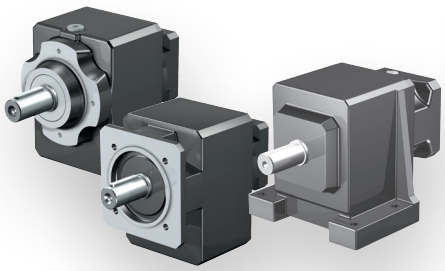
- 4:1 to 600:1
- Up to 13,000 Nm torque (nom)
- Up to 8,000 RPM input speed
- Backlash: <3 arc min
- Reduced Backlash: <1 arc min



### PE — Shaft Output*

STOBER PE Series Servo Precision Planetary Gearheads are available for applications where very low backlash is not a criteria. They are an economical helical tooth planetary, comparable in quality to other STOBER units.

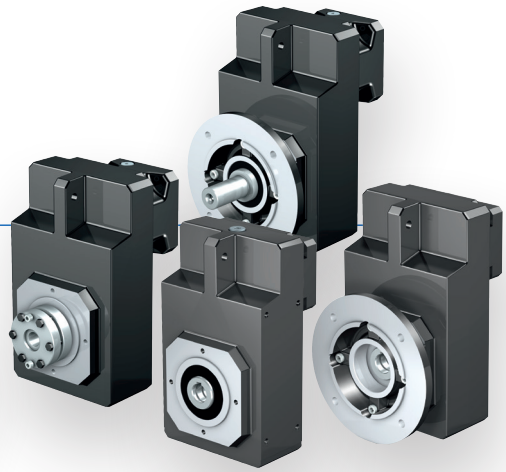
- 3:1 to 100:1
- Up to 160 Nm torque (nom)
- Up to 8,000 RPM input speed
- Backlash: < 8 arc min



### C — Shaft Output*

STOBER C Series gear drives offer performance, durability, and economy for a wide range of applications. High efficiency helical gearing keeps motor size to a minimum while running almost silently.

- 2:1 to 276:1
- Up to 7,000 Nm torque (nom)
- Up to 6,500 RPM input speed
- Backlash: < 14 arc min



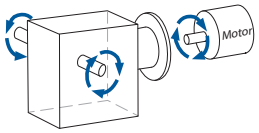
### F — Versatile Outputs*

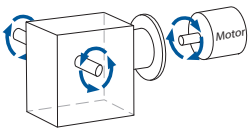
STOBER F Series gear drives are a popular choice for applications that require high performance, efficiency, durability, and flexibility. F Series are available with a wide selection of configurations to match almost any mounting requirement.

- 4:1 to 551:1
- Up to 1,100 Nm torque (nom)
- Up to 7,000 RPM input speed
- Backlash: < 10 arc min

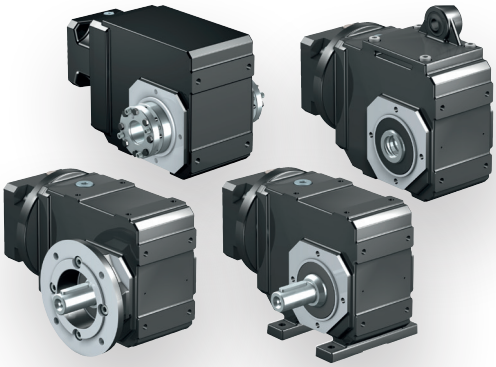
* See page 286 for comparison of all output options and sizes available

# Right Angle Gearheads



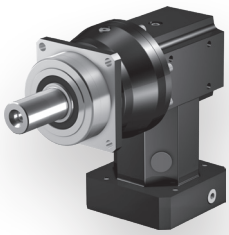

*Many right angle gearheads offer output on either or both sides*



## K — Versatile Outputs*

STOBER K Series helical/bevel gear drives are the most popular and versatile Servo right angle gearheads. They are the optimal drive for truly demanding continuous-duty applications, offering higher efficiencies than conventional worm gear drives or planetary gearheads.

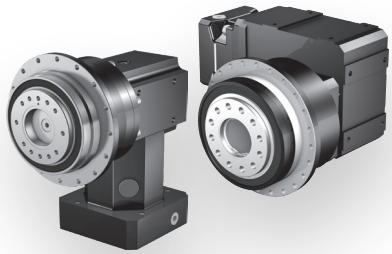
- 4:1 to 381:1
- Up to 12,000 Nm torque (nom)
- Up to 7,000 RPM input speed
- Backlash <10 arc min



## PKX/PK — Shaft Output*

STOBER PKX and PK Series precision planetary gearheads combine the P Series gearhead with the low ratio "KX" right angle platform or the reduced backlash K Series platform.

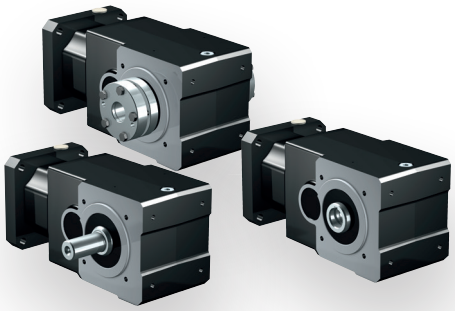
- Ratios: 3:1 to 300:1;
- Up to 2,000 Nm torque (nom)
- Up to 6,000 RPM input speed
- Backlash: PKX: ≤4 arc min; PK: ≤3.5 arc min



## PHKX/PHK/PHQK — Flange Output*

STOBER PH right angle geahead configurations offer a rotating flange output combining the P Series gearhead with the low ratio "KX" or reduced backlash K Series. The PHQK features the "Quattro" power planetary gearing for extreme torque and ratio capabilities.

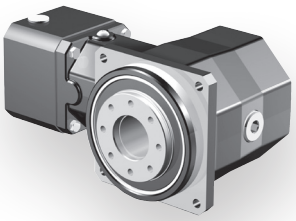
- 4:1 to 591:1
- Torque: 13,000 Nm (nom)
- Up to 7,000 RPM input speed
- Backlash <3.5 arc min



## KL — Verstile Outputs*

The STOBER KL Series offers the same output and housing versatility as the K series, but is much more compact and ideal for smaller gearhead size applications.

- 4:1 to 32:1
- Up to 50 Nm torque (nom)
- Up to 6,000 RPM input speed
- Backlash: ≤ 20 arc min



## KS — Verstile Outputs*

STOBER KS Series precision planetary gearheads use time-tested helical gearing and finish ground spiral bevel gears to provide a low backlash unit, that is smooth running, with high efficiency, high power density, and high input speed capacity..

- 6:1 to 200:1
- Up to 250 Nm torque (nom)
- Up to 6,000 RPM input speed
- Backlash: < 4 arc min




## KSS — Versatile Outputs*

STOBER is proud to offer our quality-proven, high-efficiency KSS Series Helical/Bevel speed reducer in a stainless steel housing necessary for the toughest washdown applications.

- 4:1 to 70:1
- Up to 350 Nm torque (nom)
- Up to 6,000 RPM input speed
- Backlash: < 10 arc min

# Servo Gear Units

## Versatility

STOBER Drives offers the world's largest variety of gearheads to fit virtually all servo needs.

## INLINE & OFFSET INLINE GEARHEADS







## Performance, Configurations and Options

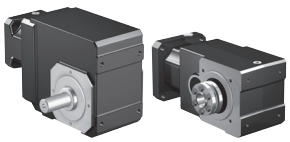
| | | P page 14 | | PH page 28 | PHQ page 44 | PE page 62 | C page 72 | F page 102 |
|---|---|---|---|---|---|---|---|---|
| Input | Large Input | • | • | • | • | • | | |
| Output (see page 286 for details) | Solid Shaft | • | • | | | • | • | • |
| | Hollow Bore | | | | | | | • |
| | Rotating Flange | | | • | • | | | |
| | Shrink Ring | | | | | | | • |
| | Single Bushing | | | | | | | • |
| | Double Bushing | | | | | | | • |
| Housing | Flange | | | | | | • | • |
| | Foot Mount | | | | | | • | • |
| | Tapped Holes | | | | | | • | • |
| Protection | IP65 | • | • | • | • | IP64 | • | • |
| | IP69K Washdown | | | | | | Opt | Opt |
| | ATEX Certified | Opt | Opt | Opt | Opt | | Opt | Opt |
| | 304SS Housing | | | | | | | |
| Paint/ Coatings | Standard Black | • | • | • | • | • | • | • |
| | Food Duty | • | | | | | • | • |
| | Corrosion Resistant Duty | | | | | | • | • |
| Added Functionality | ServoStop* | • | • | • | | | • | • |
| | Rack and Pinion* | • | • | • | | • | | |
| Performance + Good +++ Better +++++ Best | Continuous RPM | +++ | +++ | ++ | ++ | +++ | +++ | ++ |
| | Stiffness | +++ | +++ | ++ | +++++ | + | + | ++++ |
| | Torque Density | +++ | +++ | ++ | +++++ | + | + | ++++ |
| Precision ArcMin Backlash | 1 | • | | Opt | Opt | | | |
| | 1-3 | | | • | • | | | |
| | 3-5 | | | | | | | |
| | 5-10 | | | | | | | Opt |
| | 10-15 | | • | | | | • | • |
| | 15-20 | | | | | • | | |
| Nominal Output Torque Ranges Nm | 0-50 | • | • | • | | • | • | • |
| | 50-200 | • | • | • | | • | • | • |
| | 200-1,000 | • | • | • | • | • | • | • |
| | 1,000-5,000 | • | • | • | • | • | • | • |
| | 5,000-10,000 | | | | • | • | • | |
| | 10,000-23,000 | | | | • | | | |

** See page 291 for more information*

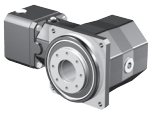


STÖBER

## RIGHT ANGLE GEARHEADS









| | K | KL | PKX | PK | PHKX | PHK | PHQK | KS | KSS |
|---|---|---|---|---|---|---|---|---|---|
| | page 120 | | page 164 | page 184 | page 204 | page 218 | page 236 | page 258 | page 272 |
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# Servo Gear Units Application-Tailored Solutions

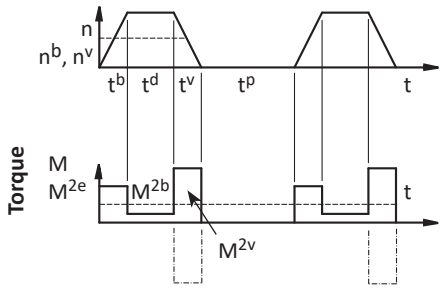
| Industry | Ideal Gearhead Applications | | Recommended STOBER Gearhead |
|---|---|---|---|
| **Aerospace** | • Automated Guided Vehicles (AGV)<br>• Drilling and Riveting<br>• Machine Tool<br>• Testing and Inspection | • Carbon Fiber Placement<br>• Fuselage<br>• Space Tracking Systems<br>• Wing assembly | Inline: P, PH<br>Right Angle: KS<br>Also: STOBER rack and pinion systems |
| **Automation** | • Assembly turn tables<br>• Linear presses<br>• Robotics auxiliary axis<br>• Palletizing | • Custom assembly machines<br>• Radar<br>• Pipe and wire bending | Inline: P, PE, PH<br>Right Angle: K/KL, PKX, KS<br>Also: STOBER rack and pinion systems, and servo brakes |
| **Automotive Manufacturing** | • Transfer lines<br>• Robotic auxiliary<br>• Machining<br>• Tire manufacturing<br>• Carbon fiber production | • Metal cutting and bending<br>• Pick and place<br>• Index tables<br>• Electronics assembly | Inline: P, PE, PH<br>Right Angle: K/KL, PKX, KS<br>Also: STOBER rack and pinion systems, and servo brakes |
| **Converting** | • Cutting<br>• Tension Control<br>• Web Lines | • Winding<br>• Paper Converting | Inline: P, C, PH<br>Right Angle: K/KL<br>Also: Servo brakes and fans |
| **Machine Tool** | • Horizontal and vertical mills<br>• Large gantry cranes<br>• Carbon fiber placement<br>• Flame, laser, water jet, and plasma cutting<br>• Back gauging | • Grinding<br>• X-Y tables<br>• Indexing tables<br>• Chip conveyors<br>• Bending and forming<br>• Tool changers | Inline: P, PH<br>Right Angle: PKX, PHKX, PHK, PHQK, KS<br>Also: STOBER rack and pinion systems, and servo brakes |
| **Material Handling** | • Pick and place<br>• Line diverter<br>• Sorting/diverting | • Linear transfer<br>• Palletizing | Inline: PE, C<br>Right Angle: K/KL, F |
| **Medical** | • Imaging<br>• Radiation<br>• Centrifuge | | Inline: P, C, PH<br>Right Angle: K/KL, F, KS |
| **Packaging** | • Continuous or intermittent filling applications | | Inline: P, PE, C, PH<br>Right Angle: K/KL, F, PKX, KS |
| **Plastics/ Composites** | • Often used to replace hydraulic actuators in injection molding<br>• Injection molding<br>• Carbon fiber placement | • Extrusion lines<br>• Blow molding<br>• Thermoforming<br>• Rubber molding | Inline: P, PH, PHQ<br>Also: STOBER rack and pinion systems |
| **Printing** | • Labels<br>• Flexographic printing | • Circuit Boards<br>• Sheet | Inline: P, PH<br>Also: Servo brakes |
| **Robotics** | • Delta<br>• Pick and place<br>• Telescoping arms | • Auxiliary axis to rotate and move robot<br>• Positioning axis | Inline: PH, PHQ<br>Also: STOBER rack and pinion systems |
| **Semiconductor** | • Wafer polishing<br>• Wafer handling | • Circuit web printing | Inline: P, PH |
| **Valve Control** | • Ideal for handling rapid dithering positioning<br>• Ball, gate, and globe valves | • Throttle/governor valves<br>• Chokes<br>• Process valves<br>• ATEX explosion proof available | Inline: P, PH<br>Right Angle: K/KL, F, PKX, PHKX |

## Sizing/Selection

Use the chart on the facing page and below to determine the best series and the right size gearhead to meet your specific application requirements. In each product section of this catalog, the necessary data and a "Load/Life/Speed Calculation" section are provided to help you work through these equations.

*By all means, please feel free to call or email (sales@stober.com), if you have any questions or need assistance determining the best solution for your application.*

## Cycle Run




$$M_{2e} = \sqrt[3]{\frac{|n_{2m.1*}| \bullet t_{1*} | \bullet M_{2.1*}{}^3 | + \ldots . + | n_{2m.n*} | \bullet t_{n*} \bullet | M_{2.n*}{}^3}{| n_{2m.1*} | \bullet t_{1*} + \ldots . + | n_{2m.n*} | \bullet t_{n*}}}$$

## Service Factor

### Apply to Nominal Rating ONLY

| Load Factor $fB_{op}$ | P, PE, PH, PHV, PHQ, KS | PKX, PK, PHKX, PHK, PHQK, C, F, K, KSS |
|---|---|---|
| **Operating Mode** | | |
| Continuous | 1.0 | 1.0 |
| Cyclic | 1.0 | 1.25 |
| Cyclic– Reversing | 1.0 | 1.4 |

| Running Time Factor $fB_t$ | |
|---|---|
| ≤8 hours | 1.0 |
| ≤16 hours | 1.15 |
| ≤24 hours | 1.2 |

| Cyclic Operation | P, PH, PHQ, PE, PKX, PK, PHKX, PHK, PHQK units $fB_{ZB}$= | C, F, K, KL, KS, KSS units $fB_{ZB}$= |
|---|---|---|
| ≤1000 load changes/ hour (LW/h) | 1.0 | 1.0 |
| >1000 load changes/ hour (LW/h) | 1.15 | 1.0 |

### Apply to Input RPM

| Temperature Factor $f_T$ | Without Ventilation | Fan Cooled |
|---|---|---|
| <20°C | 1.00 | 0.90 |
| <30°C | 1.10 | 1.00 |
| <40°C | 1.25 | 1.15 |

**1 Select Preliminary Reducer Size**

ATEX Rated / Explosion Operation
- YES → Please contact STOBER about ATEX rated solutions at sales@stober.com
- NO

**2 Determine the Permissible Acceleration Output Torque ($M_{2acc}$)**

$$M_{2acc} = J_z \left( \frac{\Delta n}{9.55 \times \Delta t} \right) + M_L$$

$M_{2acc*} \le \frac{M_{2acc*}}{fB_{ZB}}$ and $M_{2eq*} \le \frac{M_{2N}}{fB_{op} \bullet fB_t}$
- NO → Select a Larger Reducer
- YES

**3 Determine the Reducer Ratio (i)**

$n_{im} \le n_{1maxDB/fBT}$ and $n_{imax} \le n_{1maxZB/fBT}$
- NO → Select a Smaller Ratio (and larger motor, if needed)
- YES

**4 Determine the Peak Torque ($M_{2NOT}$)**

$M_{2NOT} \le M_{2NOT}$
- NO → Select a Larger Reducer
- YES

$F_{2ax*} \le F_{2axN}$, $F_{2rad,acc*} \le F_{2rad,acc}$, $F_{2rad,eq*} \le F_{2radN}$, $M_{2k,acc*} \le M_{2k,acc}$, $M_{2k,eq*} \le M_{2kN}$, $M_{1k*} \le M_{1k}$
- NO
- YES

**5 Reducer Selection Complete** (See Load Calculations for each Gearhead Series)

**Continuous Duty:** Drive is considered continuous duty if the running time ($t^r = t^b + t^d + t^v$) is 60% of the complete cycle time ($t^b + t^d + t^v + t^p$) or longer than 20 minutes.

**Cyclic Duty:** Drive will cycle on and off.

For cyclic operation, the recommended ratio of external (application) inertia to gearhead inertia can be determined by the following equation:

$$\frac{J_z}{i^2} = 4 \bullet J_D$$

The gearhead selected, using the following equation for inertia ratio, will result in the lowest motor torque demand and the optimum drive selection:

$$\frac{J_z}{i^2} = J_D$$

| | |
|---|---|
| $F_{2A}$ | Permissible Axial Load |
| $F_{2a}$ | Axial Load at Output Shaft |
| $F_{2R}$ | Permissible Radial load |
| $F_{2r}$ | Radial Load at Output Shaft |
| $f_B$ | Load Factor |
| $f_L$ | Running Time Factor |
| $f_T$ | Factor for Temperature |
| i | Exact ratio |
| $J_D$ | Motor + Reducer Inertia @ Motor RPM |
| $J_z$ | Total Inertia @ Reducer RPM |
| $M_L$ | Friction Torque (Losses) |
| $M_{2acc}$ | Acceleration Output Torque |
| $M_{2acc*}$ | Application Acceleration Torque |
| $M_{2eq*}$ | Equivalent Torque (Avg RMS Torque) |
| $M_{2k100}$ | Rated Tilting Torque |
| $M_{2k,\,eq*}$ | Equivalent Tilting Load |
| $M_{2N}$ | Nominal Output Torque |
| $M_{2NOT}$ | Peak Output Torque |
| $n_{1db}$ | Maximum Continuous Input |
| $n_{1zb}$ | Maximum Cyclic Input |
| $n_{im}$ | Maximum Continuous Speed |
| $n_{imax}$ | Maximum Cyclic Speed |
| $T_{2PEAK}$ | Peak Torque |
| $t_r$ | Running Time |
| $t_d$ | Duration Time |
| $t_v$ | Deceleration Time |

# P Series: INLINE — Shaft Output

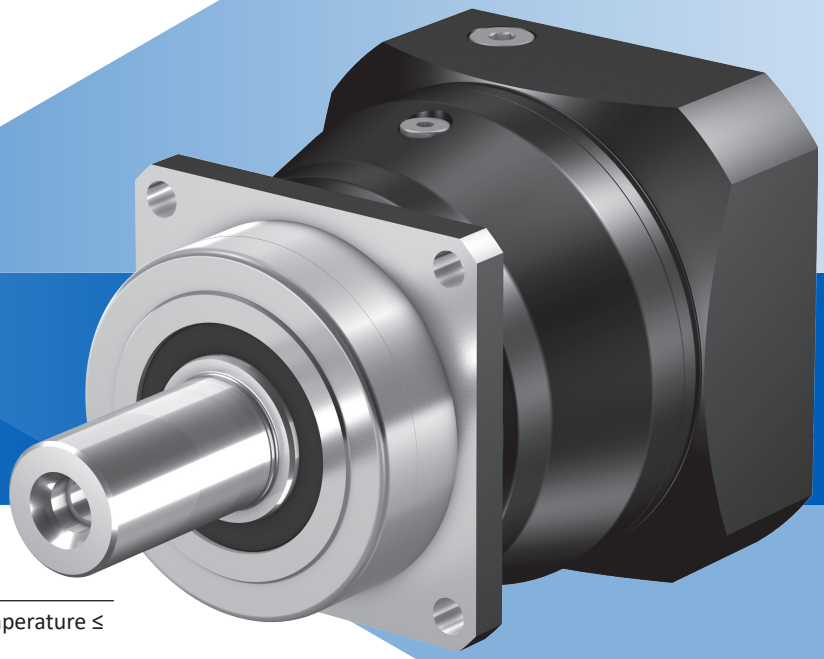
## P Features

- 3:1 to 100:1 ratios (higher ratios available. Contact STOBER.)
- Quiet running (as low as 54dB(A))
- Bearing options to suit your application needs.
- Large motor input option to accept bigger diameter motor shafts so you don't use an oversized gearbox
- Error free motor mounting and quick changeover with toleranced pilot on motor plate
- Low no load running torque (see page 19), giving you more torque for your application
- Magnetic oil filtration to remove contaminants to prevent breakdowns
- Build and ship in one day
- Assembled in the USA

*STOBER P Series Servo Precision Planetary Gearheads feature HeliCamber® gearing and other components which make them the most accurate and efficient planetary gearheads available. Our gear technology provides minimum wear, low backlash and low noise. Keyed, keyless, bearing options, and more are all available in one day. Every gearbox is made to order. STOBER will custom whatever you need to fit your application. Contact us today to learn more.*

**All P Series SHIP in 1 DAY!**

NO EXPEDITE FEE FOR 24 HOUR SERVICE



## General Specifications

| | |
|---|---|
| **Ambient Temperature** | 0° C to +40°C (104° F) [Unit temperature ≤ 90° C Max.] |
| **Backlash** | 1-8 arcmins, see performance overview chart, page 16 |
| **Coating** | Standard Black (RAL-9005); food duty optional (P3 thru P5 only) |
| **Degree of Protection** | IP65 |
| **Direction of Rotation** | Input and output rotate the SAME direction |
| **Efficiency** | 1 stage 97%; 2 stage 95% |
| **Input RPM** | Up to 8,000 rpm |
| **Installation** | Requires grade 10.9 fasteners. See page 288, for more information |
| **Lubrication** | Lubricated for life – standard Mobil SHC629; option food grade Mobil SHC CIBUS 150 |
| **Mounting Position** | Unrestricted |
| **Warranty** | 5 Year Limited (2 years on normal wear items: bearings, seals, etc.) |

# Overview



## Selection Options *At-a-Glance*

Using the **Selection Data** table later in this section, select the P Series Gearhead with the appropriate performance and design options tailored to your motor choice and exact application requirements. Use the part number guide below as a reference to build a part number for the complete gearhead assembly.

**Part Number Examples:**

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 0 | ! |
|---|---|---|---|---|---|---|---|---|---|---|
| P | 4 | 3 | 1 | S | G | S | S | 0030 | ME | L |

| | Design Option | Part Number Code | Description |
|---|---|---|---|
| 1 | **Series** | P | Solid shaft inline style planetary |
| 2 | **Size** | 2 3 4<br>5 7 8 9 | 7 sizes of gearhead |
| 3 | **Generation** | 3 | Version of gearhead |
| 4 | **# of Stages** | 1<br>2 | One stage for ratios of ≤ 10:1<br>Two stage for ratios >10:1 |
| 5 | **Housing** | S | Standard mounting style |
| 6 | **Output** | P<br>G | Shaft with key<br>Plain shaft (no key) |
| 7 | **Bearings**<br>See output bearing options page 18 |  S | Ball bearing |
| | |  D | Double row angular contact bearing (except P2) |
| | |  Z | Cylindrical roller bearing (P Series only, except P2)(“Z” cylindrical roller bearing not allowed with reduced backlash option.) |
| 8 | **Backlash** | S<br>R | Standard Backlash<br>Reduced Backlash |
| 9 | **Ratio** | 0030 | Ratios range from 3:1 to 100:1<br>(0030=3:1; 0160=16:1; 1000=100:1, etc.) |
| 0 | **Motor Adapter** | ME<br>MF<br>MB | Motor Adapter with EasyAdapt coupling<br>Motor Adapter with FlexiAdapt coupling (Contact factory for this option)<br>ServoStop motor adapter with brake (Contact factory for this option) |
| ! | **Options** | L<br>F | Large Input<br>Food Duty (size P3 thru P5 only) |

## Options

### ME Adapter Option

- MSS1 Seal – special input seal for longer life (for sizes P5-9). Contact factory for this option.

### Integrated Safety Brake

- ServoStop – provides dynamic braking during power failures or emergency stops in hazardous situations. Contact factory for this option.

### Coating Options

- **Standard:** For dry areas and normal conditions. All units standard coating, unless ordered with Food Duty.
- **Food Duty**: Able to withstand severe wet areas and washdown application (size P3 thru P5 only).

### Large Input

- Accommodates a larger diameter motor shaft without going to a larger size gearbox.

### ATEX

- ATmosphere EXplosible – rated for explosive environments. Contact factory for this option and allow additional time for delivery.

## P Series Performance Overview

P Series performance is dependent on several factors including duty cycle, bearing design, gearhead size and stage configuration, among others. Use the chart below for preliminary evaluation, then use the following performance chart and selection information on the following pages for specific performance sizing and selection.

| Series-Size | | P2 | | P3 | | P4 | | P5 | | P7 | | P8 | | P9 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| # of Stages | | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 |
| **Acceleration Torque** $M_{2BMAX}$ | N | 25 | | 75 | | 139 | | 355 | | 805 | | 1840 | | 3450 | |
| **Output Torque Nom.** [1] $M_{2N}$ | N | 19 | | 53 | | 102 | | 270 | | 584 | | 1415 | | 2483 | |
| **Torsional Stiffness** $C_2$ | Nm/arcmin | 1.9 | | 5 | | 12 | | 34 | | 67 | | 181 | | 407 | |
| **Torsional Backlash** [2] | Δϕ | ≤6 | ≤8 | ≤4 | ≤5 | ≤4 | ≤5 | ≤3 | ≤4 | ≤3 | ≤4 | ≤3 | ≤4 | ≤3 | ≤4 |
| | Δϕ Reduced | — | — | ≤2 | ≤3 | ≤2 | ≤3 | ≤1 | ≤2 | ≤1 | ≤2 | ≤1 | ≤2 | — | — |
| **Input Speed Max.** $n_{1MAX}$ | Continuous | 6000 | 6000 | 5500 | 6000 | 4000 | 5000 | 3700 | 4000 | 3000 | 3700 | 2800 | 3000 | 2500 | 2800 |
| | Cyclic | 8000 | 8000 | 8000 | 8000 | 8000 | 8000 | 6700 | 8000 | 6000 | 7000 | 4500 | 6000 | 4000 | 4500 |
| **Efficiency (@ nom torque)** | % | 97 | 95 | 97 | 95 | 97 | 95 | 97 | 95 | 97 | 95 | 97 | 95 | 97 | 95 |
| **Weight** | kg | 1.5 | 2.1 | 2.5 | 2.6 | 4.3 | 5 | 7.2 | 8.5 | 16.9 | 16.4 | 34 | 37.2 | 50 | 67.5 |
| | lbs | 3.3 | 4.6 | 5.5 | 5.7 | 9.5 | 11 | 15.8 | 19 | 37.2 | 36 | 74.8 | 81.8 | 110 | 148.5 |
| **Noise** [3] | dB(A) | ≤54 | ≤54 | ≤55 | ≤54 | ≤56 | ≤55 | ≤57 | ≤56 | ≤58 | ≤57 | ≤59 | ≤58 | ≤60 | ≤59 |

### Performance by Bearing Design Option [4]

**S = Ball bearing  D = Double row angular contact bearing  Z = Cylindrical roller bearing** [5]

| | | P2 | P3 | P4 | P5 | P7 | P8 | P9 |
|---|---|---|---|---|---|---|---|---|
| **Axial Load** $F_{2ax100}$ | S | 500 | 1000 | 1500 | 2300 | 2900 | 4700 | 6000 |
| | D | — | 2500 | 4000 | 6000 | 10,000 | 15,500 | 25,000 |
| | Z | — | 600 | 1000 | 1600 | 2000 | 3600 | 5000 |
| **Radial Load Max** $F_{2rad100}$ | S | 1200 | 2500 | 4000 | 6500 | 8500 | 13,000 | 18,000 |
| | D | — | 2750 | 4500 | 7000 | 9500 | 15,000 | 20,000 |
| | Z | — | 3000 | 5000 | 8000 | 10,000 | 18,000 | 27,000 |
| **Tilting Moment Max** $M_{2K100}$ | S | 34 | 79 | 146 | 315 | 544 | 852 | 1539 |
| | D | — | 94 | 182 | 382 | 665 | 1095 | 1930 |
| | Z | — | 95 | 183 | 388 | 640 | 1179 | 2309 |

1) *Ratings based on input speed ($n_1$) of 1500 RPM.*
*For torque at higher input speeds ($M_{2NX}$) solve the formula:*
*where $n_1$ = Actual Input Speed.*

$$M_{2NX} = \frac{M_{2N}}{\sqrt[3]{\frac{n_1}{1500}}}$$

2) *Tested at 1.5% of nominal torque and recorded on the output side of the gearhead.*

3) *Measurement at one (1) meter distance with input speed ($n_1$) of 1500 RPM.*

4) *See page 18 for output bearing options. Rating based on output speed ($n_2$) of 100 RPM. For values at other speeds see page 19.*

5) *"Z" cylindrical roller bearing not allowed with reduced backlash option.*

# Overview



## P Series Motor Mounting Plate Option (Motor information required with ME or MF Motor Adapter Option)

STOBER Servo Gearheads fit the motor of your choice with the appropriate motor mounting plate assembled between the motor and the gearhead.

**NOTE: When ordering a gearhead:**

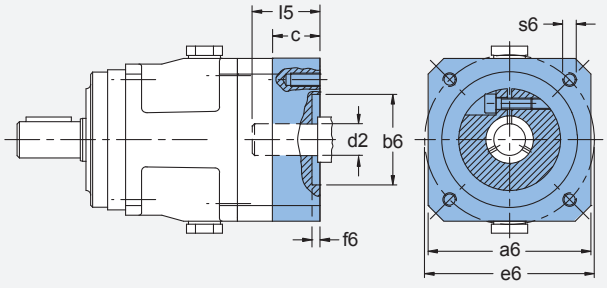
- Specify the motor manufacturer and part number
- Provide the motor drawing with dimensions, or specify the motor mounting dimensions (per the list shown at right)

For a precise dimension on a specific motor, or for general assistance, we recommend you contact STOBER Technical Support.

Maximum 10 working days for custom motor mounting plates.

### Customer Required Dimensions for Properly Sized Motor Mounting Plate

| | |
|---|---|
| d2 | Motor Shaft Diameter (If an adapter bushing is required it will be supplied with the motor plate.) |
| b6 | Pilot Diameter |
| e6 | Bolt Circle Diameter |
| s6 | Bolt Diameter |
| l5 | Motor Shaft Length |
| f6 | Pilot Length |
| a6 | Square Flange (Optional – motor plate will typically be made to match this dimension.) |

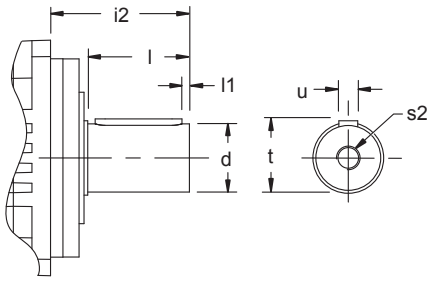



| Motor Mounting Plate Dimensions — mm(Gearhead Part Number Specific) | P231<br>P232<br>P332 | P231...L<br>P232...L<br>P331<br>P332...L<br>P432 | P331...L<br>P431<br>P432...L<br>P532 | P431...L<br>P531<br>P532...L<br>P732 | P531...L<br>P731<br>P732...L<br>P832 | P731...L<br>P831<br>P832...L<br>P932 | P831...L<br>P931<br>P932...L |
|---|---|---|---|---|---|---|---|
| Maximum Allowed Motor Shaft Dia. d2 | 14 | 19 | 24 | 32 | 38 | 48 | 60 |
| Minimum Allowed Motor Plate Thickness c* | 15 | 18 | 21 | 24 | 26 | 35 | 43 |

** Note that c motor plate thickness is determined by the motor shaft length. The minimum motor plate thickness is the value listed.*

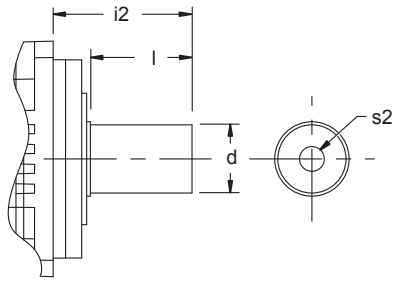
## P Series Output Shaft Options ("P" or "G" designated in part number, for example: P421S P 0160 MEL)

### P Shaft with Key




| Unit | d k6 | | l1 | l | i2 | s2 (1) | t | u (2) |
|---|---|---|---|---|---|---|---|---|
| | mm | | mm | mm | mm | | mm | W x H x L |
| P2 | 12 | +0.012/+0.001 | 2 | 22 | 36 | M4 | 13.5 | A4X4X18 |
| P3 | 16 | +0.012/+0.001 | 2 | 28 | 48 | M5 | 18 | A5X5X22 |
| P4 | 22 | +0.015/+0.002 | 3 | 36 | 56 | M8 | 24.5 | A6X6X28 |
| P5 | 32 | +0.018/+0.002 | 3 | 58 | 88 | M12 | 35 | A10X8X50 |
| P7 | 40 | +0.018/+0.002 | 4 | 82 | 112 | M16 | 43 | A12X8X70 |
| P8 | 55 | +0.021/+0.002 | 6 | 82 | 112 | M20 | 59 | A16X10X70 |
| P9 | 75 | +0.021/+0.002 | 7 | 105 | 143 | M20 | 79.5 | A20X12X90 |

### G Shaft without Key

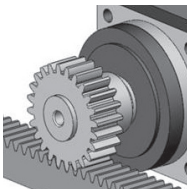
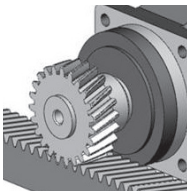
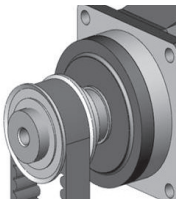



| Unit | d k6 | | l | i2 | s2 (1) |
|---|---|---|---|---|---|
| | mm | | mm | mm | |
| P2 | 12 | +0.012/+0.001 | 22 | 36 | M4 |
| P3 | 16 | +0.012/+0.001 | 28 | 48 | M5 |
| P4 | 22 | +0.015/+0.002 | 36 | 56 | M8 |
| P5 | 32 | +0.018/+0.002 | 58 | 88 | M12 |
| P7 | 40 | +0.018/+0.002 | 82 | 112 | M16 |
| P8 | 55 | +0.021/+0.002 | 82 | 112 | M20 |
| P9 | 75 | +0.021/+0.002 | 105 | 143 | M20 |

(1) *The center hole in shafts with keys (Option "P") are machined to DIN 332 T2 shape DR.*

(2) *Feather keys are toleranced according to standard DIN 6885.*

## P Series Output Bearing Options

| | S Ball Bearing | D Double Row Angular Contact Bearing | Z Cylindrical Roller Bearing ("Z" cylindrical roller bearing not allowed with reduced backlash option.) |
|---|---|---|---|
| |  |  |  |
| **Characteristics:** | • Minimal frictional torque<br>• Good radial load capacity<br>• Axial load approx. 35% of radial load | • Low frictional torque<br>• Good radial bearing capacity<br>• Axial load approx. 50% of radial load | • Very good radial load capacity<br>• Axial load approx. 20% of radial load |
| **Applications:** | • Spur geared rack/pinion<br>• Couplings<br>• Belt with or without light tension | • Helical geared rack/pinion<br>• Couplings with high axial load<br>• Belt with or without light tension | • Prestressed belt drive<br>• Prestressed spur rack drive<br>• Applications with high radial loads and/or high service requirements |

## Permissible Output Shaft Load and Tilting Moments*

| | $z_2$ Distance of Shaft Shoulder to Center of Output Bearing | $F_{2ax100}$ Permitted Axial Force | $F_{2rad100}$ Permitted Radial Force ≤100RPM | $F_{2rad,acc}$ Radial Acceleration Force | $M_{2K100}$ Permitted Tilting Torque ≤100RPM | $M_{2k,acc}$ Permitted Acceleration Tilting Torque |
|---|---|---|---|---|---|---|
| **Unit** | mm | N | N | N | Nm | Nm |
| **S Ball Bearing** | | | | | | |
| **P2** | 17 | 500 | 1200 | 1300 | 34 | 36 |
| **P3** | 17.5 | 1000 | 2500 | 2500 | 79 | 79 |
| **P4** | 18.5 | 1500 | 4000 | 4500 | 146 | 164 |
| **P5** | 19.5 | 2300 | 6500 | 7000 | 315 | 340 |
| **P7** | 23 | 2900 | 8000 | 9000 | 544 | 576 |
| **P8** | 24.5 | 4700 | 13,000 | 18,000 | 852 | 1179 |
| **P9** | 33 | 6000 | 18,000 | 27,000 | 1539 | 2309 |
| **D Double Row Angular Contact Bearing** | | | | | | |
| **P3** | 20 | 2500 | 2750 | 2750 | 94 | 94 |
| **P4** | 22.5 | 4000 | 4500 | 5000 | 182 | 203 |
| **P5** | 25.5 | 6000 | 7000 | 8000 | 382 | 436 |
| **P7** | 29 | 10,000 | 9000 | 10,000 | 665 | 700 |
| **P8** | 32 | 15,500 | 15,000 | 18,000 | 1095 | 1314 |
| **P9** | 44 | 25,000 | 20,000 | 30,000 | 1930 | 2895 |
| **Z Cylindrical Roller Bearing** | | | | | | |
| **P3** | 17.5 | 600 | 3000 | 3000 | 95 | 95 |
| **P4** | 18.5 | 1000 | 5000 | 5000 | 183 | 183 |
| **P5** | 19.5 | 1600 | 8000 | 8000 | 388 | 388 |
| **P7** | 23 | 2000 | 10,000 | 10,000 | 640 | 640 |
| **P8** | 24.5 | 3600 | 18,000 | 18,000 | 1179 | 1179 |
| **P9** | 33 | 5000 | 27,000 | 35,000 | 2309 | 2993 |

** Refer to illustration and load/life/speed definitions on page 19*

*During EMERGENCY OFF operation (maximum stops per gearhead = 1000) the permissible values in the table for $F_{2ax100}$, $F_{2rad100}$, and $M_{2K100}$ can be multiplied by a factor of 2.*

*The permissible load values given are valid with the load applied to the center of the output shaft ($x_2$).*



# Overview

## P No Load Running Torque*

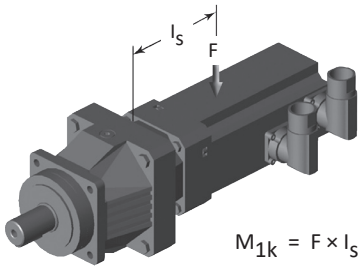
| | | Input Ratio $T_R$ | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | One Stage | | | | | | | Two Stage | | | | | | | | | | | |
| Unit | | 3 | 4 | 5 | 7 | 8 | 10 | 12 | 16 | 20 | 25 | 28 | 32 | 35 | 40 | 50 | 56 | 70 | 80 | 100 |
| P2 | Nm | – | 0.16 | 0.13 | 0.13 | 0.13 | 0.10 | – | 0.13 | 0.13 | 0.08 | 0.08 | 0.08 | 0.08 | 0.08 | 0.08 | 0.08 | 0.08 | 0.08 | 0.08 |
| P3 | Nm | 0.26 | 0.21 | .016 | 0.16 | 0.16 | .016 | 0.13 | 0.13 | 0.13 | 0.08 | 0.08 | 0.13 | 0.08 | 0.08 | 0.08 | 0.08 | 0.08 | 0.08 | 0.08 |
| P4 | Nm | 0.33 | 0.23 | 0.23 | 0.18 | 0.18 | 0.18 | 0.14 | 0.14 | 0.14 | 0.11 | 0.11 | 0.14 | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 |
| P5 | Nm | 0.60 | 0.45 | 0.40 | 0.30 | 0.20 | 0.20 | 0.23 | 0.23 | 0.23 | 0.18 | 0.18 | 0.23 | 0.18 | 0.18 | 0.18 | 0.18 | 0.18 | 0.18 | 0.18 |
| P7 | Nm | 0.83 | 0.53 | 0.43 | 0.33 | 0.23 | 0.23 | 0.30 | 0.30 | 0.30 | 0.20 | 0.20 | 0.30 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 |
| P8 | Nm | 1.05 | 0.75 | 0.65 | 0.45 | 0.35 | 0.35 | 0.48 | 0.43 | 0.43 | 0.33 | 0.33 | 0.43 | 0.23 | 0.23 | 0.23 | 0.23 | 0.23 | 0.23 | 0.23 |
| P9 | Nm | – | 0.92 | 0.72 | 0.52 | – | 0.42 | – | 0.55 | 0.55 | 0.45 | 0.45 | – | 0.35 | 0.35 | 0.35 | – | 0.35 | – | 0.35 |

** Torque is measured with the input at 2000 RPM and an ambient temperature of 20° C.*

## Permissible Motor Tilting Torque

The permissible tilting torque of the motor attached to the gear unit is a result of the static and dynamic load "F" from the motor weight, mass acceleration, and vibration multiplied by the distance from the center of gravity "$l_S$" of the motor.

| $M_{1K}$ | P231 P232 P332 | P331 P432 | P431 P532 | P531 P732 | P731 P832 | P831 P932 | P931 |
|---|---|---|---|---|---|---|---|
| Nm | 10 | 20 | 40 | 80 | 200 | 400 | 800 |




$$M_{1k} = F \times l_S \leq M_{1K}$$

## P Series Load/Life/Speed Calculations

The permissible load and tilting moment values are based on an output speed of 100 RPM. For higher speeds the following applies, where $n_2$ is the desired speed:

$$F_{2AX} = \frac{F_{2ax100}}{\sqrt[3]{\frac{n_2}{100}}} \qquad F_{2RX} = \frac{F_{2rad100}}{\sqrt[3]{\frac{n_2}{100}}} \qquad M_{2KX} = \frac{M_{2K100}}{\sqrt[3]{\frac{n_2}{100}}}$$

The application output tilting moment should be determined by the following formula:

$$M_{2k,acc*} = \frac{2 \bullet F_{2ax100} \bullet y_2 + F_{2rad,acc} \bullet (x_2 + Z_2)}{1000} \leq M_{2k,acc}$$

$$M_{2k,eq*} = \sqrt[3]{\frac{n_{2b1} \bullet t_{b1} \bullet M_{2kb1}^{\ 3} + \ldots + n_{2bn} \bullet t_{bn} \bullet M_{2kbn}^{\ 3}}{n_{2b1} \bullet t_{b1} + \ldots + n_{2bn} \bullet t_{bn}}} \leq M_{2kN}$$

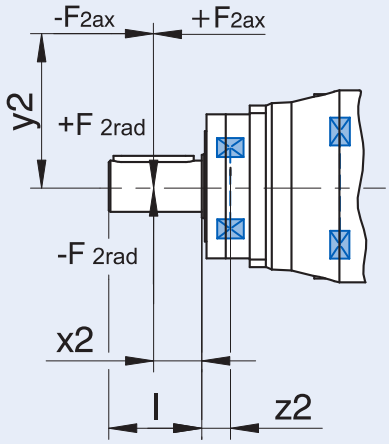
$$F_{2rad,eq*} = \sqrt[3]{\frac{n_{2b1} \bullet t_{b1} \bullet F_{2rb1}^{\ 3} + \ldots + n_{2bn} \bullet t_{bn} \bullet F_{2rbn}^{\ 3}}{n_{2b1} \bullet t_{b1} + \ldots + n_{2bn} \bullet t_{bn}}} \leq F_{2radN}$$

Where:

| | |
|---|---|
| **$z_2$** | Distance of Shaft Shoulder to Center of Output Bearing |
| **$n_2$** | Actual Average Output Speed |
| **$x_2$** | Distance of the Shaft Shoulder to the Force Application Point |
| **$y_2$** | Distance of the Shaft Axis to the Axial Force Application Point |
| **$F_{2ax}$*** | Actual Axial Force at Gear Unit Output |
| **$F_{2ax100}$** | Permitted Axial Force |
| **$F_{2rad100}$** | Permitted Radial Force ≤100RPM |
| **$F_{2rad,acc}$** | Radial Acceleration Force |
| **$F_{2rad,acc}$*** | Radial Acceleration Force at Gear Unit Output |
| **$M_{2K100}$** | Permitted Tilting Torque ≤100RPM |
| **$M_{2K,acc}$** | Permitted Acceleration Tilting Torque |
| **$M_{2k,acc}$*** | Permitted Acceleration Tilting Torque at Gear Unit Output |
| **$C_{2K}$** | Tilting Stiffness |

**All formulas shown are based on METRIC values**

*Upper case letters are permissible values. Lower case letters are for existing values.*




The hours of life ($L_h$) of the unit can be determined by the following formula:

**bearing life for duty cycle ≤ 40%**

$L_h$ > 10,000 hours if $M_{2K100}/M_{2A}$ < 1.25 and > 1
$L_h$ > 20,000 hours if $M_{2K100}/M_{2A}$ > 1.25 and > 1.5
$L_h$ > 30,000 hours if $M_{2K100}/M_{2A}$ < 1.5

**bearing life for duty cycle ≥ 40%**

$$L_{hA} = L_h \left( \frac{40\%}{\text{Duty Cycle}} \right)$$

| Exact Ratio (i) | Output Torque: Nom. [1] $M_{2N}$ Nm | Output Torque: Accel. $M_{2acc}$ Nm | Output Torque: Accel. Torque for Reduced Backlash $M_{2accHT}$ Nm | Output Torque: Peak [2] $M_{2NOT}$ Nm | Backlash $\Delta\phi_2$ arcmin | Red. Backlash $\Delta\phi_{2red}$ arcmin | Part Number* (Gearhead + Input) | Max. Input Speed RPM (n1): Cont. | Max. Input Speed RPM (n1): Cyclic | Motor Shaft [3] Max Ø $d_{MW}$ mm | Input Inertia $J_1$ kgcm² | Tors. Stiffness $C_2$ Nm/arcmin | Oper. Noise $L_{pA}$ dB(A) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **P2** | | | | | | | | | | | | | |
| 4.000 | 16 | 25 | – | 51 | 6 | – | P231_0040 ME | 6000 | 8000 | ≤14 | 0.14 | 1.8 | 59 |
| | | | | | | | P231_0040 MEL | | | ≤19 | 0.43 | 1.9 | |
| 5.000 | 16 | 25 | – | 51 | 6 | – | P231_0050 ME | 6000 | 8000 | ≤14 | 0.12 | 1.9 | 57 |
| | | | | | | | P231_0050 MEL | | | ≤19 | 0.41 | | |
| 7.000 | 16 | 23 | – | 46 | 6 | – | P231_0070 ME | 6000 | 8000 | ≤14 | 0.11 | 1.8 | 56 |
| | | | | | | | P231_0070 MEL | | | ≤19 | 0.40 | | |
| 8.000 | 14 | 21 | – | 41 | 6 | – | P231_0080 ME | 6000 | 8000 | ≤14 | 0.10 | 1.7 | 55 |
| | | | | | | | P231_0080 MEL | | | ≤19 | 0.40 | | |
| 10.00 | 12 | 21 | – | 41 | 6 | – | P231_0100 ME | 6000 | 8000 | ≤14 | 0.10 | 1.6 | 54 |
| | | | | | | | P231_0100 MEL | | | ≤19 | 0.39 | | |
| 16.00 | 16 | 24 | – | 48 | 8 | – | P232_0160 ME | 6000 | 8000 | ≤14 | 0.13 | 1.8 | 59 |
| | | | | | | | P232_0160 MEL | | | ≤19 | 0.42 | | |
| 20.00 | 16 | 25 | – | 51 | 8 | – | P232_0200 ME | 6000 | 8000 | ≤14 | 0.14 | 1.8 | 59 |
| | | | | | | | P232_0200 MEL | | | ≤19 | 0.43 | | |
| 25.00 | 16 | 25 | – | 51 | 8 | – | P232_0250 ME | 6000 | 8000 | ≤14 | 0.12 | 1.8 | 57 |
| | | | | | | | P232_0250 MEL | | | ≤19 | 0.41 | | |
| 28.00 | 16 | 24 | – | 48 | 8 | – | P232_0280 ME | 6000 | 8000 | ≤14 | 0.11 | 1.8 | 56 |
| | | | | | | | P232_0280 MEL | | | ≤19 | 0.40 | | |
| 32.00 | 16 | 21 | – | 41 | 8 | – | P232_0320 ME | 6000 | 8000 | ≤14 | 0.13 | 1.7 | 59 |
| | | | | | | | P232_0320 MEL | | | ≤19 | 0.42 | | |
| 35.00 | 18 | 25 | – | 51 | 8 | – | P232_0350 ME | 6000 | 8000 | ≤14 | 0.11 | 1.8 | 56 |
| | | | | | | | P232_0350 MEL | | | ≤19 | 0.40 | | |
| 40.00 | 16 | 24 | – | 48 | 8 | – | P232_0400 ME | 6000 | 8000 | ≤14 | 0.10 | 1.8 | 54 |
| | | | | | | | P232_0400 MEL | | | ≤19 | 0.39 | | |
| 50.00 | 19 | 25 | – | 51 | 8 | – | P232_0500 ME | 6000 | 8000 | ≤14 | 0.10 | 1.8 | 54 |
| | | | | | | | P232_0500 MEL | | | ≤19 | 0.39 | | |
| 56.00 | 16 | 21 | – | 41 | 8 | – | P232_0560 ME | 6000 | 8000 | ≤14 | 0.11 | 1.7 | 56 |
| | | | | | | | P232_0560 MEL | | | ≤19 | 0.40 | | |
| 70.00 | 18 | 23 | – | 46 | 8 | – | P232_0700 ME | 6000 | 8000 | ≤14 | 0.10 | 1.8 | 54 |
| | | | | | | | P232_0700 MEL | | | ≤19 | 0.39 | | |
| 80.00 | 16 | 21 | – | 41 | 8 | – | P232_0800 ME | 6000 | 8000 | ≤14 | 0.10 | 1.7 | 54 |
| | | | | | | | P232_0800 MEL | | | ≤19 | 0.39 | | |
| 100.0 | 16 | 21 | – | 41 | 8 | – | P232_1000 ME | 6000 | 8000 | ≤14 | 0.10 | 1.6 | 54 |
| | | | | | | | P232_1000 MEL | | | ≤19 | 0.39 | | |

[1] *Based on input speed of 1500RPM. See page 16 for details on torque calculations.*
[2] *Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
[3] *For additional motor shaft sizes or smaller inertia values, please visit configurator.stober.com*
* *ME = Motor Adapter L = Large Input*

# Selection Data



| Exact Ratio (i) | Output Torque: Nom. $M_{2N}$ [1] Nm | Output Torque: Accel. $M_{2acc}$ Nm | Output Torque: Accel. Torque for Reduced Backlash $M_{2accHT}$ Nm | Output Torque: Peak $M_{2NOT}$ [2] Nm | Back-lash $\Delta\phi_2$ arcmin | Red. Back-lash $\Delta\phi_{2red}$ arcmin | Part Number* (Gearhead + Input) | Max. Input Speed RPM (n1): Cont. | Max. Input Speed RPM (n1): Cyclic | Motor Shaft [3] Max Ø $d_{MW}$ mm | Input Inertia $J_1$ kgcm² | Tors. Stiffness $C_2$ Nm/arcmin | Oper. Noise $L_{pA}$ dB(A) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **P3** | | | | | | | | | | | | | |
| 3.000 | 30 | 50 | 50 | 100 | 4 | 2 | P331_0030 ME | 3500 | 7000 | ≤19 | 0.67 | 5.0 | 62 |
| | | | | | | | P331_0030 MEL | | | ≤24 | 1.1 | 5.1 | |
| 4.000 | 45 | 65 | 65 | 130 | 4 | 2 | P331_0040 ME | 4000 | 8000 | ≤19 | 0.51 | 5.3 | 60 |
| | | | | | | | P331_0040 MEL | | | ≤24 | 0.94 | | |
| 5.000 | 45 | 75 | 80 | 150 | 4 | 2 | P331_0050 ME | 4500 | 8000 | ≤19 | 0.46 | 5.4 | 58 |
| | | | | | | | P331_0050 MEL | | | ≤24 | 0.89 | | |
| 7.000 | 45 | 69 | 75 | 138 | 4 | 2 | P331_0070 ME | 5000 | 8000 | ≤19 | 0.42 | 5.0 | 57 |
| | | | | | | | P331_0070 MEL | | | ≤24 | 0.85 | | |
| 8.000 | 40 | 63 | 65 | 126 | 4 | 2 | P331_0080 ME | 5000 | 8000 | ≤19 | 0.41 | 4.6 | 56 |
| | | | | | | | P331_0080 MEL | | | ≤24 | 0.84 | | |
| 10.00 | 36 | 60 | 60 | 120 | 4 | 2 | P331_0100 ME | 5500 | 8000 | ≤19 | 0.40 | 4.4 | 55 |
| | | | | | | | P331_0100 MEL | | | ≤24 | 0.83 | | |
| 12.00 | 30 | 50 | 50 | 100 | 5 | 3 | P332_0120 ME | 5500 | 8000 | ≤14 | 0.14 | 4.6 | 59 |
| | | | | | | | P332_0120 MEL | | | ≤19 | 0.43 | | |
| 16.00 | 45 | 65 | 65 | 130 | 5 | 3 | P332_0160 ME | 5500 | 8000 | ≤14 | 0.13 | 5.1 | 59 |
| | | | | | | | P332_0160 MEL | | | ≤19 | 0.42 | | |
| 20.00 | 50 | 75 | 75 | 150 | 5 | 3 | P332_0200 ME | 5500 | 8000 | ≤14 | 0.13 | 5.2 | 59 |
| | | | | | | | P332_0200 MEL | | | ≤19 | 0.42 | | |
| 25.00 | 50 | 75 | 75 | 150 | 5 | 3 | P332_0250 ME | 6000 | 8000 | ≤14 | 0.13 | 5.2 | 57 |
| | | | | | | | P332_0250 MEL | | | ≤19 | 0.41 | | |
| 28.00 | 45 | 65 | 70 | 130 | 5 | 3 | P332_0280 ME | 6000 | 8000 | ≤14 | 0.11 | 5.1 | 56 |
| | | | | | | | P332_0280 MEL | | | ≤19 | 0.42 | | |
| 32.00 | 48 | 63 | 65 | 126 | 5 | 3 | P332_0320 ME | 5500 | 8000 | ≤14 | 0.13 | 4.6 | 59 |
| | | | | | | | P332_0320 MEL | | | ≤19 | 0.43 | | |
| 35.00 | 50 | 75 | 75 | 150 | 5 | 3 | P332_0350 ME | 6000 | 8000 | ≤14 | 0.10 | 5.2 | 56 |
| | | | | | | | P332_0350 MEL | | | ≤19 | 0.39 | | |
| 40.00 | 45 | 65 | 65 | 130 | 5 | 3 | P332_0400 ME | 6000 | 8000 | ≤14 | 0.10 | 4.8 | 54 |
| | | | | | | | P332_0400 MEL | | | ≤19 | 0.39 | | |
| 50.00 | 50 | 75 | 75 | 150 | 5 | 3 | P332_0500 ME | 6000 | 8000 | ≤14 | 0.10 | 5.0 | 54 |
| | | | | | | | P332_0500 MEL | | | ≤19 | 0.39 | | |
| 56.00 | 48 | 63 | 65 | 126 | 5 | 3 | P332_0560 ME | 6000 | 8000 | ≤14 | 0.10 | 4.6 | 56 |
| | | | | | | | P332_0560 MEL | | | ≤19 | 0.39 | | |
| 70.00 | 53 | 69 | 69 | 138 | 5 | 3 | P332_0700 ME | 6000 | 8000 | ≤14 | 0.10 | 4.9 | 54 |
| | | | | | | | P332_0700 MEL | | | ≤19 | 0.39 | | |
| 80.00 | 48 | 63 | 65 | 126 | 5 | 3 | P332_0800 ME | 6000 | 8000 | ≤14 | 0.10 | 4.5 | 54 |
| | | | | | | | P332_0800 MEL | | | ≤19 | 0.39 | | |
| 100.0 | 46 | 60 | 60 | 120 | 5 | 3 | P332_1000 ME | 6000 | 8000 | ≤14 | 0.10 | 4.3 | 54 |
| | | | | | | | P332_1000 MEL | | | ≤19 | 0.39 | | |

[1] *Based on input speed of 1500RPM. See page 16 for details on torque calculations.*
[2] *Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
[3] *For additional motor shaft sizes or smaller inertia values, please visit configurator.stober.com*
* *ME = Motor Adapter L = Large Input*

| Exact Ratio (i) | Output Torque: Nom. [1] $M_{2N}$ Nm | Output Torque: Accel. $M_{2acc}$ Nm | Output Torque: Accel. Torque for Reduced Backlash $M_{2accHT}$ Nm | Output Torque: Peak [2] $M_{2NOT}$ Nm | Backlash $\Delta\phi_2$ arcmin | Red. Backlash $\Delta\phi_{2red}$ arcmin | Part Number* (Gearhead + Input) | Max. Input Speed RPM (n1): Cont. | Max. Input Speed RPM (n1): Cyclic | Motor Shaft [3] Max Ø $d_{MW}$ mm | Input Inertia $J_1$ kgcm² | Tors. Stiffness $C_2$ Nm/arcmin | Oper. Noise $L_{pA}$ dB(A) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **P4** | | | | | | | | | | | | | |
| 3.000 | 50 | 100 | 100 | 200 | 4 | 2 | P431_0030 ME | 3000 | 6000 | ≤24 | 1.6 | 12 | 63 |
| | | | | | | | P431_0030 MEL | | | ≤32 | 3.2 | | |
| 4.000 | 90 | 120 | 130 | 240 | 4 | 2 | P431_0040 ME | 3300 | 6500 | ≤24 | 1.2 | 13 | 61 |
| | | | | | | | P431_0040 MEL | | | ≤32 | 2.8 | | |
| 5.000 | 90 | 139 | 145 | 277 | 4 | 2 | P431_0050 ME | 3700 | 7000 | ≤24 | 1.0 | 13 | 59 |
| | | | | | | | P431_0050 MEL | | | ≤32 | 2.7 | | |
| 7.000 | 90 | 135 | 143 | 271 | 4 | 2 | P431_0070 ME | 4000 | 8000 | ≤24 | 0.92 | 11 | 58 |
| | | | | | | | P431_0070 MEL | | | ≤32 | 2.5 | | |
| 8.000 | 80 | 120 | 125 | 239 | 4 | 2 | P431_0080 ME | 4000 | 8000 | ≤24 | 0.90 | 9.7 | 57 |
| | | | | | | | P431_0080 MEL | | | ≤32 | 2.5 | | |
| 10.00 | 75 | 115 | 115 | 230 | 4 | 2 | P431_0100 ME | 4000 | 8000 | ≤24 | 0.88 | 9.1 | 56 |
| | | | | | | | P431_0100 MEL | | | ≤32 | 2.5 | | |
| 12.00 | 60 | 100 | 100 | 200 | 5 | 3 | P432_0120 ME | 3500 | 7000 | ≤19 | 0.52 | 11 | 60 |
| | | | | | | | P432_0120 MEL | | | ≤24 | 0.95 | | |
| 16.00 | 89 | 130 | 130 | 260 | 5 | 3 | P432_0160 ME | 4000 | 8000 | ≤19 | 0.49 | 12 | 60 |
| | | | | | | | P432_0160 MEL | | | ≤24 | 0.92 | | |
| 20.00 | 95 | 134 | 139 | 268 | 5 | 3 | P432_0200 ME | 4000 | 8000 | ≤19 | 0.48 | 12 | 60 |
| | | | | | | | P432_0200 MEL | | | ≤24 | 0.91 | | |
| 25.00 | 100 | 134 | 139 | 268 | 5 | 3 | P432_0250 ME | 4500 | 8000 | ≤19 | 0.45 | 12 | 58 |
| | | | | | | | P432_0250 MEL | | | ≤24 | 0.87 | | |
| 28.00 | 95 | 130 | 130 | 260 | 5 | 3 | P432_0280 ME | 4500 | 8000 | ≤19 | 0.42 | 12 | 57 |
| | | | | | | | P432_0280 MEL | | | ≤24 | 0.85 | | |
| 32.00 | 90 | 126 | 131 | 253 | 5 | 3 | P432_0320 ME | 4000 | 8000 | ≤19 | 0.47 | 9.6 | 60 |
| | | | | | | | P432_0320 MEL | | | ≤24 | 0.90 | | |
| 35.00 | 102 | 133 | 138 | 266 | 5 | 3 | P432_0350 ME | 4500 | 8000 | ≤19 | 0.42 | 12 | 57 |
| | | | | | | | P432_0350 MEL | | | ≤24 | 0.84 | | |
| 40.00 | 87 | 130 | 130 | 260 | 5 | 3 | P432_0400 ME | 5000 | 8000 | ≤19 | 0.40 | 12 | 55 |
| | | | | | | | P432_0400 MEL | | | ≤24 | 0.83 | | |
| 50.00 | 102 | 132 | 138 | 264 | 5 | 3 | P432_0500 ME | 5000 | 8000 | ≤19 | 0.40 | 12 | 55 |
| | | | | | | | P432_0500 MEL | | | ≤24 | 0.83 | | |
| 56.00 | 88 | 115 | 115 | 230 | 5 | 3 | P432_0560 ME | 5000 | 8000 | ≤19 | 0.41 | 9.6 | 57 |
| | | | | | | | P432_0560 MEL | | | ≤24 | 0.84 | | |
| 70.00 | 97 | 127 | 127 | 253 | 5 | 3 | P432_0700 ME | 5000 | 8000 | ≤19 | 0.40 | 11 | 55 |
| | | | | | | | P432_0700 MEL | | | ≤24 | 0.83 | | |
| 80.00 | 88 | 115 | 115 | 230 | 5 | 3 | P432_0800 ME | 5000 | 8000 | ≤19 | 0.40 | 9.6 | 55 |
| | | | | | | | P432_0800 MEL | | | ≤24 | 0.83 | | |
| 100.0 | 85 | 110 | 110 | 220 | 5 | 3 | P432_1000 ME | 5000 | 8000 | ≤19 | 0.40 | 9.0 | 55 |
| | | | | | | | P432_1000 MEL | | | ≤24 | 0.83 | | |

[1] *Based on input speed of 1500RPM. See page 16 for details on torque calculations.*
[2] *Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
[3] *For additional motor shaft sizes or smaller inertia values, please visit configurator.stober.com*
* *ME = Motor Adapter  L = Large Input*

# Selection Data



| Exact Ratio (i) | Output Torque: Nom. [1] $M_{2N}$ Nm | Output Torque: Accel. $M_{2acc}$ Nm | Output Torque: Accel. Torque for Reduced Backlash $M_{2accHT}$ Nm | Output Torque: Peak [2] $M_{2NOT}$ Nm | Back-lash $\Delta\phi_2$ arcmin | Red. Back-lash $\Delta\phi_{2red}$ arcmin | Part Number* (Gearhead + Input) | Max. Input Speed RPM (n1): Cont. | Max. Input Speed RPM (n1): Cyclic | Motor Shaft [3] Max Ø $d_{MW}$ mm | Input Inertia $J_1$ kgcm² | Tors. Stiffness $C_2$ Nm/arcmin | Oper. Noise $L_{pA}$ dB(A) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **P5** | | | | | | | | | | | | | |
| 3.000 | 120 | 200 | 200 | 400 | 3 | 1 | P531_0030 ME | 2500 | 5000 | ≤32 | 5.3 | 33 | 64 |
| | | | | | | | P531_0030 MEL | | | ≤38 | 8.8 | | |
| 4.000 | 210 | 300 | 320 | 600 | 3 | 1 | P531_0040 ME | 3000 | 6000 | ≤32 | 3.7 | 34 | 62 |
| | | | | | | | P531_0040 MEL | | | ≤38 | 7.2 | | |
| 5.000 | 220 | 350 | 385 | 700 | 3 | 1 | P531_0050 ME | 3500 | 7000 | ≤32 | 3.2 | 34 | 60 |
| | | | | | | | P531_0050 MEL | | | ≤38 | 6.8 | | |
| 7.000 | 210 | 333 | 380 | 667 | 3 | 1 | P531_0070 ME | 3700 | 7000 | ≤32 | 2.9 | 31 | 59 |
| | | | | | | | P531_0070 MEL | | | ≤38 | 6.4 | | |
| 8.000 | 200 | 296 | 300 | 592 | 3 | 1 | P531_0080 ME | 3700 | 7000 | ≤32 | 2.8 | 25 | 58 |
| | | | | | | | P531_0080 MEL | | | ≤38 | 6.3 | | |
| 10.00 | 180 | 288 | 288 | 575 | 3 | 1 | P531_0100 ME | 3700 | 7000 | ≤32 | 2.7 | 26 | 57 |
| | | | | | | | P531_0100 MEL | | | ≤38 | 6.2 | | |
| 12.00 | 120 | 200 | 200 | 400 | 4 | 2 | P532_0120 ME | 3000 | 6000 | ≤24 | 1.2 | 31 | 61 |
| | | | | | | | P532_0120 MEL | | | ≤32 | 2.8 | | |
| 16.00 | 220 | 300 | 300 | 600 | 4 | 2 | P532_0160 ME | 3500 | 7000 | ≤24 | 1.1 | 33 | 61 |
| | | | | | | | P532_0160 MEL | | | ≤32 | 2.8 | | |
| 20.00 | 250 | 355 | 364 | 710 | 4 | 2 | P532_0200 ME | 3500 | 7000 | ≤24 | 1.1 | 33 | 61 |
| | | | | | | | P532_0200 MEL | | | ≤32 | 2.7 | | |
| 25.00 | 260 | 355 | 357 | 710 | 4 | 2 | P532_0250 ME | 3700 | 7000 | ≤24 | 0.99 | 33 | 59 |
| | | | | | | | P532_0250 MEL | | | ≤32 | 2.6 | | |
| 28.00 | 231 | 300 | 300 | 600 | 4 | 2 | P532_0280 ME | 4000 | 8000 | ≤24 | 0.92 | 32 | 58 |
| | | | | | | | P532_0280 MEL | | | ≤32 | 2.5 | | |
| 32.00 | 240 | 312 | 363 | 624 | 4 | 2 | P532_0320 ME | 3500 | 7000 | ≤24 | 1.1 | 25 | 61 |
| | | | | | | | P532_0320 MEL | | | ≤32 | 2.7 | | |
| 35.00 | 270 | 352 | 352 | 704 | 4 | 2 | P532_0350 ME | 4000 | 8000 | ≤24 | 0.91 | 33 | 58 |
| | | | | | | | P532_0350 MEL | | | ≤32 | 2.5 | | |
| 40.00 | 214 | 300 | 300 | 600 | 4 | 2 | P532_0400 ME | 4000 | 8000 | ≤24 | 0.88 | 31 | 56 |
| | | | | | | | P532_0400 MEL | | | ≤32 | 2.5 | | |
| 50.00 | 269 | 352 | 352 | 704 | 4 | 2 | P532_0500 ME | 4000 | 8000 | ≤24 | 0..87 | 32 | 56 |
| | | | | | | | P532_0500 MEL | | | ≤32 | 2.5 | | |
| 56.00 | 221 | 288 | 288 | 575 | 4 | 2 | P532_0560 ME | 4000 | 8000 | ≤24 | 0.90 | 25 | 58 |
| | | | | | | | P532_0560 MEL | | | ≤32 | 2.5 | | |
| 70.00 | 263 | 345 | 357 | 690 | 4 | 2 | P532_0700 ME | 4200 | 8000 | ≤24 | 0.87 | 30 | 56 |
| | | | | | | | P532_0700 MEL | | | ≤32 | 2.5 | | |
| 80.00 | 221 | 288 | 288 | 575 | 4 | 2 | P532_0800 ME | 4200 | 8000 | ≤24 | 0.87 | 25 | 56 |
| | | | | | | | P532_0800 MEL | | | ≤32 | 2.5 | | |
| 100.0 | 221 | 288 | 288 | 575 | 4 | 2 | P532_1000 ME | 4200 | 8000 | ≤24 | 0.87 | 26 | 56 |
| | | | | | | | P532_1000 MEL | | | ≤32 | 2.5 | | |

[1] *Based on input speed of 1500RPM. See page 16 for details on torque calculations.*
[2] *Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
[3] *For additional motor shaft sizes or smaller inertia values, please visit configurator.stober.com*
* *ME = Motor Adapter L = Large Input*

| Exact Ratio (i) | Output Torque: Nom. [1] $M_{2N}$ Nm | Output Torque: Accel. $M_{2acc}$ Nm | Output Torque: Accel. Torque for Reduced Backlash $M_{2accHT}$ Nm | Output Torque: Peak [2] $M_{2NOT}$ Nm | Back-lash $\Delta\phi_2$ arcmin | Red. Back-lash $\Delta\phi_{2red}$ arcmin | Part Number* (Gearhead + Input) | Max. Input Speed RPM (n1): Cont. | Max. Input Speed RPM (n1): Cyclic | Motor Shaft [3] Max Ø $d_{MW}$ mm | Input Inertia $J_1$ kgcm² | Tors. Stiffness $C_2$ Nm/arcmin | Oper. Noise $L_{pA}$ dB(A) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **P7** | | | | | | | | | | | | | |
| 3.000 | 300 | 500 | 500 | 1000 | 3 | 1 | P731_0030 ME | 2200 | 4000 | ≤38 | 15 | 62 | 65 |
| | | | | | | | P731_0030 MEL | | | ≤48 | 26 | 64 | |
| 4.000 | 440 | 700 | 725 | 1335 | 3 | 1 | P731_0040 ME | 2500 | 5000 | ≤38 | 10 | 65 | 63 |
| | | | | 1400 | | | P731_0040 MEL | | | ≤48 | 21 | 67 | |
| 5.000 | 440 | 805 | 840 | 1610 | 3 | 1 | P731_0050 ME | 2700 | 5500 | ≤38 | 8.8 | 65 | 61 |
| | | | | | | | P731_0050 MEL | | | ≤48 | 19 | | |
| 7.000 | 440 | 805 | 840 | 1610 | 3 | 1 | P731_0070 ME | 3000 | 6000 | ≤38 | 7.6 | 60 | 60 |
| | | | | | | | P731_0070 MEL | | | ≤48 | 18 | 61 | |
| 8.000 | 400 | 668 | 700 | 1336 | 3 | 1 | P731_0080 ME | 3000 | 6000 | ≤38 | 7.3 | 57 | 59 |
| | | | | | | | P731_0080 MEL | | | ≤48 | 17 | | |
| 10.00 | 350 | 575 | 575 | 1150 | 3 | 1 | P731_0100 ME | 3000 | 6000 | ≤38 | 7.0 | 54 | 58 |
| | | | | | | | P731_0100 MEL | | | ≤48 | 17 | | |
| 12.00 | 295 | 500 | 500 | 1000 | 4 | 2 | P732_0120 ME | 2500 | 5000 | ≤32 | 3.9 | 61 | 62 |
| | | | | | | | P732_0120 MEL | | | ≤38 | 7.4 | | |
| 16.00 | 450 | 700 | 700 | 1400 | 4 | 2 | P732_0160 ME | 3000 | 6000 | ≤32 | 3.6 | 65 | 62 |
| | | | | | | | P732_0160 MEL | | | ≤38 | 7.1 | | |
| 20.00 | 460 | 805 | 805 | 1610 | 4 | 2 | P732_0200 ME | 3000 | 6000 | ≤32 | 3.6 | 64 | 62 |
| | | | | | | | P732_0200 MEL | | | ≤38 | 7.1 | | |
| 25.00 | 500 | 805 | 805 | 1610 | 4 | 2 | P732_0250 ME | 3500 | 7000 | ≤32 | 3.1 | 64 | 60 |
| | | | | | | | P732_0250 MEL | | | ≤38 | 6.6 | | |
| 28.00 | 538 | 700 | 700 | 1400 | 4 | 2 | P732_0280 ME | 3700 | 7000 | ≤32 | 2.8 | 64 | 59 |
| | | | | | | | P732_0280 MEL | | | ≤38 | 6.3 | | |
| 32.00 | 470 | 730 | 730 | 1460 | 4 | 2 | P732_0320 ME | 3000 | 6000 | ≤32 | 3.4 | 57 | 62 |
| | | | | | | | P732_0320 MEL | | | ≤38 | 6.9 | | |
| 35.00 | 540 | 770 | 805 | 1540 | 4 | 2 | P732_0350 ME | 3700 | 7000 | ≤32 | 2.8 | 64 | 59 |
| | | | | | | | P732_0350 MEL | | | ≤38 | 6.4 | | |
| 40.00 | 454 | 700 | 700 | 1400 | 4 | 2 | P732_0400 ME | 3700 | 7000 | ≤32 | 2.7 | 63 | 57 |
| | | | | | | | P732_0400 MEL | | | ≤38 | 6.2 | | |
| 50.00 | 565 | 770 | 805 | 1540 | 4 | 2 | P732_0500 ME | 3700 | 7000 | ≤32 | 2.7 | 63 | 57 |
| | | | | | | | P732_0500 MEL | | | ≤38 | 6.2 | | |
| 56.00 | 500 | 650 | 650 | 1300 | 4 | 2 | P732_0560 ME | 3700 | 7000 | ≤32 | 2.8 | 57 | 59 |
| | | | | | | | P732_0560 MEL | | | ≤38 | 6.4 | | |
| 70.00 | 584 | 762 | 799 | 1525 | 4 | 2 | P732_0700 ME | 3700 | 7000 | ≤32 | 2.7 | 60 | 57 |
| | | | | | | | P732_0700 MEL | | | ≤38 | 6.2 | | |
| 80.00 | 477 | 620 | 620 | 1240 | 4 | 2 | P732_0800 ME | 3700 | 7000 | ≤32 | 2.7 | 57 | 57 |
| | | | | | | | P732_0800 MEL | | | ≤38 | 6.2 | | |
| 100.0 | 423 | 550 | 550 | 1100 | 4 | 2 | P732_1000 ME | 3700 | 7000 | ≤32 | 2.7 | 54 | 57 |
| | | | | | | | P732_1000 MEL | | | ≤38 | 6.2 | | |

[1] *Based on input speed of 1500RPM. See page 16 for details on torque calculations.*
[2] *Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
[3] *For additional motor shaft sizes or smaller inertia values, please visit configurator.stober.com*
* *ME = Motor Adapter  L = Large Input*

# Selection Data



| Exact Ratio (i) | Output Torque: Nom. $M_{2N}$ Nm | Output Torque: Accel. $M_{2acc}$ Nm | Output Torque: Accel. Torque for Reduced Backlash $M_{2accHT}$ Nm | Output Torque: Peak $M_{2NOT}$ Nm | Back-lash $\Delta\phi_2$ arcmin | Red. Back-lash $\Delta\phi_{2red}$ arcmin | Part Number* (Gearhead + Input) | Max. Input Speed RPM (n1): Cont. | Max. Input Speed RPM (n1): Cyclic | Motor Shaft [3] Max Ø $d_{MW}$ mm | Input Inertia $J_1$ kgcm² | Tors. Stiffness $C_2$ Nm/arcmin | Oper. Noise $L_{pA}$ dB(A) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **P8** | | | | | | | | | | | | | |
| 3.000 | 800 | 1200 | 1200 | 1825 | 3 | 1 | P831_0030 ME | 1800 | 3000 | ≤48 | 59 | 170 | 66 |
| | | | | 2400 | | | P831_0030 MEL | | | ≤60 | 87 | 178 | |
| 4.000 | 880 | 1760 | 1760 | 2433 | 3 | 1 | P831_0040 ME | 2000 | 3500 | ≤48 | 36 | 176 | 64 |
| | | | | 3230 | | | P831_0040 MEL | | | ≤60 | 64 | 180 | |
| 5.000 | 1100 | 1840 | 2000 | 3041 | 3 | 1 | P831_0050 ME | 2500 | 4000 | ≤48 | 28 | 178 | 62 |
| | | | | 3230 | | | P831_0050 MEL | | | ≤60 | 56 | 181 | |
| 7.000 | 1000 | 1760 | 1840 | 3230 | 3 | 1 | P831_0070 ME | 2800 | 4500 | ≤48 | 23 | 167 | 61 |
| | | | | | | | P831_0070 MEL | | | ≤60 | 51 | 168 | |
| 8.000 | 850 | 1500 | 1500 | 3000 | 3 | 1 | P831_0080 ME | 2800 | 4500 | ≤48 | 21 | 160 | 60 |
| | | | | | | | P831_0080 MEL | | | ≤60 | 50 | 161 | |
| 10.00 | 850 | 1380 | 1380 | 2760 | 3 | 1 | P831_0100 ME | 2800 | 4500 | ≤48 | 20 | 149 | 59 |
| | | | | | | | P831_0100 MEL | | | ≤60 | 48 | | |
| 12.00 | 800 | 1200 | 1200 | 2400 | 4 | 2 | P832_0120 ME | 2200 | 4500 | ≤38 | 12 | 166 | 63 |
| | | | | | | | P832_0120 MEL | | | ≤48 | 22 | 167 | |
| 16.00 | 1100 | 1600 | 1600 | 3200 | 4 | 2 | P832_0160 ME | 2700 | 5000 | ≤38 | 11 | 173 | 63 |
| | | | | | | | P832_0160 MEL | | | ≤48 | 21 | 174 | |
| 20.00 | 1250 | 1840 | 2000 | 3230 | 4 | 2 | P832_0200 ME | 2700 | 5000 | ≤38 | 10 | 176 | 63 |
| | | | | | | | P832_0200 MEL | | | ≤48 | 20 | 177 | |
| 25.00 | 1300 | 1840 | 2000 | 3230 | 4 | 2 | P832_0250 ME | 2900 | 5000 | ≤38 | 8.8 | 176 | 61 |
| | | | | | | | P832_0250 MEL | | | ≤48 | 19 | | |
| 28.00 | 1100 | 1600 | 1600 | 3200 | 4 | 2 | P832_0280 ME | 3000 | 5000 | ≤38 | 7.8 | 171 | 60 |
| | | | | | | | P832_0280 MEL | | | ≤48 | 18 | 172 | |
| 32.00 | 1173 | 1525 | 1595 | 3049 | 4 | 2 | P832_0320 ME | 2700 | 5000 | ≤38 | 9.9 | 159 | 63 |
| | | | | | | | P832_0320 MEL | | | ≤48 | 20 | | |
| 35.00 | 1415 | 1840 | 2000 | 3230 | 4 | 2 | P832_0350 ME | 3000 | 6000 | ≤38 | 7.6 | 175 | 60 |
| | | | | | | | P832_0350 MEL | | | ≤48 | 18 | | |
| 40.00 | 1097 | 1600 | 1600 | 3200 | 4 | 2 | P832_0400 ME | 3000 | 6000 | ≤38 | 7.1 | 168 | 58 |
| | | | | | | | P832_0400 MEL | | | ≤48 | 17 | | |
| 50.00 | 1415 | 1840 | 2000 | 3230 | 4 | 2 | P832_0500 ME | 3000 | 6000 | ≤38 | 7.0 | 173 | 58 |
| | | | | | | | P832_0500 MEL | | | ≤48 | 17 | | |
| 56.00 | 1062 | 1380 | 1380 | 2760 | 4 | 2 | P832_0560 ME | 3000 | 6000 | ≤38 | 7.5 | 159 | 60 |
| | | | | | | | P832_0560 MEL | | | ≤48 | 18 | | |
| 70.00 | 1238 | 1610 | 1610 | 3220 | 4 | 2 | P832_0700 ME | 3000 | 6000 | ≤38 | 7.0 | 164 | 58 |
| | | | | | | | P832_0700 MEL | | | ≤48 | 17 | | |
| 80.00 | 1062 | 1380 | 1380 | 2760 | 4 | 2 | P832_0800 ME | 3000 | 6000 | ≤38 | 6.9 | 159 | 58 |
| | | | | | | | P832_0800 MEL | | | ≤48 | 17 | | |
| 100.0 | 1015 | 1320 | 1320 | 2640 | 4 | 2 | P832_1000 ME | 3000 | 6000 | ≤38 | 6.9 | 148 | 58 |
| | | | | | | | P832_1000 MEL | | | ≤48 | 17 | | |

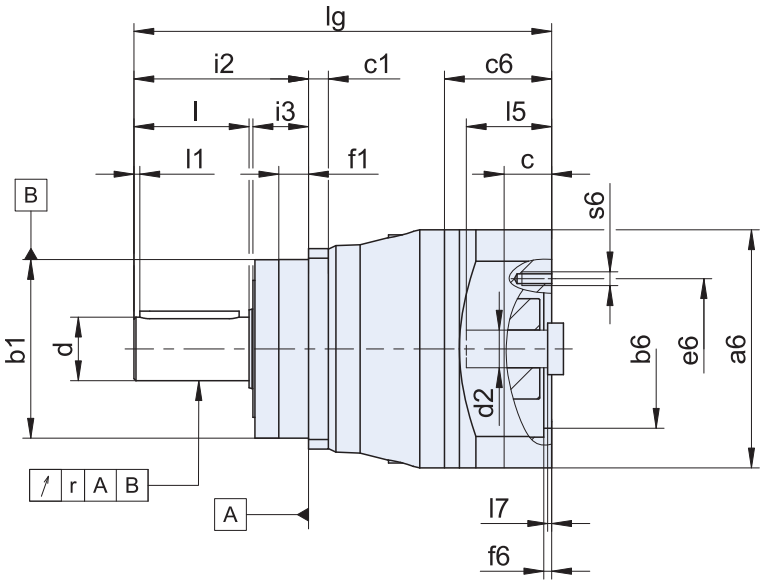
[1] *Based on input speed of 1500RPM. See page 16 for details on torque calculations.*
[2] *Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
[3] *For additional motor shaft sizes or smaller inertia values, please visit configurator.stober.com*
* *ME = Motor Adapter L = Large Input*

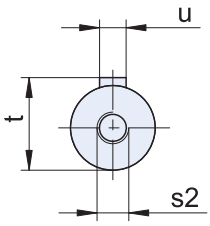
| Exact Ratio (i) | Output Torque: Nom. [1] $M_{2N}$ Nm | Output Torque: Accel. $M_{2acc}$ Nm | Output Torque: Accel. Torque for Reduced Backlash $M_{2accHT}$ Nm | Output Torque: Peak [2] $M_{2NOT}$ Nm | Back-lash $\Delta\phi_2$ arcmin | Red. Back-lash $\Delta\phi_{2red}$ arcmin | Part Number* (Gearhead + Input) | Max. Input Speed RPM (n1): Cont. | Max. Input Speed RPM (n1): Cyclic | Motor Shaft [3] Max Ø $d_{MW}$ mm | Input Inertia $J_1$ kgcm² | Tors. Stiffness $C_2$ Nm/arcmin | Oper. Noise $L_{pA}$ dB(A) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **P9** | | | | | | | | | | | | | |
| 4.000 | 2000 | 3000 | – | 5599 | 3 | – | P931_0040 ME | 1800 | 3000 | ≤60 | 100 | 407 | 70 |
| 5.000 | 2000 | 3450 | – | 6900 | 3 | – | P931_0050 ME | 2000 | 3500 | ≤60 | 82 | 407 | 68 |
| 7.000 | 2100 | 3105 | – | 6210 | 3 | – | P931_0070 ME | 2300 | 4000 | ≤60 | 69 | 375 | 66 |
| 10.00 | 1769 | 2300 | – | 4600 | 3 | – | P931_0100 ME | 2500 | 4000 | ≤60 | 62 | 323 | 64 |
| 16.00 | 2000 | 3000 | – | 6000 | 4 | – | P932_0160 ME | 2000 | 3500 | ≤48 | 37 | 403 | 64 |
| | | | | | | | P932_0160 MEL | | | ≤60 | 65 | 404 | |
| 20.00 | 2483 | 3450 | – | 6900 | 4 | – | P932_0200 ME | 2000 | 3500 | ≤48 | 35 | 405 | 64 |
| | | | | | | | P932_0200 MEL | | | ≤60 | 64 | 406 | |
| 25.00 | 2441 | 3300 | – | 6600 | 4 | – | P932_0250 ME | 2500 | 4000 | ≤48 | 28 | 405 | 62 |
| | | | | | | | P932_0250 MEL | | | ≤60 | 56 | 406 | |
| 28.00 | 2280 | 3000 | – | 6000 | 4 | – | P932_0280 ME | 2800 | 4500 | ≤48 | 23 | 401 | 61 |
| | | | | | | | P932_0280 MEL | | | ≤60 | 51 | | |
| 35.00 | 2376 | 3300 | – | 6600 | 4 | – | P932_0350 ME | 2800 | 4500 | ≤48 | 23 | 403 | 61 |
| | | | | | | | P932_0350 MEL | | | ≤60 | 51 | 404 | |
| 40.00 | 2000 | 3000 | – | 6000 | 4 | – | P932_0400 ME | 2800 | 4500 | ≤48 | 20 | 394 | 59 |
| | | | | | | | P932_0400 MEL | | | ≤60 | 48 | | |
| 50.00 | 2295 | 3200 | – | 6400 | 4 | – | P932_0500 ME | 2800 | 4500 | ≤48 | 20 | 399 | 59 |
| | | | | | | | P932_0500 MEL | | | ≤60 | 48 | | |
| 70.00 | 2387 | 3156 | – | 6312 | 4 | – | P932_0700 ME | 2800 | 4500 | ≤48 | 20 | 372 | 59 |
| | | | | | | | P932_0700 MEL | | | ≤60 | 48 | | |
| 100.0 | 1692 | 2200 | – | 4400 | 4 | – | P932_1000 ME | 2800 | 4500 | ≤48 | 20 | 321 | 59 |
| | | | | | | | P932_1000 MEL | | | ≤60 | 48 | | |

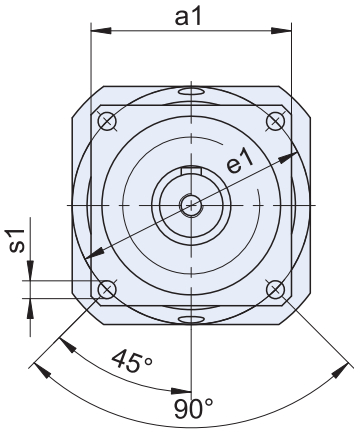
[1] *Based on input speed of 1500RPM. See page 16 for details on torque calculations.*
[2] *Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
[3] *For additional motor shaft sizes or smaller inertia values, please visit configurator.stober.com*
* *ME = Motor Adapter  L = Large Input*

# Dimensional Data






** See Motor Mounting Plate Option, page 17 for details.*
*** See Output Shaft Options, page 17 for details.*

## Table 1 Dimensions (mm)

| Unit | □a1 | Øb1 | c1 | Ød | Øe1 | f1 | i2 | i3 | l | l1 | r | Øs1 | s2 | t | u |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| P231 | 55 | $50_{h6}$ | 6 | $12_{k6}$ | 63 | 7.0 | 36 | 12 | 22 | 2 | – | 5.5 | M4 | 13.5 | A4×4×18 |
| P232 | 55 | $50_{h6}$ | 6 | $12_{k6}$ | 63 | 7.0 | 36 | 12 | 22 | 2 | – | 5.5 | M4 | 13.5 | A4×4×18 |
| P331 | 72 | $60_{h6}$ | 7 | $16_{k6}$ | 75 | 7.5 | 48 | 18 | 28 | 2 | 0.025 | 5.5 | M5 | 18.0 | A5×5×22 |
| P332 | 72 | $60_{h6}$ | 7 | $16_{k6}$ | 75 | 7.5 | 48 | 18 | 28 | 2 | 0.025 | 5.5 | M5 | 18.0 | A5×5×22 |
| P431 | 76 | $70_{h6}$ | 9 | $22_{k6}$ | 85 | 7.5 | 56 | 18 | 36 | 3 | 0.025 | 6.6 | M8 | 24.5 | A6×6×28 |
| P432 | 76 | $70_{h6}$ | 9 | $22_{k6}$ | 85 | 7.5 | 56 | 18 | 36 | 3 | 0.025 | 6.6 | M8 | 24.5 | A6×6×28 |
| P531 | 101 | $90_{h6}$ | 10 | $32_{k6}$ | 120 | 15.0 | 88 | 28 | 58 | 3 | 0.030 | 9.0 | M12 | 35.0 | A10×8×50 |
| P532 | 101 | $90_{h6}$ | 10 | $32_{k6}$ | 120 | 15.0 | 88 | 28 | 58 | 3 | 0.030 | 9.0 | M12 | 35.0 | A10×8×50 |
| P731 | 144 | $130_{h6}$ | 15 | $40_{k6}$ | 165 | 3.5 | 112 | 27 | 82 | 4 | 0.035 | 11.0 | M16 | 43.0 | A12×8×70 |
| P732 | 144 | $130_{h6}$ | 15 | $40_{k6}$ | 165 | 3.5 | 112 | 27 | 82 | 4 | 0.035 | 11.0 | M16 | 43.0 | A12×8×70 |
| P831 | 190 | $160_{h6}$ | 15 | $55_{k6}$ | 215 | 10.0 | 112 | 27 | 82 | 6 | 0.035 | 13.5 | M20 | 59.0 | A16×10×70 |
| P832 | 190 | $160_{h6}$ | 15 | $55_{k6}$ | 215 | 10.0 | 112 | 27 | 82 | 6 | 0.035 | 13.5 | M20 | 59.0 | A16×10×70 |
| P931 | 212 | $180_{h6}$ | 17 | $75_{k6}$ | 250 | 10.0 | 143 | 34 | 105 | 7 | 0.040 | 17.5 | M20 | 79.5 | A20×12×90 |
| P932 | 212 | $180_{h6}$ | 17 | $75_{k6}$ | 250 | 10.0 | 143 | 34 | 105 | 7 | 0.040 | 17.5 | M20 | 79.5 | A20×12×90 |

## Table 2 Dimensions (mm)

| Unit | Øb6 | Øe6 | Ød2max | l5 | □a6 | c | c6 | f6 | l7 | lg | s6 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| P231 ME | $40^{H7}$ | 63 | 14 | 30 | 55 | 15 | 32.0 | 3.5 | 3.0 | 109.5 | M5 |
| P232 ME | $40^{H7}$ | 63 | 14 | 30 | 55 | 15 | 32.0 | 3.5 | 3.0 | 141.5 | M5 |
| P331 ME | $60^{H7}$ | 75 | 19 | 41 | 75 | 18 | 41.5 | 3.5 | 4.0 | 145.5 | M5 |
| P332 ME | $40^{H7}$ | 63 | 14 | 30 | 55 | 15 | 32.0 | 3.5 | 3.0 | 163.0 | M5 |
| P431 ME | $95^{H7}$ | 115 | 24 | 41 | 100 | 21 | 42.5 | 4.0 | 3.5 | 165.5 | M8 |
| P432 ME | $60^{H7}$ | 75 | 19 | 41 | 75 | 18 | 41.5 | 3.5 | 4.0 | 202.5 | M5 |
| P531 ME | $110^{H7}$ | 130 | 32 | 51 | 120 | 24 | 54.0 | 4.0 | 4.5 | 210.5 | M8 |
| P532 ME | $95^{H7}$ | 115 | 24 | 41 | 100 | 21 | 42.5 | 4.0 | 3.5 | 239.5 | M8 |
| P731 ME | $130^{H7}$ | 165 | 38 | 61 | 150 | 26 | 66.0 | 5.5 | 4.5 | 264.5 | M10 |
| P732 ME | $110^{H7}$ | 130 | 32 | 51 | 120 | 24 | 54.0 | 4.0 | 4.5 | 302.5 | M8 |
| P831 ME | $180^{H7}$ | 215 | 48 | 83 | 204 | 35 | 80.5 | 5.5 | 8.5 | 311.5 | M12 |
| P832 ME | $130^{H7}$ | 165 | 38 | 61 | 150 | 26 | 66.0 | 5.5 | 4.5 | 356.5 | M10 |
| P931 ME | $180^{H7}$ | 215 | 60 | 85 | 230 | 43 | 91.5 | 6.0 | 10.5 | 382.5 | M12 |
| P932 ME | $180^{H7}$ | 215 | 48 | 83 | 204 | 35 | 80.5 | 5.5 | 8.5 | 463.5 | M12 |

*In the table above, you will find example dimensions for the motor connection for the ME motor adapter. Note that when dimension c is lengthened (depending on the motor used), dimensions c6, l5 and lg are also lengthened accordingly. You will find additional motor connection dimensions for motor adapters ME, MEL, MF and MFL in our STOBER Configurator at http://configurator.stober.com. Here, you can directly download a 3D model of your drive.*

# PH Series: INLINE — Flange Output

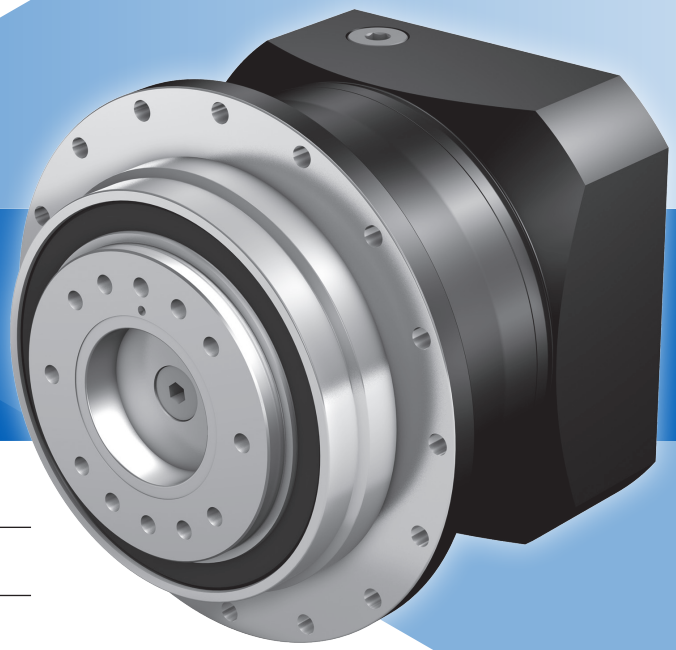
## PH Features

- 4:1 to 121:1 ratios (higher ratios available. Contact STOBER.)
- Quiet running (As low as 55dB(A))
- High load capacity and tilting rigidity through symmetrical bearing arrangement
- FKM seals for extended gearbox life
- Large motor input option to accept bigger diameter motor shafts so you don't use an oversized gearbox
- Error free motor mounting and quick changeover with toleranced pilot on motor plate
- Low no load running torque, giving you more torque for your application
- Magnetic oil filtration to remove contaminants to prevent breakdowns
- Build and ship in one day
- Assembled in the USA

*STOBER PH Series Servo Precision Planetary Gearheads are designed for applications that demand torsional stiffness and tilting rigidity. The advanced lines can handle high accuracy machines. Every gearbox is made to order. STOBER will custom whatever you need to fit your application. Contact us today to learn more.*

**All PH Series and select PHV Series SHIP in 1 DAY!**

NO EXPEDITE FEE FOR 24 HOUR SERVICE



## General Specifications

| | |
|---|---|
| **Ambient Temperature** | 0°C to +40°C (104°F) [Unit temperature <90°C Max] |
| **Backlash** | ≤1 arcmins (see performance overview page 30) |
| **Coating** | Black (RAL-9005) |
| **Degree of Protection** | IP65 |
| **Direction of Rotation** | Input and output rotate the SAME direction |
| **Efficiency** | 1 stage 96%; 2 stage 93%; 3 stage 90% |
| **Input RPM** | Up to 8,000 RPM |
| **Installation** | Requires 12.9 fasteners. See page 288 for more information |
| **Lubrication** | Lubricated for life – standard Mobil SHC629; option food grade Mobil SHC CIBUS 150 |
| **Mounting Position** | Unrestricted, see page 31 |
| **Warranty** | 5 Year Limited (2 Years on normal wear items: bearings, seals, etc.) |



# Overview

## Selection Options *At-a-Glance*

Using the **Selection Data** table later in this section, select the PH Series Gearhead with the appropriate performance and design options tailored to your motor choice and exact application requirements. Use the part number guide below as a reference to build a part number for the complete gearhead assembly.

**Part Number Examples:**

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 0 | ! |
|---|---|---|---|---|---|---|---|---|---|---|
| PH | 3 | 3 | 1 | S | F | S | S | 0040 | ME | L |
| PHV | 9 | 3 | 3 | | F | | | 0121 | ME | L |

| | Design Option | Part Number Code | Description |
|---|---|---|---|
| 1 | **Series** | PH<br>PHV | Rotating flange output planetary<br>Rotating flange output planetary — 3 Stage (size 9-10 only) |
| 2 | **Size** | 3 4 5 7<br>8 9 10 | 7 sizes of gearhead |
| 3 | **Generation** | 3<br>4 | Version of gearhead 3 Sizes3-8<br>Version of gearhead 4 Sizes 9 and 10 |
| 4 | **# of Stages** | 1<br>2<br>3 | One stage for ratios of ≤ 10:1<br>Two stage for ratios >10:1<br>Three stage (PHV: Size 9-10) |
| 5 | **Housing** | S | Standard |
| 6 | **Output** | F | Flange output |
| 7 | **Bearing** | S<br>V | Standard<br>Reinforced Bearing (PH3-PH5) |
| 8 | **Backlash** | S<br>R | Standard Backlash<br>Reduced backlash (PH3-9 only) |
| 9 | **Ratio** | 0040 | Ratios range from 4:1 to 100:1<br>(0040=4:1; 0160=16:1; 1000=100:1, etc.) |
| 0 | **Motor Adapter** | ME<br>MF<br>MB | Motor Adapter with EasyAdapt coupling<br>Motor Adapter with FlexiAdapt coupling (PH3-8)(Contact factory for this option)<br>ServoStop motor adapter with brake (Contact factory for this option) |
| ! | **Options** | L | Large Input |

## Options

### ME Adapter Option

- MSS1 Seal – special input seal for longer life (For sizes PH5-8). Contact factory for this option.

### Integrated Safety Brake

- ServoStop – provides dynamic braking during power failures or emergency stops in hazardous situations. Contact factory for this option.

### Coating Option

- Available with multi-layer, industrial 316 stainless steel epoxy coating. Contact factory for this option.

### Large Input

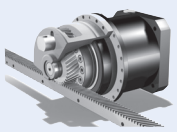
- Accommodates a larger diameter motor shaft without going to a larger size gearbox.

### ATEX

- ATmosphere EXplosible – rated for explosive environments. Contact factory for this option and allow additional time for delivery.

### Rack and Pinion Systems

- PH available with rack and pinion. Contact factory for this option.



## PH Performance Overview

PH Series performance is dependent on several factors including duty cycle, bearing design, gearhead size and stage configuration, among others. Use the chart below for preliminary evaluation, then use the following performance chart and selection information on the following pages for specific performance sizing and selection.

| | | Size | 3 | | 4 | | 5 | |
|---|---|---|---|---|---|---|---|---|
| | | # of Stages | 1 | 2 | 1 | 2 | 1 | 2 |
| **Acceleration Torque** $M_{2BMAX}$ | Nm | | 80 | | 189 | | 385 | |
| **Output Torque Nom.** [1] $M_{2N}$ | Nm | | 45 | | 120 | | 296 | |
| **Torsional Stiffness** $C_2$ | Nm/arcmin | | 15 | | 36 | | 91 | |
| **Torsional Backlash** [2] | arcmin | Δϕ | ≤4 | | ≤3 | | ≤3 | |
| | | Δϕ Reduced | ≤2 | | ≤1 | | ≤1 | |
| **Input Speed Max.** $n_{1MAX}$ | rpm | Continuous | 5500 | 6000 | 3500 | 4500 | 3300 | 4000 |
| | | Cyclic | 8000 | 8000 | 7000 | 8000 | 6500 | 8000 |
| **Efficiency (@nom torque)** | % | | 96 | 94 | 96 | 94 | 96 | 94 |
| **Weight** | kg | | 2.2 | 2.4 | 4.8 | 5.2 | 7.7 | 8.8 |
| | lbs | | 4.8 | 5.28 | 10.6 | 11.4 | 16.9 | 19.4 |
| **Noise** [3] | dB(A) | | ≤55 | | ≤56 | | ≤57 | |
| **Performance by Bearing Design Option** [4] | | | | | | | | |
| **Permitted Axial Force** $F_{2ax100}$ | N | | 1650 | | 2150 | | 4150 | |
| **Permitted Tilting Torque** $M_{2K100}$ | Nm | | 101 | | 296 | | 475 | |
| **Tilting Stiffness** $C_{2K}$ | Nm/arcmin | | 75 | | 192 | | 429 | |
| **Performance by Reinforced Bearing Design Option – Choose V Option** [4] | | | | | | | | |
| **Permitted Axial Force** $F_{2ax100}$ | N | | 2200 | | 2900 | | 5500 | |
| **Permitted Tilting Torque ≤100RPM** $M_{2K100}$ | Nm | | 150 | | 354 | | 572 | |
| **Tilting Stiffness** $C_{2K}$ | Nm/arcmin | | 80 | | 217 | | 478 | |

[1] *Ratings based on input speed ($n_1$) of 1500 RPM. For torque at higher input speeds ($M_{2NX}$) solve the formula: where $n_1$ = Actual Input Speed.*

$$M_{2NX} = \frac{M_{2N}}{\sqrt[3]{\frac{n_1}{1500}}}$$

[2] *Tested at 1.5% of nominal torque and recorded on the output side of the gearhead. For lower backlash, contact STOBER technical support.*

[3] *Measurement at one (1) meter distance with input speed ($n_1$) of 1500 RPM.*

[4] *Rating based on output speed ($n_2$) of 100 RPM. For values at other speeds see page 33.*

# Overview



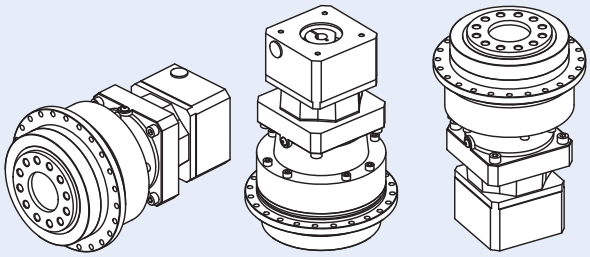
**Note: Overview data is general. Actual data is dependent on case size and ratio**

| | 7 | | 8 | | 9 | | 10 | |
|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 1 | 2 | 2 | 3 | 2 | 3 |
| | 882 | | 2100 | | 5000 | | 7500 | |
| | 600 | | 1557 | | 3000 | | 5000 | |
| | 207 | | 561 | | 1200 | | 1748 | |
| | ≤3<br>≤1 | | ≤3<br>≤1 | | ≤3<br>– | | ≤3<br>– | |
| | 2500<br>5000 | 3700<br>7000 | 2200<br>4000 | 3000<br>6000 | 2800<br>4500 | 2500<br>4500 | 2800<br>4500 | 2500<br>4500 |
| | 96 | 94 | 96 | 94 | 96 | 94 | 94 | 92 |
| | 15.9<br>35 | | 35.9<br>79 | 39.7<br>87.3 | 75.2<br>166 | 66.6<br>147 | 90.6<br>200 | 90<br>198 |
| | ≤58 | | ≤59 | | ≤59 | | ≤59 | |
| | 6150 | | 10,050 | | 33,000 | | 50,000 | |
| | 1466 | | 3486 | | 7500 | | 8800 | |
| | 500 | | 1550 | | 7500 | | 9500 | |
| | — | | — | | — | | — | |
| | — | | — | | — | | — | |
| | — | | — | | — | | — | |

## PH Series Three-Stage Mounting Position

For all three stage units, the amount of lubrication depends on the mounting position.

**When ordering any of these three stage units, the mounting position (EL1, EL5 or EL6) MUST BE SPECIFIED WITH THE ORDER!**



EL1 EL5 EL6

# PH Series Motor Mounting Plate Option

**(Motor information required with Motor Adapter ME option)**

STOBER Servo Gearheads fit the motor of your choice with the appropriate motor mounting plate assembled between the motor and the gearhead.

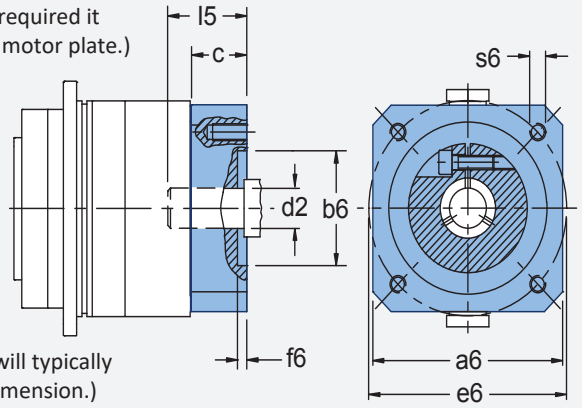
### NOTE: When ordering a gearhead:

- Specify the motor manufacturer and part number
- Provide the motor drawing with dimensions, or specify the motor mounting dimensions (per the list shown at right)

For a precise dimension on a specific motor, or for general assistance, we recommend you contact STOBER Technical Support.

### Customer Required Dimensions for Properly Sized Motor Mounting Plate

| | |
|---|---|
| d2 | Motor Shaft Diameter (If an adapter bushing is required it will be supplied with the motor plate.) |
| b6 | Pilot Diameter |
| e6 | Bolt Circle Diameter |
| s6 | Bolt Diameter |
| l5 | Motor Shaft Length |
| f6 | Pilot Length |
| a6 | Square Flange (Optional – motor plate will typically be made to match this dimension.) |




### Motor Mounting Plate Dimensions — mm (Part Number Specific)

| d2 | c | Series / Size / # of Stages | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 3 | | 4 | | 5 | | 7 | | 8 | | 9 | | 10 | |
| Max. Motor Shaft Ø | Min. Motor Plate Thickness* | | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 2 | 3 | 2 | 3 |
| 14 | 15 | PH | | 332 | | | | | | | | | | | | |
| 19 | 18 | PH | 331 | 332...L | | 432 | | | | | | | | | | |
| 24 | 21 | PH | 331...L | | 431 | 432...L | | 532 | | | | | | | | |
| 32 | 24 | PH | | | 431...L | | 531 | 532...L | | 732 | | | | | | |
| 38 | 25 | PH | | | | | 531...L | | 731 | 732...L | | 832 | | | | |
| | | PHV | | | | | | | | | | | | 943 | | |
| 48 | 33 | PH | | | | | | | 731...L | | 831 | 832...L | 942 | | 1042 | |
| | | PHV | | | | | | | | | | | | 943...L | | 1043 |
| 55 | | PH | | | | | | | | | | | | | | |
| 60 | | PH | | | | | | | | | 831...L | | 942...L | | 1042...L | |

** Note that the c motor plate thickness is determined by the motor shaft length. The minimum motor plate thickness is the value listed.*



# Overview

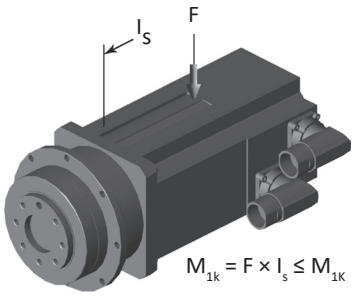
## PH No Load Running Torque*

| | | Input Ratio $T_R$ | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | One Stage | | | | Two Stage | | | | | | | | |
| Unit | | 4 | 5 | 7 | 10 | 16 | 20 | 25 | 28 | 35 | 40 | 50 | 70 | 100 |
| PH3 | Nm | – | 0.26 | .016 | .016 | – | 0.18 | 0.13 | 0.13 | 0.13 | 0.13 | 0.13 | 0.13 | 0.13 |
| PH4 | Nm | 0.33 | 0.33 | 0.23 | 0.18 | 0.16 | 0.16 | 0.16 | 0.16 | 0.16 | 0.16 | 0.16 | 0.16 | 0.16 |
| PH5 | Nm | 0.70 | 0.60 | 0.40 | 0.30 | 0.33 | 0.28 | 0.23 | 0.23 | 0.23 | 0.23 | 0.23 | 0.23 | 0.23 |
| PH7 | Nm | 1.43 | 1.13 | 0.83 | 0.63 | 0.50 | 0.40 | 0.40 | 0.30 | .030 | 0.30 | 0.30 | 0.30 | 0.30 |
| PH8 | Nm | 2.25 | 1.85 | 1.35 | 0.95 | 0.73 | 0.73 | 0.63 | 0.53 | 0.53 | 0.53 | 0.53 | 0.53 | 0.53 |

** Torque is measured with the input at 2000 RPM and an ambient temperature of 20° C.*

## PH Series Permissible Motor Tilting Torque

The permissible tilting torque of the motor attached to the gear unit is a result of the static and dynamic load "F" from the motor weight, mass acceleration, and vibration multiplied by the distance from the center of gravity "$l_S$" of the motor.




| $M_{1K}$ | PH332_ME | PH331_ME<br>PH432_ME | PH431_ME<br>PH532_ME | PH531_ME<br>PH732_ME | PH731_ME<br>PH832_ME<br>PHV943_ME | PH831_ME<br>PH942_ME<br>PH1042_ME<br>PHV1043_ME |
|---|---|---|---|---|---|---|
| Nm | 10 | 20 | 40 | 80 | 200 | 400 |

## PH Series Permissible Output Shaft Load and Tilting Moments – Standard Bearings

| | $Z_2$ | $F_{2ax100}$ | $F_{2rad100}$ | $F_{2rad,acc}$ | $M_{2K100}$ | $M_{2K,acc}$ | $C_{2K}$ |
|---|---|---|---|---|---|---|---|
| | Distance of Shaft Shoulder to Center of Output Bearing | Permitted Axial Force | Permitted Radial Force ≤100RPM | Radial Acceleration Force | Permitted Tilting Torque ≤100RPM | Permitted Acceleration Tilting Torque | Tilting Stiffness |
| Size | mm | N | N | N | Nm | Nm | Nm/arcmin |
| 3 | 62.5 | 1650 | 1613 | 1613 | 101 | 101 | 75 |
| 4 | 83.0 | 2150 | 3095 | 3571 | 257 | 296 | 192 |
| 5 | 97.0 | 4150 | 4536 | 4897 | 440 | 475 | 429 |
| 7 | 86.0 | 6150 | 17,045 | 17,045 | 1466 | 1466 | 500 |
| 8 | 125.5 | 10,050 | 27,778 | 27,778 | 3486 | 3486 | 1550 |
| 9 | 155.0 | 33,000 | 48,387 | 70,968 | 7500 | 11,000 | 7500 |
| 10 | 171.0 | 50,000 | 51,462 | 73,099 | 8800 | 12,500 | 9500 |

## PH Series Permissible Output Shaft Load and Tilting Moments – Reinforced Bearings

| | $Z_2$ | $F_{2ax100}$ | $F_{2rad100}$ | $F_{2rad,acc}$ | $M_{2K100}$ | $M_{2K,acc}$ | $C_{2K}$ |
|---|---|---|---|---|---|---|---|
| | Distance of Shaft Shoulder to Center of Output Bearing | Permitted Axial Force | Permitted Radial Force ≤100RPM | Radial Acceleration Force | Permitted Tilting Torque ≤100RPM | Permitted Acceleration Tilting Torque | Tilting Stiffness |
| Size | mm | N | N | N | Nm | Nm | Nm/arcmin |
| 3 | 66.5 | 2200 | 2250 | 2250 | 150 | 150 | 80 |
| 4 | 88.5 | 2900 | 4000 | 4000 | 354 | 354 | 217 |
| 5 | 104.0 | 5000 | 5500 | 5500 | 572 | 572 | 478 |

## PH Series Load/Life/Speed Calculations

The permissible load and tilting moment values are based on an output speed of 100 RPM. For higher speeds the following applies, where $n_2$ is the desired speed:

$$F_{2radN} = \frac{F_{2rad100}}{\sqrt[3]{\frac{n_2}{100rpm}}} \qquad F_{2AX} = \frac{F_{2ax100}}{\sqrt[3]{\frac{n_2}{100}}} \qquad M_{2KX} = \frac{M_{2K100}}{\sqrt[3]{\frac{n_2}{100}}}$$

The application output tilting moment should be determined by the following formula:

$$M_{2k,acc*} = \frac{2 \bullet F_{2ax100*} \bullet y_2 + F_{2rad,acc*} \bullet (x_2 + Z_2)}{1000} \leq M_{2k,acc}$$

$$M_{2k,eq*} = \sqrt[3]{\frac{n_{2b1} \bullet t_{b1} \bullet M_{2kb1}{}^3 + ... + n_{2bn} \bullet t_{bn} \bullet M_{2kbn}{}^3}{n_{2b1} \bullet t_{b1} + ... + n_{2bn} \bullet t_{bn}}} \leq M_{2kN}$$

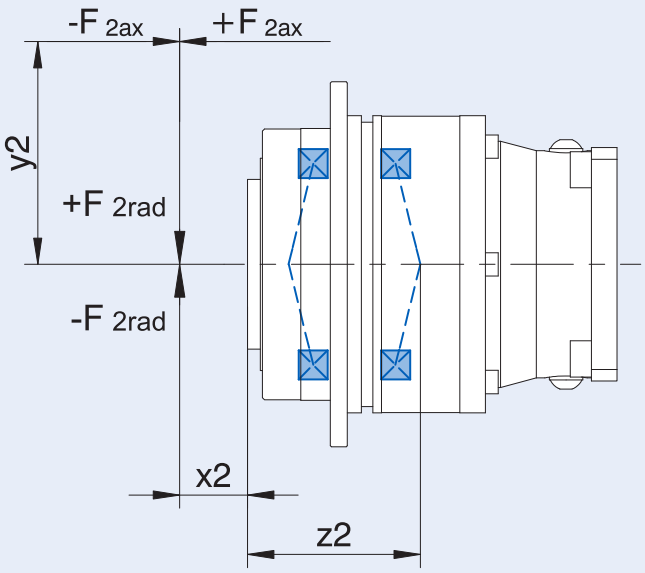
$$F_{2rad,eq*} = \sqrt[3]{\frac{n_{2b1} \bullet t_{b1} \bullet F_{2rb1}{}^3 + ... + n_{2bn} \bullet t_{bn} \bullet F_{2rbn}{}^3}{n_{2b1} \bullet t_{b1} + ... + n_{2bn} \bullet t_{bn}}} \leq F_{2radN}$$

Where:

| | |
|---|---|
| **$Z_2$** | Distance of Shaft Shoulder to Center of Output Bearing |
| **$n_2$** | Actual Average Output Speed |
| **$X_2$** | Distance of the Shaft Shoulder to the Force Application Point |
| **$Y_2$** | Distance of the Shaft Axis to the Axial Force Application Point |
| **$F_{2ax*}$** | Actual Axial Force at Gear Unit Output |
| **$F_{2ax100}$** | Permitted Axial Force |
| **$F_{2rad100}$** | Permitted Radial Force ≤100RPM |
| **$F_{2rad,acc}$** | Radial Acceleration Force |
| **$F_{2rad,acc*}$** | Radial Acceleration Force at Gear Unit Output |
| **$M_{2K100}$** | Permitted Tilting Torque ≤100RPM |
| **$M_{2K,acc}$** | Permitted Acceleration Tilting Torque |
| **$M_{2k,acc*}$** | Permitted Acceleration Tilting Torque at Gear Unit Output |
| **$C_{2K}$** | Tilting Stiffness |

**All formulas shown are based on METRIC values**

*Upper case letters are permissible values. Lower case letters are for existing values.*




The hours of life ($L_h$) of the unit can be determined by the following formula:

**bearing life for duty cycle ≤ 40%**

$L_h$ > 10,000 hours if $M_{2K100}/M_{2A*}$ < 1.25 and > 1
$L_h$ > 20,000 hours if $M_{2K100}/M_{2A*}$ > 1.25 and > 1.5
$L_h$ > 30,000 hours if $M_{2K100}/M_{2A*}$ < 1.5

**bearing life for duty cycle ≥ 40%**

$$L_{hA} = L_h \left(\frac{40\%}{\text{Duty Cycle}}\right)$$



# Selection Data

| Exact Ratio (i) | Output Torque: Nom. $M_{2N}$ [1] Nm | Output Torque: Accel. $M_{2acc}$ Nm | Output Torque: Accel. Torque for Reduced Backlash $M_{2accHT}$ Nm | Output Torque: Peak $M_{2NOT}$ [2] Nm | Backlash $\Delta\phi_2$ arcmin | Red. Backlash $\Delta\phi_{2red}$ arcmin | Part Number* (Gearhead + Input) | Max. Input Speed RPM (n1): Cont. | Max. Input Speed RPM (n1): Cyclic | Motor Shaft [3] Max Ø $d_{MW}$ mm | Input Inertia $J_1$ kgcm² | Tors. Stiffness $C_2$ Nm/arcmin | Oper. Noise $L_{pA}$ dB(A) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **PH3** | | | | | | | | | | | | | |
| 5.000 | 45 | 80 | 85 | 160 | 4 | 2 | PH331_0050 ME | 4000 | 8000 | ≤19 | 0.46 | 15 | 58 |
| | | | | | | | PH331_0050 MEL | | | ≤24 | 0.89 | | |
| 7.000 | 45 | 75 | 77 | 150 | 4 | 2 | PH331_0070 ME | 5000 | 8000 | ≤19 | 0.42 | 12 | 57 |
| | | | | | | | PH331_0070 MEL | | | ≤24 | 0.85 | | |
| 10.00 | 36 | 60 | 60 | 120 | 4 | 2 | PH331_0100 ME | 5500 | 8000 | ≤19 | 0.40 | 9.1 | 55 |
| | | | | | | | PH331_0100 MEL | | | ≤24 | 0.83 | | |
| 20.00 | 45 | 80 | 85 | 160 | 4 | 2 | PH332_0200 ME | 5500 | 8000 | ≤14 | 0.14 | 14 | 59 |
| | | | | | | | PH332_0200 MEL | | | ≤19 | 0.42 | | |
| 25.00 | 50 | 80 | 85 | 160 | 4 | 2 | PH332_0250 ME | 6000 | 8000 | ≤14 | 0.12 | 14 | 57 |
| | | | | | | | PH332_0250 MEL | | | ≤19 | 0.41 | | |
| 28.00 | 50 | 75 | 75 | 150 | 4 | 2 | PH332_0280 ME | 6000 | 8000 | ≤14 | 0.14 | 12 | 59 |
| | | | | | | | PH332_0280 MEL | | | ≤19 | 0.42 | | |
| 35.00 | 50 | 80 | 85 | 160 | 4 | 2 | PH332_0350 ME | 6000 | 8000 | ≤14 | 0.12 | 14 | 56 |
| | | | | | | | PH332_0350 MEL | | | ≤19 | 0.41 | | |
| 40.00 | 50 | 67 | 67 | 134 | 4 | 2 | PH332_0400 ME | 6000 | 8000 | ≤14 | 0.14 | 9.0 | 59 |
| | | | | | | | PH332_0400 MEL | | | ≤19 | 0.42 | | |
| 50.00 | 50 | 75 | 75 | 150 | 4 | 2 | PH332_0500 ME | 6000 | 8000 | ≤14 | 0.12 | 12 | 54 |
| | | | | | | | PH332_0500 MEL | | | ≤19 | 0.41 | | |
| 70.00 | 53 | 69 | 69 | 138 | 4 | 2 | PH332_0700 ME | 6000 | 8000 | ≤14 | 0.10 | 11 | 54 |
| | | | | | | | PH332_0700 MEL | | | ≤19 | 0.40 | | |
| 100.0 | 46 | 60 | 60 | 120 | 4 | 2 | PH332_1000 ME | 6000 | 8000 | ≤14 | 0.10 | 8.9 | 54 |
| | | | | | | | PH332_1000 MEL | | | ≤19 | 0.39 | | |

[1] *Based on input speed of 1500 RPM. See page 34 for details on torque calculations.*
[2] *Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
[3] *For additional motor shaft sizes or smaller inertia value, please visit configurator.stober.com*
* *ME= Motor Adapter L=Large Input Option*

| Exact Ratio (i) | Output Torque: Nom. $M_{2N}$ | Output Torque: Accel. $M_{2acc}$ | Output Torque: Accel. Torque for Reduced Backlash $M_{2accHT}$ | Output Torque: Peak $M_{2NOT}$ | Back-lash $\Delta\phi_2$ | Red. Back-lash $\Delta\phi_{2red}$ | Part Number* (Gearhead + Input) | Max. Input Speed RPM (n1): Cont. | Max. Input Speed RPM (n1): Cyclic | Motor Shaft [3] Max Ø $d_{MW}$ | Input Inertia $J_1$ | Tors. Stiffness $C_2$ | Oper. Noise $L_{pA}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Nm | Nm | Nm | Nm | arcmin | arcmin | | | | mm | kgcm² | Nm/ arcmin | dB(A) |
| **PH4** | | | | | | | | | | | | | |
| 4.000 | 90 | 136 | 189 | 273 | 3 | 1 | PH431_0040 ME | 2600 | 5000 | ≤24 | 1.3 | 36 | 61 |
| | | | | | | | PH431_0040 MEL | | | ≤32 | 2.9 | | |
| 5.000 | 90 | 172 | 189 | 344 | 3 | 1 | PH431_0050 ME | 3000 | 6000 | ≤24 | 1.1 | 35 | 59 |
| | | | | | | | PH431_0050 MEL | | | ≤32 | 2.7 | | |
| 7.000 | 90 | 160 | 175 | 320 | 3 | 1 | PH431_0070 ME | 3200 | 6000 | ≤24 | 0.99 | 30 | 58 |
| | | | | | | | PH431_0070 MEL | | | ≤32 | 2.6 | | |
| 10.00 | 75 | 115 | 115 | 230 | 3 | 1 | PH431_0100 ME | 3500 | 7000 | ≤24 | 0.91 | 21 | 56 |
| | | | | | | | PH431_0100 MEL | | | ≤32 | 2.5 | | |
| 16.00 | 90 | 160 | 173 | 312 | 3 | 1 | PH432_0160 ME | 4000 | 8000 | ≤19 | 0.52 | 31 | 60 |
| | | | | | | | PH432_0160 MEL | | | ≤24 | 0.95 | | |
| 20.00 | 95 | 150 | 150 | 299 | 3 | 1 | PH432_0200 ME | 4000 | 8000 | ≤19 | 0.47 | 31 | 60 |
| | | | | | | | PH432_0200 MEL | | | ≤24 | 0.90 | | |
| 25.00 | 100 | 161 | 174 | 322 | 3 | 1 | PH432_0250 ME | 4500 | 8000 | ≤19 | 0.47 | 32 | 58 |
| | | | | | | | PH432_0250 MEL | | | ≤24 | 0.90 | | |
| 28.00 | 95 | 160 | 173 | 312 | 3 | 1 | PH432_0280 ME | 4500 | 8000 | ≤19 | 0.50 | 31 | 57 |
| | | | | | | | PH432_0280 MEL | | | ≤24 | 0.93 | | |
| 35.00 | 110 | 160 | 174 | 320 | 3 | 1 | PH432_0350 ME | 4500 | 8000 | ≤19 | 0.46 | 32 | 57 |
| | | | | | | | PH432_0350 MEL | | | ≤24 | 0.89 | | |
| 40.00 | 110 | 155 | 169 | 310 | 3 | 1 | PH432_0400 ME | 4500 | 8000 | ≤19 | 0.50 | 30 | 55 |
| | | | | | | | PH432_0400 MEL | | | ≤24 | 0.92 | | |
| 50.00 | 120 | 159 | 174 | 318 | 3 | 1 | PH432_0500 ME | 4500 | 8000 | ≤19 | 0.46 | 31 | 55 |
| | | | | | | | PH432_0500 MEL | | | ≤24 | 0.89 | | |
| 70.00 | 120 | 158 | 164 | 316 | 3 | 1 | PH432_0700 ME | 4500 | 8000 | ≤19 | 0.42 | 27 | 55 |
| | | | | | | | PH432_0700 MEL | | | ≤24 | 0.85 | | |
| 100.0 | 85 | 110 | 110 | 220 | 3 | 1 | PH432_1000 ME | 4500 | 8000 | ≤19 | 0.40 | 20 | 55 |
| | | | | | | | PH432_1000 MEL | | | ≤24 | 0.83 | | |

[1] *Based on input speed of 1500 RPM. See page 34 for details on torque calculations.*
[2] *Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
[3] *For additional motor shaft sizes or smaller inertia value, please visit configurator.stober.com*
* *ME= Motor Adapter L=Large Input Option*





| Exact Ratio (i) | Output Torque: Nom. [1] $M_{2N}$ Nm | Output Torque: Accel. $M_{2acc}$ Nm | Output Torque: Accel. Torque for Reduced Backlash $M_{2accHT}$ Nm | Output Torque: Peak [2] $M_{2NOT}$ Nm | Back-lash $\Delta\phi_2$ arcmin | Red. Back-lash $\Delta\phi_{2red}$ arcmin | Part Number* (Gearhead + Input) | Max. Input Speed RPM (n1): Cont. | Max. Input Speed RPM (n1): Cyclic | Motor Shaft [3] Max Ø $d_{MW}$ mm | Input Inertia $J_1$ kgcm² | Tors. Stiffness $C_2$ Nm/arcmin | Oper. Noise $L_{pA}$ dB(A) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **PH5** | | | | | | | | | | | | | |
| 4.000 | 210 | 355 | 387 | 696 | 3 | 1 | PH531_0040 ME | 2200 | 5000 | ≤32 | 4.1 | 90 | 62 |
| | | | | | | | PH531_0040 MEL | | | ≤38 | 7.7 | 91 | |
| 5.000 | 220 | 385 | 400 | 705 | 3 | 1 | PH531_0050 ME | 2500 | 5500 | ≤32 | 3.5 | 91 | 60 |
| | | | | | | | PH531_0050 MEL | | | ≤38 | 7.1 | | |
| 7.000 | 210 | 370 | 387 | 705 | 3 | 1 | PH531_0070 ME | 3000 | 6000 | ≤32 | 3.1 | 75 | 59 |
| | | | | | | | PH531_0070 MEL | | | ≤38 | 6.6 | | |
| 10.00 | 180 | 288 | 288 | 575 | 3 | 1 | PH531_0100 ME | 3300 | 6500 | ≤32 | 2.8 | 53 | 57 |
| | | | | | | | PH531_0100 MEL | | | ≤38 | 6.3 | | |
| 16.00 | 230 | 355 | 355 | 696 | 3 | 1 | PH532_0160 ME | 3500 | 7000 | ≤24 | 1.2 | 82 | 61 |
| | | | | | | | PH532_0160 MEL | | | ≤32 | 2.8 | | |
| 20.00 | 250 | 370 | 387 | 705 | 3 | 1 | PH532_0200 ME | 3500 | 7000 | ≤24 | 1.1 | 85 | 61 |
| | | | | | | | PH532_0200 MEL | | | ≤32 | 2.7 | | |
| 25.00 | 260 | 385 | 400 | 705 | 3 | 1 | PH532_0250 ME | 3700 | 7500 | ≤24 | 1.0 | 84 | 59 |
| | | | | | | | PH532_0250 MEL | | | ≤32 | 2.7 | | |
| 28.00 | 240 | 355 | 387 | 696 | 3 | 1 | PH532_0280 ME | 4000 | 8000 | ≤24 | 1.1 | 79 | 58 |
| | | | | | | | PH532_0280 MEL | | | ≤32 | 2.7 | 80 | |
| 35.00 | 290 | 385 | 400 | 705 | 3 | 1 | PH532_0350 ME | 4000 | 8000 | ≤24 | 1.0 | 84 | 58 |
| | | | | | | | PH532_0350 MEL | | | ≤32 | 2.6 | | |
| 40.00 | 260 | 355 | 356 | 696 | 3 | 1 | PH532_0400 ME | 4000 | 8000 | ≤24 | 1.1 | 74 | 56 |
| | | | | | | | PH532_0400 MEL | | | ≤32 | 2.7 | | |
| 50.00 | 296 | 385 | 400 | 705 | 3 | 1 | PH532_0500 ME | 4000 | 8000 | ≤24 | 1.0 | 79 | 56 |
| | | | | | | | PH532_0500 MEL | | | ≤32 | 2.6 | | |
| 70.00 | 284 | 370 | 387 | 705 | 3 | 1 | PH532_0700 ME | 4000 | 8000 | ≤24 | 0.93 | 70 | 56 |
| | | | | | | | PH532_0700 MEL | | | ≤32 | 2.5 | | |
| 100.0 | 221 | 288 | 288 | 575 | 3 | 1 | PH532_1000 ME | 4000 | 8000 | ≤24 | 0.88 | 52 | 56 |
| | | | | | | | PH532_1000 MEL | | | ≤32 | 2.5 | | |

[1] *Based on input speed of 1500 RPM. See page 34 for details on torque calculations.*
[2] *Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
[3] *For additional motor shaft sizes or smaller inertia value, please visit configurator.stober.com*
* *ME= Motor Adapter L=Large Input Option*

| Exact Ratio (i) | Output Torque: Nom. [1] $M_{2N}$ Nm | Output Torque: Accel. $M_{2acc}$ Nm | Output Torque: Accel. Torque for Reduced Backlash $M_{2accHT}$ Nm | Output Torque: Peak [2] $M_{2NOT}$ Nm | Back-lash $\Delta\phi_2$ arcmin | Red. Back-lash $\Delta\phi_{2red}$ arcmin | Part Number* (Gearhead + Input) | Max. Input Speed RPM (n1): Cont. | Max. Input Speed RPM (n1): Cyclic | Motor Shaft [3] Max Ø $d_{MW}$ mm | Input Inertia $J_1$ kgcm² | Tors. Stiffness $C_2$ Nm/ arcmin | Oper. Noise $L_{pA}$ dB(A) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **PH7** | | | | | | | | | | | | | |
| 4.000 | 440 | 840 | 924 | 1321 | 3 | 1 | PH731_0040 ME | 1900 | 4000 | ≤38 | 12 | 207 | 63 |
| | | | | 1680 | | | PH731_0040 MEL | | | ≤48 | 22 | 219 | |
| 5.000 | 440 | 882 | 924 | 1651 | 3 | 1 | PH731_0050 ME | 2200 | 5000 | ≤38 | 9.5 | 190 | 61 |
| | | | | 1720 | | | PH731_0050 MEL | | | ≤48 | 20 | 196 | |
| 7.000 | 440 | 869 | 869 | 1720 | 3 | 1 | PH731_0070 ME | 2500 | 5000 | ≤38 | 8.0 | 160 | 60 |
| | | | | | | | PH731_0070 MEL | | | ≤48 | 18 | 162 | |
| 10.00 | 350 | 575 | 575 | 1150 | 3 | 1 | PH731_0100 ME | 2500 | 5000 | ≤38 | 7.2 | 123 | 58 |
| | | | | | | | PH731_0100 MEL | | | ≤48 | 17 | | |
| 16.00 | 450 | 740 | 740 | 1480 | 3 | 1 | PH732_0160 ME | 3000 | 6000 | ≤32 | 3.8 | 200 | 62 |
| | | | | | | | PH732_0160 MEL | | | ≤38 | 7.3 | | |
| 20.00 | 460 | 805 | 845 | 1610 | 3 | 1 | PH732_0200 ME | 3000 | 6000 | ≤32 | 3.4 | 186 | 62 |
| | | | | | | | PH732_0200 MEL | | | ≤38 | 6.9 | | |
| 25.00 | 500 | 866 | 908 | 1720 | 3 | 1 | PH732_0250 ME | 3500 | 7000 | ≤32 | 3.3 | 185 | 60 |
| | | | | | | | PH732_0250 MEL | | | ≤38 | 6.8 | | |
| 28.00 | 540 | 770 | 880 | 1540 | 3 | 1 | PH732_0280 ME | 3700 | 7000 | ≤32 | 3.6 | 194 | 59 |
| | | | | | | | PH732_0280 MEL | | | ≤38 | 7.1 | | |
| 35.00 | 540 | 866 | 908 | 1720 | 3 | 1 | PH732_0350 ME | 3700 | 7000 | ≤32 | 3.2 | 183 | 59 |
| | | | | | | | PH732_0350 MEL | | | ≤38 | 6.7 | | |
| 40.00 | 540 | 770 | 770 | 1540 | 3 | 1 | PH732_0400 ME | 3700 | 7000 | ≤32 | 3.5 | 182 | 57 |
| | | | | | | | PH732_0400 MEL | | | ≤38 | 7.1 | | |
| 50.00 | 600 | 830 | 834 | 1660 | 3 | 1 | PH732_0500 ME | 3700 | 7000 | ≤32 | 3.2 | 176 | 57 |
| | | | | | | | PH732_0500 MEL | | | ≤38 | 6.7 | | |
| 70.00 | 600 | 809 | 847 | 1617 | 3 | 1 | PH732_0700 ME | 3700 | 7000 | ≤32 | 2.9 | 154 | 57 |
| | | | | | | | PH732_0700 MEL | | | ≤38 | 6.4 | | |
| 100.0 | 423 | 550 | 550 | 1100 | 3 | 1 | PH732_1000 ME | 3700 | 7000 | ≤32 | 2.7 | 121 | 57 |
| | | | | | | | PH732_1000 MEL | | | ≤38 | 6.2 | | |

[1] *Based on input speed of 1500 RPM. See page 34 for details on torque calculations.*
[2] *Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
[3] *For additional motor shaft sizes or smaller inertia value, please visit configurator.stober.com*
* *ME= Motor Adapter L=Large Input Option*





| Exact Ratio (i) | Output Torque: Nom. [1] $M_{2N}$ Nm | Output Torque: Accel. $M_{2acc}$ Nm | Output Torque: Accel. Torque for Reduced Backlash $M_{2accHT}$ Nm | Output Torque: Peak [2] $M_{2NOT}$ Nm | Back-lash $\Delta\phi_2$ arcmin | Red. Back-lash $\Delta\phi_{2red}$ arcmin | Part Number* (Gearhead + Input) | Max. Input Speed RPM (n1): Cont. | Max. Input Speed RPM (n1): Cyclic | Motor Shaft [3] Max Ø $d_{MW}$ mm | Input Inertia $J_1$ kgcm² | Tors. Stiffness $C_2$ Nm/arcmin | Oper. Noise $L_{pA}$ dB(A) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **PH8** | | | | | | | | | | | | | |
| 4.000 | 880 | 1820 | 2112 | 2408 | 3 | 1 | PH831_0040 ME | 1400 | 3500 | ≤48 | 44 | 512 | 64 |
| | | | | 3639 | | | PH831_0040 MEL | | | ≤60 | 72 | 553 | |
| 5.000 | 1100 | 2100 | 2300 | 3010 | 3 | 1 | PH831_0050 ME | 1600 | 4000 | ≤48 | 33 | 534 | 62 |
| | | | | 4200 | | | PH831_0050 MEL | | | ≤60 | 62 | 561 | |
| 7.000 | 1000 | 2000 | 2112 | 4000 | 3 | 1 | PH831_0070 ME | 2000 | 4000 | ≤48 | 26 | 441 | 61 |
| | | | | | | | PH831_0070 MEL | | | ≤60 | 54 | 450 | |
| 10.00 | 850 | 1392 | 1392 | 2784 | 3 | 1 | PH831_0100 ME | 2200 | 4000 | ≤48 | 22 | 338 | 59 |
| | | | | | | | PH831_0100 MEL | | | ≤60 | 50 | 341 | |
| 16.00 | 1100 | 2000 | 2200 | 4000 | 3 | 1 | PH832_0160 ME | 2500 | 4500 | ≤38 | 11 | 490 | 63 |
| | | | | | | | PH832_0160 MEL | | | ≤48 | 22 | 494 | |
| 20.00 | 1250 | 2100 | 2300 | 4200 | 3 | 1 | PH832_0200 ME | 2500 | 4500 | ≤38 | 9.4 | 518 | 63 |
| | | | | | | | PH832_0200 MEL | | | ≤48 | 20 | 521 | |
| 25.00 | 1300 | 2100 | 2300 | 4200 | 3 | 1 | PH832_0250 ME | 2700 | 5500 | ≤38 | 9.0 | 516 | 61 |
| | | | | | | | PH832_0250 MEL | | | ≤48 | 19 | 518 | |
| 28.00 | 1100 | 2000 | 2000 | 3929 | 3 | 1 | PH832_0280 ME | 3000 | 6000 | ≤38 | 10 | 477 | 60 |
| | | | | | | | PH832_0280 MEL | | | ≤48 | 20 | 478 | |
| 35.00 | 1450 | 2100 | 2300 | 4200 | 3 | 1 | PH832_0350 ME | 3000 | 6000 | ≤38 | 8.7 | 509 | 60 |
| | | | | | | | PH832_0350 MEL | | | ≤48 | 19 | | |
| 40.00 | 1100 | 1920 | 1936 | 3840 | 3 | 1 | PH832_0400 ME | 3000 | 6000 | ≤38 | 9.9 | 452 | 58 |
| | | | | | | | PH832_0400 MEL | | | ≤48 | 20 | | |
| 50.00 | 1557 | 2100 | 2300 | 4200 | 3 | 1 | PH832_0500 ME | 3000 | 6000 | ≤38 | 8.5 | 490 | 58 |
| | | | | | | | PH832_0500 MEL | | | ≤48 | 19 | | |
| 70.00 | 1422 | 1848 | 1936 | 3696 | 3 | 1 | PH832_0700 ME | 3000 | 6000 | ≤38 | 7.5 | 425 | 58 |
| | | | | | | | PH832_0700 MEL | | | ≤48 | 18 | | |
| 100.0 | 1062 | 1380 | 1380 | 2760 | 3 | 1 | PH832_1000 ME | 3000 | 6000 | ≤38 | 6.9 | 333 | 58 |
| | | | | | | | PH832_1000 MEL | | | ≤48 | 17 | | |

[1] *Based on input speed of 1500 RPM. See page 34 for details on torque calculations.*
[2] *Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
[3] *For additional motor shaft sizes or smaller inertia value, please visit configurator.stober.com*
* *ME= Motor Adapter L=Large Input Option*

| Exact Ratio (i) | Output Torque: Nom. [1] $M_{2N}$ Nm | Output Torque: Accel. $M_{2acc}$ Nm | Output Torque: Accel. Torque for Reduced Backlash $M_{2accHT}$ Nm | Output Torque: Peak [2] $M_{2NOT}$ Nm | Backlash $\Delta\phi_2$ arc-min | Red. Backlash $\Delta\phi_{2red}$ arcmin | Part Number* (Gearhead + Input) | Max. Input Speed RPM (n1): Cont. | Max. Input Speed RPM (n1): Cyclic | Motor Shaft [3] Max Ø $d_{MW}$ mm | Input Inertia $J_1$ kgcm² | Tors. Stiffness $C_2$ Nm/arcmin | Oper. Noise $L_{pA}$ dB(A) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **PH9** | | | | | | | | | | | | | |
| 12.00 | 3000 | 4600 | 4600 | 6997 | 3.0 | 1.0 | PH942_0120 ME | 1800 | 3000 | ≤48 | 68 | 1200 | 66 |
| | | | | 9200 | | | PH942_0120 MEL | | | ≤60 | 96 | 1223 | |
| 16.00 | 3000 | 5000 | 5000 | 9330 | 3.0 | 1.0 | PH942_0160 ME | 2000 | 3500 | ≤48 | 40 | 1181 | 64 |
| | | | | 10000 | | | PH942_0160 MEL | | | ≤60 | 68 | 1193 | |
| 18.00 | 3000 | 5000 | 5000 | 10000 | 3.0 | 1.0 | PH942_0180 ME | 1800 | 3000 | ≤48 | 62 | 1120 | 66 |
| | | | | | | | PH942_0180 MEL | | | ≤60 | 90 | 1129 | |
| 20.00 | 3000 | 5000 | 5000 | 10000 | 3.0 | 1.0 | PH942_0200 ME | 2500 | 4000 | ≤48 | 31 | 1174 | 62 |
| | | | | | | | PH942_0200 MEL | | | ≤60 | 59 | 1182 | |
| 24.00 | 3000 | 5000 | 5000 | 10000 | 3.0 | 1.0 | PH942_0240 ME | 2000 | 3500 | ≤48 | 37 | 1112 | 64 |
| | | | | | | | PH942_0240 MEL | | | ≤60 | 65 | 1117 | |
| 28.00 | 3500 | 5000 | 5000 | 10000 | 3.0 | 1.0 | PH942_0280 ME | 2800 | 4500 | ≤48 | 25 | 1147 | 61 |
| | | | | | | | PH942_0280 MEL | | | ≤60 | 53 | 1151 | |
| 30.00 | 3300 | 5000 | 5000 | 10000 | 3.0 | 1.0 | PH942_0300 ME | 2500 | 4000 | ≤48 | 29 | 1110 | 62 |
| | | | | | | | PH942_0300 MEL | | | ≤60 | 57 | 1113 | |
| 32.00 | 3200 | 4600 | 4600 | 9200 | 3.0 | 1.0 | PH942_0320 ME | 2800 | 4500 | ≤48 | 23 | 1105 | 60 |
| | | | | | | | PH942_0320 MEL | | | ≤60 | 51 | 1108 | |
| 40.00 | 3200 | 4600 | 4600 | 9200 | 3.0 | 1.0 | PH942_0400 ME | 2800 | 4500 | ≤48 | 21 | 1064 | 59 |
| | | | | | | | PH942_0400 MEL | | | ≤60 | 49 | 1066 | |
| 42.00 | 3500 | 5000 | 5000 | 10000 | 3.0 | 1.0 | PH942_0420 ME | 2800 | 4500 | ≤48 | 23 | 1099 | 61 |
| | | | | | | | PH942_0420 MEL | | | ≤60 | 52 | 1101 | |
| 48.00 | 3500 | 5000 | 5000 | 10000 | 3.0 | 1.0 | PH942_0480 ME | 2800 | 4500 | ≤48 | 22 | 1081 | 60 |
| | | | | | | | PH942_0480 MEL | | | ≤60 | 51 | 1083 | |
| 60.00 | 3500 | 5000 | 5000 | 10000 | 3.0 | 1.0 | PH942_0600 ME | 2800 | 4500 | ≤48 | 20 | 1064 | 59 |
| | | | | | | | PH942_0600 MEL | | | ≤60 | 49 | 1064 | |
| 61.00 | 2500 | 4250 | 4250 | 9000 | 3.0 | 1.0 | PHV943_0610 ME | 2500 | 4500 | ≤38 | 12 | 848 | 62 |
| | | | | | | | PHV943_0610 MEL | | | ≤48 | 22 | 849 | |
| 91.00 | 2500 | 4250 | 4250 | 9000 | 3.0 | 1.0 | PHV943_0910 ME | 2500 | 4500 | ≤38 | 8.7 | 837 | 62 |
| | | | | | | | PHV943_0910 MEL | | | ≤48 | 19 | 838 | |
| 121.0 | 2500 | 4250 | 4250 | 9000 | 3.0 | 1.0 | PHV943_1210 ME | 2500 | 4500 | ≤38 | 7.7 | 805 | 62 |
| | | | | | | | PHV943_1210 MEL | | | ≤48 | 18 | | |

[1] *Based on input speed of 1500 RPM. See page 34 for details on torque calculations.*
[2] *Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
[3] *For additional motor shaft sizes or smaller inertia value, please visit configurator.stober.com*
* *ME= Motor Adapter L=Large Input Option*

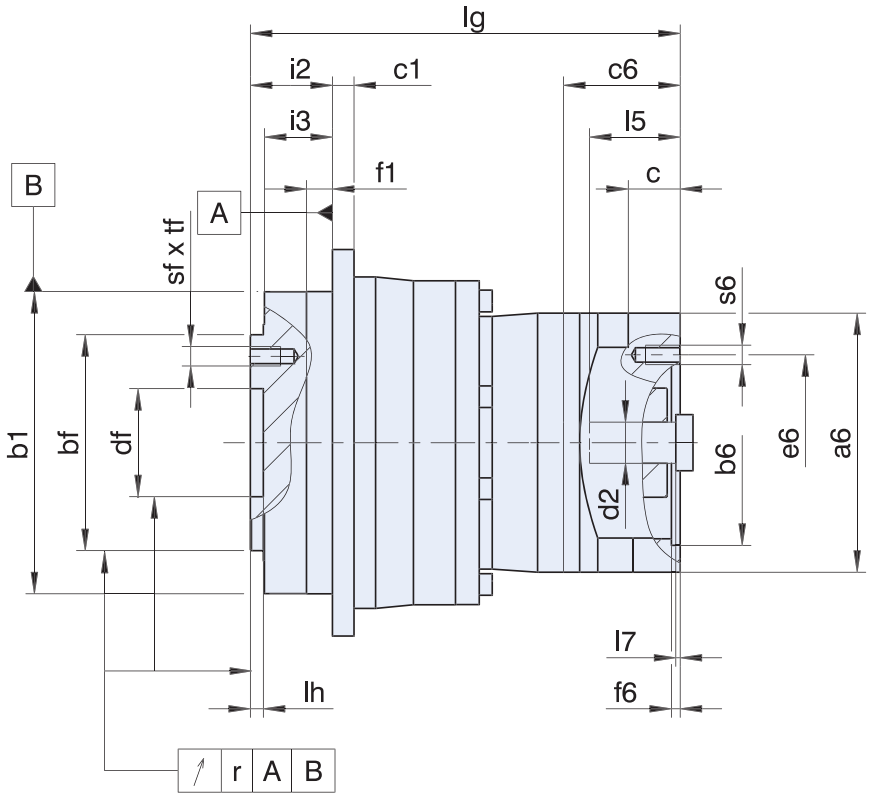


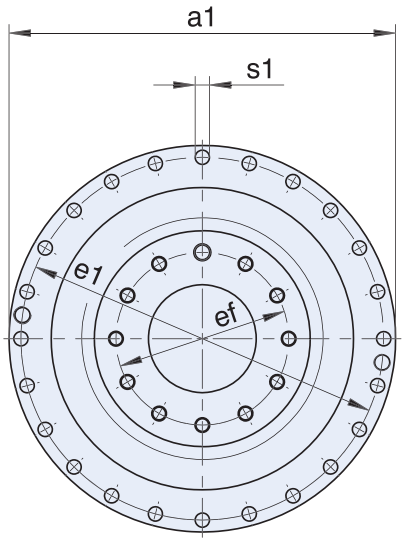


| Exact Ratio (i) | Output Torque: Nom. $M_{2N}$ Nm | Output Torque: Accel. $M_{2acc}$ Nm | Output Torque: Accel. Torque for Reduced Backlash $M_{2accHT}$ Nm | Output Torque: Peak $M_{2NOT}$ Nm | Backlash $\Delta\phi_2$ arc-min | Red. Backlash $\Delta\phi_{2red}$ arcmin | Part Number* (Gearhead + Input) | Max. Input Speed RPM (n1): Cont. | Max. Input Speed RPM (n1): Cyclic | Motor Shaft Max Ø $d_{MW}$ mm | Input Inertia $J_1$ kgcm² | Tors. Stiffness $C_2$ Nm/arcmin | Oper. Noise $L_{pA}$ dB(A) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **PH10** | | | | | | | | | | | | | |
| 18.00 | 4600 | 6900 | – | 10496 | 3.0 | – | PH1042_0180 ME | 1800 | 3000 | ≤48 | 64 | 1727 | 66 |
| | | | | 13800 | | | PH1042_0180 MEL | | | ≤60 | 92 | 1748 | |
| 24.00 | 4700 | 7500 | – | 13995 | 3.0 | – | PH1042_0240 ME | 2000 | 3500 | ≤48 | 38 | 1725 | 64 |
| | | | | 15000 | | | PH1042_0240 MEL | | | ≤60 | 66 | 1737 | |
| 30.00 | 5000 | 7500 | – | 15000 | 3.0 | – | PH1042_0300 ME | 2500 | 4000 | ≤48 | 30 | 1719 | 62 |
| | | | | | | | PH1042_0300 MEL | | | ≤60 | 58 | 1726 | |
| 42.00 | 5000 | 7500 | – | 15000 | 3.0 | – | PH1042_0420 ME | 2800 | 4500 | ≤48 | 24 | 1693 | 61 |
| | | | | | | | PH1042_0420 MEL | | | ≤60 | 52 | 1697 | |
| 60.00 | 4900 | 7000 | – | 14000 | 3.0 | – | PH1042_0600 ME | 2800 | 4500 | ≤48 | 21 | 1611 | 59 |
| | | | | | | | PH1042_0600 MEL | | | ≤60 | 49 | 1613 | |
| 61.00 | 4000 | 7500 | – | 15000 | 3.0 | – | PHV1043_0610 ME | 2500 | 4500 | ≤48 | 24 | 1368 | 63 |
| 91.00 | 4000 | 7500 | – | 15000 | 3.0 | – | PHV1043_910 ME | 2500 | 4500 | ≤48 | 21 | 1341 | 63 |

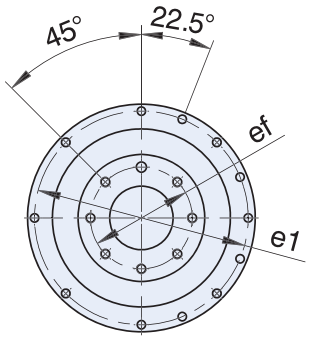
[1] *Based on input speed of 1500 RPM. See page 34 for details on torque calculations.*
[2] *Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
[3] *For additional motor shaft sizes or smaller inertia value, please visit configurator.stober.com*
* *ME= Motor Adapter L=Large Input Option*

## PH Standard Input

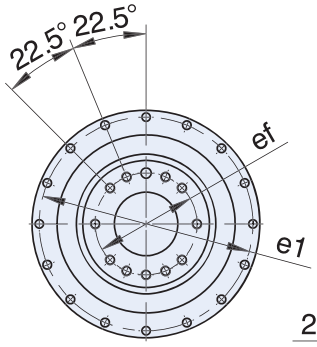


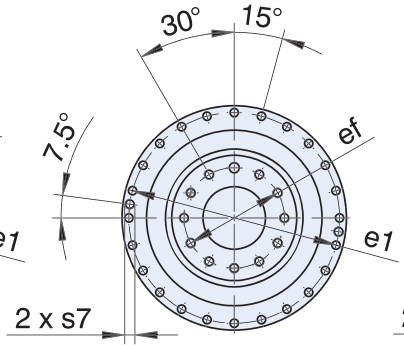

**PH3 | PH4**



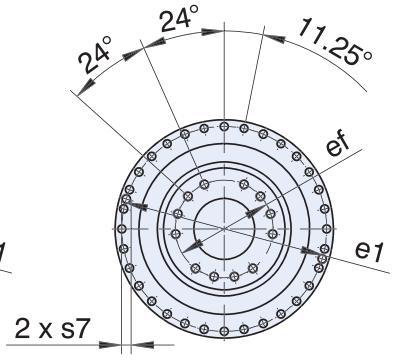

**PH5**




**PH7 | PH8**




**PH9 | PH10**




** See Motor Mounting Plate Option, page 32 for details.*



# Dimensional Data

**Table 1** Dimensions (mm)

| Unit | Øa1 | Øb1 | Øbf | c1 | Ødf | Øe1 | Øef | f1 | i2 | i3 | lh | r | Øs1 | s7 | sf | tf |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PH331 | 86 | $64^{h7}$ | $40^{h7}$ | 4 | $20.0^{H6}$ | 79 | 31.5 | 7 | 19.5 | 16.5 | 4 | 0.020 | 4.5 | – | M5 | 7 |
| PH332 | 86 | $64^{h7}$ | $40^{h7}$ | 4 | $20.0^{H6}$ | 79 | 31.5 | 7 | 19.5 | 16.5 | 4 | 0.020 | 4.5 | – | M5 | 7 |
| PH431 | 118 | $90^{h7}$ | $63^{h7}$ | 7 | $31.5^{H6}$ | 109 | 50.0 | 10 | 30.0 | 24.0 | 6 | 0.020 | 5.5 | – | M6 | 11 |
| PH432 | 118 | $90^{h7}$ | $63^{h7}$ | 7 | $31.5^{H6}$ | 109 | 50.0 | 10 | 30.0 | 24.0 | 6 | 0.020 | 5.5 | – | M6 | 11 |
| PH531 | 145 | $110^{h7}$ | $80^{h7}$ | 8 | $40.0^{H6}$ | 135 | 63.0 | 12 | 29.0 | 23.0 | 6 | 0.020 | 5.5 | – | M6 | 11 |
| PH532 | 145 | $110^{h7}$ | $80^{h7}$ | 8 | $40.0^{H6}$ | 135 | 63.0 | 12 | 29.0 | 23.0 | 6 | 0.020 | 5.5 | – | M6 | 11 |
| PH731 | 179 | $140^{h7}$ | $100^{h7}$ | 10 | $50.0^{H6}$ | 168 | 80.0 | 12 | 38.0 | 32.0 | 6 | 0.025 | 6.6 | – | M8 | 14 |
| PH732 | 179 | $140^{h7}$ | $100^{h7}$ | 10 | $50.0^{H6}$ | 168 | 80.0 | 12 | 38.0 | 32.0 | 6 | 0.025 | 6.6 | – | M8 | 14 |
| PH831 | 247 | $200^{h7}$ | $160^{h7}$ | 12 | $80.0^{H6}$ | 233 | 125.0 | 15 | 50.0 | 42.0 | 8 | 0.030 | 9.0 | M10 | M10 | 18 |
| PH832 | 247 | $200^{h7}$ | $160^{h7}$ | 12 | $80.0^{H6}$ | 233 | 125.0 | 15 | 50.0 | 42.0 | 8 | 0.030 | 9.0 | M10 | M10 | 18 |
| PH942 | 300 | $255^{h7}$ | $180^{h7}$ | 18 | $90.0^{H6}$ | 280 | 140.0 | 20 | 66.0 | 55.0 | 12 | 0.030 | 13.5 | M8 | M16 | 24 |
| PHV943 | 300 | $255^{h7}$ | $180^{h7}$ | 18 | $90.0^{H6}$ | 280 | 140.0 | 20 | 66.0 | 55.0 | 12 | 0.030 | 13.5 | M8 | M16 | 24 |
| PH1042 | 330 | $285^{h7}$ | $200^{h7}$ | 20 | $95.0^{H6}$ | 310 | 160.0 | 20 | 75.0 | 60.0 | 10 | 0.040 | 13.5 | M10 | M20 | 28 |
| PHV1043 | 330 | $285^{h7}$ | $200^{h7}$ | 20 | $95.0^{H6}$ | 310 | 160.0 | 20 | 75.0 | 60.0 | 10 | 0.040 | 13.5 | M10 | M20 | 28 |

**Table 2** Dimensions (mm)

| Unit | Øb6 | Øe6 | Ød2max | l5 | □a6 | c | c6 | f6 | l7 | lg | s6 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PH331_ME | $60^{H7}$ | 75 | 19 | 41 | 75 | 18 | 41.5 | 3.5 | 4.0 | 98.5 | M5 |
| PH332_ME | $40^{H7}$ | 63 | 14 | 30 | 55 | 15 | 32.0 | 3.5 | 3.0 | 116.0 | M5 |
| PH431_ME | $95^{H7}$ | 115 | 24 | 41 | 100 | 21 | 42.5 | 4.0 | 3.5 | 113.5 | M8 |
| PH432_ME | $60^{H7}$ | 75 | 19 | 41 | 75 | 18 | 41.5 | 3.5 | 4.0 | 150.5 | M5 |
| PH531_ME | $110^{H7}$ | 130 | 32 | 51 | 120 | 24 | 54.0 | 4.0 | 4.5 | 132.0 | M8 |
| PH532_ME | $95^{H7}$ | 115 | 24 | 41 | 100 | 21 | 42.5 | 4.0 | 3.5 | 161.0 | M8 |
| PH731_ME | $130^{H7}$ | 165 | 38 | 61 | 150 | 26 | 66.0 | 5.5 | 4.5 | 161.0 | M10 |
| PH732_ME | $110^{H7}$ | 130 | 32 | 51 | 120 | 24 | 54.0 | 4.0 | 4.5 | 199.0 | M8 |
| PH831_ME | $180^{H7}$ | 215 | 48 | 83 | 204 | 35 | 80.5 | 5.5 | 8.5 | 218.0 | M12 |
| PH832_ME | $130^{H7}$ | 165 | 38 | 61 | 150 | 26 | 66.0 | 5.5 | 4.5 | 263.0 | M10 |
| PH942_ME | $180^{H7}$ | 215 | 48 | 83 | 204 | 35 | 80.5 | 5.5 | 8.5 | 334.5 | M12 |
| PHV943_ME | $130^{H7}$ | 165 | 38 | 61 | 150 | 26 | 66.0 | 5.5 | 4.5 | 294.0 | M10 |
| PH1042_ME | $180^{H7}$ | 215 | 48 | 83 | 204 | 35 | 80.5 | 5.5 | 8.5 | 350.5 | M12 |
| PHV1043_ME | $180^{H7}$ | 215 | 48 | 83 | 204 | 35 | 80.5 | 5.5 | 8.5 | 344.0 | M12 |

*In the table above, you will find example dimensions for the motor connection for the ME motor adapter. Note that when dimension c is lengthened (depending on the motor used), dimensions c6, l5 and lg are also lengthened accordingly. You will find additional motor connection dimensions for motor adapters ME, MEL, MF and MFL in our STOBER Configurator at http://configurator.stober.com. Here, you can directly download a 3D model of your drive.*

# PHQ Series: INLINE — Flange Output

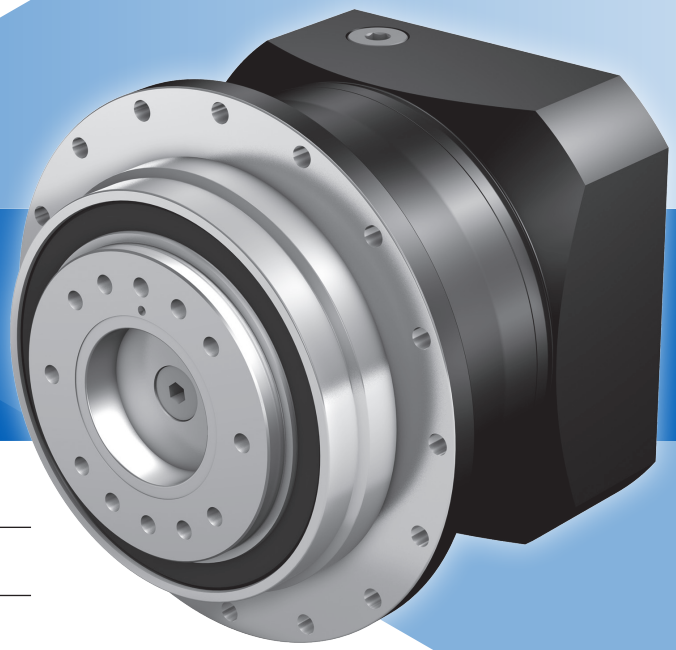
## PHQ Features

- 4:1 to 600:1 ratios (higher ratios available. Contact STOBER.)
- Quiet running (As low as 55dB(A))
- High load capacity and tilting rigidity through symmetrical bearing arrangement
- FKM seals for extended gearbox life
- Large motor input option to accept bigger diameter motor shafts so you don't use an oversized gearbox
- Error free motor mounting and quick changeover with toleranced pilot on motor plate
- Low no load running torque, giving you more torque for your application
- Magnetic oil filtration to remove contaminants to prevent breakdowns
- Build and ship in one day
- Assembled in the USA

*STOBER PHQ Series Servo Precision Planetary Gearheads are designed for applications that demand torsional stiffness and tilting rigidity. The advanced lines can handle high accuracy machines. Every gearbox is made to order. STOBER will custom whatever you need to fit your application. Contact us today to learn more.*

**All PHQ Series SHIP in 1 Day!**

NO EXPEDITE FEE FOR 24 HOUR SERVICE



## General Specifications

| | |
|---|---|
| **Ambient Temperature** | 0°C to +40°C (104°F) [Unit temperature <90°C Max] |
| **Backlash** | ≤1 arcmins (see performance overview page 46) |
| **Coating** | Black (RAL-9005) |
| **Degree of Protection** | IP65 |
| **Direction of Rotation** | Input and output rotate the SAME direction |
| **Efficiency** | 1 stage 96%; 2 stage 93%; 3 stage 90% |
| **Input RPM** | Up to 8,000 RPM |
| **Installation** | Requires 12.9 fasteners. See page 288 for more information |
| **Lubrication** | Lubricated for life – standard Mobil SHC629; option food grade Mobil SHC CIBUS 150 |
| **Mounting Position** | Unrestricted except PHQ three stage units, see page 47 |
| **Warranty** | 5 Year Limited (2 Years on normal wear items: bearings, seals, etc.) |



# Overview

## Selection Options *At-a-Glance*

Using the **Selection Data** table later in this section, select the PH Series Gearhead with the appropriate performance and design options tailored to your motor choice and exact application requirements. Use the part number guide below as a reference to build a part number for the complete gearhead assembly.

**Part Number Examples:**

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 0 | ! |
|---|---|---|---|---|---|---|---|---|---|---|
| PHQ | 4 | 3 | 1 | S | F | S | S | 0055 | ME | L |

| | Design Option | Part Number Code | Description |
|---|---|---|---|
| 1 | **Series** | PHQ | Rotating flange output planetary |
| 2 | **Size** | 4 5 7 8<br>9 10 11 12 | 8 sizes of gearhead |
| 3 | **Generation** | 3<br>4 | Sizes 3-8<br>Sizes 9-12 |
| 4 | **# of Stages** | 1<br>2<br>3 | One stage<br>Two stage<br>Three stage |
| 5 | **Housing** | S | Standard |
| 6 | **Output** | F | Flange output |
| 7 | **Bearing** | S<br>V | Standard<br>Reinforced Bearing (PHQ4 and 5) |
| 8 | **Backlash** | S<br>R | Standard Backlash (PHQ4-8 only)<br>Reduced backlash (PHQ4-9 only) |
| 9 | **Ratio** | 0055 | Ratios range from 5.5:1 to 600:1<br>(0055=5.5:1; 0160=16:1; 1000=100:1, etc.) |
| 0 | **Motor Adapter** | ME<br>MF<br>MB | Motor Adapter with EasyAdapt coupling<br>Motor Adapter with FlexiAdapt coupling (PHQ3-8) (Contact factory for this option)<br>ServoStop motor adapter with brake (Contact factory for this option) |
| ! | **Options** | L | Large Input |

## Options

### ME Adapter Option

- MSS1 Seal – special input seal for longer life (For sizes PHQ5-8). Contact factory for this option.

### Integrated Safety Brake

- ServoStop – provides dynamic braking during power failures or emergency stops in hazardous situations. Contact factory for this option.

### Coating Option

- Available with multi-layer, industrial 316 stainless steel epoxy coating. Contact factory for this option.

### Large Input

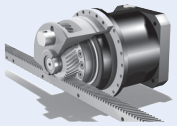
- Accommodates a larger diameter motor shaft without going to a larger size gearbox.

### ATEX

- ATmosphere EXplosible – rated for explosive environments. Contact factory for this option and allow additional time for delivery.

### Rack and Pinion Systems

- PHQ available with rack and pinion. Contact factory for this option.



## PHQ Performance Overview

PH Series performance is dependent on several factors including duty cycle, bearing design, gearhead size and stage configuration, among others. Use the chart below for preliminary evaluation, then use the following performance chart and selection information on the following pages for specific performance sizing and selection.

| Size | | 4 | | 5 | | 7 | | |
|---|---|---|---|---|---|---|---|---|
| # of Stages | | 1 | 2 | 1 | 2 | 1 | 2 | 3 |
| **Acceleration Torque** $M_{2BMAX}$ | Nm | 200 | | 550 | | 1050 | | |
| **Output Torque Nom.** [1] $M_{2N}$ | Nm | 130 | | 320 | | 680 | | |
| **Torsional Stiffness** $C_2$ | Nm/arcmin | 42 | | 102 | | 224 | | |
| **Torsional Backlash** [2] | Δϕ<br>Δϕ Reduced | ≤3<br>≤1 | | ≤3<br>≤1 | | ≤3<br>≤1 | | |
| **Input Speed Max.** $n_{1MAX}$ | Continuous<br>Cyclic | 3000<br>6000 | 4500<br>8000 | 2500<br>5000 | 4000<br>8000 | 2200<br>5000 | 3700<br>7000 | 4000<br>7000 |
| **Efficiency (@nom torque)** | % | 96 | 94 | 96 | 94 | 96 | 94 | 92 |
| **Weight** | kg<br>lbs | 4.8<br>10.6 | 5.3<br>11.7 | 7.6<br>16.7 | 8.9<br>19.6 | 15.9<br>35 | 16.1<br>35.4 | 17.4<br>38.3 |
| **Noise** [3] | dB(A) | ≤55 | | ≤56 | | ≤57 | | |
| **Performance by Bearing Design Option** [4] | | | | | | | | |
| **Permitted Axial Force** $F_{2ax100}$ | N | 2150 | | 4150 | | 6150 | | |
| **Permitted Tilting Torque** $M_{2K100}$ | Nm | 257 | | 440 | | 1466 | | |
| **Tilting Stiffness** $C_{2K}$ | Nm/arcmin | 192 | | 429 | | 500 | | |
| **Performance by Reinforced Bearing Design Option – Choose V Option** [4] | | | | | | | | |
| **Permitted Axial Force** $F_{2ax100}$ | N | 2900 | | 5000 | | — | | |
| **Permitted Tilting Torque** $M_{2K100}$ | Nm | 354 | | 572 | | — | | |
| **Tilting Stiffness** $C_{2K}$ | Nm/arcmin | 217 | | 478 | | — | | |

** PHQ cyclic speed is 5000*

*[1] Ratings based on input speed ($n_1$) of 1500 RPM.*

*For torque at higher input speeds ($M_{2NX}$) solve the formula:*

$$M_{2NX} = \frac{M_{2N}}{\sqrt[3]{\frac{n_1}{1500}}}$$

*where $n_1$ = Actual Input Speed.*

*[2] Tested at 1.5% of nominal torque and recorded on the output side of the gearhead. For lower backlash, contact STOBER technical support.*

*[3] Measurement at one (1) meter distance with input speed ($n_1$) of 1500 RPM.*

*[4] Rating based on output speed ($n_2$) of 100 RPM. For values at other speeds see page <?>.*

# Overview

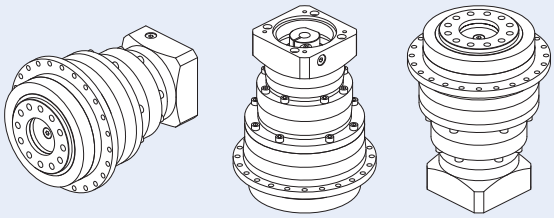


| | 8 | | | 9 | | 10 | | 11 | | 12 | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 2 | 3 | 2 | 3 | 2 | 3 | 2 | 3 |
| | 2800 | | | 6000 | | 10,000 | | 22,000 | | 43,000 | |
| | 1700 | | | 4500 | | 6500 | | 13,000 | | 25,000 | |
| | 713 | | | 1223 | | 2072 | | 3529 | | 6277 | |
| | ≤3<br>≤1 | | | ≤3<br>– | | ≤3<br>– | | ≤3<br>– | | ≤3<br>– | |
| | 1500<br>4000 | 3000<br>6000 | 3700<br>6500 | 2800<br>4500 | 3300<br>6000 | 2500<br>4000 | 2800<br>4500 | 2300<br>3800 | 2800<br>4500 | 1700<br>3500 | 2500<br>4000 |
| | 96 | 94 | 92 | 94 | 92 | 94 | 92 | 94 | 92 | 94 | 92 |
| | 36.0<br>79.2 | 40.6<br>89.32 | 37.6<br>82.7 | 85.6<br>188.3 | 88.9<br>195.6 | 118.2<br>260 | 132.7<br>301.4 | 242.2<br>532.8 | 242.2<br>532.8 | 438.6<br>964.9 | 451.7<br>993.7 |
| | ≤57 | | | ≤58 | | ≤59 | | ≤59 | | ≤60 | |
| | 10,050 | | | 33,000 | | 50,000 | | 60,000 | | 70,000 | |
| | 3486 | | | 7500 | | 8800 | | 11,000 | | 18,000 | |
| | 1550 | | | 7500 | | 9500 | | 11,500 | | 14,000 | |
| | – | | | – | | – | | – | | – | |
| | – | | | – | | – | | – | | – | |
| | – | | | – | | – | | – | | – | |

## PHQ Series Three-Stage Mounting Position

For all three stage units (PHQ: Size 7-12) , the amount of lubrication depends on the mounting position.

**When ordering any of these three stage units, the mounting position (EL1, EL5 or EL6) MUST BE SPECIFIED WITH THE ORDER!**



EL1 EL5 EL6

# PHQ Series Motor Mounting Plate Option

**(Motor information required with Motor Adapter ME option)**

STOBER Servo Gearheads fit the motor of your choice with the appropriate motor mounting plate assembled between the motor and the gearhead.

**NOTE: When ordering a gearhead:**

- Specify the motor manufacturer and part number
- Provide the motor drawing with dimensions, or specify the motor mounting dimensions (per the list shown at right)

For a precise dimension on a specific motor, or for general assistance, we recommend you contact STOBER Technical Support.

### Customer Required Dimensions for Properly Sized Motor Mounting Plate

d2 Motor Shaft Diameter
(If an adapter bushing is required it will be supplied with the motor plate.)

b6 Pilot Diameter

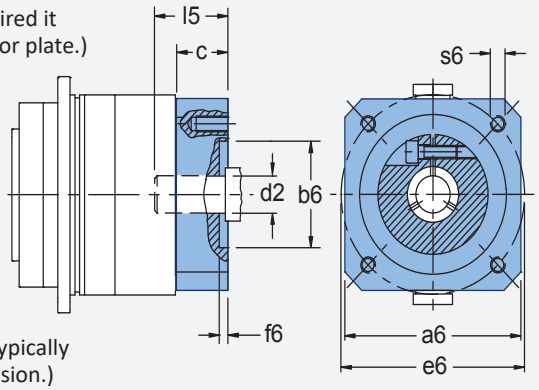
e6 Bolt Circle Diameter

s6 Bolt Diameter

l5 Motor Shaft Length

f6 Pilot Length

a6 Square Flange
(Optional – motor plate will typically be made to match this dimension.)




**Motor Mounting Plate Dimensions — mm (Part Number Specific)**

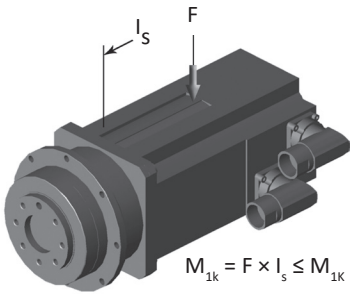
| d2 Max. Motor Shaft Ø | c Min. Motor Plate Thickness* | Series / Size / # of Stages | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 4 | | 5 | | 7 | | | 8 | | | 9 | | 10 | | 11 | | 12 | |
| | | | 1 | 2 | 1 | 2 | 1 | 2 | 3 | 1 | 2 | 3 | 2 | 3 | 2 | 3 | 2 | 3 | 2 | 3 |
| 19 | 18 | PHQ | | 432 | | | | | | | | | | | | | | | | |
| 24 | 21 | PHQ | 431 | 432…L | | 532 | | | 733 | | | | | | | | | | | |
| 32 | 24 | PHQ | 431…L | | 531 | 532…L | | 732 | 733…L | | | 833 | | | | | | | | |
| 38 | 25 | PHQ | | | 531…L | | 731 | 732…L | | | 832 | 833…L | | 943 | | | | | | |
| 48 | 43 | PHQ | | | | | 731…L | | | | 832…L | | 942 | 943…L | | 1043 | | 1143 | | |
| 60 [1)] | 43 | PHQ | | | | | | | | | | | 942…L | | 1042 | 1043…L | 1142 | 1143…L | 1242 | 1243 |

** Note that the c motor plate thickness is determined by the motor shaft length. The minimum motor plate thickness is the value listed.*
*[1)] Maximum motor shaft diameter is 55 mm for PHQ932…L with ratios above 30:1 and for PHQ1033…L and PHQ1133…L with ratios above 150:1.*

# PHQ Series Permissible Motor Tilting Torque

The permissible tilting torque of the motor attached to the gear unit is a result of the static and dynamic load "F" from the motor weight, mass acceleration, and vibration multiplied by the distance from the center of gravity "$l_S$" of the motor.

| $M_{1K}$ | PHQ432_ME | PHQ431_ME<br>PHQ532_ME<br>PHQ733_ME | PHQ531_ME<br>PHQ732_ME<br>PHQ833_ME | PHQ731_ME<br>PHQ832_ME<br>PHQ933_ME | PHQ831_ME<br>PHQ942_ME<br>PHQ1043_ME<br>PHQ1143_ME | PHQ1042_ME<br>PHQ1243_ME | PHQ1142_ME | PHQ1242_ME |
|---|---|---|---|---|---|---|---|---|
| Nm | 20 | 40 | 80 | 200 | 400 | 800 | 1200 | 1800 |





# Overview

## PHQ Series Permissible Output Shaft Load and Tilting Moments – Standard Bearings

| Size | $z_2$ Distance of Shaft Shoulder to Center of Output Bearing mm | $F_{2ax100}$ Permitted Axial Force N | $F_{2rad100}$ Permitted Radial Force ≤100RPM N | $F_{2rad,acc}$ Radial Acceleration Force N | $M_{2K100}$ Permitted Tilting Torque ≤100RPM Nm | $M_{2K,acc}$ Permitted Acceleration Tilting Torque Nm | $C_{2K}$ Tilting Stiffness Nm/arcmin |
|---|---|---|---|---|---|---|---|
| 4 | 83.0 | 2150 | 3095 | 3929 | 257 | 326 | 192 |
| 5 | 97.0 | 4150 | 4536 | 4897 | 440 | 475 | 429 |
| 7 | 86.0 | 6150 | 17,045 | 17,045 | 1466 | 1466 | 500 |
| 8 | 125.5 | 10,050 | 27,778 | 33,333 | 3486 | 4183 | 1550 |
| 9 | 155.0 | 33,000 | 48,387 | 70,968 | 7,500 | 11,000 | 7500 |
| 10 | 171.0 | 50,000 | 51,462 | 73,099 | 8,800 | 12,500 | 9500 |
| 11 | 231.0 | 60,000 | 47,619 | 69,264 | 11,000 | 16,000 | 11,500 |
| 12 | 281.0 | 70,000 | 64,057 | 106,761 | 18,000 | 30,000 | 14,000 |

## PHQ Series Permissible Output Shaft Load and Tilting Moments – Reinforced Bearings

| Size | $z_2$ Distance of Shaft Shoulder to Center of Output Bearing mm | $F_{2ax100}$ Permitted Axial Force N | $F_{2rad100}$ Permitted Radial Force ≤100RPM N | $F_{2rad,acc}$ Radial Acceleration Force N | $M_{2K100}$ Permitted Tilting Torque ≤100RPM Nm | $M_{2K,acc}$ Permitted Acceleration Tilting Torque Nm | $C_{2K}$ Tilting Stiffness Nm/arcmin |
|---|---|---|---|---|---|---|---|
| 4 | 88.5 | 2900 | 4000 | 4000 | 354 | 354 | 217 |
| 5 | 104.0 | 5000 | 5500 | 5500 | 572 | 572 | 478 |

## PHQ Series Load/Life/Speed Calculations

The permissible load and tilting moment values are based on an output speed of 100 RPM. For higher speeds the following applies, where $n_2$ is the desired speed:

$$F_{2AX} = \frac{F_{2ax100}}{\sqrt[3]{\frac{n_2}{100}}} \qquad F_{2radN} = \frac{F_{2rad100}}{\sqrt[3]{\frac{n_2}{100rpm}}} \qquad M_{2KX} = \frac{M_{2K100}}{\sqrt[3]{\frac{n_2}{100}}}$$

The application output tilting moment should be determined by the following formula:

$$M_{2k,acc*} = \frac{2 \bullet F_{2ax100*} \bullet y_2 + F_{2rad,acc*} \bullet (x_2 + Z_2)}{1000} \leq M_{2k,acc}$$

$$M_{2k,eq*} = \sqrt[3]{\frac{n_{2b1} \bullet t_{b1} \bullet M_{2kb1}{}^3 + \ldots + n_{2bn} \bullet t_{bn} \bullet M_{2kbn}{}^3}{n_{2b1} \bullet t_{b1} + \ldots + n_{2bn} \bullet t_{bn}}} \leq M_{2kN}$$

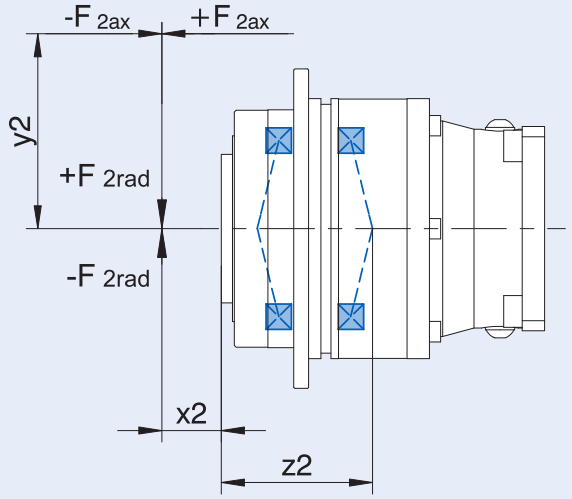
$$F_{2rad,eq*} = \sqrt[3]{\frac{n_{2b1} \bullet t_{b1} \bullet F_{2rb1}{}^3 + \ldots + n_{2bn} \bullet t_{bn} \bullet F_{2rbn}{}^3}{n_{2b1} \bullet t_{b1} + \ldots + n_{2bn} \bullet t_{bn}}} \leq F_{2radN}$$

Where:

| | |
|---|---|
| $z_2$ | Distance of Shaft Shoulder to Center of Output Bearing |
| $n_2$ | Actual Average Output Speed |
| $x_2$ | Distance of the Shaft Shoulder to the Force Application Point |
| $y_2$ | Distance of the Shaft Axis to the Axial Force Application Point |
| $F_{2ax*}$ | Actual Axial Force at Gear Unit Output |
| $F_{2ax100}$ | Permitted Axial Force |
| $F_{2rad100}$ | Permitted Radial Force ≤100RPM |
| $F_{2rad,acc}$ | Radial Acceleration Force |
| $F_{2rad,acc*}$ | Radial Acceleration Force at Gear Unit Output |
| $M_{2K100}$ | Permitted Tilting Torque ≤100RPM |
| $M_{2K,acc}$ | Permitted Acceleration Tilting Torque |
| $M_{2k,acc*}$ | Permitted Acceleration Tilting Torque at Gear Unit Output |
| $C_{2K}$ | Tilting Stiffness |

**All formulas shown are based on METRIC values**

*Upper case letters are permissible values. Lower case letters are for existing values.*




The hours of life ($L_h$) of the unit can be determined by the following formula:

**bearing life for duty cycle ≤ 40%**

$L_h$ > 10,000 hours if $M_{2K100}/M_{2A*}$ < 1.25 and > 1
$L_h$ > 20,000 hours if $M_{2K100}/M_{2A*}$ > 1.25 and > 1.5
$L_h$ > 30,000 hours if $M_{2K100}/M_{2A*}$ < 1.5

**bearing life for duty cycle ≥ 40%**

$$L_{hA} = L_h \left( \frac{40\%}{\text{Duty Cycle}} \right)$$

| Exact Ratio (i) | Output Torque: Nom. [1] $M_{2N}$ | Output Torque: Accel. $M_{2acc}$ | Output Torque: Accel. Torque for Reduced Backlash $M_{2accHT}$ | Output Torque: Peak [2] $M_{2NOT}$ | Back-lash $\Delta\phi_2$ | Red. Back-lash $\Delta\phi_{2red}$ | Part Number* (Gearhead + Input) | Max. Input Speed RPM (n1): Cont. | Max. Input Speed RPM (n1): Cyclic | Motor Shaft [3] Max Ø $d_{MW}$ | Input Inertia $J_1$ | Tors. Stiffness $C_2$ | Oper. Noise $L_{pA}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Nm | Nm | Nm | Nm | arcmin | arcmin | | | | mm | kgcm² | Nm/ arcmin | dB(A) |
| **PHQ4** | | | | | | | | | | | | | |
| 5.500 | 100 | 200 | 220 | 385 | 3 | 1 | PHQ431_0055 ME | 3000 | 6000 | ≤24 | 1.1 | 42 | 59 |
| | | | | 400 | | | PHQ431_0055 MEL | | | ≤32 | 2.7 | | |
| 22.00 | 120 | 200 | 238 | 400 | 3 | 1 | PHQ432_0220 ME | 4000 | 8000 | ≤19 | 0.51 | 40 | 60 |
| | | | | | | | PHQ432_0220 MEL | | | ≤24 | 0.94 | | |
| 27.50 | 120 | 200 | 246 | 400 | 3 | 1 | PHQ432_0280 ME | 4500 | 8000 | ≤19 | 0.46 | 40 | 58 |
| | | | | | | | PHQ432_0280 MEL | | | ≤24 | 0.89 | | |
| 38.50 | 130 | 200 | 246 | 400 | 3 | 1 | PHQ432_0390 ME | 4500 | 8000 | ≤19 | 0.43 | 40 | 57 |
| | | | | | | | PHQ432_0390 MEL | | | ≤24 | 0.86 | | |
| 55.00 | 130 | 200 | 247 | 400 | 3 | 1 | PHQ432_0550 ME | 4500 | 8000 | ≤19 | 0.41 | 38 | 55 |
| | | | | | | | PHQ432_0550 MEL | | | ≤24 | 0.84 | | |

[1] *Based on input speed of 1500 RPM. See page 46 for details on torque calculations.*
[2] *Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
[3] *For additional motor shaft sizes or smaller inertia value, please visit configurator.stober.com*
* *ME= Motor Adapter L=Large Input Option*



# Selection Data

| Exact Ratio (i) | Output Torque: Nom. $M_{2N}$ Nm | Output Torque: Accel. $M_{2acc}$ Nm | Output Torque: Accel. Torque for Reduced Backlash $M_{2accHT}$ Nm | Output Torque: Peak $M_{2NOT}$ Nm | Back-lash $\Delta\phi_2$ arcmin | Red. Back-lash $\Delta\phi_{2red}$ arcmin | Part Number* (Gearhead + Input) | Max. Input Speed RPM (n1): Cont. | Max. Input Speed RPM (n1): Cyclic | Motor Shaft Max Ø $d_{MW}$ mm | Input Inertia $J_1$ kgcm² | Tors. Stiffness $C_2$ Nm/arcmin | Oper. Noise $L_{pA}$ dB(A) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **PHQ5** | | | | | | | | | | | | | |
| 5.500 | 280 | 550 | 550 | 948 | 3 | 1 | PHQ531_0055 ME | 2500 | 5000 | ≤32 | 3.3 | 101 | 60 |
| | | | | | | | PHQ531_0055 MEL | | | ≤38 | 6.9 | 102 | |
| 22.00 | 290 | 480 | 530 | 948 | 3 | 1 | PHQ532_0220 ME | 3500 | 7000 | ≤24 | 1.1 | 102 | 61 |
| | | | | | | | PHQ532_0220 MEL | | | ≤32 | 2.7 | | |
| 27.50 | 300 | 540 | 562 | 948 | 3 | 1 | PHQ532_0280 ME | 3700 | 7500 | ≤24 | 1.0 | 102 | 59 |
| | | | | | | | PHQ532_0280 MEL | | | ≤32 | 2.6 | | |
| 38.50 | 320 | 530 | 552 | 948 | 3 | 1 | PHQ532_0390 ME | 4000 | 8000 | ≤24 | 0.94 | 100 | 58 |
| | | | | | | | PHQ532_0390 MEL | | | ≤32 | 2.5 | | |
| 55.00 | 320 | 500 | 500 | 948 | 3 | 1 | PHQ532_0550 ME | 4000 | 8000 | ≤24 | 0.89 | 95 | 56 |
| | | | | | | | PHQ532_0550 MEL | | | ≤32 | 2.5 | | |



[1] *Based on input speed of 1500 RPM. See page 46 for details on torque calculations.*
[2] *Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
[3] *For additional motor shaft sizes or smaller inertia value, please visit configurator.stober.com*
* *ME= Motor Adapter L=Large Input Option*

| Exact Ratio (i) | Output Torque: Nom. [1] $M_{2N}$ Nm | Output Torque: Accel. $M_{2acc}$ Nm | Output Torque: Accel. Torque for Reduced Backlash $M_{2accHT}$ Nm | Output Torque: Peak [2] $M_{2NOT}$ Nm | Back-lash $\Delta\phi_2$ arcmin | Red. Back-lash $\Delta\phi_{2red}$ arcmin | Part Number* (Gearhead + Input) | Max. Input Speed RPM (n1): Cont. | Max. Input Speed RPM (n1): Cyclic | Motor Shaft [3] Max Ø $d_{MW}$ mm | Input Inertia $J_1$ kgcm² | Tors. Stiffness $C_2$ Nm/arcmin | Oper. Noise $L_{pA}$ dB(A) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **PHQ7** | | | | | | | | | | | | | |
| 5.500 | 500 | 1050 | 1050 | 1816 | 3 | 1 | PHQ731_0055 ME | 2200 | 5000 | ≤38 | 8.9 | 216 | 61 |
| | | | | 2100 | | | PHQ731_0055 MEL | | | ≤48 | 19 | 222 | |
| 22.00 | 650 | 900 | 1000 | 1800 | 3 | 1 | PHQ732_0220 ME | 3000 | 6000 | ≤32 | 3.6 | 224 | 62 |
| | | | | | | | PHQ732_0220 MEL | | | ≤38 | 7.2 | | |
| 27.50 | 650 | 1050 | 1050 | 2100 | 3 | 1 | PHQ732_0280 ME | 3500 | 7000 | ≤32 | 3.3 | 223 | 60 |
| | | | | | | | PHQ732_0280 MEL | | | ≤38 | 6.8 | | |
| 38.50 | 680 | 1050 | 1050 | 2100 | 3 | 1 | PHQ732_0390 ME | 3700 | 7000 | ≤32 | 2.9 | 220 | 59 |
| | | | | | | | PHQ732_0390 MEL | | | ≤38 | 6.4 | | |
| 55.00 | 680 | 1050 | 1050 | 2100 | 3 | 1 | PHQ732_0550 ME | 3700 | 7000 | ≤32 | 2.7 | 213 | 57 |
| | | | | | | | PHQ732_0550 MEL | | | ≤38 | 6.2 | | |
| 88.00 | 680 | 1050 | 1050 | 2100 | 3 | 1 | PHQ733_0880 ME | 3300 | 6000 | ≤24 | 1.2 | 224 | 61 |
| | | | | | | | PHQ733_0880 MEL | | | ≤32 | 2.8 | | |
| 110.0 | 680 | 1050 | 1050 | 2100 | 3 | 1 | PHQ733_1100 ME | 3300 | 6000 | ≤24 | 1.1 | 224 | 61 |
| | | | | | | | PHQ733_1100 MEL | | | ≤32 | 2.7 | | |
| 137.5 | 680 | 1050 | 1050 | 2100 | 3 | 1 | PHQ733_1380 ME | 3700 | 6500 | ≤24 | 1.0 | 224 | 59 |
| | | | | | | | PHQ733_1380 MEL | | | ≤32 | 2.6 | | |
| 154.0 | 680 | 1050 | 1050 | 2100 | 3 | 1 | PHQ733_1540 ME | 4000 | 7000 | ≤24 | 0.95 | 223 | 58 |
| | | | | | | | PHQ733_1540 MEL | | | ≤32 | 2.6 | | |
| 192.5 | 680 | 1050 | 1050 | 2100 | 3 | 1 | PHQ733_1930 ME | 4000 | 7000 | ≤24 | 0.94 | 223 | 58 |
| | | | | | | | PHQ733_1930 MEL | | | ≤32 | 2.5 | | |
| 220.0 | 680 | 1050 | 1050 | 2100 | 3 | 1 | PHQ733_2200 ME | 4000 | 7000 | ≤24 | 0.89 | 222 | 56 |
| | | | | | | | PHQ733_2200 MEL | | | ≤32 | 2.5 | | |
| 275.0 | 680 | 1050 | 1050 | 2100 | 3 | 1 | PHQ733_2750 ME | 4000 | 7000 | ≤24 | 0.89 | 222 | 56 |
| | | | | | | | PHQ733_2750 MEL | | | ≤32 | 2.5 | | |
| 385.0 | 680 | 1050 | 1050 | 2100 | 3 | 1 | PHQ733_3850 ME | 4000 | 7000 | ≤24 | 0.88 | 221 | 56 |
| | | | | | | | PHQ733_3850 MEL | | | ≤32 | 2.5 | | |
| 550.0 | 680 | 1050 | 1050 | 2100 | 3 | 1 | PHQ733_5500 ME | 4000 | 7000 | ≤24 | 0.88 | 214 | 56 |
| | | | | | | | PHQ733_5500 MEL | | | ≤32 | 2.5 | | |

[1] *Based on input speed of 1500 RPM. See page 46 for details on torque calculations.*
[2] *Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
[3] *For additional motor shaft sizes or smaller inertia value, please visit configurator.stober.com*
* *ME= Motor Adapter L=Large Input Option*





| Exact Ratio (i) | Output Torque: Nom. [1] $M_{2N}$ Nm | Output Torque: Accel. $M_{2acc}$ Nm | Output Torque: Accel. Torque for Reduced Backlash $M_{2accHT}$ Nm | Output Torque: Peak [2] $M_{2NOT}$ Nm | Back-lash $\Delta\phi_2$ arcmin | Red. Back-lash $\Delta\phi_{2red}$ arcmin | Part Number* (Gearhead + Input) | Max. Input Speed RPM (n1): Cont. | Max. Input Speed RPM (n1): Cyclic | Motor Shaft [3] Max Ø $d_{MW}$ mm | Input Inertia $J_1$ kgcm² | Tors. Stiffness $C_2$ Nm/arcmin | Oper. Noise $L_{pA}$ dB(A) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **PHQ8** | | | | | | | | | | | | | |
| 5.500 | 1400 | 2800 | 3300 | 3311 | 3 | 1 | PHQ831_0055 ME | 1500 | 4000 | ≤48 | 31 | 621 | 62 |
| | | | | 4964 | | | PHQ831_0055 MEL | | | ≤60 | 59 | 652 | |
| 22.00 | 1700 | 2800 | 3300 | 4964 | 3 | 1 | PHQ832_0220 ME | 2500 | 4500 | ≤38 | 11 | 709 | 63 |
| | | | | | | | PHQ832_0220 MEL | | | ≤48 | 21 | 713 | |
| 27.50 | 1700 | 2800 | 3300 | 4964 | 3 | 1 | PHQ832_0280 ME | 2700 | 5500 | ≤38 | 8.9 | 707 | 61 |
| | | | | | | | PHQ832_0280 MEL | | | ≤48 | 19 | 710 | |
| 38.50 | 1700 | 2800 | 3300 | 4964 | 3 | 1 | PHQ832_0390 ME | 3000 | 6000 | ≤38 | 7.7 | 697 | 60 |
| | | | | | | | PHQ832_0390 MEL | | | ≤48 | 18 | 698 | |
| 55.00 | 1700 | 2700 | 2990 | 4964 | 3 | 1 | PHQ832_0550 ME | 3000 | 6000 | ≤38 | 7.0 | 669 | 58 |
| | | | | | | | PHQ832_0550 MEL | | | ≤48 | 17 | | |
| 88.00 | 1700 | 2800 | 3300 | 4964 | 3 | 1 | PHQ833_0880 ME | 3000 | 5000 | ≤32 | 3.7 | 711 | 62 |
| | | | | | | | PHQ833_0880 MEL | | | ≤38 | 7.3 | | |
| 110.0 | 1700 | 2800 | 3300 | 4964 | 3 | 1 | PHQ833_1100 ME | 3000 | 5000 | ≤32 | 3.6 | 711 | 62 |
| | | | | | | | PHQ833_1100 MEL | | | ≤38 | 7.2 | | |
| 137.5 | 1700 | 2800 | 3300 | 4964 | 3 | 1 | PHQ833_1380 ME | 3500 | 6000 | ≤32 | 3.3 | 710 | 60 |
| | | | | | | | PHQ833_1380 MEL | | | ≤38 | 6.8 | | |
| 154.0 | 1700 | 2800 | 3300 | 4964 | 3 | 1 | PHQ833_1540 ME | 3700 | 6500 | ≤32 | 3.0 | 709 | 59 |
| | | | | | | | PHQ833_1540 MEL | | | ≤38 | 6.5 | | |
| 192.5 | 1700 | 2800 | 3300 | 4964 | 3 | 1 | PHQ833_1930 ME | 3700 | 6500 | ≤32 | 2.9 | 709 | 59 |
| | | | | | | | PHQ833_1930 MEL | | | ≤38 | 6.4 | | |
| 220.0 | 1700 | 2800 | 3300 | 4964 | 3 | 1 | PHQ833_2200 ME | 3700 | 6500 | ≤32 | 2.7 | 705 | 57 |
| | | | | | | | PHQ833_2200 MEL | | | ≤38 | 6.2 | | |
| 275.0 | 1700 | 2800 | 3300 | 4964 | 3 | 1 | PHQ833_2750 ME | 3700 | 6500 | ≤32 | 2.7 | 707 | 57 |
| | | | | | | | PHQ833_2750 MEL | | | ≤38 | 6.2 | | |
| 385.0 | 1700 | 2800 | 3300 | 4964 | 3 | 1 | PHQ833_3850 ME | 3700 | 6500 | ≤32 | 2.7 | 698 | 57 |
| | | | | | | | PHQ833_3850 MEL | | | ≤38 | 6.2 | | |
| 550.0 | 1700 | 2700 | 2990 | 4964 | 3 | 1 | PHQ833_5500 ME | 3700 | 6500 | ≤32 | 2.7 | 672 | 57 |
| | | | | | | | PHQ833_5500 MEL | | | ≤38 | 6.2 | | |

[1] *Based on input speed of 1500 RPM. See page 46 for details on torque calculations.*
[2] *Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
[3] *For additional motor shaft sizes or smaller inertia value, please visit configurator.stober.com*
* *ME= Motor Adapter L=Large Input Option*

| Exact Ratio (i) | Output Torque: Nom. [1] $M_{2N}$ | Output Torque: Accel. $M_{2acc}$ | Output Torque: Accel. Torque for Reduced Backlash $M_{2accHT}$ | Output Torque: Peak [2] $M_{2NOT}$ | Back-lash $\Delta\phi_2$ | Red. Back-lash $\Delta\phi_{2red}$ | Part Number* (Gearhead + Input) | Max. Input Speed RPM (n1): Cont. | Max. Input Speed RPM (n1): Cyclic | Motor Shaft [3] Max Ø $d_{MW}$ | Input Inertia $J_1$ | Tors. Stiffness $C_2$ | Oper. Noise $L_{pA}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Nm | Nm | Nm | Nm | arcmin | arcmin | | | | mm | kgcm² | Nm/ arcmin | dB(A) |
| **PHQ9** | | | | | | | | | | | | | |
| 18.00 | 3800 | 6000 | 6000 | 10496 | 3.0 | 1.0 | PHQ942_0180 ME | 1800 | 3000 | ≤48 | 62 | 1212 | 66 |
| | | | | 12000 | | | PHQ942_0180 MEL | | | ≤60 | 90 | 1223 | |
| 24.00 | 3800 | 6600 | 6600 | 13200 | 3.0 | 1.0 | PHQ942_0240 ME | 2000 | 3500 | ≤48 | 37 | 1211 | 64 |
| | | | | | | | PHQ942_0240 MEL | | | ≤60 | 65 | 1217 | |
| 30.00 | 4200 | 6600 | 6600 | 13200 | 3.0 | 1.0 | PHQ942_0300 ME | 2500 | 4000 | ≤48 | 29 | 1205 | 62 |
| | | | | | | | PHQ942_0300 MEL | | | ≤60 | 57 | 1209 | |
| 42.00 | 4500 | 6600 | 6600 | 13200 | 3.0 | 1.0 | PHQ942_0420 ME | 2800 | 4500 | ≤48 | 23 | 1190 | 61 |
| | | | | | | | PHQ942_0420 MEL | | | ≤60 | 52 | 1192 | |
| 60.00 | 4500 | 6600 | 6600 | 13200 | 3.0 | 1.0 | PHQ942_0600 ME | 2800 | 4500 | ≤48 | 20 | 1147 | 59 |
| | | | | | | | PHQ942_0600 MEL | | | ≤60 | 49 | 1148 | |
| 72.00 | 3800 | 6600 | 6600 | 13200 | 3.0 | 1.0 | PHQ943_0720 ME | 2200 | 4500 | ≤38 | 13 | 1202 | 63 |
| | | | | | | | PHQ943_0720 MEL | | | ≤48 | 23 | 1203 | |
| 96.00 | 3800 | 6600 | 6600 | 13200 | 3.0 | 1.0 | PHQ943_0960 ME | 2500 | 4500 | ≤38 | 11 | 1205 | 63 |
| | | | | | | | PHQ943_0960 MEL | | | ≤48 | 21 | 1206 | |
| 120.0 | 4200 | 6600 | 6600 | 13200 | 3.0 | 1.0 | PHQ943_1200 ME | 2500 | 4500 | ≤38 | 10 | 1201 | 63 |
| | | | | | | | PHQ943_1200 MEL | | | ≤48 | 21 | 1202 | |
| 150.0 | 4200 | 6600 | 6600 | 13200 | 3.0 | 1.0 | PHQ943_1500 ME | 2700 | 5500 | ≤38 | 8.8 | 1201 | 61 |
| | | | | | | | PHQ943_1500 MEL | | | ≤48 | 19 | | |
| 168.0 | 3800 | 6600 | 6600 | 13200 | 3.0 | 1.0 | PHQ943_1680 ME | 3000 | 6000 | ≤38 | 7.8 | 1203 | 60 |
| | | | | | | | PHQ943_1680 MEL | | | ≤48 | 18 | | |
| 210.0 | 4200 | 6600 | 6600 | 13200 | 3.0 | 1.0 | PHQ943_2100 ME | 3000 | 6000 | ≤38 | 7.6 | 1200 | 60 |
| | | | | | | | PHQ943_2100 MEL | | | ≤48 | 18 | | |
| 240.0 | 3800 | 6600 | 6600 | 13200 | 3.0 | 1.0 | PHQ943_2400 ME | 3000 | 6000 | ≤38 | 7.1 | 1197 | 58 |
| | | | | | | | PHQ943_2400 MEL | | | ≤48 | 17 | | |
| 300.0 | 4200 | 6600 | 6600 | 13200 | 3.0 | 1.0 | PHQ943_3000 ME | 3000 | 6000 | ≤38 | 7.0 | 1196 | 58 |
| | | | | | | | PHQ943_3000 MEL | | | ≤48 | 17 | | |
| 420.0 | 4500 | 6600 | 6600 | 13200 | 3.0 | 1.0 | PHQ943_4200 ME | 3000 | 6000 | ≤38 | 6.9 | 1184 | 58 |
| | | | | | | | PHQ943_4200 MEL | | | ≤48 | 17 | | |
| 600.0 | 4500 | 6600 | 6600 | 13200 | 3.0 | 1.0 | PHQ943_6000 ME | 3000 | 6000 | ≤38 | 6.9 | 1145 | 58 |
| | | | | | | | PHQ943_6000 MEL | | | ≤48 | 17 | | |

[1] *Based on input speed of 1500 RPM. See page 46 for details on torque calculations.*
[2] *Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
[3] *For additional motor shaft sizes or smaller inertia value, please visit configurator.stober.com*
* *ME= Motor Adapter L=Large Input Option*





| Exact Ratio (i) | Output Torque: Nom. [1] $M_{2N}$ Nm | Output Torque: Accel. $M_{2acc}$ Nm | Output Torque: Accel. Torque for Reduced Backlash $M_{2accHT}$ Nm | Output Torque: Peak [2] $M_{2NOT}$ Nm | Back-lash $\Delta\phi_2$ arcmin | Red. Back-lash $\Delta\phi_{2red}$ arcmin | Part Number* (Gearhead + Input) | Max. Input Speed RPM (n1): Cont. | Max. Input Speed RPM (n1): Cyclic | Motor Shaft [3] Max Ø $d_{MW}$ mm | Input Inertia $J_1$ kgcm² | Tors. Stiffness $C_2$ Nm/arcmin | Oper. Noise $L_{pA}$ dB(A) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **PHQ10** | | | | | | | | | | | | | |
| 24.00 | 6500 | 10000 | – | 20000 | 3.0 | – | PHQ1042_0240 ME | 1800 | 3000 | ≤60 | 100 | 2072 | 65 |
| 30.00 | 6500 | 10000 | – | 20000 | 3.0 | – | PHQ1042_0300 ME | 2000 | 3500 | ≤60 | 82 | 2064 | 63 |
| 42.00 | 6500 | 10000 | – | 20000 | 3.0 | – | PHQ1042_0420 ME | 2300 | 4000 | ≤60 | 69 | 2043 | 62 |
| 60.00 | 6500 | 10000 | – | 20000 | 3.0 | – | PHQ1042_0600 ME | 2500 | 4000 | ≤60 | 62 | 1972 | 60 |
| 96.00 | 6500 | 10000 | – | 20000 | 3.0 | – | PHQ1043_0960 ME | 2000 | 3500 | ≤48 | 36 | 2066 | 64 |
| | | | | | | | PHQ1043_0960 MEL | | | ≤60 | 65 | 2067 | |
| 120.0 | 6500 | 10000 | – | 20000 | 3.0 | – | PHQ1043_1200 ME | 2000 | 3500 | ≤48 | 35 | 2060 | 64 |
| | | | | | | | PHQ1043_1200 MEL | | | ≤60 | 64 | 2061 | |
| 150.0 | 6500 | 10000 | – | 20000 | 3.0 | – | PHQ1043_1500 ME | 2500 | 4000 | ≤48 | 28 | 2060 | 62 |
| | | | | | | | PHQ1043_1500 MEL | | | ≤60 | 56 | | |
| 168.0 | 6500 | 10000 | – | 20000 | 3.0 | – | PHQ1043_1680 ME | 2800 | 4500 | ≤48 | 23 | 2063 | 61 |
| | | | | | | | PHQ1043_1680 MEL | | | ≤60 | 51 | | |
| 210.0 | 6500 | 10000 | – | 20000 | 3.0 | – | PHQ1043_2100 ME | 2800 | 4500 | ≤48 | 23 | 2059 | 61 |
| | | | | | | | PHQ1043_2100 MEL | | | ≤60 | 51 | | |
| 240.0 | 6500 | 10000 | – | 20000 | 3.0 | – | PHQ1043_2400 ME | 2800 | 4500 | ≤48 | 20 | 2055 | 59 |
| | | | | | | | PHQ1043_2400 MEL | | | ≤60 | 48 | | |
| 300.0 | 6500 | 10000 | – | 20000 | 3.0 | – | PHQ1043_3000 ME | 2800 | 4500 | ≤48 | 20 | 2054 | 59 |
| | | | | | | | PHQ1043_3000 MEL | | | ≤60 | 48 | | |
| 420.0 | 6500 | 10000 | – | 20000 | 3.0 | – | PHQ1043_4200 ME | 2800 | 4500 | ≤48 | 20 | 2036 | 62 |
| | | | | | | | PHQ1043_4200 MEL | | | ≤60 | 48 | | |
| 600.0 | 6500 | 10000 | – | 20000 | 3.0 | – | PHQ1043_6000 ME | 2800 | 4500 | ≤48 | 20 | 1969 | 59 |
| | | | | | | | PHQ1043_6000 MEL | | | ≤60 | 48 | | |

[1] *Based on input speed of 1500 RPM. See page 46 for details on torque calculations.*
[2] *Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
[3] *For additional motor shaft sizes or smaller inertia value, please visit configurator.stober.com*
* *ME= Motor Adapter L=Large Input Option*

| Exact Ratio (i) | Output Torque: Nom. [1] $M_{2N}$ | Output Torque: Accel. $M_{2acc}$ | Output Torque: Accel. Torque for Reduced Backlash $M_{2accHT}$ | Output Torque: Peak [2] $M_{2NOT}$ | Back-lash $\Delta\phi_2$ | Red. Back-lash $\Delta\phi_{2red}$ | Part Number* (Gearhead + Input) | Max. Input Speed RPM (n1) | | Motor Shaft [3] Max Ø $d_{MW}$ | Input Inertia $J_1$ | Tors. Stiffness $C_2$ | Oper. Noise $L_{pA}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Nm | Nm | Nm | Nm | arcmin | arcmin | | Cont. | Cyclic | mm | kgcm² | Nm/ arcmin | dB(A) |
| **PHQ11** | | | | | | | | | | | | | |
| 24.00 | 13000 | 22000 | – | 32208 | 3.0 | – | **PHQ1142_0240 ME** | 1800 | 2800 | ≤60 | 171 | 3533 | 68 |
| 30.00 | 13000 | 22000 | – | 40000 | 3.0 | – | **PHQ1142_0300 ME** | 2000 | 3300 | ≤60 | 126 | 3538 | 66 |
| 42.00 | 13000 | 22000 | – | 40000 | 3.0 | – | **PHQ1142_0420 ME** | 2300 | 3800 | ≤60 | 92 | 3515 | 65 |
| 60.00 | 13000 | 22000 | – | 40000 | 3.0 | – | **PHQ1142_0600 ME** | 2300 | 3800 | ≤60 | 73 | 3460 | 63 |
| 96.00 | 13000 | 22,000 | – | 40,000 | 3.0 | – | **PHQ1143_0960 ME** | 2000 | 3500 | ≤48 | 43 | 3526 | 64 |
| | | | | | | | **PHQ1143_0960 MEL** | | | ≤60 | 71 | 3529 | |
| 120.0 | 13000 | 22,000 | – | 40,000 | 3.0 | – | **PHQ1143_1200 ME** | 2000 | 3500 | ≤48 | 40 | 3509 | 62 |
| | | | | | | | **PHQ1143_1200 MEL** | | | ≤60 | 68 | 3511 | |
| 150.0 | 13000 | 22,000 | – | 40,000 | 3.0 | – | **PHQ1143_1500 ME** | 2500 | 4000 | ≤48 | 31 | 3508 | 62 |
| | | | | | | | **PHQ1143_1500 MEL** | | | ≤60 | 59 | 3509 | |
| 168.0 | 13000 | 22,000 | – | 40,000 | 3.0 | – | **PHQ1143_1680 ME** | 2800 | 4500 | ≤48 | 25 | 3518 | 61 |
| | | | | | | | **PHQ1143_1680 MEL** | | | ≤60 | 53 | 3519 | |
| 210.0 | 13000 | 22,000 | – | 40,000 | 3.0 | – | **PHQ1143_2100 ME** | 2800 | 4500 | ≤48 | 24 | 3504 | 61 |
| | | | | | | | **PHQ1143_2100 MEL** | | | ≤60 | 52 | 3505 | |
| 240.0 | 13000 | 22,000 | – | 40,000 | 3.0 | – | **PHQ1143_2400 ME** | 2800 | 4500 | ≤48 | 21 | 3494 | 59 |
| | | | | | | | **PHQ1143_2400 MEL** | | | ≤60 | 49 | 3494 | |
| 300.0 | 13000 | 22,000 | – | 40,000 | 3.0 | – | **PHQ1143_3000 ME** | 2800 | 4500 | ≤48 | 21 | 3489 | 59 |
| | | | | | | | **PHQ1143_3000 MEL** | | | ≤60 | 49 | 3490 | |

[1] *Based on input speed of 1500 RPM. See page 46 for details on torque calculations.*
[2] *Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
[3] *For additional motor shaft sizes or smaller inertia value, please visit configurator.stober.com*
* *ME= Motor Adapter L=Large Input Option*

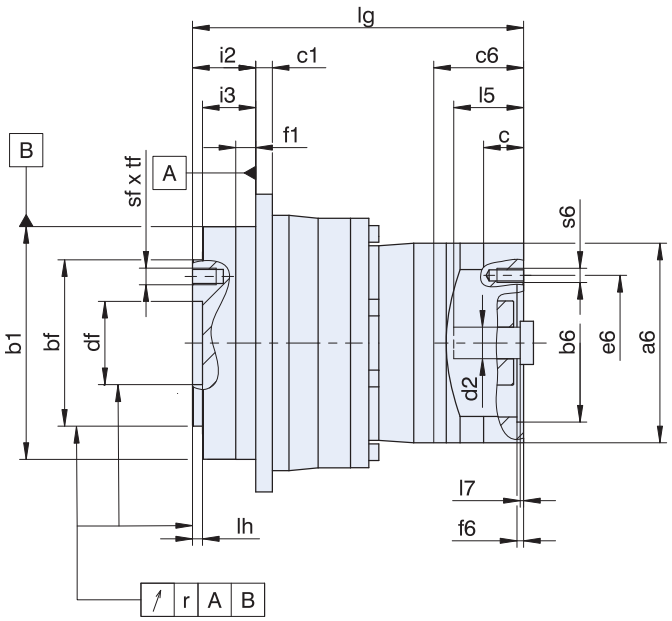


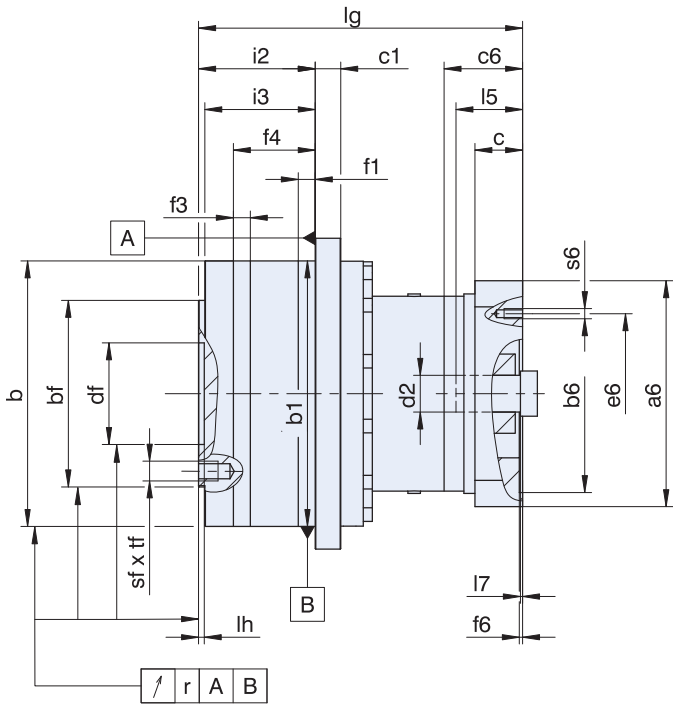
| Exact Ratio (i) | Output Torque: Nom. [1] $M_{2N}$ Nm | Output Torque: Accel. $M_{2acc}$ Nm | Output Torque: Accel. Torque for Reduced Backlash $M_{2accHT}$ Nm | Output Torque: Peak [2] $M_{2NOT}$ Nm | Backlash $\Delta\phi_2$ arcmin | Red. Backlash $\Delta\phi_{2red}$ arcmin | Part Number* (Gearhead + Input) | Max. Input Speed RPM (n1): Cont. | Max. Input Speed RPM (n1): Cyclic | Motor Shaft [3] Max Ø $d_{MW}$ mm | Input Inertia $J_1$ kgcm² | Tors. Stiffness $C_2$ Nm/arcmin | Oper. Noise $L_{pA}$ dB(A) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **PHQ12** | | | | | | | | | | | | | |
| 24.00 | 25000 | 43000 | – | 53836 | 3.0 | – | PHQ1242_0240 ME | 1200 | 3000 | ≤60 | 584 | 6248 | 72 |
| 42.00 | 25000 | 43000 | – | 80000 | 3.0 | – | PHQ1242_0420 ME | 1700 | 3500 | ≤60 | 388 | 6236 | 69 |
| 96.00 | 25000 | 43000 | – | 80000 | 3.0 | – | PHQ1243_0960 ME | 1800 | 3000 | ≤60 | 113 | 6277 | 65 |
| 120.0 | 25000 | 43000 | – | 80000 | 3.0 | – | PHQ1243_1200 ME | 2000 | 3500 | ≤60 | 91 | 6272 | 63 |
| 168.0 | 25000 | 43000 | – | 80000 | 3.0 | – | PHQ1243_1680 ME | 2300 | 4000 | ≤60 | 74 | 6260 | 62 |
| 210.0 | 25000 | 43000 | – | 80000 | 3.0 | – | PHQ1243_2100 ME | 2000 | 3500 | ≤60 | 83 | 6154 | 63 |
| 240.0 | 25000 | 43000 | – | 80000 | 3.0 | – | PHQ1243_2400 ME | 2500 | 4000 | ≤60 | 64 | 6217 | 60 |
| 294.0 | 25000 | 43000 | – | 80000 | 3.0 | – | PHQ1243_2940 ME | 2300 | 4000 | ≤60 | 70 | 6150 | 62 |
| 420.0 | 25000 | 43000 | – | 80000 | 3.0 | – | PHQ1243_4200 ME | 2500 | 4000 | ≤60 | 62 | 6136 | 60 |

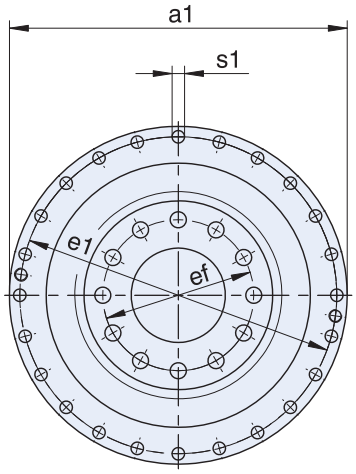


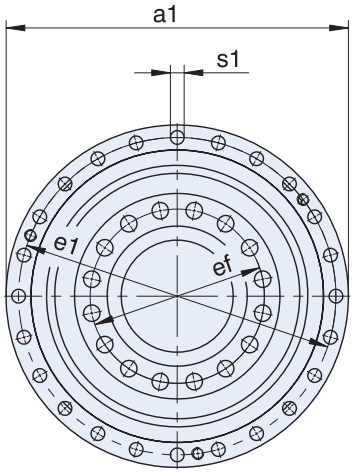
*[1] Based on input speed of 1500 RPM. See page 46 for details on torque calculations.*
*[2] Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
*[3] For additional motor shaft sizes or smaller inertia value, please visit configurator.stober.com*
** ME= Motor Adapter L=Large Input Option*

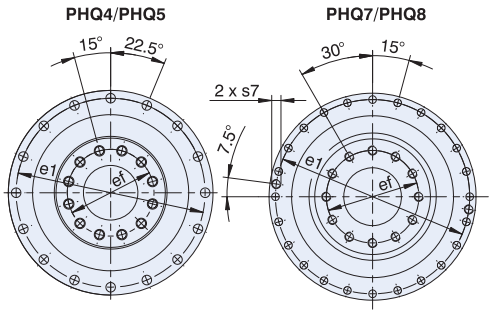
## PHQ Standard Input

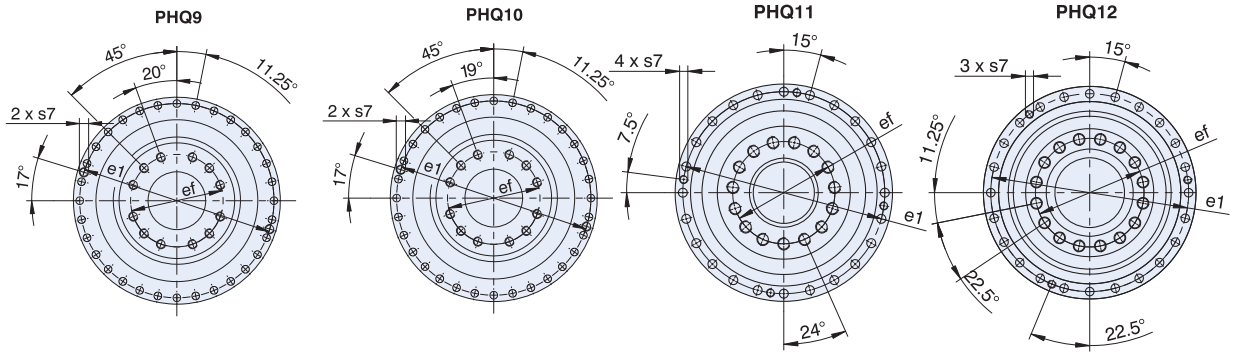




# Dimensional Data

**Table 1** Dimensions (mm)

| Unit | Øa1 | Øb1 | Øbf | c1 | Ødf | Øe1 | Øef | f1 | i2 | i3 | lh | r | Øs1 | s7 | sf | f |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PHQ431 | $118^{h7}$ | $90^{h7}$ | $63^{h7}$ | 7 | $31.5^{H6}$ | 109 | 50 | 10 | 30 | 24 | 6 | 0.020 | 5.5 | – | M6 | 11 |
| PHQ432 | $118^{h7}$ | $90^{h7}$ | $63^{h7}$ | 7 | $31.5^{H6}$ | 109 | 50 | 10 | 30 | 24 | 6 | 0.020 | 5.5 | – | M6 | 11 |
| PHQ531 | $145^{h7}$ | $110^{h7}$ | $80^{h7}$ | 8 | $40.0^{H6}$ | 135 | 63 | 12 | 29 | 23 | 6 | 0.020 | 5.5 | – | M8 | 12 |
| PHQ532 | $145^{h7}$ | $110^{h7}$ | $80^{h7}$ | 8 | $40.0^{H6}$ | 135 | 63 | 12 | 29 | 23 | 6 | 0.020 | 5.5 | – | M8 | 12 |
| PHQ731 | $179^{h7}$ | $140^{h7}$ | $100^{h7}$ | 10 | $50.0^{H6}$ | 168 | 80 | 12 | 38 | 32 | 6 | 0.025 | 6.6 | – | M10 | 16 |
| PHQ732 | $179^{h7}$ | $140^{h7}$ | $100^{h7}$ | 10 | $50.0^{H6}$ | 168 | 80 | 12 | 38 | 32 | 6 | 0.025 | 6.6 | – | M10 | 16 |
| PHQ733 | $179^{h7}$ | $140^{h7}$ | $100^{h7}$ | 10 | $50.0^{H6}$ | 168 | 80 | 12 | 38 | 32 | 6 | 0.025 | 6.6 | – | M10 | 16 |
| PHQ831 | $247^{h7}$ | $200^{h7}$ | $160^{h7}$ | 12 | $80.0^{H6}$ | 233 | 125 | 15 | 50 | 42 | 8 | 0.030 | 9.0 | M10 | M12 | 17 |
| PHQ832 | $247^{h7}$ | $200^{h7}$ | $160^{h7}$ | 12 | $80.0^{H6}$ | 233 | 125 | 15 | 50 | 42 | 8 | 0.030 | 9.0 | M10 | M12 | 17 |
| PHQ833 | $247^{h7}$ | $200^{h7}$ | $160^{h7}$ | 12 | $80.0^{H6}$ | 233 | 125 | 15 | 50 | 42 | 8 | 0.030 | 9.0 | M10 | M12 | 17 |
| PHQ942 | $300^{h7}$ | $255^{h7}$ | $180^{h7}$ | 18 | $90.0^{H6}$ | 280 | 145 | 20 | 66 | 55 | 12 | 0.030 | 13.5 | M8 | M20 | 28 |
| PHQ943 | $300^{h7}$ | $255^{h7}$ | $180^{h7}$ | 18 | $90.0^{H6}$ | 280 | 145 | 20 | 66 | 55 | 12 | 0.030 | 13.5 | M8 | M20 | 28 |
| PHQ1042 | $330^{h7}$ | $285^{h7}$ | $200^{h7}$ | 20 | $95.0^{H6}$ | 310 | 166 | 20 | 75 | 60 | 10 | 0.040 | 13.5 | M10 | M24 | 35 |
| PHQ1043 | $330^{h7}$ | $285^{h7}$ | $200^{h7}$ | 20 | $95.0^{H6}$ | 310 | 166 | 20 | 75 | 60 | 10 | 0.040 | 13.5 | M10 | M24 | 35 |

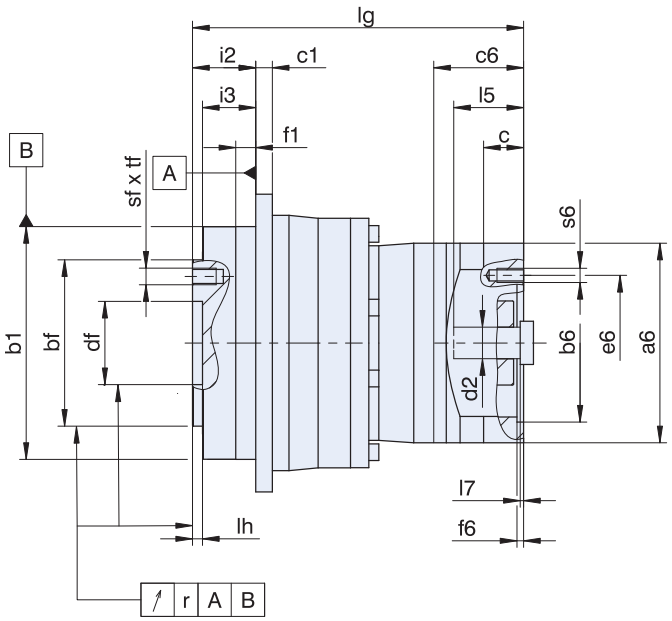
**Table 2** Dimensions (mm)

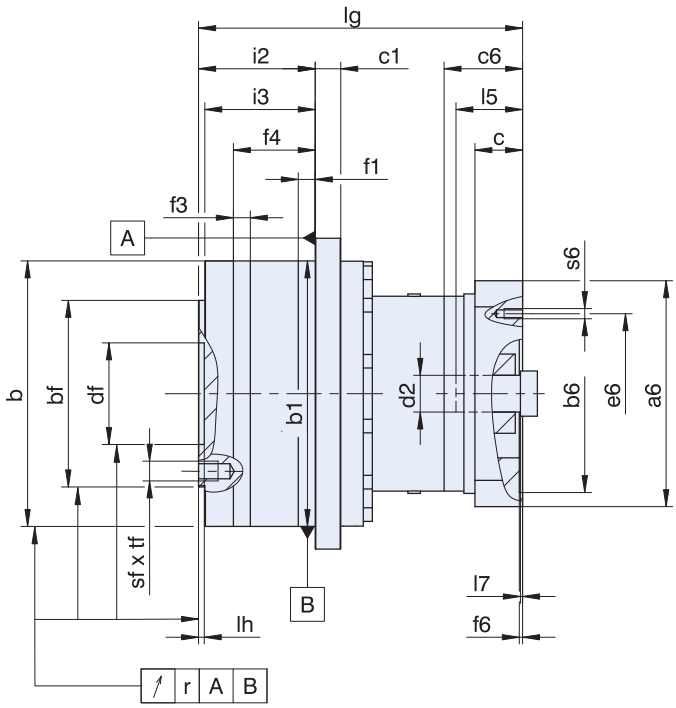
| Unit | Øb6 | Øe6 | Ød2max | l5 | □a6 | c | c6 | f6 | l7 | lg | s6 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PHQ431_ME | 95 | 115 | 24 | 41 | 100 | 21.0 | 42.5 | 4.0 | 3.5 | 113.5 | M8 |
| PHQ432_ME | 60 | 75 | 19 | 41 | 75 | 18.0 | 41.5 | 3.5 | 4.0 | 150.5 | M5 |
| PHQ531_ME | 110 | 130 | 32 | 51 | 120 | 24.0 | 54.0 | 4.0 | 4.5 | 132.0 | M8 |
| PHQ532_ME | 95 | 115 | 24 | 41 | 100 | 21.0 | 42.5 | 4.0 | 3.5 | 161.0 | M8 |
| PHQ731_ME | 130 | 165 | 38 | 61 | 150 | 26.0 | 66.0 | 5.5 | 4.5 | 161.0 | M10 |
| PHQ732_ME | 110 | 130 | 32 | 51 | 120 | 24.0 | 54.0 | 4.0 | 4.5 | 199.0 | M8 |
| PHQ733_ME | 95 | 115 | 24 | 41 | 100 | 21.0 | 42.5 | 4.0 | 3.5 | 228.0 | M8 |
| PHQ831_ME | 180 | 215 | 48 | 83 | 204 | 35.0 | 80.5 | 5.5 | 8.5 | 218.0 | M12 |
| PHQ832_ME | 130 | 165 | 38 | 61 | 150 | 26.0 | 66.0 | 5.5 | 4.5 | 263.0 | M10 |
| PHQ833_ME | 110 | 130 | 32 | 51 | 120 | 24.0 | 54.0 | 4.0 | 4.5 | 301.0 | M8 |
| PHQ942_ME | 180 | 215 | 48 | 83 | 204 | 35.0 | 80.5 | 5.5 | 8.5 | 334.5 | M12 |
| PHQ943_ME | 130 | 165 | 38 | 61 | 150 | 26.0 | 66.0 | 5.5 | 4.5 | 379.5 | M10 |
| PHQ1042_ME | 180 | 215 | 60 | 85 | 230 | 43.0 | 91.5 | 6.0 | 10.5 | 376.5 | M12 |
| PHQ1043_ME | 180 | 215 | 48 | 83 | 204 | 35.0 | 80.5 | 5.5 | 8.5 | 457.5 | M12 |

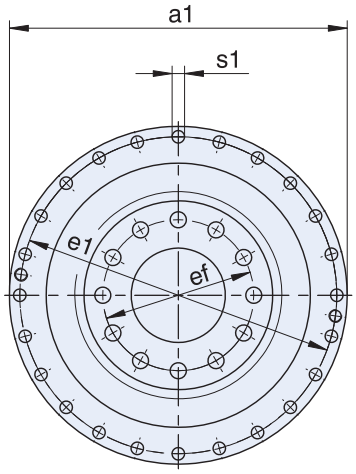
*In the table above, you will find example dimensions for the motor connection for the ME motor adapter. Note that when dimension c is lengthened (depending on the motor used), dimensions c6, l5 and lg are also lengthened accordingly. You will find additional motor connection dimensions for motor adapters ME, MEL, MF and MFL in our STOBER Configurator at http://configurator.stober.com. Here, you can directly download a 3D model of your drive.*

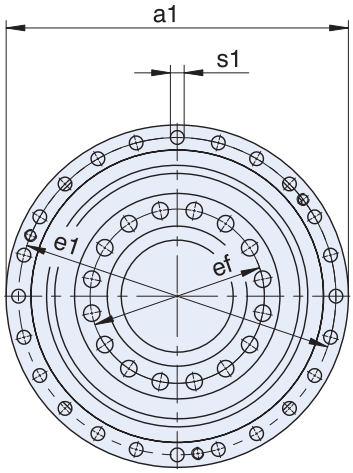
** See Motor Mounting Plate Option, see page 48 for details.*

## PHQ Standard Input

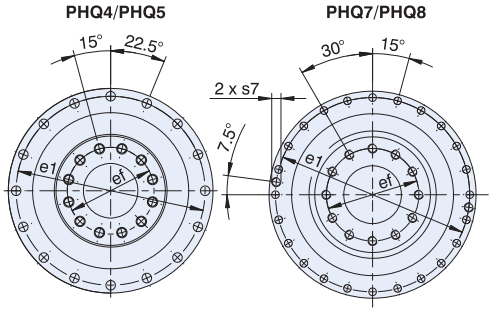


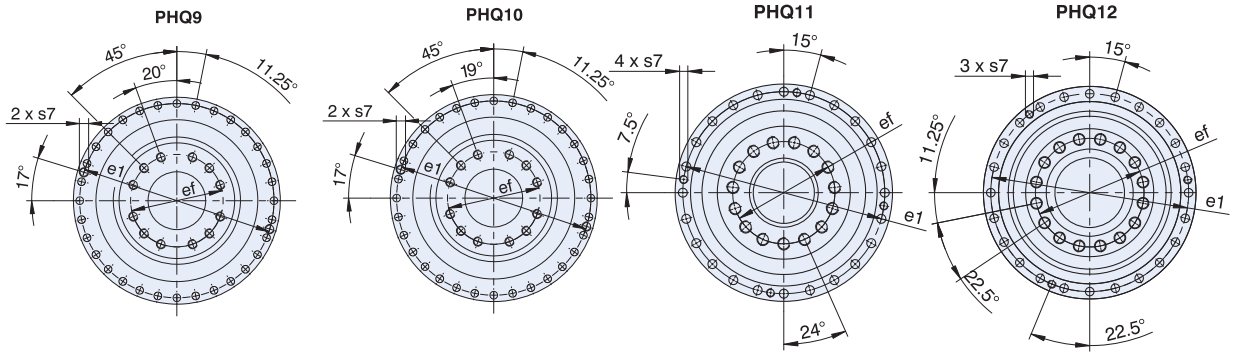




** See Motor Mounting Plate Option, see page 48 for details.*





# Dimensional Data

**Table 1** Dimensions (mm)

| Unit | Øa1 | Øb | Øb1 | Øbf | c1 | Ødf | Øe1 | Øef | f1 | f3 | f4 | i2 | i3 | lh | r | s1 | s7 | sf | tf |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PHQ1142 | 425 | $365^{g6}$ | $365^{h6}$ | $260^{h7}$ | 32 | $120.0^{H6}$ | 395 | 200 | 30 | 30 | 120 | 190 | 180 | 10 | 0.04 | 17.5 | M16 | M24 | 35.5 |
| PHQ1143 | 425 | $365^{g6}$ | $365^{h6}$ | $260^{h7}$ | 32 | $120.0^{H6}$ | 395 | 200 | 30 | 30 | 120 | 190 | 180 | 10 | 0.04 | 17.5 | M16 | M24 | 35.5 |
| PHQ1242 | 550 | $470^{g6}$ | $470^{h6}$ | $330^{h7}$ | 45 | $180.0^{H7}$ | 510 | 280 | 30 | 30 | 145 | 206.5 | 195.5 | 10 | 0.04 | 22 | M16 | M30 | 48 |
| PHQ1243 | 550 | $470^{g6}$ | $470^{h6}$ | $330^{h7}$ | 45 | $180.0^{H7}$ | 510 | 280 | 30 | 30 | 145 | 206.5 | 195.5 | 10 | 0.04 | 22 | M16 | M30 | 48 |

**Table 2** Dimensions (mm)

| Unit | Øb6 | Øe6 | Ød2max | l5 | □a6 | c | c6 | f6 | l7 | lg | s6 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PHQ1142_ME | $250^{H7}$ | 300 | 60 | 110 | 315 | 72.0 | 131.0 | 6.0 | 15.0 | 473.0 | M16 |
| PHQ1143_ME | $180^{H7}$ | 215 | 48 | 83 | 204 | 35.0 | 80.5 | 5.5 | 8.5 | 528.0 | M12 |
| PHQ1242_ME | $300^{H7}$ | 350 | 60 | 141 | 355 | 84.5 | 139.0 | 6.0 | 15.0 | 573.5 | M16 |
| PHQ1243_ME | $180^{H7}$ | 215 | 60 | 85 | 230 | 43.0 | 91.5 | 6.0 | 10.5 | 643.0 | M12 |

*In the table above, you will find example dimensions for the motor connection for the ME motor adapter. Note that when dimension c is lengthened (depending on the motor used), dimensions c6, l5 and lg are also lengthened accordingly. You will find additional motor connection dimensions for motor adapters ME, MEL, MF and MFL in our STO- BER Configurator at http://configurator.stoeber.de. Here, you can directly download a 3D model of your drive.*

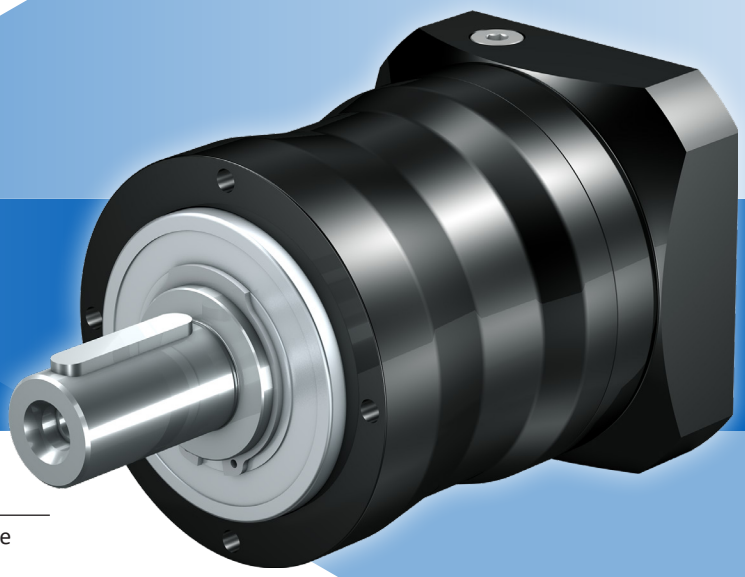
# PE Series: INLINE — Shaft Output

## PE Features

- 3:1 to 100:1 ratios
- Helical gearing produces more torque while running quieter compared to spur tooth gearing
- Input coupling design transfers more torque with lower inertia for vibration free operation
- Large motor input option to accept bigger diameter motor shafts so you don't use an oversized gearbox
- Error free motor mounting and quick changeover with toleranced pilot on motor plate
- Low no load running torque, giving you more torque for your application
- Optional food grade grease (Contact STOBER.)
- Build and ship in one day
- Assembled in the USA

*STOBER PE Series Servo Precision Planetary Gearheads are available for applications where very low backlash is not important. They are an economical helical tooth planetary, comparable in quality to other STOBER units. Every gearbox is made to order. STOBER will custom whatever you need to fit your application. Contact us today to learn more*

SHIPS in 1 DAY!
NO EXPEDITE FEE FOR 24 HOUR SERVICE



## General Specifications

| | |
|---|---|
| **Ambient Temperature** | 0°C to +40°C (104°F) [Unit temperature <90°C Max] |
| **Backlash** | ≤8 arcmins, see performance overview chart page |
| **Coating** | Black (RAL-9005) |
| **Degree of Protection** | IP64 |
| **Direction of Rotation** | Input and output rotate the SAME direction |
| **Efficiency** | 1 stage 97%; 2 stage 95% |
| **Input RPM** | Up to 8,000 RPM |
| **Installation** | Requires 10.9 fasteners. See page 288 for more information |
| **Grease** | Synthetic grease (NLGI 2)/ Food grease - lubricated for life |
| **Mounting Position** | Unrestricted |
| **Warranty** | 5 Year Limited (2 Years on normal wear items: bearings, seals, etc.) |

## Options

### Large Input (MEL)

- Accommodates a larger diameter motor shaft without going to a larger size gearbox.

### Coating Option

- Available with multi-layer, industrial 316 stainless steel epoxy coating. Contact factory for this option.

# Overview



## Selection Options *At-a-Glance*

Using the **Selection Data** table later in this section, select the PE Series Gearhead with the appropriate performance and design options tailored to your motor choice and exact application requirements. Use the part number guide below as a reference to build a part number for the complete gearhead assembly.

**Part Number Examples:**

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|
| PE | 3 | 2 | 1 | S | P | S | S | 0030 | ME |

| | Design Option | Part Number Code | Description |
|---|---|---|---|
| 1 | **Series** | **PE** | Economical planetary |
| 2 | **Size** | **2 3 4 5** | 4 sizes of gearhead |
| 3 | **Generation** | **2** | Version of gearhead |
| 4 | **# of Stages** | **1**<br>**2** | One stage for ratios of ≤ 10:1<br>Two stage for ratios >10:1 |
| 5 | **Housing** | **S** | Standard mounting style |
| 6 | **Output** | **P** | Shaft with key |
| 7 | **Bearings** | **S** | Standard |
| 8 | **Backlash** | **S** | Standard Backlash |
| 9 | **Ratio** | **0030** | Ratios range from 3:1 to 100:1<br>(0030=3:1; 0200=20:1; 1000=100:1, etc.) |
| 10 | **Motor Adapter** | **ME**<br>**MEL** | Motor adapter w/standard input*<br>Motor adapter w/large Input*<br>*See Motor Mounting Plate Option, page 64 |

## PE Series Performance Overview

PE Series performance is dependent on several factors including duty cycle, bearing design, gearhead size and stage configuration, among others. Use the chart below for preliminary evaluation, then use the following performance chart and selection information on the following pages for specific performance sizing and selection.

| Size/Generation | | PE22 | | PE32 | | PE42 | | PE52 | |
|---|---|---|---|---|---|---|---|---|---|
| # of Stages | | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 |
| **Permissible Acceleration Torque** $M_{2ACCMAX}$ | Nm | 20 | 20 | 53 | 50 | 109 | 104 | 250 | 250 |
| **Output Torque Nom.** [1] $M_{2NMAX}$ | Nm | 8 | 10 | 26 | 30 | 60 | 65 | 130 | 160 |
| **Torsional Stiffness** $C_{2MAX}$ | Nm/arcmin | 1.4 | 1.4 | 4.4 | 4.2 | 14 | 13 | 35 | 33 |
| **Torsional Backlash** [2] $\Delta\phi$ | arcmin | ≤10 | ≤13 | ≤8 | ≤10 | ≤8 | ≤10 | ≤8 | ≤10 |
| **Input Speed Max.** $n_{1MAX}$ | Continuous<br>Cyclic | 4500<br>8000 | | 4000<br>7000 | 4500<br>8000 | 3600<br>6000 | 4000<br>7000 | 3000<br>5000 | 3600<br>6000 |
| **Efficiency (@nom torque)** | % | 1 Stage = 97; 2 Stage = 95 | | | | | | | |
| **Weight** | kg<br>lbs | 1.3<br>2.87 | 1.4<br>3.09 | 2.5<br>5.51 | 2.4<br>5.29 | 4.7<br>10.36 | 5.1<br>11.24 | 8.8<br>19.40 | 10.0<br>22.05 |
| **Noise** [3] | dB(A) | ≤60 | ≤60 | ≤62 | ≤61 | ≤64 | ≤63 | ≤65 | ≤64 |

[1] *Ratings based on input speed ($n_1$) of 1500 RPM.*

*For torque at higher input speeds ($M_{2NX}$) solve the formula:*

$$M_{2NX} = \frac{M_{2N}}{\sqrt[3]{\frac{n_1}{1500}}}$$

*where $n_1$ = Actual Input Speed.*

[2] *Tested at 1.5% of nominal torque and recorded on the output side of the gearhead. For lower backlash, contact STOBER technical support.*

[3] *Measurement at one (1) meter distance with input speed ($n_1$) of 2000 RPM.*

## PE Series Motor Mounting Plate Option (Motor information required with Motor Adapter option)

STOBER Servo Gearheads fit the motor of your choice with the appropriate motor mounting plate assembled between the motor and the gearhead.

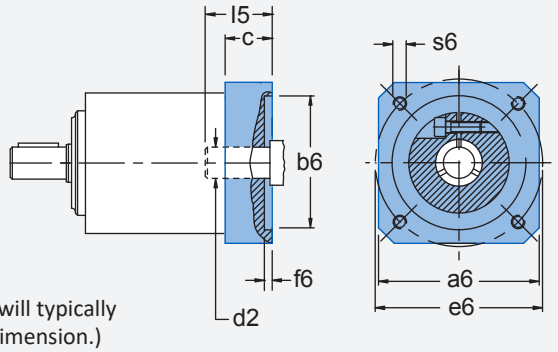
**NOTE: When ordering a gearhead:**

- Specify the motor manufacturer and part number
- Provide the motor drawing with dimensions, or specify the motor mounting dimensions (per the list shown at right)

For a precise dimension on a specific motor, or for general assistance, we recommend you contact STOBER Technical Support.

### Customer Required Dimensions for Properly Sized Motor Mounting Plate

| | |
|---|---|
| d2 | Motor Shaft Diameter (If an adapter bushing is required it will be supplied with the motor plate.) |
| b6 | Pilot Diameter |
| e6 | Bolt Circle Diameter |
| s6 | Bolt Diameter |
| l5 | Motor Shaft Length |
| f6 | Pilot Length |
| a6 | Square Flange (Optional – motor plate will typically be made to match this dimension.) |

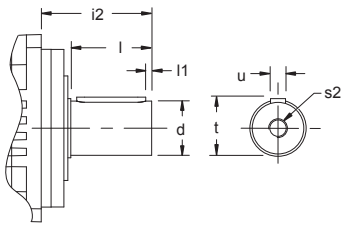



| Motor Mounting Plate Dimensions — mm (Gearhead Part Number Specific) | PE221<br>PE222<br>PE322 | PE221...L<br>PE321<br>PE422 | PE321...L<br>PE421<br>PE522 | PE421...L<br>PE521 | PE521...L |
|---|---|---|---|---|---|
| Maximum Allowed Motor Shaft Dia. d2 | 14 | 19 | 24 | 32 | 38 |
| Minimum Allowed Motor Plate Thickness c* | 15 | 18 | 21 | 24 | 26 |

** Note that the c motor plate thickness is determined by the motor shaft length. The minimum motor plate thickness is the value listed.*

## PE Series Output Shaft Options ("P" designated in part number, for example: PE221S P 0040 MEL)

**P Shaft with Key**




| Unit | d k6 | | i2 | l | l1 | s2 (1) | t | u (2) |
|---|---|---|---|---|---|---|---|---|
| | mm | | mm | mm | mm | | mm | W x H x L |
| PE2 | 12 | +0.012/+0.001 | 24.5 | 18 | 2 | M4 | 13.5 | A4x4x14 |
| PE3 | 16 | +0.012/+0.001 | 36 | 28 | 2 | M5 | 18.0 | A5x5x22 |
| PE4 | 22 | +0.015/+0.002 | 46 | 36 | 2 | M8 | 24.5 | A6x6x32 |
| PE5 | 32 | +0.018/+0.002 | 70 | 58 | 4 | M12 | 35.0 | A10x8x50 |

(1) *The center hole in shafts with keys (Option "P") are machined to DIN 332 T2 shape DR.*

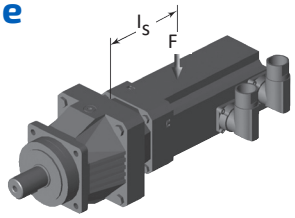
(2) *Feather keys are toleranced according to standard DIN 6885.*



# Overview

## Permissible Motor Tilting Torque

The permissible tilting torque of the motor attached to the gear unit is a result of the static and dynamic load "F" from the motor weight, mass acceleration, and vibration multiplied by the distance from the center of gravity "$l_S$" of the motor.




$$M_{1k} = F \times l_S \leq M_{1K}$$

| $M_{1K}$ | PE221<br>PE222<br>PE322 | PE321<br>PE322 | PE421<br>PE422 | PE521 |
|---|---|---|---|---|
| Nm | 10 | 20 | 40 | 80 |

## PE Permissible Output Shaft Load and Tilting Moments*

| | $Z_2$<br>Distance of Shaft Shoulder to Center of Output Bearing | $F_{2ax100}$<br>Permitted Axial Force | $F_{2rad100}$<br>Permitted Radial Force ≤100RPM | $M_{2K100}$<br>Permitted Tilting Torque ≤100RPM |
|---|---|---|---|---|
| **Unit** | mm | N | N | Nm |
| **PE221, PE222** | 8 | 400 | 800 | 13 |
| **PE321, PE322** | 11 | 800 | 1600 | 40 |
| **PE421, PE422** | 13 | 1900 | 2400 | 73 |
| **PE521, PE522** | 16 | 4000 | 4600 | 206 |

** Refer to illustration and definitions below. During EMERGENCY OFF operation (maximum stops per gearhead = 1000) the permissible values in the table for $F_{2A}$, $F_{2R}$, and $M_{2K}$ can be multiplied by a factor of 2. Rating based on output speed ($n_2$) of 100 RPM. For values at other speeds see below.*

## PE Series Load/Life/Speed Calculations

**All formulas shown are based on METRIC values**

*Upper case letters are permissible values. Lower case letters are for existing values.*

The permissible load and tilting moment values are based on an output speed of 100 RPM. For higher speeds the following applies, where $n_2$ is the desired speed:

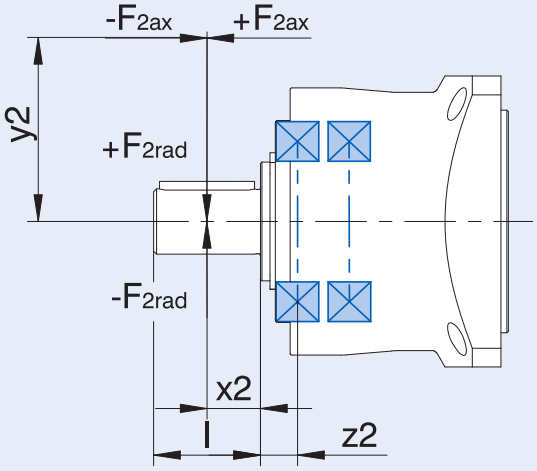
$$F_{2AX} = \frac{F_{2ax100}}{\sqrt[3]{\frac{n_2}{100}}} \qquad F_{2RX} = \frac{F_{2rad100}}{\sqrt[3]{\frac{n_2}{100}}} \qquad M_{2KX} = \frac{M_{2K100}}{\sqrt[3]{\frac{n_2}{100}}}$$

The application output tilting moment should be determined by the following formula:

$$M_{2k,acc*} = \frac{2 \bullet F_{2ax*} \bullet Y_2 + F_{2rad,acc*} \bullet (x_2+z_2)}{1000} \leq M_{2k,acc}$$

Where:

| | |
|---|---|
| **$Z_2$** | Distance of Shaft Shoulder to Center of Output Bearing |
| **$n_2$** | Actual Average Output Speed |
| **$X_2$** | Distance of the Shaft Shoulder to the Force Application Point |
| **$Y_2$** | Distance of the Shaft Axis to the Axial Force Application Point |
| **$F_{2ax*}$** | Actual Axial Force at Gear Unit Output |
| **$F_{2ax100}$** | Permitted Axial Force |
| **$F_{2rad100}$** | Permitted Radial Force ≤100RPM |
| **$F_{2rad,acc}$** | Radial Acceleration Force |
| **$F_{2rad,acc*}$** | Radial Acceleration Force at Gear Unit Output |
| **$M_{2K100}$** | Permitted Tilting Torque ≤100RPM |
| **$M_{2K,acc}$** | Permitted Acceleration Tilting Torque |
| **$M_{2k,acc*}$** | Permitted Acceleration Tilting Torque at Gear Unit Output |
| **$C_{2K}$** | Tilting Stiffness |




**The following apply to the bearing service life L10h (ED10≤40%):**

$L_{10h} > 10{,}000h$ with $1 < M_{2kN}/M_{2k*} < 1.25$

$L_{10h} > 20{,}000h$ with $1.25 < M_{2kN}/M_{2k*} < 1.5$

$L_{10h} > 30{,}000h$ with $1.5 < M_{2kN}/M_{2k*}$

**For different duty cycles:**

$L_{10h} > L_{10h(ED_{10}=40\%)} \ (40\%/ED_{10})$

| Exact Ratio (i) | Output Torque: Nom. [1] $M_{2N}$ Nm | Output Torque: Accel. $M_{2acc}$ Nm | Output Torque: Peak [2] $M_{2NOT}$ Nm | Back-lash $\Delta\phi_2$ arcmin | Part Number* (Gearhead + Input) | Max. Input Speed RPM (n1): Cont. | Max. Input Speed RPM (n1): Cyclic | Motor Shaft Max Ø $d_{MW}$ mm | Input Inertia [3] $J_1$ kgcm² | Tors. Stiffness $C_2$ Nm/arcmin | Oper. Noise $L_{pA}$ dB(A) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **PE2** | | | | | | | | | | | |
| 4.000 | 8.0 | 20 | 32 | 10 | **PE221_0040 ME** | 4000 | 8000 | ≤14 | 0.12 | 1.4 | 60 |
| | | | | | **PE221_0040 MEL** | | | ≤19 | 0.41 | | |
| 5.000 | 8.0 | 20 | 32 | 10 | **PE221_0050 ME** | 4000 | 8000 | ≤14 | 0.11 | 1.4 | 58 |
| | | | | | **PE221_0050 MEL** | | | ≤19 | 0.40 | | |
| 7.000 | 8.0 | 18 | 32 | 10 | **PE221_0070 ME** | 4500 | 8000 | ≤14 | 0.10 | 1.3 | 56 |
| | | | | | **PE221_0070 MEL** | | | ≤19 | 0.39 | | |
| 10.00 | 8.0 | 17 | 32 | 10 | **PE221_0100 ME** | 4500 | 8000 | ≤14 | 0.10 | 1.2 | 54 |
| | | | | | **PE221_0100 MEL** | | | ≤19 | 0.39 | | |
| 16.00 | 10 | 19 | 32 | 13 | **PE222_0160 ME** | 4000 | 8000 | ≤14 | 0.14 | 1.4 | 60 |
| | | | | | **PE222_0160 MEL** | | | ≤19 | 0.42 | | |
| 20.00 | 10 | 20 | 32 | 13 | **PE222_0200 ME** | 4000 | 8000 | ≤14 | 0.12 | 1.4 | 60 |
| | | | | | **PE222_0200 MEL** | | | ≤19 | 0.41 | | |
| 25.00 | 10 | 20 | 32 | 13 | **PE222_0250 ME** | 4000 | 8000 | ≤14 | 0.12 | 1.4 | 59 |
| | | | | | **PE222_0250 MEL** | | | ≤19 | 0.41 | | |
| 28.00 | 10 | 19 | 32 | 13 | **PE222_0280 ME** | 4000 | 8000 | ≤14 | 0.11 | 1.4 | 59 |
| | | | | | **PE222_0280 MEL** | | | ≤19 | 0.40 | | |
| 35.00 | 10 | 20 | 32 | 13 | **PE222_0350 ME** | 4000 | 8000 | ≤14 | 0.11 | 1.4 | 58 |
| | | | | | **PE222_0350 MEL** | | | ≤19 | 0.40 | | |
| 40.00 | 10 | 19 | 32 | 13 | **PE222_0400 ME** | 4500 | 8000 | ≤14 | 0.10 | 1.4 | 58 |
| | | | | | **PE222_0400 MEL** | | | ≤19 | 0.39 | | |
| 50.00 | 10 | 20 | 32 | 13 | **PE222_0500 ME** | 4500 | 8000 | ≤14 | 0.10 | 1.4 | 57 |
| | | | | | **PE222_0500 MEL** | | | ≤19 | 0.39 | | |
| 70.00 | 10 | 18 | 32 | 13 | **PE222_0700 ME** | 4500 | 8000 | ≤14 | 0.10 | 1.3 | 56 |
| | | | | | **PE222_0700 MEL** | | | ≤19 | 0.39 | | |
| 100.0 | 10 | 17 | 32 | 13 | **PE222_1000 ME** | 4500 | 8000 | ≤14 | 0.10 | 1.2 | 55 |
| | | | | | **PE222_1000 MEL** | | | ≤19 | 0.39 | | |

[1] *Based on input speed of 1500 RPM. See page 63 for details on torque calculations.*
[2] *Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
[3] *Inertia based on maximum input. For lower inertia, using smaller diameter input, contact STOBER.*
* *ME = Motor Accurate  L = Large Input Option*

# Selection Data



| Exact Ratio (i) | Output Torque: Nom. [1] $M_{2N}$ Nm | Output Torque: Accel. $M_{2acc}$ Nm | Output Torque: Peak [2] $M_{2NOT}$ Nm | Back-lash $\Delta\phi_2$ arcmin | Part Number* (Gearhead + Input) | Max. Input Speed RPM (n1): Cont. | Max. Input Speed RPM (n1): Cyclic | Motor Shaft Max Ø $d_{MW}$ mm | Input Inertia [3] $J_1$ kgcm² | Tors. Stiffness $C_2$ Nm/arcmin | Oper. Noise $L_{pA}$ dB(A) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **PE3** | | | | | | | | | | | |
| 3.000 | 21 | 40 | 80 | 8 | PE321_0030 ME | 3500 | 6000 | ≤19 | 0.56 | 3.4 | 62 |
| | | | | | PE321_0030 MEL | | | ≤24 | 0.99 | | |
| 4.000 | 24 | 46 | 90 | 8 | PE321_0040 ME | 3700 | 7000 | ≤19 | 0.47 | 4.3 | 61 |
| | | | | | PE321_0040 MEL | | | ≤24 | 0.90 | | |
| 5.000 | 25 | 53 | 90 | 8 | PE321_0050 ME | 3700 | 7000 | ≤19 | 0.44 | 4.4 | 59 |
| | | | | | PE321_0050 MEL | | | ≤24 | 0.87 | | |
| 7.000 | 26 | 50 | 90 | 8 | PE321_0070 ME | 4000 | 7000 | ≤19 | 0.41 | 4.1 | 57 |
| | | | | | PE321_0070 MEL | | | ≤24 | 0.84 | | |
| 10.00 | 26 | 48 | 90 | 8 | PE321_0100 ME | 4000 | 7000 | ≤19 | 0.40 | 3.7 | 55 |
| | | | | | PE321_0100 MEL | | | ≤24 | 0.83 | | |
| 16.00 | 30 | 45 | 90 | 10 | PE322_0160 ME | 4000 | 8000 | ≤14 | 0.16 | 4.0 | 61 |
| | | | | | PE322_0160 MEL | | | ≤19 | 0.45 | | |
| 20.00 | 30 | 50 | 90 | 10 | PE322_0200 ME | 4000 | 8000 | ≤14 | 0.16 | 4.0 | 61 |
| | | | | | PE322_0200 MEL | | | ≤19 | 0.44 | | |
| 25.00 | 30 | 50 | 90 | 10 | PE322_0250 ME | 4000 | 8000 | ≤14 | 0.13 | 4.2 | 60 |
| | | | | | PE322_0250 MEL | | | ≤19 | 0.42 | | |
| 28.00 | 30 | 44 | 88 | 10 | PE322_0280 ME | 4000 | 8000 | ≤14 | 0.12 | 4.0 | 60 |
| | | | | | PE322_0280 MEL | | | ≤19 | 0.40 | | |
| 35.00 | 30 | 50 | 90 | 10 | PE322_0350 ME | 4000 | 8000 | ≤14 | 0.11 | 4.2 | 59 |
| | | | | | PE322_0350 MEL | | | ≤19 | 0.40 | | |
| 40.00 | 30 | 44 | 88 | 10 | PE322_0400 ME | 4500 | 8000 | ≤14 | 0.10 | 3.9 | 59 |
| | | | | | PE322_0400 MEL | | | ≤19 | 0.39 | | |
| 50.00 | 30 | 50 | 90 | 10 | PE322_0500 ME | 4500 | 8000 | ≤14 | 0.10 | 4.1 | 58 |
| | | | | | PE322_0500 MEL | | | ≤19 | 0.39 | | |
| 70.00 | 30 | 50 | 90 | 10 | PE322_0700 ME | 4500 | 8000 | ≤14 | 0.10 | 4.0 | 57 |
| | | | | | PE322_0700 MEL | | | ≤19 | 0.39 | | |
| 100.0 | 30 | 48 | 90 | 10 | PE322_1000 ME | 4500 | 8000 | ≤14 | 0.10 | 3.6 | 56 |
| | | | | | PE322_1000 MEL | | | ≤19 | 0.39 | | |

[1] *Based on input speed of 1500 RPM. See page 63 for details on torque calculations.*
[2] *Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
[3] *Inertia based on maximum input. For lower inertia, using smaller diameter input, contact STOBER.*
* *ME = Motor Accurate  L = Large Input Option*

| Exact Ratio (i) | Output Torque: Nom. [1] $M_{2N}$ Nm | Output Torque: Accel. $M_{2acc}$ Nm | Output Torque: Peak [2] $M_{2NOT}$ Nm | Back-lash $\Delta\phi_2$ arcmin | Part Number* (Gearhead + Input) | Max. Input Speed RPM (n1): Cont. | Max. Input Speed RPM (n1): Cyclic | Motor Shaft Max Ø $d_{MW}$ mm | Input Inertia [3] $J_1$ kgcm² | Tors. Stiffness $C_2$ Nm/arcmin | Oper. Noise $L_{pA}$ dB(A) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **PE4** | | | | | | | | | | | |
| 3.000 | 45 | 90 | 180 | 8 | PE421_0030 ME | 3000 | 5500 | ≤24 | 1.4 | 12 | 64 |
| | | | | | PE421_0030 MEL | | | ≤32 | 3.0 | | |
| 4.000 | 55 | 100 | 200 | 8 | PE421_0040 ME | 3400 | 6000 | ≤24 | 1.1 | 14 | 63 |
| | | | | | PE421_0040 MEL | | | ≤32 | 2.7 | | |
| 5.000 | 56 | 109 | 200 | 8 | PE421_0050 ME | 3400 | 6000 | ≤24 | 1.0 | 14 | 61 |
| | | | | | PE421_0050 MEL | | | ≤32 | 2.6 | | |
| 7.000 | 60 | 100 | 200 | 8 | PE421_0070 ME | 3600 | 6000 | ≤24 | 0.91 | 12 | 59 |
| | | | | | PE421_0070 MEL | | | ≤32 | 2.5 | | |
| 10.00 | 60 | 92 | 184 | 8 | PE421_0100 ME | 3600 | 6000 | ≤24 | 0.87 | 10 | 57 |
| | | | | | PE421_0100 MEL | | | ≤32 | 2.5 | | |
| 16.00 | 65 | 95 | 190 | 10 | PE422_0160 ME | 3700 | 7000 | ≤19 | 0.52 | 13 | 63 |
| | | | | | PE422_0160 MEL | | | ≤24 | 0.95 | | |
| 20.00 | 65 | 104 | 200 | 10 | PE422_0200 ME | 3700 | 7000 | ≤19 | 0.51 | 13 | 63 |
| | | | | | PE422_0200 MEL | | | ≤24 | 0.94 | | |
| 25.00 | 65 | 103 | 200 | 10 | PE422_0250 ME | 3700 | 7000 | ≤19 | 0.47 | 13 | 62 |
| | | | | | PE422_0250 MEL | | | ≤24 | 0.90 | | |
| 28.00 | 65 | 95 | 190 | 10 | PE422_0280 ME | 4000 | 7000 | ≤19 | 0.43 | 13 | 62 |
| | | | | | PE422_0280 MEL | | | ≤24 | 0.86 | | |
| 35.00 | 65 | 103 | 200 | 10 | PE422_0350 ME | 4000 | 7000 | ≤19 | 0.42 | 13 | 61 |
| | | | | | PE422_0350 MEL | | | ≤24 | 0.85 | | |
| 40.00 | 65 | 95 | 190 | 10 | PE422_0400 ME | 4000 | 7000 | ≤19 | 0.41 | 13 | 61 |
| | | | | | PE422_0400 MEL | | | ≤24 | 0.84 | | |
| 50.00 | 65 | 102 | 200 | 10 | PE422_0500 ME | 4000 | 7000 | ≤19 | 0.41 | 13 | 60 |
| | | | | | PE422_0500 MEL | | | ≤24 | 0.83 | | |
| 70.00 | 65 | 90 | 180 | 10 | PE422_0700 ME | 4000 | 7000 | ≤19 | 0.42 | 10 | 59 |
| | | | | | PE422_0700 MEL | | | ≤24 | 0.85 | | |
| 100.0 | 65 | 90 | 180 | 10 | PE422_1000 ME | 4000 | 7000 | ≤19 | 0.40 | 10 | 58 |
| | | | | | PE422_1000 MEL | | | ≤24 | 0.83 | | |

[1] *Based on input speed of 1500 RPM. See page 63 for details on torque calculations.*
[2] *Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
[3] *Inertia based on maximum input. For lower inertia, using smaller diameter input, contact STOBER.*
* *ME = Motor Accurate  L = Large Input Option*

# Selection Data



| Exact Ratio (i) | Output Torque: Nom. [1] $M_{2N}$ Nm | Output Torque: Accel. $M_{2acc}$ Nm | Output Torque: Peak [2] $M_{2NOT}$ Nm | Back-lash $\Delta\phi_2$ arcmin | Part Number* (Gearhead + Input) | Max. Input Speed RPM (n1): Cont. | Max. Input Speed RPM (n1): Cyclic | Motor Shaft Max Ø $d_{MW}$ mm | Input Inertia [3] $J_1$ kgcm² | Tors. Stiffness $C_2$ Nm/arcmin | Oper. Noise $L_{pA}$ dB(A) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **PE5** | | | | | | | | | | | |
| 3.000 | 90 | 180 | 360 | 8 | PE521_0030 ME | 2500 | 4500 | ≤32 | 4.4 | 31 | 65 |
| | | | | | PE521_0030 MEL | | | ≤38 | 7.9 | | |
| 4.000 | 130 | 250 | 500 | 8 | PE521_0040 ME | 2600 | 5000 | ≤32 | 3.5 | 35 | 64 |
| | | | | | PE521_0040 MEL | | | ≤38 | 7.0 | | |
| 5.000 | 130 | 250 | 500 | 8 | PE521_0050 ME | 2600 | 5000 | ≤32 | 3.1 | 35 | 62 |
| | | | | | PE521_0050 MEL | | | ≤38 | 6.6 | | |
| 7.000 | 130 | 250 | 500 | 8 | PE521_0070 ME | 2800 | 5000 | ≤32 | 2.8 | 32 | 60 |
| | | | | | PE521_0070 MEL | | | ≤38 | 6.3 | | |
| 10.00 | 130 | 220 | 440 | 8 | PE521_0100 ME | 3000 | 5000 | ≤32 | 2.7 | 27 | 58 |
| | | | | | PE521_0100 MEL | | | ≤38 | 6.2 | | |
| 16.00 | 160 | 240 | 480 | 10 | PE522_0160 ME | 3400 | 6000 | ≤24 | 1.2 | 33 | 64 |
| | | | | | PE522_0160 MEL | | | ≤32 | 2.8 | | |
| 20.00 | 160 | 250 | 500 | 10 | PE522_0200 ME | 3400 | 6000 | ≤24 | 1.2 | 33 | 64 |
| | | | | | PE522_0200 MEL | | | ≤32 | 2.8 | | |
| 25.00 | 160 | 250 | 500 | 10 | PE522_0250 ME | 3400 | 6000 | ≤24 | 1.0 | 33 | 63 |
| | | | | | PE522_0250 MEL | | | ≤32 | 2.7 | | |
| 28.00 | 160 | 240 | 480 | 10 | PE522_0280 ME | 3600 | 6000 | ≤24 | 0.95 | 33 | 63 |
| | | | | | PE522_0280 MEL | | | ≤32 | 2.6 | | |
| 35.00 | 160 | 250 | 500 | 10 | PE522_0350 ME | 3600 | 6000 | ≤24 | 0.94 | 33 | 62 |
| | | | | | PE522_0350 MEL | | | ≤32 | 2.5 | | |
| 40.00 | 160 | 240 | 480 | 10 | PE522_0400 ME | 3600 | 6000 | ≤24 | 0.89 | 33 | 62 |
| | | | | | PE522_0400 MEL | | | ≤32 | 2.5 | | |
| 50.00 | 160 | 250 | 500 | 10 | PE522_0500 ME | 3600 | 6000 | ≤24 | 0.89 | 33 | 61 |
| | | | | | PE522_0500 MEL | | | ≤32 | 2.5 | | |
| 70.00 | 160 | 220 | 440 | 10 | PE522_0700 ME | 3600 | 6000 | ≤24 | 0.93 | 27 | 60 |
| | | | | | PE522_0700 MEL | | | ≤32 | 2.5 | | |
| 100.0 | 160 | 220 | 440 | 10 | PE522_1000 ME | 3600 | 6000 | ≤24 | 0.88 | 27 | 59 |
| | | | | | PE522_1000 MEL | | | ≤32 | 2.5 | | |



[1] *Based on input speed of 1500 RPM. See page 63 for details on torque calculations.*
[2] *Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
[3] *Inertia based on maximum input. For lower inertia, using smaller diameter input, contact STOBER.*
* *ME = Motor Accurate L = Large Input Option*

## PE with ME Input

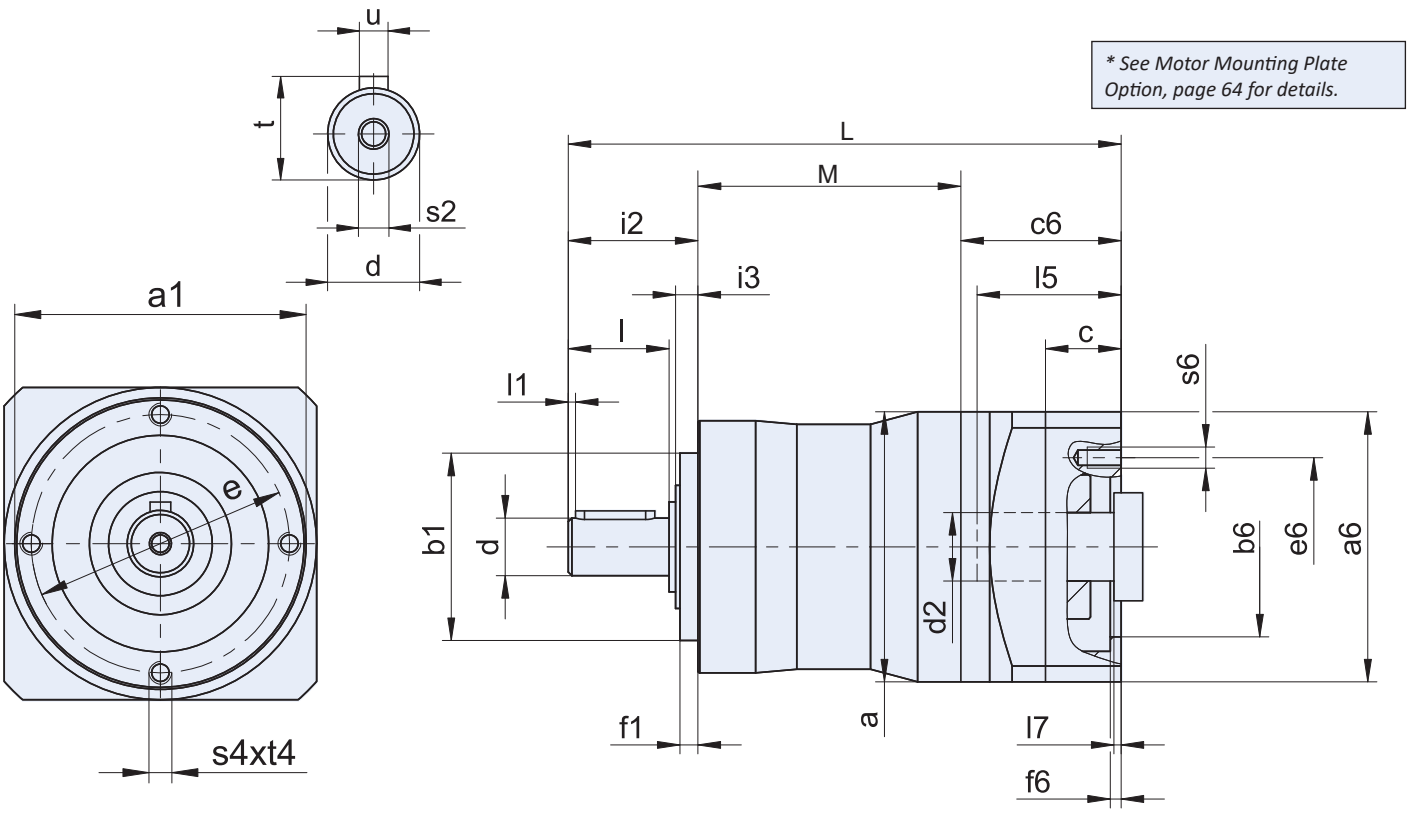



**Table 1** PE Unit Dimensions (mm)

| Unit | a | a1 | b1 | h6 | d | k6 | e | f1 | i2 | l | l1 | i3 | s2 | s4 | t | t4 | u |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PE221/PE222 | 55 | 50 | 35 | +0.000/-0.016 | 12 | +0.012/+0.001 | 44 | 4 | 24.5 | 18 | 2 | 5.0 | M4 | M4 | 13.5 | 8 | A4x4x14 |
| PE321/PE322 | 75 | 70 | 52 | +0.000/-0.019 | 16 | +0.012/+0.001 | 62 | 5 | 36 | 28 | 2 | 6.0 | M5 | M5 | 18 | 10 | A5x5x22 |
| PE421/PE422 | 100 | 90 | 68 | +0.000/-0.019 | 22 | +0.015/+0.002 | 80 | 5 | 46 | 36 | 2 | 6.5 | M8 | M6 | 24.5 | 12 | A6x6x32 |
| PE521/PE522 | 120 | 120 | 90 | +0.000/-0.022 | 32 | +0.018/+0.002 | 108 | 6 | 70 | 58 | 4 | 8.0 | M12 | M8 | 35 | 16 | A10x8x50 |

**Table 2** PE Unit Dimensions (mm)

| Unit | L | M |
|---|---|---|
| PE221 | 109.5 | 53 |
| PE222 | 141.5 | 85 |
| PE321 | 150.5 | 73 |
| PE322 | 168 | 100 |
| PE421 | 167 | 78.5 |
| PE422 | 204 | 116.5 |
| PE521 | 222 | 98 |
| PE522 | 251 | 138.5 |

**Table 3** ME Dimensions (mm)

| Unit | c | Ød |
|---|---|---|
| PE221 | 15 | 14 |
| PE222 | 15 | 14 |
| PE321 | 18 | 19 |
| PE322 | 15 | 14 |
| PE421 | 21 | 24 |
| PE422 | 18 | 19 |
| PE521 | 24 | 32 |
| PE522 | 21 | 24 |

# Dimensional Data



**Table 1** Dimensions (mm)

| Unit | Øb6 | Øe6 | Ød2max | l5 | □a6 | c | c6 | f6 | l7 | lg | s6 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PE221_ME | $40^{H7}$ | 63 | 14 | 30 | 55 | 15 | 32.0 | 3.5 | 3.0 | 109.5 | M5 |
| PE222_ME | $40^{H7}$ | 63 | 14 | 30 | 55 | 15 | 32.0 | 3.5 | 3.0 | 141.5 | M5 |
| PE321_ME | $60^{H7}$ | 75 | 19 | 41 | 75 | 18 | 41.5 | 3.5 | 4.0 | 150.5 | M5 |
| PE322_ME | $40^{H7}$ | 63 | 14 | 30 | 55 | 15 | 32.0 | 3.5 | 3.0 | 168.0 | M5 |
| PE421_ME | $95^{H7}$ | 115 | 24 | 41 | 100 | 21 | 42.5 | 4.0 | 3.5 | 167.0 | M8 |
| PE422_ME | $60^{H7}$ | 75 | 19 | 41 | 75 | 18 | 41.5 | 3.5 | 4.0 | 204.0 | M5 |
| PE521ME | $110^{H7}$ | 130 | 32 | 51 | 120 | 24 | 54.0 | 4.0 | 4.5 | 222.0 | M8 |
| PE522_ME | $95^{H7}$ | 115 | 24 | 41 | 100 | 21 | 42.5 | 4.0 | 3.5 | 251.0 | M8 |

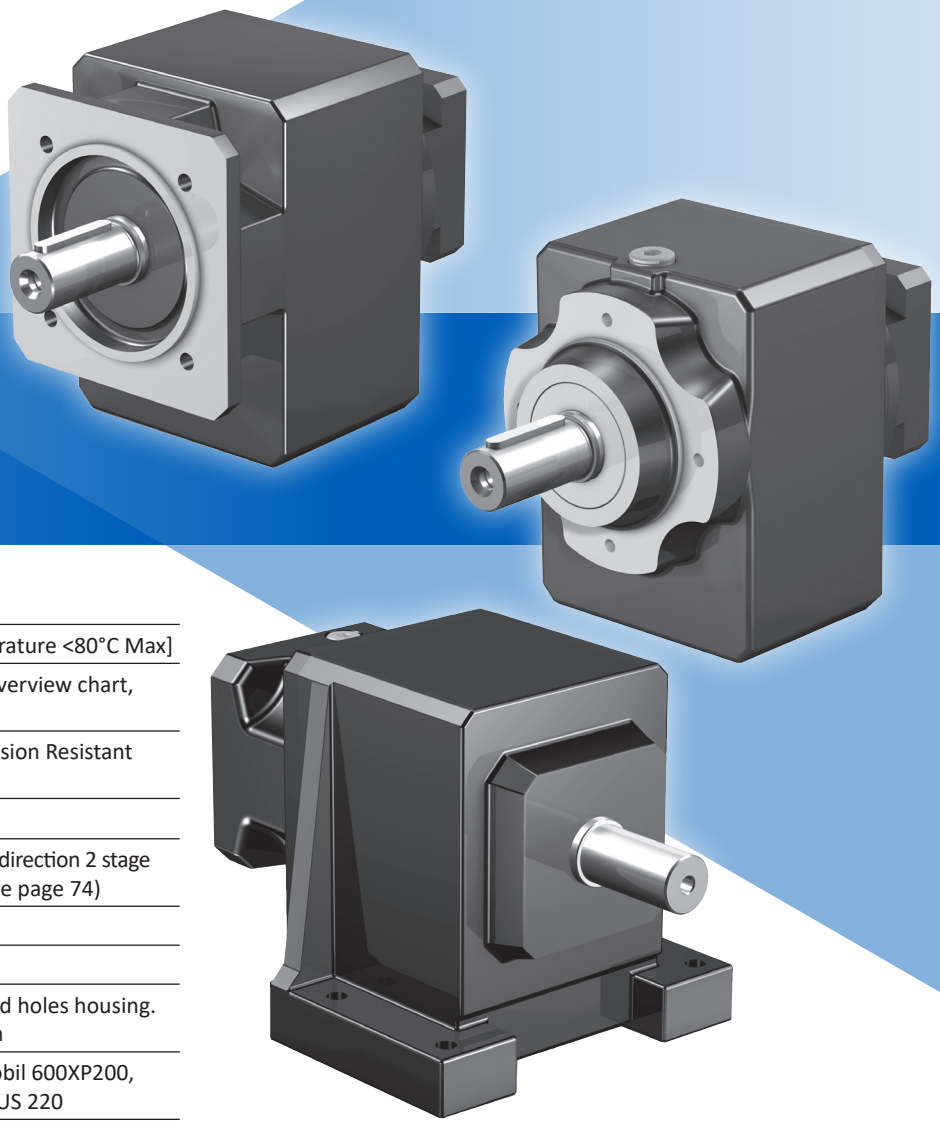
*In the table above, you will find example dimensions for the motor connection for the ME motor adapter. Note that when dimension c is lengthened (depending on the motor used), dimensions c6, l5 and lg are also lengthened accordingly. You will find additional motor connection dimensions for motor adapters ME and MEL in our STOBER Configurator at https://configurator.stober.com. Here, you can directly download a 3D model of your drive.*

# C Series: INLINE — Shaft Output

## C Features

- 2:1 to 276:1 ratios (higher ratios available. Contact STOBER.)
- Quiet running (As low as 53dB(A))
- Mounting flexibility to fit the application
- Adaptability: shafts available in metric or imperial, carbon or stainless steel to meet your requirements
- Optional food and corrosion resistant package
- Dual seals for extreme duty applications
- Error free motor mounting and quick changeover with toleranced pilot on motor plate
- Magnetic oil filtration to remove contaminants to prevent breakdowns
- Build and ship in one day
- Assembled in the USA

The STOBER C Series offer performance, durability, and economy for a wide range of applications. High efficiency helical gearing keeps motor size to a minimum while running almost silently. Easily install the C series with a variety of mounting configurations, including the foot mounted option. Every gearbox is made to order. STOBER will custom whatever you need to fit your application. Contact us today to learn more.



SHIPS in 1 DAY!
NO EXPEDITE FEE FOR 24 HOUR SERVICE

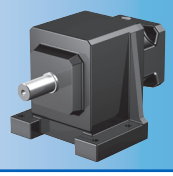
## General Specifications

| | |
|---|---|
| **Ambient Temperature** | 0°C to +40°C (104°F) [Unit temperature <80°C Max] |
| **Backlash** | ≤10 arcmins, (see performance overview chart, (page 75) |
| **Coating** | Standard Black (RAL-9005), Corrosion Resistant option, Food option |
| **Degree of Protection** | IP65 |
| **Direction of Rotation** | Input and output rotate the SAME direction 2 stage units, opposite for 3 stage units (see page 74) |
| **Efficiency** | 2 stage 97%; 3 stage 96% |
| **Input RPM** | Up to 6,000 RPM |
| **Installation** | Requires 10.9 fasteners for tapped holes housing. See page 288 for more information |
| **Lubrication** | Lubricated for life* - standard Mobil 600XP200, option food grade Mobil SHC CIBUS 220 |
| **Mounting Position** | Must be specified, see page 74 |
| **Warranty** | 5 Year Limited (2 Years on normal wear items: bearings, seals, etc.) |

** Scheduled lubrication is required for some larger frame C Series units (excluding F Food Duty and B Corrosion Resistant option). See page 77 for lubrication details.*

### Benefits of NEW ME Motor Adapters

- Higher torques
- Higher input speeds
- More compact with square coupling housing
- More clamp ring options, so less need for adapter bushings
- Clamp ring with roll pin



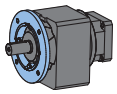
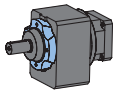
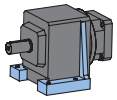
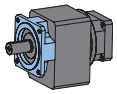
# Overview

## Selection Options *At-a-Glance*

Using the **Selection Data** table later in this section, select the C Series Gearhead with the appropriate performance and design options tailored to your motor choice and exact application requirements. Use the part number guide below as a reference to build a part number for the complete gearhead assembly.

**Part Number Examples:**

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | |
|---|---|---|---|---|---|---|---|---|
| C | 0 | 0 | 2 | F | 0020 | ME10 | B | EL1 * |

| | Design Option | | Part Number Code | Description |
|---|---|---|---|---|
| 1 | **Series** | | C | Concentric inline helical |
| 2 | **Size** | | 0 1 2 3 4<br>5 6 7 8 9 | 10 sizes of gearhead |
| 3 | **Generation** | | 0 1 | Version of gearhead |
| 4 | **# of Stages** | | 2<br>3 | Two stage for ratios <70:1<br>Three stage >40:1 |
| 5 | **Housing** |  | F | Round output flange |
| | |  | G | Pitch Circle Diameter (PCD) tapped holes |
| | |  | N | Foot mounting |
| | |  | Q | Square output flange (not bolt-on type) |
| 6 | **Ratio** | | 0020 | Ratios range from 2:1 to 276:1<br>(0020=2:1; 0063=6.3:1; 2700=270:1) |
| 7 | **Motor Adapter** | | ME10 – ME50 | 5 input sizes (see also motor mounting plate option) |
| 8 | **Options** | | B<br>F | Corrosion Resistant Duty (size C0 thru C8 only)<br>Food Duty (size C0 thru C8 only) |
| * | **Mounting Position** | | EL1 EL2 EL3 EL4<br>EL5 EL6 | Required special instruction for all units, see page 74 |

## Options

### ME Adapter Option

- MSS1 Seal – special input seal for longer life. Contact factory for this option.
- Peak Torque Booster – pinion securing element for shock loads, increasing peak torque up to 80%.

### Lubrication Options

- Food grade or synthetic optionally available. Contact factory for this option.

### Integrated Safety Brake

- ServoStop – provides dynamic braking during power failures or emergency stops in hazardous situations. Contact factory for this option.

### Coating Option

- Corrosion Resistant Duty (**B** special option)
- Food Duty (**F** special option)

Food and Corrosion Resistant units are lubricated for life with double output seals (where possible), stainless output shaft, and heat cured paint.

### ATEX

- ATmosphere EXplosible – rated for explosive environments. Contact factory for this option and allow additional time for delivery.

## C Series Performance Overview

C Series performance is dependent on several factors including duty cycle, bearing design, gearhead size and stage configuration, among others. Use the chart below for preliminary evaluation, then use the following performance chart and selection information on the following pages for specific performance sizing and selection.

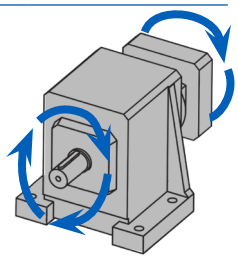
| Size/Generation | | | C00 | C10 | | C20 | | C30 | |
|---|---|---|---|---|---|---|---|---|---|
| # of Stages | | | 2 | 2 | 3 | 2 | 3 | 2 | 3 |
| **Permissible Acceleration Torque** $M_{2BMAX}$ | | Nm | 72 | 140 | | 230 | | 400 | |
| **Output Torque Nom.** $M_{2N}$ | | Nm | 60 | 120 | | 200 | | 350 | |
| **Torsional Stiffness** | $C_2$ | Nm/arcmin | ≤1.6 | ≤3.9 | ≤3.9 | ≤8.3 | ≤8.3 | ≤8.7 | ≤8.7 |
| **Torsional Backlash** [1] | $\Delta\phi$ | arcmin | ≤16 | ≤15 | ≤15 | ≤14 | ≤16 | ≤13 | ≤13 |
| **Input Speed Max.** $n_{1MAX}$ | Continuous | EL1, 2, 3, 4 (N1DBH) | 4000 | 4000 | 4000 | 4000 | 4000 | 3700 | 3800 |
| | | EL5, 6 (N1DBV) | 4000 | 3900 | 3900 | 3900 | 3900 | 3500 | 3500 |
| | Cyclic | | 6000 | 6500 | 6500 | 6500 | 6500 | 6000 | 6000 |
| **Efficiency (@nom torque)** | | % | 97 | 97 | 96 | 97 | 96 | 97 | 96 |
| **Weight** | | kg<br>lbs | 8.2<br>18 | 13.1<br>29 | 15.4<br>34 | 17.2<br>38 | 20.4<br>45 | 22.2<br>49 | 25.4<br>56 |
| **Noise** [2] | | dB(A) | ≤55 | ≤55 | | ≤53 | | ≤53 | |
| **Axial Load Max.** $F_{2AMAX}$ | | N | 500 | 850 | | 1050 | | 1400 | |
| **Radial Load Max.** [3] $F_{2RMAX}$ | | N | 1900 | 3400 | | 4200 | | 5650 | |
| **Tilting Moment Max.** [3] $M_{2KMAX}$ | | Nm | 80 | 190 | | 260 | | 350 | |

[1] *Tested at 1.5% of nominal torque and recorded on the output side of the gearhead. For lower backlash, contact STOBER technical support.*
[2] *Measurement at one (1) meter distance with input speed ($n_1$) of 1500 RPM. To calculate torque at higher input speeds, contact the factory.*
[3] *Rating based on output speed ($n_2$) of 20 RPM. For values at other speeds see page 77.*

## C Series Direction of Rotation

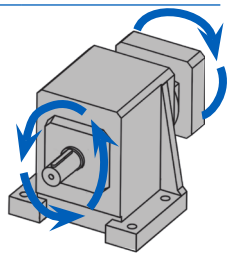
**All 2 Stage Units**

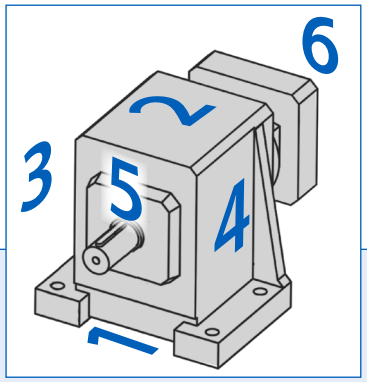
C002 C612
C102 C712
C202 C812
C302 C912
C402
C502



**All 3 Stage Units**

C103 C613
C203 C713
C303 C813
C403 C913
C503

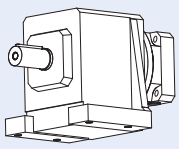


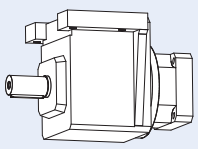


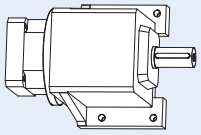

## C Series Mounting Position Options

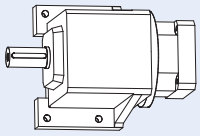
**When ordering, the Mounting Position MUST BE SPECIFIED using one of the Mounting Position order codes below.**

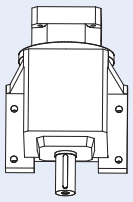
*Note: the code relates to the unit's orientation side that faces down.*
*For example, EL1 has side 1 facing down, EL2 has side 2 facing down, etc.*

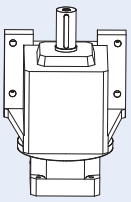

EL1

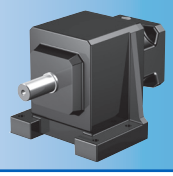

EL2


EL3


EL4


EL5


EL6



# Overview

| | C40 | | C50 | | C61 | | C71 | | C81 | | C91 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2 | 3 | 2 | 3 | 2 | 3 | 2 | 3 | 2 | 3 | 2 | 3 |
| | 600 | | 920 | | 1650 | | 2760 | | 4800 | | 7210 | 8000 |
| | 550 | | 800 | | 1450 | | 2400 | | 4200 | | 6000 | 7000 |
| | ≤22.0 | ≤22.0 | ≤23 | ≤23 | ≤74 | ≤74 | ≤122 | ≤122 | ≤204 | ≤204 | ≤392 | ≤393 |
| | ≤12 | ≤12 | ≤12 | ≤12 | ≤10 | ≤10 | ≤10 | ≤10 | ≤10 | ≤10 | ≤10 | ≤10 |
| | 3500 | 3500 | 3400 | 3400 | 3200 | 3200 | 3100 | 3100 | 2900 | 2900 | 2500 | 2800 |
| | 3200 | 3200 | 3000 | 3000 | 2900 | 2900 | 2900 | 2900 | 2700 | 2700 | 2500 | 2600 |
| | 5500 | 5500 | 5000 | 5000 | 4500 | 4500 | 4500 | 4500 | 4300 | 4300 | 4000 | 4000 |
| | 97 | 96 | 97 | 96 | 97 | 96 | 97 | 96 | 97 | 96 | 97 | 96 |
| | 32.2<br>71 | 35.3<br>78 | 43.0<br>95 | 50.3<br>111 | 52.1<br>115 | 72.0<br>159 | 90.1<br>199 | 100.1<br>221 | 145.9<br>322 | 154.9<br>342 | 270.0<br>596 | 307.1<br>678 |
| | ≤61 | | ≤61 | | ≤61 | | ≤67 | | ≤67 | | ≤73 | |
| | 2400 | | 3000 | | 4000 | | 5500 | | 7500 | | 9500 | |
| | 9700 | | 11,000 | | 16,000 | | 22,000 | | 30,000 | | 37,000 | |
| | 750 | | 900 | | 1500 | | 2400 | | 3700 | | 5200 | |

## C Series Solid Output Shaft Options

Diameters in **BOLD BLUE** are readily available from inventory. Contact STOBER Drives for delivery on other output sizes.

| | | C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Carbon Steel** | **Inches** | **3/4** | **1** | **1-1/4** | **1-1/4** | **1-5/8** | **1-5/8** | **2-1/8** | **2-3/8** | **2-7/8** | **3-5/8** |
| | **Metric** | 20 | 25 | 30 | 30 | 40 | 40 | 50 | 60 | 70 | 90 |
| **Stainless Steel*** | **Inches** | **3/4** | **1** | **1-1/4** | **1-1/4** | **1-5/8** | **1-5/8** | **2-1/8** | **2-3/8** | **2-7/8** | — |
| | **Metric** | 20 | 25 | 30 | 30 | 40 | — | 60 | — | — | — |

** Stainless steel options are ideal for food and corrosion resistant, harsh washdown environments.*

## C Series Standard & Optional Output Flange Sizes

**BOLD BLUE** are the standard flange size shipped with the unit unless otherwise specified. Optional flanges are not available for all sizes.

| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
|---|---|---|---|---|---|---|---|---|---|
| 120 | 140 | 160 | 160 | 200 | 250 | **300** | **350** | 350 | **450** |
| 140 | 160 | **200** | 200 | **250** | **300** | | | **400** | |
| **160** | **200** | 250 | **250** | 300 | | | | 450 | |

# C Series Motor Mounting Plate Option (Motor information required with Motor Adapter ME option)

STOBER Servo Gearheads fit the motor of your choice with the appropriate motor mounting plate assembled between the motor and the gearhead.

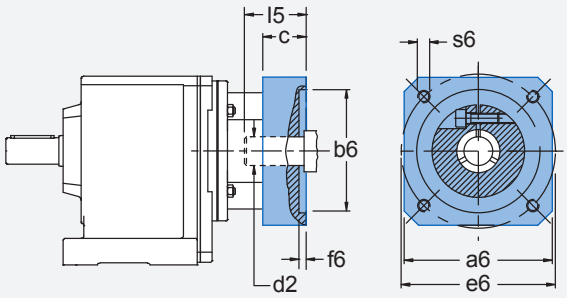
**NOTE: When ordering a gearhead:**

- Specify the motor manufacturer and part number
- Provide the motor drawing with dimensions, or specify the motor mounting dimensions (per the list shown at right)

For a precise dimension on a specific motor, or for general assistance, we recommend you contact STOBER Technical Support.

### Customer Required Dimensions for Properly Sized Motor Mounting Plate

| | |
|---|---|
| d2 | Motor Shaft Diameter (If an adapter bushing is required it will be supplied with the motor plate.) |
| b6 | Pilot Diameter |
| e6 | Bolt Circle Diameter |
| s6 | Bolt Diameter |
| l5 | Motor Shaft Length |
| f6 | Pilot Length |
| a6 | Square Flange (Optional – motor plate will typically be made to match this dimension.) |

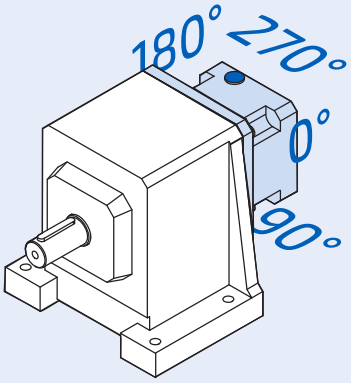



| Motor Mounting Plate Dimensions — mm(Gearhead Part Number Specific) | ME10 | ME20 | ME30 | ME40 | ME50 |
|---|---|---|---|---|---|
| Maximum Allowed Motor Shaft Dia. d2 | 19 | 32 | 38 | 48 | 60 |
| Minimum Allowed Motor Plate Thickness c* | 21 | 24 | 26 | 35 | 43 |

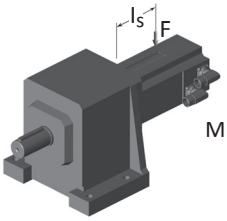
** Note that the c motor plate thickness is determined by the motor shaft length. The minimum motor plate thickness is the value listed.*

## C Series Motor Mounting Plate Access Hole

Access to the clamping screw for the motor coupling is located on the 270° side of the motor mounting plate at the location shown. If necessary, the motor mounting plate can be rotated in the field, if a 0°, 90° or 180° orientation for the access hole is desirable.




## Permissible Motor Tilting Torque




$$M_{1k} = F \times l_s \leq M_{1K}$$

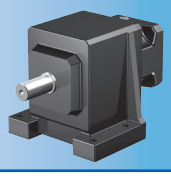
The permissible tilting torque of the motor attached to the gear unit is a result of the static and dynamic load "F" from the motor weight, mass acceleration, and vibration multiplied by the distance from the center of gravity "$l_s$" of the motor.

| $M_{1K}$ | ME10 | ME20 | ME30 | ME40 | ME50 |
|---|---|---|---|---|---|
| Nm | 25 | 60 | 125 | 250 | 600 |

## Permissible Output Shaft Load and Tilting Moments*

| Unit | $Z_2$ mm | $F_{2A}$ N | $F_{2R}$ N | $M_{2K}$ Nm |
|---|---|---|---|---|
| C0 | 20 | 500 | 1900 | 80 |
| C1 | 30 | 850 | 3400 | 190 |
| C2 | 30 | 1050 | 4200 | 260 |
| C3 | 30 | 1400 | 5650 | 350 |
| C4 | 35 | 2400 | 9700 | 750 |
| C5 | 42 | 3000 | 11,000 | 900 |
| C6 | 40 | 4000 | 16,000 | 1500 |
| C7 | 45 | 5500 | 22,000 | 2400 |
| C8 | 50 | 7500 | 30,000 | 3700 |
| C9 | 55 | 9500 | 37,000 | 5200 |

** Refer to illustration and definitions on page 77. During EMERGENCY OFF operation (maximum stops per gearhead = 1000) the permissible values in the table for $F_{2A}$, $F_{2R}$, and $M_{2K}$ can be multiplied by a factor of 2. The permissible load values given are valid with the load applied to the center of the output shaft ($x_2$).*

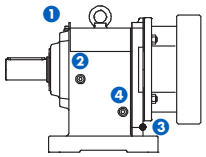


# Overview

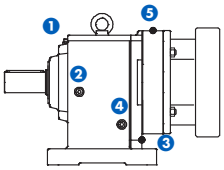
## C Series Lubrication Maintenance

With STOBER reducers very little maintenance is required under normal operating conditions. Units C002 thru C502/C503 are supplied without breathers and are lubricated for life and maintenance free. Breathers are provided on standard units C612/C613 thru C912/C913, located as shown to the right*. STOBER recommends changing the lubrication in breather supplied units after 10,000 hours for normal operating conditions or every 5000 hours for wet operating conditions.

**C612/C613 and larger units with the Food & Corrosion Resistant option exclude a breather. Contact STOBER for details.*




**2 Stage Units**
(C612 thru C912)




**3 Stage Units**
(C613 thru C913)

**Drain Plug and Vent Location**

| Mounting Position | | 1 | 2 * | 2a * | 3 | 4 | 5 |
|---|---|---|---|---|---|---|---|
| EL1 | | Vent | | | Drain | | |
| EL2 | | Drain | | | Vent | | |
| EL3 | | | Vent | Drain | | | |
| EL4 | | | Drain | Vent | | | |
| EL5 | C612-C912 | Drain | | | Vent | | |
| | C613-C913 | Drain | | | | | Vent |
| EL6 | | Vent | | | Drain | | |

** Position 2a is on the opposite side of 2.*

## Overhung Load Calculations

Pulling forces or overhung load of pulleys, sheaves, sprockets, etc. on the reducer output shaft must not exceed the allowable limits shown in the load/life/speed calculations below.

Note: Overhung load is measured at the center of the shaft extension. No overhung load is encountered when a reducer is flange mounted and/or coupling connected to another unit. However, the shafts of all components must be accurately aligned and secured to prevent pre-loading of the bearings and premature bearing failure.

Use the following formula to determine actual overhung load for a given drive:.

$$\textbf{Imperial OHL (lbs)} = \frac{126{,}000 \times HP \times K}{D \times n}$$

$$\textbf{Metric OHL (N)} = \frac{19{,}100 \times kW \times K}{D \times n}$$

Where:

| | |
|---|---|
| **OHL** | Overhung load |
| **HP** | Horsepower |
| **kW** | Transmitted Kilowatt |
| **D** | Pitch Diameter (inches or meters) of Sprocket, Gear, Sheave, Pulley, etc. |
| **n** | Maximum Shaft RPM |
| **K** | 1.00 Single Chain Drive; 1.25 Timing Belt Drive; 1.25 Spur or Helical Gear Drive; 1.50 V-Belt Drive; 2.50 Flat Belt Drive |

## C Series Load/Life/Speed Calculations

The permissible load and tilting moment values are based on an output speed of 20 RPM. For higher speeds the following applies, where $n_2$ is the desired speed:

$$F_{2axN} = \frac{F_{2ax20}}{\sqrt[3]{\frac{n_{2m*}}{20\ rpm}}} \qquad F_{2radN} = \frac{F_{2rad20}}{\sqrt[3]{\frac{n_{2m*}}{20\ rpm}}} \qquad M_{2kN} = \frac{M_{2k20}}{\sqrt[3]{\frac{n_{2m*}}{20\ rpm}}}$$

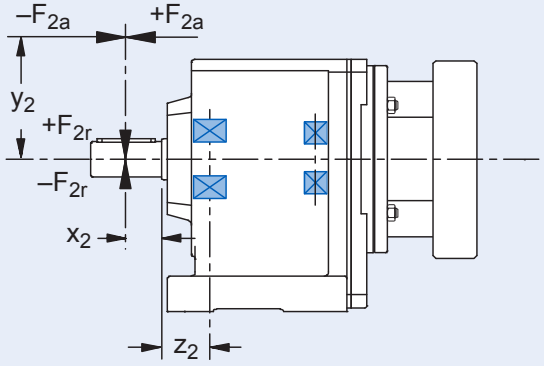
The application output tilting moment should be determined by the following formula:

$$M_{2k*} = \frac{2 \bullet F_{2ax*} \bullet Y_2 + F_{2rad*} \bullet (x_2 + z_2)}{1000} \leq M_{2kN}$$

$$F_{2rad*} \leq F_{2radN} \qquad F_{2ax*} \leq F_{2axN}$$

**All formulas shown are based on METRIC values**

*Upper case letters are permissible values. Lower case letters are for existing values.*

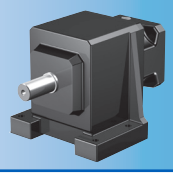



Where:

| | |
|---|---|
| **$z_2$** | Distance of Shaft Shoulder to Center of Output Bearing |
| **$n_2$** | Actual Average Output Speed |
| **$x_2$** | Distance of the Shaft Shoulder to the Force Application Point |
| **$y_2$** | Distance of the Shaft Axis to the Axial Force Application Point |
| **$F_{2ax*}$** | Actual Axial Force at Gear Unit Output |
| **$F_{2ax100}$** | Permitted Axial Force |
| **$F_{2rad100}$** | Permitted Radial Force ≤100RPM |
| **$F_{2rad,acc}$** | Radial Acceleration Force |
| **$F_{2rad,acc*}$** | Radial Acceleration Force at Gear Unit Output |
| **$M_{2K100}$** | Permitted Tilting Torque ≤100RPM |
| **$M_{2K,acc}$** | Permitted Acceleration Tilting Torque |
| **$M_{2k,acc*}$** | Permitted Acceleration Tilting Torque at Gear Unit Output |
| **$C_{2K}$** | Tilting Stiffness |

| Reducer Ratio (i) | | Output Torque | | | Backlash | Part Number | Max. Input Speed RPM (n1) | | | Motor Shaft Max Ø | Input Inertia | Tors. Stiffness |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Nom. [1] | Accel. | Peak [2] | | | Continuous | | Cyclic | | | |
| | | $M_{2N}$ | $M_{2acc}$ | $M_{2NOT}$ | $\Delta\phi_2$ | | | | | $d_{MW}$ | $J_1$ | $C_2$ |
| Nom. | Exact | Nm | Nm | Nm | arcmin | (Gearhead + Input) | EL 1,2,3,4 | EL 5,6 | All | mm | kgcm² | Nm/ arcmin |
| **C0** | **(continued next page)** | | | | | | | | | | | |
| 1.997 | 1480/741 | 35 | 47 | 58 | 20 | C002_0020 ME10 | 3500 | 3000 | 6000 | ≤19 | 1.4 | 1.2 |
| | | | | | | C002_0020 ME20 | | | | ≤24 | 3.3 | |
| 3.067 | 46/15 | 40 | 60 | 89 | 20 | C002_0031 ME10 | 3700 | 3600 | 6000 | ≤19 | 1.0 | 1.2 |
| | | | | | | C002_0031 ME20 | | | | ≤24 | 2.9 | |
| 3.318 | 1702/513 | 41 | 62 | 97 | 20 | C002_0033 ME10 | 3700 | 3600 | 6000 | ≤19 | 1.0 | 1.2 |
| | | | | | | C002_0033 ME20 | | | | ≤24 | 2.9 | |
| 4.680 | 117/25 | 46 | 65 | 110 | 20 | C002_0047 ME10 | 4000 | 4000 | 6500 | ≤19 | 0.8 | 1.2 |
| | | | | | | C002_0047 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.7 | |
| 5.063 | 481/95 | 47 | 65 | 110 | 20 | C002_0051 ME10 | 4000 | 4000 | 6500 | ≤19 | 0.8 | 1.2 |
| | | | | | | C002_0051 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.7 | |
| 7.714 | 54/7 | 54 | 65 | 110 | 20 | C002_0077 ME10 | 4000 | 4000 | 7000 | ≤19 | 0.7 | 1.2 |
| | | | | | | C002_0077 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.6 | |
| 8.235 | 667/81 | 60 | 72 | 120 | 16 | C002_0082 ME10 | 3700 | 3600 | 6000 | ≤19 | 0.9 | 1.6 |
| | | | | | | C002_0082 ME20 | | | | ≤24 | 2.8 | |
| 9.228 | 1495/162 | 60 | 65 | 120 | 16 | C002_0092 ME10 | 3700 | 3600 | 6000 | ≤19 | 0.9 | 1.6 |
| | | | | | | C002_0092 ME20 | | | | ≤24 | 2.8 | |
| 12.57 | 377/30 | 60 | 72 | 120 | 16 | C002_0125 ME10 | 4000 | 4000 | 6500 | ≤19 | 0.8 | 1.6 |
| | | | | | | C002_0125 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.7 | |
| 14.08 | 169/12 | 60 | 65 | 120 | 16 | C002_0140 ME10 | 4000 | 4000 | 6500 | ≤19 | 0.8 | 1.6 |
| | | | | | | C002_0140 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.7 | |
| 20.71 | 145/7 | 60 | 72 | 120 | 16 | C002_0210 ME10 | 4000 | 4000 | 7000 | ≤19 | 0.7 | 1.6 |
| | | | | | | C002_0210 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.6 | |
| 23.21 | 325/14 | 60 | 65 | 120 | 16 | C002_0230 ME10 | 4000 | 4000 | 7000 | ≤19 | 0.7 | 1.6 |
| | | | | | | C002_0230 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.6 | |
| 24.97 | 899/36 | 60 | 72 | 120 | 16 | C002_0250 ME10 | 4000 | 4000 | 7000 | ≤19 | 0.7 | 1.6 |
| | | | | | | C002_0250 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.6 | |
| 27.99 | 2015/72 | 60 | 65 | 120 | 16 | C002_0280 ME10 | 4000 | 4000 | 7000 | ≤19 | 0.7 | 1.6 |
| | | | | | | C002_0280 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.6 | |
| 31.26 | 2813/90 | 60 | 72 | 120 | 16 | C002_0310 ME10 | 4000 | 4000 | 7000 | ≤19 | 0.7 | 1.6 |
| | | | | | | C002_0310 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.6 | |
| 35.03 | 1261/36 | 60 | 65 | 120 | 16 | C002_0350 ME10 | 4000 | 4000 | 7000 | ≤19 | 0.7 | 1.6 |
| | | | | | | C002_0350 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.6 | |
| 41.77 | 3509/84 | 60 | 72 | 120 | 16 | C002_0420 ME10 | 4000 | 4000 | 7000 | ≤19 | 0.6 | 1.6 |
| 55.97 | 2015/36 | 60 | 65 | 120 | 16 | C002_0560 ME10 | 4000 | 4000 | 7000 | ≤19 | 0.6 | 1.6 |

[1] *Maximum torque for continuous input 1500 RPM - horizontal output position.*
[2] *Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
* *Motor shaft adapter code (shaft diameter max - mm): ME10 (19), ME20 (32), ME30 (38), ME40 (48), ME50 (60)*



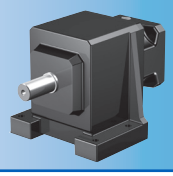
# Selection Data

| Reducer Ratio (i) | | Output Torque | | | Backlash | Part Number | Max. Input Speed RPM (n1) | | | Motor Shaft Max Ø | Input Inertia | Tors. Stiffness |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Nom. [1] | Accel. | Peak [2] | | | Continuous | | Cyclic | | | |
| | | $M_{2N}$ | $M_{2acc}$ | $M_{2NOT}$ | $\Delta\phi_2$ | | | | | $d_{MW}$ | $J_1$ | $C_2$ |
| Nom. | Exact | Nm | Nm | Nm | arcmin | (Gearhead + Input) | EL 1,2,3,4 | EL 5,6 | All | mm | kgcm² | Nm/ arcmin |
| **C1** | **(continued next page)** | | | | | | | | | | | |
| 2.394 | 2303/962 | 74 | 110 | 174 | 18 | C102_0024 ME20 | 3100 | 2600 | 5000 | ≤32 | 5.5 | 3.1 |
| | | | | | | C102_0024 ME30 | | | | ≤38 | 11.0 | |
| 2.582 | 1911/740 | 75 | 13 | 8 | 18 | C102_0026 ME20 | 3100 | 2600 | 5000 | ≤32 | 5.5 | 3.1 |
| | | | | | | C102_0026 ME30 | | | | ≤38 | 11.0 | |
| 3.883 | 1363/351 | 69 | 90 | 110 | 18 | C102_0039 ME10 | 3600 | 3100 | 6000 | ≤19 | 1.3 | 3.0 |
| | | 86 | 130 | 220 | | C102_0039 ME20 | | | | ≤32 | 4.8 | 3.1 |
| | | | | | | C102_0039 ME30 | 3500 | | 5000 | ≤38 | 10.0 | |
| 4.189 | 377/90 | 74 | 98 | 122 | 18 | C102_0042 ME10 | 3600 | 3100 | 6000 | ≤19 | 1.3 | 3.0 |
| | | 89 | 130 | 220 | | C102_0042 ME20 | | | | ≤32 | 4.7 | 3.1 |
| | | | | | | C102_0042 ME30 | 3500 | | 5000 | ≤38 | 10.0 | |
| 4.658 | 3149/676 | 72 | 108 | 136 | 18 | C102_0047 ME10 | 3800 | 3500 | 6000 | ≤19 | 1.2 | 3.1 |
| | | 92 | 130 | 220 | | C102_0047 ME20 | 3700 | | | ≤32 | 4.6 | |
| | | | | | | C102_0047 ME30 | 3500 | | 5000 | ≤38 | 9.9 | |
| 5.025 | 201/40 | 77 | 117 | 146 | 18 | C102_0050 ME10 | 3800 | 3500 | 6000 | ≤19 | 1.2 | 3.1 |
| | | 94 | 130 | 220 | | C102_0050 ME20 | 3700 | | | ≤32 | 4.6 | |
| | | | | | | C102_0050 ME30 | 3500 | | 5000 | ≤38 | 9.9 | |
| 5.875 | 47/8 | 78 | 130 | 171 | 18 | C102_0059 ME10 | 3800 | 3500 | 6000 | ≤19 | 1.0 | 3.1 |
| | | 99 | | 220 | | C102_0059 ME20 | 3700 | | | ≤32 | 4.4 | |
| | | | | | | C102_0059 ME30 | 3500 | | 5000 | ≤38 | 9.7 | |
| 6.338 | 507/80 | 84 | 130 | 184 | 18 | C102_0063 ME10 | 3800 | 3500 | 6000 | ≤19 | 1.0 | 3.1 |
| | | 102 | | 220 | | C102_0063 ME20 | 3700 | | | ≤32 | 4.4 | |
| | | | | | | C102_0063 ME30 | 3500 | | 5000 | ≤38 | 9.7 | |
| 10.38 | 841/81 | 120 | 138 | 240 | 15 | C102_0105 ME10 | 3600 | 3100 | 6000 | ≤19 | 1.2 | 3.9 |
| | | | | | | C102_0105 ME20 | | | | ≤32 | 4.6 | |
| | | | | | | C102_0105 ME30 | 3500 | | 5000 | ≤38 | 9.9 | |
| 11.72 | 1160/99 | 120 | 138 | 240 | 15 | C102_0115 ME10 | 3600 | 3100 | 6000 | ≤19 | 1.2 | 3.9 |
| | | | | | | C102_0115 ME20 | | | | ≤32 | 4.6 | |
| | | | | | | C102_0115 ME30 | 3500 | | 5000 | ≤38 | 9.9 | |

[1] *Maximum torque for continuous input 1500 RPM - horizontal output position.*
[2] *Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
* *Motor shaft adapter code (shaft diameter max - mm): ME10 (19), ME20 (32), ME30 (38), ME40 (48), ME50 (60)*

| Reducer Ratio (i) | | Output Torque | | | Backlash | | Max. Input Speed RPM (n1) | | | Motor Shaft Max Ø | Input Inertia | Tors. Stiffness |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Nom. [1] $M_{2N}$ | Accel. $M_{2acc}$ | Peak [2] $M_{2NOT}$ | $\Delta\phi_2$ | | Continuous | | Cyclic | $d_{MW}$ | $J_1$ | $C_2$ |
| Nom. | Exact | Nm | Nm | Nm | arcmin | Part Number (Gearhead + Input) | EL 1,2,3,4 | EL 5,6 | All | mm | kgcm² | Nm/ arcmin |
| **C1** | | **(continued from previous page)** | | | | | | | | | | |
| 12.46 | 1943/156 | 120 | 138 | 240 | 15 | C102_0125 ME10 | 3800 | 3500 | 6000 | ≤19 | 1.0 | 3.9 |
| | | | | | | C102_0125 ME20 | 3700 | | | ≤32 | 4.5 | |
| | | | | | | C102_0125 ME30 | 3500 | | 5000 | ≤38 | 9.8 | |
| 14.06 | 2010/143 | 120 | 138 | 240 | 15 | C102_0140 ME10 | 3800 | 3500 | 6000 | ≤19 | 1.0 | 3.9 |
| | | | | | | C102_0140 ME20 | 3700 | | | ≤32 | 4.4 | |
| | | | | | | C102_0140 ME30 | 3500 | | 5000 | ≤38 | 9.8 | |
| 15.71 | 377/24 | 120 | 138 | 240 | 15 | C102_0155 ME10 | 3800 | 3500 | 6000 | ≤19 | 0.9 | 3.9 |
| | | | | | | C102_0155 ME20 | 3700 | | | ≤32 | 4.3 | |
| | | | | | | C102_0155 ME30 | 3500 | | 5000 | ≤38 | 9.7 | |
| 17.73 | 195/11 | 120 | 138 | 240 | 15 | C102_0175 ME10 | 3800 | 3500 | 6000 | ≤19 | 0.9 | 3.9 |
| | | | | | | C102_0175 ME20 | 3700 | | | ≤32 | 4.3 | |
| | | | | | | C102_0175 ME30 | 3500 | | 5000 | ≤38 | 9.7 | |
| 25.13 | 377/15 | 120 | 138 | 240 | 15 | C102_0250 ME10 | 4000 | 3900 | 6500 | ≤19 | 0.8 | 3.9 |
| | | | | | | C102_0250 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.7 | |
| 28.36 | 312/11 | 120 | 138 | 240 | 15 | C102_0280 ME10 | 4000 | 3900 | 6500 | ≤19 | 0.8 | 3.9 |
| | | | | | | C102_0280 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.7 | |
| 31.07 | 435/14 | 120 | 138 | 240 | 15 | C102_0310 ME10 | 4000 | 3900 | 6500 | ≤19 | 0.7 | 3.9 |
| | | | | | | C102_0310 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.6 | |
| 35.07 | 2700/77 | 120 | 138 | 240 | 15 | C102_0350 ME10 | 4000 | 3900 | 6500 | ≤19 | 0.7 | 3.9 |
| | | | | | | C102_0350 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.6 | |
| 41.57 | 1247/30 | 120 | 138 | 240 | 15 | C102_0420 ME10 | 4000 | 3900 | 6500 | ≤19 | 0.7 | 3.9 |
| | | | | | | C102_0420 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.6 | |
| 46.91 | 516/11 | 120 | 138 | 240 | 15 | C102_0470 ME10 | 4000 | 3900 | 6500 | ≤19 | 0.7 | 3.9 |
| | | | | | | C102_0470 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.6 | |
| 111.1 | 1222/11 | 120 | 138 | 240 | 15 | C103_1110 ME10 | 4000 | 3900 | 6500 | ≤19 | 0.7 | 3.9 |
| 137.3 | 10,575/77 | 120 | 138 | 240 | 15 | C103_1370 ME10 | 4000 | 3900 | 6500 | ≤19 | 0.7 | 3.9 |
| 183.7 | 2021/11 | 120 | 138 | 240 | 15 | C103_1840 ME10 | 4000 | 3900 | 6500 | ≤19 | 0.7 | 3.9 |

[1] *Maximum torque for continuous input 1500 RPM - horizontal output position.*
[2] *Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
* *Motor shaft adapter code (shaft diameter max - mm): ME10 (19), ME20 (32), ME30 (38), ME40 (48), ME50 (60)*



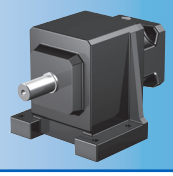
# Selection Data

| Reducer Ratio (i) | | Output Torque | | | Backlash | Part Number | Max. Input Speed RPM (n1) | | | Motor Shaft Max Ø | Input Inertia | Tors. Stiffness |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Nom. [1] $M_{2N}$ | Accel. $M_{2acc}$ | Peak [2] $M_{2NOT}$ | $\Delta\phi_2$ | | Continuous | | Cyclic | $d_{MW}$ | $J_1$ | $C_2$ |
| Nom. | Exact | Nm | Nm | Nm | arcmin | (Gearhead + Input) | EL 1,2,3,4 | EL 5,6 | All | mm | kgcm² | Nm/ arcmin |
| **C2** | **(continued next page)** | | | | | | | | | | | |
| 2.475 | 99/40 | 114 | 144 | 180 | 17 | C202_0025 ME20 | 3000 | 2600 | 4500 | ≤32 | 6.9 | 5.8 |
| | | | | | | C202_0025 ME30 | | | | ≤38 | 12.0 | 5.9 |
| 2.690 | 495/184 | 117 | 157 | 196 | 17 | C202_0027 ME20 | 3000 | 2600 | 4500 | ≤32 | 6.8 | 5.8 |
| | | | | | | C202_0027 ME30 | | | | ≤38 | 12.0 | 5.9 |
| 3.888 | 486/125 | 78 | 91 | 113 | 17 | C202_0039 ME10 | 3500 | 3100 | 5000 | ≤19 | 2.1 | 5.6 |
| | | 132 | 198 | 283 | | C202_0039 ME20 | | | | ≤32 | 5.5 | 5.9 |
| | | | | | | C202_0039 ME30 | | | | ≤38 | 11.0 | 6.0 |
| 4.226 | 486/115 | 85 | 98 | 123 | 17 | C202_0042 ME10 | 3500 | 3100 | 5000 | ≤19 | 2.1 | 5.7 |
| | | 136 | 200 | 308 | | C202_0042 ME20 | | | | ≤32 | 5.5 | 5.9 |
| | | | | | | C202_0042 ME30 | | | | ≤38 | 11.0 | 6.0 |
| 4.667 | 14/3 | 81 | 109 | 136 | 17 | C202_0047 ME10 | 3700 | 3500 | 5500 | ≤19 | 1.7 | 5.8 |
| | | 140 | 200 | 339 | | C202_0047 ME20 | | | | ≤32 | 5.1 | 6.0 |
| | | | | | | C202_0047 ME30 | 3500 | | 5000 | ≤38 | 10.0 | |
| 5.072 | 350/69 | 88 | 118 | 148 | 17 | C202_0051 ME10 | 3700 | 3500 | 5500 | ≤19 | 1.7 | 5.8 |
| | | 144 | 200 | 350 | | C202_0051 ME20 | | | | ≤32 | 5.1 | 6.0 |
| | | | | | | C202_0051 ME30 | 3500 | | 5000 | ≤38 | 10.0 | |
| 5.791 | 666/115 | 86 | 135 | 169 | 17 | C202_0058 ME10 | 3700 | 3500 | 5500 | ≤19 | 1.4 | 5.8 |
| | | 151 | 200 | 350 | | C202_0058 ME20 | | | | ≤32 | 4.8 | 6.0 |
| | | | | | | C202_0058 ME30 | 3500 | | 5000 | ≤38 | 10.0 | |
| 6.295 | 3330/529 | 93 | 147 | 183 | 17 | C202_0063 ME10 | 3700 | 3500 | 5500 | ≤19 | 1.4 | 5.9 |
| | | 155 | 200 | 350 | | C202_0063 ME20 | | | | ≤32 | 4.8 | 6.0 |
| | | | | | | C202_0063 ME30 | 3500 | | 5000 | ≤38 | 10.0 | |
| 7.800 | 39/5 | 91 | 173 | 216 | 17 | C202_0078 ME10 | 4000 | 3900 | 6500 | ≤19 | 1.1 | 5.9 |
| | | 167 | 200 | 350 | | C202_0078 ME20 | 3700 | 3700 | 6000 | ≤32 | 4.5 | 6.0 |
| | | | | | | C202_0078 ME30 | 3500 | 3500 | 5000 | ≤38 | 9.9 | |
| 10.26 | 513/50 | 200 | 230 | 299 | 14 | C202_0105 ME10 | 3500 | 3100 | 5000 | ≤19 | 1.8 | 8.2 |
| | | | | 400 | | C202_0105 ME20 | | | | ≤32 | 5.2 | 8.3 |
| | | | | | | C202_0105 ME30 | | | | ≤38 | 10.0 | |
| 11.76 | 294/25 | 200 | 230 | 342 | 14 | C202_0120 ME10 | 3500 | 3100 | 5000 | ≤19 | 1.7 | 8.2 |
| | | | | 400 | | C202_0120 ME20 | | | | ≤32 | 5.2 | 8.3 |
| | | | | | | C202_0120 ME30 | | | | ≤38 | 10.0 | |

*[1] Maximum torque for continuous input 1500 RPM - horizontal output position.*
*[2] Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
** Motor shaft adapter code (shaft diameter max - mm): ME10 (19), ME20 (32), ME30 (38), ME40 (48), ME50 (60)*

| Reducer Ratio (i) | | Output Torque | | | Backlash | Part Number | Max. Input Speed RPM (n1) | | | Motor Shaft Max Ø | Input Inertia | Tors. Stiffness |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Nom. [1] $M_{2N}$ | Accel. $M_{2acc}$ | Peak [2] $M_{2NOT}$ | $\Delta\phi_2$ | | Continuous | | Cyclic | $d_{MW}$ | $J_1$ | $C_2$ |
| Nom. | Exact | Nm | Nm | Nm | arcmin | (Gearhead + Input) | EL 1,2,3,4 | EL 5,6 | All | mm | kgcm² | Nm/ arcmin |
| **C2** | | **(continued next page)** | | | | | | | | | | |
| 12.32 | 665/54 | 200 | 230 | 359 | 14 | C202_0125 ME10 | 3700 | 3500 | 5500 | ≤19 | 1.5 | 8.2 |
| | | | | 400 | | C202_0125 ME20 | | | | ≤32 | 4.9 | 8.3 |
| | | | | | | C202_0125 ME30 | 3500 | | 5000 | ≤38 | 10.0 | |
| 14.12 | 3430/243 | 200 | 230 | 400 | 14 | C202_0140 ME10 | 3700 | 3500 | 5500 | ≤19 | 1.5 | 8.2 |
| | | | | | | C202_0140 ME20 | | | | ≤32 | 4.9 | 8.3 |
| | | | | | | C202_0140 ME30 | 3500 | | 5000 | ≤38 | 10.0 | |
| 15.28 | 703/46 | 200 | 230 | 400 | 14 | C202_0155 ME10 | 3700 | 3500 | 5500 | ≤19 | 1.3 | 8.2 |
| | | | | | | C202_0155 ME20 | | | | ≤32 | 4.7 | 8.3 |
| | | | | | | C202_0155 ME30 | 3500 | | 5000 | ≤38 | 10.0 | |
| 17.52 | 3626/207 | 200 | 230 | 400 | 14 | C202_0175 ME10 | 3700 | 3500 | 5500 | ≤19 | 1.3 | 8.3 |
| | | | | | | C202_0175 ME20 | | | | ≤32 | 4.7 | |
| | | | | | | C202_0175 ME30 | 3500 | | 5000 | ≤38 | 10.0 | |
| 20.58 | 247/12 | 200 | 230 | 400 | 14 | C202_0210 ME10 | 4000 | 3900 | 6500 | ≤19 | 1.1 | 8.3 |
| | | | | | | C202_0210 ME20 | 3700 | 3700 | 6000 | ≤32 | 4.5 | |
| | | | | | | C202_0210 ME30 | 3500 | 3500 | 5000 | ≤38 | 9.8 | |
| 23.59 | 637/27 | 200 | 230 | 400 | 14 | C202_0240 ME10 | 4000 | 3900 | 6500 | ≤19 | 1.0 | 8.3 |
| | | | | | | C202_0240 ME20 | 3700 | 3700 | 6000 | ≤32 | 4.5 | |
| | | | | | | C202_0240 ME30 | 3500 | 3500 | 5000 | ≤38 | 9.8 | |
| 24.64 | 1577/64 | 200 | 230 | 400 | 14 | C202_0250 ME10 | 4000 | 3900 | 6500 | ≤19 | 1.0 | 8.3 |
| | | | | | | C202_0250 ME20 | 3700 | 3700 | 6000 | ≤32 | 4.4 | |
| | | | | | | C202_0250 ME30 | 3500 | 3500 | 5000 | ≤38 | 9.7 | |
| 28.24 | 4067/144 | 200 | 230 | 400 | 14 | C202_0280 ME10 | 4000 | 3900 | 6500 | ≤19 | 1.0 | 8.3 |
| | | | | | | C202_0280 ME20 | 3700 | 3700 | 6000 | ≤32 | 4.4 | |
| | | | | | | C202_0280 ME30 | 3500 | 3500 | 5000 | ≤38 | 9.7 | |
| 30.69 | 399/13 | 200 | 230 | 400 | 14 | C202_0310 ME10 | 4000 | 3900 | 6500 | ≤19 | 0.9 | 8.3 |
| | | | | | | C202_0310 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.8 | |
| | | | | | | C202_0310 ME30 | 3500 | 3500 | 5000 | ≤32 | 7.9 | |
| 35.18 | 1372/39 | 200 | 230 | 400 | 14 | C202_0350 ME10 | 4000 | 3900 | 6500 | ≤19 | 0.9 | 8.3 |
| | | | | | | C202_0350 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.8 | |
| 40.85 | 817/20 | 200 | 230 | 400 | 14 | C202_0410 ME10 | 4000 | 3900 | 6500 | ≤19 | 0.8 | 8.3 |
| | | | | | | C202_0410 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.7 | |
| 46.82 | 2107/45 | 200 | 230 | 400 | 14 | C202_0470 ME10 | 4000 | 3900 | 6500 | ≤19 | 0.8 | 8.3 |
| | | | | | | C202_0470 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.7 | |

[1] *Maximum torque for continuous input 1500 RPM - horizontal output position.*
[2] *Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
* *Motor shaft adapter code (shaft diameter max - mm): ME10 (19), ME20 (32), ME30 (38), ME40 (48), ME50 (60)*



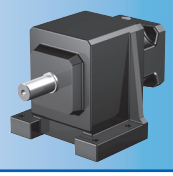
# Selection Data

| Reducer Ratio (i) | | Output Torque | | | Backlash | Part Number | Max. Input Speed RPM (n1) | | | Motor Shaft Max Ø | Input Inertia | Tors. Stiffness |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Nom. [1] | Accel. | Peak [2] | | | Continuous | | Cyclic | | | |
| | | $M_{2N}$ | $M_{2acc}$ | $M_{2NOT}$ | $\Delta\phi_2$ | | | | | $d_{MW}$ | $J_1$ | $C_2$ |
| Nom. | Exact | Nm | Nm | Nm | arcmin | (Gearhead + Input) | EL 1,2,3,4 | EL 5,6 | All | mm | kgcm² | Nm/ arcmin |
| **C2** | | **(continued from previous page)** | | | | | | | | | | |
| 49.23 | 1083/22 | 200 | 230 | 400 | 14 | C202_0490 ME10 | 4000 | 3900 | 6500 | ≤19 | 0.7 | 8.3 |
| | | | | | | C202_0490 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.6 | |
| 56.42 | 1862/33 | 200 | 230 | 400 | 14 | C202_0560 ME10 | 4000 | 3900 | 6500 | ≤19 | 0.7 | 8.3 |
| | | | | | | C202_0560 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.6 | |
| 79.59 | 7163/90 | 200 | 230 | 400 | 14 | C203_0800 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.7 | 8.3 |
| 91.23 | 36,946/405 | 200 | 230 | 400 | 14 | C203_0910 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.7 | 8.3 |
| 109.2 | 117,943/1080 | 200 | 230 | 400 | 14 | C203_1090 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.7 | 8.3 |
| 136.0 | 79,576/585 | 200 | 230 | 400 | 14 | C203_1360 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.7 | 8.3 |
| 137.8 | 16,121/117 | 200 | 230 | 400 | 14 | C203_1380 ME10 | 4000 | 3900 | 6500 | ≤19 | 0.7 | 8.3 |
| 181.0 | 122,206/675 | 200 | 230 | 400 | 14 | C203_1810 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.7 | 8.3 |
| 183.4 | 99,029/540 | 200 | 230 | 400 | 14 | C203_1830 ME10 | 4000 | 3900 | 6500 | ≤19 | 0.7 | 8.3 |
| 221.0 | 43,757/198 | 200 | 230 | 400 | 14 | C203_2210 ME10 | 4000 | 3900 | 6500 | ≤19 | 0.7 | 8.3 |
| **C3** | | **(continued next page)** | | | | | | | | | | |
| 2.510 | 1634/651 | 187 | 280 | 487 | 16 | C302_0025 ME30 | 2700 | 2300 | 4000 | ≤38 | 15.0 | 7.0 |
| | | | | | | C302_0025 ME40 | | | | ≤48 | 36.0 | 6.9 |
| 2.705 | 1677/620 | 192 | 287 | 525 | 16 | C302_0027 ME30 | 2700 | 2300 | 4000 | ≤38 | 14.0 | 7.0 |
| | | | | | | C302_0027 ME40 | | | | ≤48 | 36.0 | |
| 3.878 | 190/49 | 203 | 226 | 282 | 16 | C302_0039 ME20 | 3200 | 2800 | 4800 | ≤32 | 6.6 | 6.9 |
| | | 216 | 324 | 550 | | C302_0039 ME30 | | | | ≤38 | 12.0 | 7.0 |
| | | | | | | C302_0039 ME40 | 3000 | | 4500 | ≤48 | 34.0 | |
| 4.179 | 117/28 | 218 | 243 | 304 | 16 | C302_0042 ME20 | 3200 | 2800 | 4800 | ≤32 | 6.6 | 7.0 |
| | | 221 | 330 | 550 | | C302_0042 ME30 | | | | ≤38 | 12.0 | |
| | | | | | | C302_0042 ME40 | 3000 | | 4500 | ≤48 | 34.0 | |
| 4.675 | 589/126 | 210 | 272 | 340 | 16 | C302_0047 ME20 | 3500 | 3100 | 5500 | ≤32 | 6.0 | 7.0 |
| | | 230 | 330 | 550 | | C302_0047 ME30 | | | 5000 | ≤38 | 11.0 | |
| | | | | | | C302_0047 ME40 | 3000 | 3000 | 4500 | ≤48 | 33.0 | |
| 5.038 | 403/80 | 227 | 293 | 367 | 16 | C302_0050 ME20 | 3500 | 3100 | 5500 | ≤32 | 6.0 | 7.0 |
| | | 236 | 330 | 550 | | C302_0050 ME30 | | | 5000 | ≤38 | 11.0 | |
| | | | | | | C302_0050 ME40 | 3000 | 3000 | 4500 | ≤48 | 33.0 | |
| 5.859 | 2584/441 | 231 | 322 | 403 | 16 | C302_0059 ME20 | 3500 | 3100 | 5500 | ≤32 | 5.4 | 7.0 |
| | | 248 | 330 | 550 | | C302_0059 ME30 | | | 5000 | ≤38 | 11.0 | |
| | | | | | | C302_0059 ME40 | 3000 | 3000 | 4500 | ≤48 | 33.0 | |

[1] *Maximum torque for continuous input 1500 RPM - horizontal output position.*
[2] *Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
* *Motor shaft adapter code (shaft diameter max - mm): ME10 (19), ME20 (32), ME30 (38), ME40 (48), ME50 (60)*

| Reducer Ratio (i) | | Output Torque | | | Backlash | Part Number | Max. Input Speed RPM (n1) | | | Motor Shaft Max Ø | Input Inertia | Tors. Stiffness |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Nom. [1] $M_{2N}$ | Accel. $M_{2acc}$ | Peak [2] $M_{2NOT}$ | $\Delta\phi_2$ | | Continuous | | Cyclic | $d_{MW}$ | $J_1$ | $C_2$ |
| Nom. | Exact | Nm | Nm | Nm | arcmin | (Gearhead + Input) | EL 1,2,3,4 | EL 5,6 | All | mm | kgcm² | Nm/ arcmin |
| **C3** | **(continued next page)** | | | | | | | | | | | |
| 6.314 | 221/35 | 249 | 330 | 434 | 16 | C302_0063 ME20 | 3500 | 3100 | 5500 | ≤32 | 5.4 | 7.0 |
| | | | | 550 | | C302_0063 ME30 | | | 5000 | ≤38 | 11.0 | 7.1 |
| | | | | | | C302_0063 ME40 | 3000 | 3000 | 4500 | ≤48 | 33.0 | 7.0 |
| 10.29 | 72/7 | 350 | 400 | 700 | 13 | C302_0105 ME20 | 3200 | 2800 | 4800 | ≤32 | 6.0 | 8.7 |
| | | | | | | C302_0105 ME30 | | | | ≤38 | 11.0 | |
| | | | | | | C302_0105 ME40 | 3000 | | 4500 | ≤48 | 33.0 | |
| 11.61 | 325/28 | 350 | 350 | 700 | 13 | C302_0115 ME20 | 3200 | 2800 | 4800 | ≤32 | 5.9 | 8.7 |
| | | | | | | C302_0115 ME30 | | | | ≤38 | 11.0 | |
| | | | | | | C302_0115 ME40 | 3000 | | 4500 | ≤48 | 33.0 | |
| 12.40 | 62/5 | 350 | 400 | 700 | 13 | C302_0125 ME20 | 3500 | 3100 | 5500 | ≤32 | 5.6 | 8.7 |
| | | | | | | C302_0125 ME30 | | | 5000 | ≤38 | 11.0 | |
| | | | | | | C302_0125 ME40 | 3000 | 3000 | 4500 | ≤48 | 33.0 | |
| 13.99 | 2015/144 | 350 | 350 | 700 | 13 | C302_0140 ME20 | 3500 | 3100 | 5500 | ≤32 | 5.5 | 8.7 |
| | | | | | | C302_0140 ME30 | | | 5000 | ≤38 | 11.0 | |
| | | | | | | C302_0140 ME40 | 3000 | 3000 | 4500 | ≤48 | 33.0 | |
| 15.54 | 544/35 | 350 | 400 | 700 | 13 | C302_0155 ME20 | 3500 | 3100 | 5500 | ≤32 | 5.1 | 8.7 |
| | | | | | | C302_0155 ME30 | | | 5000 | ≤38 | 11.0 | |
| | | | | | | C302_0155 ME40 | 3000 | 3000 | 4500 | ≤48 | 33.0 | |
| 17.54 | 1105/63 | 350 | 350 | 700 | 13 | C302_0175 ME20 | 3500 | 3100 | 5500 | ≤32 | 5.1 | 8.7 |
| | | | | | | C302_0175 ME30 | | | 5000 | ≤38 | 11.0 | |
| | | | | | | C302_0175 ME40 | 3000 | 3000 | 4500 | ≤48 | 32.0 | |
| 24.80 | 124/5 | 350 | 400 | 700 | 13 | C302_0250 ME20 | 3700 | 3500 | 6000 | ≤32 | 4.6 | 8.7 |
| | | | | | | C302_0250 ME30 | 3500 | | 5000 | ≤38 | 9.9 | |
| 27.99 | 2015/72 | 350 | 350 | 700 | 13 | C302_0280 ME20 | 3700 | 3500 | 6000 | ≤32 | 4.6 | 8.7 |
| | | | | | | C302_0280 ME30 | 3500 | | 5000 | ≤38 | 9.9 | |
| 31.04 | 776/25 | 350 | 400 | 700 | 13 | C302_0310 ME20 | 3700 | 3500 | 6000 | ≤32 | 4.4 | 8.7 |
| | | | | | | C302_0310 ME30 | 3500 | | 5000 | ≤38 | 9.7 | |
| 35.03 | 1261/36 | 350 | 350 | 700 | 13 | C302_0350 ME20 | 3700 | 3500 | 6000 | ≤32 | 4.4 | 8.7 |
| | | | | | | C302_0350 ME30 | 3500 | | 5000 | ≤38 | 9.7 | |
| 41.35 | 2688/65 | 350 | 400 | 700 | 13 | C302_0410 ME20 | 3700 | 3500 | 6000 | ≤24 | 2.8 | 8.7 |
| 46.67 | 140/3 | 350 | 350 | 700 | 13 | C302_0470 ME20 | 3700 | 3500 | 6000 | ≤24 | 2.8 | 8.7 |
| 49.75 | 2736/55 | 350 | 400 | 700 | 13 | C302_0500 ME20 | 3700 | 3500 | 6000 | ≤24 | 2.7 | 8.7 |
| 56.14 | 1235/22 | 350 | 350 | 700 | 13 | C302_0560 ME20 | 3700 | 3500 | 6000 | ≤24 | 2.7 | 8.7 |

[1] *Maximum torque for continuous input 1500 RPM - horizontal output position.*
[2] *Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
* *Motor shaft adapter code (shaft diameter max - mm): ME10 (19), ME20 (32), ME30 (38), ME40 (48), ME50 (60)*



# Selection Data

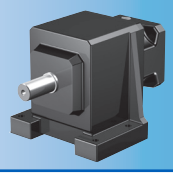
| Reducer Ratio (i) | | Output Torque | | | Backlash | Part Number | Max. Input Speed RPM (n1) | | | Motor Shaft Max Ø | Input Inertia | Tors. Stiffness |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Nom. [1] | Accel. | Peak [2] | | | Continuous | | Cyclic | | | |
| | | $M_{2N}$ | $M_{2acc}$ | $M_{2NOT}$ | $\Delta\phi_2$ | | | | | $d_{MW}$ | $J_1$ | $C_2$ |
| Nom. | Exact | Nm | Nm | Nm | arcmin | (Gearhead + Input) | EL 1,2,3,4 | EL 5,6 | All | mm | kgcm² | Nm/ arcmin |
| **C3** | | **(continued from previous page)** | | | | | | | | | | |
| 108.2 | 11,687/108 | 350 | 350 | 700 | 13 | C303_1080 ME20 | 3700 | 3500 | 6000 | ≤24 | 2.7 | 8.7 |
| 135.4 | 36,569/270 | 350 | 350 | 700 | 13 | C303_1350 ME20 | 3700 | 3500 | 6000 | ≤24 | 2.7 | 8.7 |
| 137.2 | 59,267/432 | 350 | 350 | 700 | 13 | C303_1370 ME10 | 3800 | 3500 | 6000 | ≤19 | 0.7 | 8.7 |
| 180.4 | 1624/9 | 350 | 350 | 700 | 13 | C303_1800 ME20 | 3700 | 3500 | 6000 | ≤24 | 2.7 | 8.7 |
| 182.8 | 1645/9 | 350 | 350 | 700 | 13 | C303_1830 ME10 | 3800 | 3500 | 6000 | ≤19 | 0.7 | 8.7 |
| 217.1 | 7163/33 | 350 | 350 | 700 | 13 | C303_2170 ME20 | 3700 | 3500 | 6000 | ≤24 | 2.7 | 8.7 |
| 219.9 | 58,045/264 | 350 | 350 | 700 | 13 | C303_2200 ME10 | 3800 | 3500 | 6000 | ≤19 | 0.7 | 8.7 |
| **C4** | | **(continued next page)** | | | | | | | | | | |
| 1.968 | 551/280 | 251 | 306 | 382 | 15 | C402_0020 ME30 | 2500 | 2100 | 3500 | ≤38 | 27.0 | 16.0 |
| | | | | | | C402_0020 ME40 | | | | ≤48 | 48.0 | |
| 3.099 | 1537/496 | 292 | 437 | 599 | 15 | C402_0031 ME30 | 2900 | 2500 | 4500 | ≤38 | 18.0 | 17.0 |
| | | | | | | C402_0031 ME40 | | | | ≤48 | 40.0 | |
| 4.682 | 899/192 | 244 | 273 | 341 | 15 | C402_0047 ME20 | 3300 | 2800 | 5000 | ≤32 | 8.6 | 17.0 |
| | | 335 | 502 | 800 | | C402_0047 ME30 | | | | ≤38 | 14.0 | |
| | | | | | | C402_0047 ME40 | 3000 | | 4500 | ≤48 | 36.0 | |
| 7.816 | 2001/256 | 274 | 360 | 450 | 15 | C402_0078 ME20 | 3500 | 3200 | 5500 | ≤32 | 6.1 | 17.0 |
| | | 397 | 550 | 850 | | C402_0078 ME30 | | | 5000 | ≤38 | 12.0 | |
| | | | | | | C402_0078 ME40 | 3000 | 3000 | 4500 | ≤48 | 33.0 | |
| 8.285 | 3339/403 | 550 | 600 | 1100 | 12 | C402_0083 ME30 | 2900 | 2500 | 4500 | ≤38 | 15.0 | 22.0 |
| | | | | | | C402_0083 ME40 | | | | ≤48 | 37.0 | |
| 9.261 | 3445/372 | 550 | 550 | 1100 | 12 | C402_0093 ME30 | 2900 | 2500 | 4500 | ≤38 | 15.0 | 22.0 |
| | | | | | | C402_0093 ME40 | | | | ≤48 | 37.0 | |
| 12.52 | 651/52 | 550 | 600 | 911 | 12 | C402_0125 ME20 | 3300 | 2800 | 5000 | ≤32 | 7.5 | 22.0 |
| | | | | 1100 | | C402_0125 ME30 | | | | ≤38 | 13.0 | |
| | | | | | | C402_0125 ME40 | 3000 | | 4500 | ≤48 | 35.0 | |
| 13.99 | 2015/144 | 550 | 550 | 1018 | 12 | C402_0140 ME20 | 3300 | 2800 | 5000 | ≤32 | 7.4 | 22.0 |
| | | | | 1100 | | C402_0140 ME30 | | | | ≤38 | 13.0 | |
| | | | | | | C402_0140 ME40 | 3000 | | 4500 | ≤48 | 35.0 | |
| 20.90 | 4347/208 | 550 | 600 | 1100 | 12 | C402_0210 ME20 | 3500 | 3200 | 5500 | ≤32 | 5.7 | 22.0 |
| | | | | | | C402_0210 ME30 | | | 5000 | ≤38 | 11.0 | |
| | | | | | | C402_0210 ME40 | 3000 | 3000 | 4500 | ≤48 | 33.0 | |
| 23.36 | 1495/64 | 550 | 550 | 1100 | 12 | C402_0230 ME20 | 3500 | 3200 | 5500 | ≤32 | 5.7 | 22.0 |
| | | | | | | C402_0230 ME30 | | | 5000 | ≤38 | 11.0 | |
| | | | | | | C402_0230 ME40 | 3000 | 3000 | 4500 | ≤48 | 33.0 | |

[1] *Maximum torque for continuous input 1500 RPM - horizontal output position.*
[2] *Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
* *Motor shaft adapter code (shaft diameter max - mm): ME10 (19), ME20 (32), ME30 (38), ME40 (48), ME50 (60)*

| Reducer Ratio (i) | | Output Torque | | | Backlash | Part Number | Max. Input Speed RPM (n1) | | | Motor Shaft Max Ø | Input Inertia | Tors. Stiffness |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Nom. [1] $M_{2N}$ | Accel. $M_{2acc}$ | Peak [2] $M_{2NOT}$ | $\Delta\phi_2$ | | Continuous | | Cyclic | $d_{MW}$ | $J_1$ | $C_2$ |
| Nom. | Exact | Nm | Nm | Nm | arcmin | (Gearhead + Input) | EL 1,2,3,4 | EL 5,6 | All | mm | kgcm² | Nm/ arcmin |
| **C4** | **(continued from previous page)** | | | | | | | | | | | |
| 24.92 | 324/13 | 550 | 600 | 1100 | 12 | C402_0250 ME20 | 3500 | 3200 | 5500 | ≤32 | 5.3 | 22.0 |
| | | | | | | C402_0250 ME30 | | | 5000 | ≤38 | 11.0 | |
| 27.86 | 195/7 | 550 | 550 | 1100 | 12 | C402_0280 ME20 | 3500 | 3200 | 5500 | ≤32 | 5.3 | 22.0 |
| | | | | | | C402_0280 ME30 | | | 5000 | ≤38 | 11.0 | |
| 41.75 | 7056/169 | 550 | 600 | 1100 | 12 | C402_0420 ME20 | 3500 | 3200 | 5500 | ≤32 | 4.6 | 22.0 |
| | | | | | | C402_0420 ME30 | | | 5000 | ≤38 | 9.9 | |
| 46.67 | 140/3 | 550 | 550 | 1100 | 12 | C402_0470 ME20 | 3500 | 3200 | 5500 | ≤32 | 4.6 | 22.0 |
| | | | | | | C402_0470 ME30 | | | 5000 | ≤38 | 9.9 | |
| 50.19 | 1305/26 | 550 | 600 | 917 | 12 | C402_0500 ME20 | 3500 | 3200 | 5500 | ≤24 | 2.9 | 22.0 |
| 56.10 | 9425/168 | 550 | 550 | 1025 | 12 | C402_0560 ME20 | 3500 | 3200 | 5500 | ≤24 | 2.9 | 22.0 |
| 80.81 | 42,021/520 | 550 | 600 | 1100 | 12 | C403_0810 ME20 | 3500 | 3200 | 5500 | ≤24 | 2.8 | 22.0 |
| 90.32 | 8671/96 | 550 | 550 | 1100 | 12 | C403_0900 ME20 | 3500 | 3200 | 5500 | ≤24 | 2.8 | 22.0 |
| 107.7 | 754/7 | 550 | 550 | 1100 | 12 | C403_1080 ME20 | 3500 | 3200 | 5500 | ≤24 | 2.8 | 22.0 |
| 180.4 | 1624/9 | 550 | 550 | 1100 | 12 | C403_1800 ME20 | 3500 | 3200 | 5500 | ≤24 | 2.7 | 22.0 |
| 216.9 | 54,665/252 | 550 | 550 | 1025 | 12 | C403_2170 ME20 | 3500 | 3200 | 5500 | ≤24 | 2.7 | 22.0 |
| **C5** | **(continued next page)** | | | | | | | | | | | |
| 1.976 | 81/41 | 290 | 307 | 384 | 14 | C502_0020 ME30 | 2400 | 2000 | 3200 | ≤38 | 40.0 | 20.0 |
| | | 389 | 575 | 719 | | C502_0020 ME40 | | | | ≤48 | 62.0 | |
| | | | | | | C502_0020 ME50 | | | | ≤60 | 90.0 | |
| 3.077 | 477/155 | 350 | 478 | 597 | 14 | C502_0031 ME30 | 2800 | 2400 | 4000 | ≤38 | 25.0 | 21.0 |
| | | 451 | | | | C502_0031 ME40 | | | | ≤48 | 47.0 | 20.0 |
| | | | | | | C502_0031 ME50 | 2500 | | | ≤60 | 76.0 | 21.0 |
| 4.629 | 162/35 | 269 | 269 | 337 | 14 | C502_0046 ME20 | 3100 | 2700 | 4500 | ≤32 | 12.0 | 20.0 |
| | | 404 | 704 | 881 | | C502_0046 ME30 | | | | ≤38 | 18.0 | 21.0 |
| | | 517 | | | | C502_0046 ME40 | 3000 | | | ≤48 | 40.0 | |
| | | | | | | C502_0046 ME50 | 2500 | 2500 | 4000 | ≤60 | 69.0 | |
| 7.763 | 621/80 | 320 | 396 | 496 | 14 | C502_0078 ME20 | 3400 | 3000 | 5000 | ≤32 | 7.8 | 21.0 |
| | | 464 | 800 | 1110 | | C502_0078 ME30 | | | | ≤38 | 13.0 | |
| | | 614 | | | | C502_0078 ME40 | 3000 | | 4500 | ≤48 | 35.0 | |
| | | | | | | C502_0078 ME50 | 2500 | 2500 | 4000 | ≤60 | 64.0 | |
| 8.263 | 1537/186 | 800 | 920 | 1600 | 12 | C502_0083 ME30 | 2800 | 2400 | 4000 | ≤38 | 20.0 | 23.0 |
| | | | | | | C502_0083 ME40 | | | | ≤48 | 42.0 | |
| | | | | | | C502_0083 ME50 | 2500 | | | ≤60 | 71.0 | |

[1] *Maximum torque for continuous input 1500 RPM - horizontal output position.*
[2] *Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
* *Motor shaft adapter code (shaft diameter max - mm): ME10 (19), ME20 (32), ME30 (38), ME40 (48), ME50 (60)*

# Selection Data



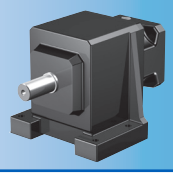
| Reducer Ratio (i) | | Output Torque | | | Backlash | Part Number (Gearhead + Input) | Max. Input Speed RPM (n1) | | | Motor Shaft Max Ø | Input Inertia | Tors. Stiffness |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Nom. [1] $M_{2N}$ | Accel. $M_{2acc}$ | Peak [2] $M_{2NOT}$ | $\Delta\phi_2$ | | Continuous | | Cyclic | $d_{MW}$ | $J_1$ | $C_2$ |
| Nom. | Exact | Nm | Nm | Nm | arcmin | | EL 1,2,3,4 | EL 5,6 | All | mm | kgcm² | Nm/ arcmin |
| **C5** | **(continued from previous page)** | | | | | | | | | | | |
| 9.261 | 3445/372 | 800 | 850 | 1600 | 12 | C502_0093 ME30 | 2800 | 2400 | 4000 | ≤38 | 20.0 | 23.0 |
| | | | | | | C502_0093 ME40 | | | | ≤48 | 42.0 | |
| | | | | | | C502_0093 ME50 | 2500 | | | ≤60 | 71.0 | |
| 12.43 | 87/7 | 723 | 723 | 904 | 12 | C502_0125 ME20 | 3100 | 2700 | 4500 | ≤32 | 10.0 | 23.0 |
| | | 800 | 920 | 1600 | | C502_0125 ME30 | | | | ≤38 | 16.0 | |
| | | | | | | C502_0125 ME40 | 3000 | | | ≤48 | 38.0 | |
| | | | | | | C502_0125 ME50 | 2500 | 2500 | 4000 | ≤60 | 67.0 | |
| 13.93 | 195/14 | 800 | 811 | 1013 | 12 | C502_0140 ME20 | 3100 | 2700 | 4500 | ≤32 | 10.0 | 23.0 |
| | | | 850 | 1600 | | C502_0140 ME30 | | | | ≤38 | 16.0 | |
| | | | | | | C502_0140 ME40 | 3000 | | | ≤48 | 37.0 | |
| | | | | | | C502_0140 ME50 | 2500 | 2500 | 4000 | ≤60 | 67.0 | |
| 20.84 | 667/32 | 800 | 920 | 1331 | 12 | C502_0210 ME20 | 3400 | 3000 | 5000 | ≤32 | 7.1 | 23.0 |
| | | | | 1600 | | C502_0210 ME30 | | | | ≤38 | 13.0 | |
| | | | | | | C502_0210 ME40 | 3000 | | 4500 | ≤48 | 34.0 | |
| | | | | | | C502_0210 ME50 | 2500 | 2500 | 4000 | ≤60 | 64.0 | |
| 23.36 | 1495/64 | 800 | 850 | 1491 | 12 | C502_0230 ME20 | 3400 | 3000 | 5000 | ≤32 | 7.1 | 23.0 |
| | | | | 1600 | | C502_0230 ME30 | | | | ≤38 | 13.0 | |
| | | | | | | C502_0230 ME40 | 3000 | | 4500 | ≤48 | 34.0 | |
| | | | | | | C502_0230 ME50 | 2500 | 2500 | 4000 | ≤60 | 63.0 | |
| 31.23 | 406/13 | 800 | 920 | 1524 | 12 | C502_0310 ME20 | 3400 | 3000 | 5000 | ≤32 | 5.7 | 23.0 |
| | | | | | | C502_0310 ME30 | | | | ≤38 | 11.0 | |
| 35.00 | 35/1 | 800 | 850 | 1600 | 12 | C502_0350 ME20 | 3400 | 3000 | 5000 | ≤32 | 5.6 | 23.0 |
| | | | | | | C502_0350 ME30 | | | | ≤38 | 11.0 | |
| 49.82 | 1943/39 | 800 | 920 | 1600 | 12 | C502_0500 ME20 | 3400 | 3000 | 5000 | ≤32 | 4.8 | 23.0 |
| | | | | | | C502_0500 ME30 | | | | ≤38 | 10.0 | |
| 55.83 | 335/6 | 800 | 850 | 1600 | 12 | C502_0560 ME20 | 3400 | 3000 | 5000 | ≤32 | 4.8 | 23.0 |
| | | | | | | C502_0560 ME30 | | | | ≤38 | 10.0 | |
| 80.60 | 19,343/240 | 800 | 920 | 1331 | 12 | C503_0810 ME20 | 3400 | 3000 | 5000 | ≤24 | 2.9 | 23.0 |
| 90.32 | 8671/96 | 800 | 850 | 1491 | 12 | C503_0900 ME20 | 3400 | 3000 | 5000 | ≤24 | 2.9 | 23.0 |
| 135.3 | 406/3 | 800 | 850 | 1600 | 12 | C503_1350 ME20 | 3400 | 3000 | 5000 | ≤24 | 2.8 | 23.0 |
| 215.9 | 1943/9 | 800 | 850 | 1600 | 12 | C503_2160 ME20 | 3400 | 3000 | 5000 | ≤24 | 2.7 | 23.0 |

*[1] Maximum torque for continuous input 1500 RPM - horizontal output position.*
*[2] Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
** Motor shaft adapter code (shaft diameter max - mm): ME10 (19), ME20 (32), ME30 (38), ME40 (48), ME50 (60)*

| Reducer Ratio (i) | | Output Torque | | | Backlash | Part Number | Max. Input Speed RPM (n1) | | | Motor Shaft Max Ø | Input Inertia | Tors. Stiffness |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Nom. [1] $M_{2N}$ | Accel. $M_{2acc}$ | Peak [2] $M_{2NOT}$ | $\Delta\phi_2$ | (Gearhead + Input) | Continuous | | Cyclic | $d_{MW}$ | $J_1$ | $C_2$ |
| Nom. | Exact | Nm | Nm | Nm | arcmin | | EL 1,2,3,4 | EL 5,6 | All | mm | kgcm² | Nm/ arcmin |
| **C6** | | **(continued next page)** | | | | | | | | | | |
| 4.184 | 2745/656 | 930 | 1220 | 1520 | 10 | C612_0042 ME40 | 2300 | 1900 | 3000 | ≤48 | 79.0 | 70.0 |
| | | | | | | C612_0042 ME50 | | | | ≤60 | 107.0 | 72.0 |
| 5.854 | 240/41 | 1040 | 1380 | 2130 | 10 | C612_0059 ME40 | 2300 | 1900 | 3000 | ≤48 | 74.0 | 72.0 |
| | | | | | | C612_0059 ME50 | | | | ≤60 | 102.0 | 73.0 |
| 6.518 | 3233/496 | 829 | 1012 | 1265 | 10 | C612_0065 ME30 | 2700 | 2300 | 3800 | ≤38 | 35.0 | 72.0 |
| | | 1075 | 1612 | 2372 | | C612_0065 ME40 | | | | ≤48 | 58.0 | |
| | | | | | | C612_0065 ME50 | 2500 | | | ≤60 | 86.0 | 73.0 |
| 9.118 | 848/93 | 1160 | 1380 | 1770 | 10 | C612_0091 ME30 | 2700 | 2300 | 3800 | ≤38 | 33.0 | 73.0 |
| | | 1202 | 1380 | 2600 | | C612_0091 ME40 | | | | ≤48 | 56.0 | |
| | | | | | | C612_0091 ME50 | 2500 | | | ≤60 | 83.0 | 74.0 |
| 10.11 | 3721/368 | 965 | 1439 | 1799 | 10 | C612_0100 ME30 | 3000 | 2600 | 4000 | ≤38 | 24.0 | 73.0 |
| | | 1244 | 1650 | 2900 | | C612_0100 ME40 | | | | ≤48 | 47.0 | |
| | | | | | | C612_0100 ME50 | 2500 | 2500 | | ≤60 | 75.0 | 74.0 |
| 14.15 | 976/69 | 1300 | 1380 | 2516 | 10 | C612_0140 ME30 | 3000 | 2600 | 4000 | ≤38 | 23.0 | 74.0 |
| | | | | 2600 | | C612_0140 ME40 | | | | ≤48 | 46.0 | |
| | | | | | | C612_0140 ME50 | 2500 | 2500 | | ≤60 | 74.0 | |
| 16.20 | 1037/64 | 1086 | 1650 | 2296 | 10 | C612_0160 ME30 | 3200 | 2900 | 4500 | ≤38 | 17.0 | 74.0 |
| | | 1450 | | 2900 | | C612_0160 ME40 | 3000 | | | ≤48 | 39.0 | |
| | | | | | | C612_0160 ME50 | 2500 | 2500 | 4000 | ≤60 | 67.0 | |
| 22.67 | 68/3 | 1300 | 1380 | 2600 | 10 | C612_0230 ME30 | 3200 | 2900 | 4500 | ≤38 | 16.0 | 74.0 |
| | | | | | | C612_0230 ME40 | 3000 | | | ≤48 | 39.0 | |
| | | | | | | C612_0230 ME50 | 2500 | 2500 | 4000 | ≤60 | 67.0 | |
| 24.93 | 5185/208 | 1169 | 1650 | 2900 | 10 | C612_0250 ME30 | 3200 | 2900 | 4500 | ≤38 | 13.0 | 74.0 |
| | | 1450 | | | | C612_0250 ME40 | 3000 | | | ≤48 | 35.0 | |
| | | | | | | C612_0250 ME50 | 2500 | 2500 | 4000 | ≤60 | 64.0 | |
| 34.87 | 1360/39 | 1300 | 1380 | 2600 | 10 | C612_0350 ME30 | 3200 | 2900 | 4500 | ≤38 | 13.0 | 74.0 |
| | | | | | | C612_0350 ME40 | 3000 | | | ≤48 | 35.0 | |
| | | | | | | C612_0350 ME50 | 2500 | 2500 | 4000 | ≤60 | 64.0 | |
| 39.40 | 1891/48 | 1221 | 1283 | 1603 | 10 | C612_0390 ME30 | 3200 | 2900 | 4500 | ≤38 | 11.0 | 74.0 |
| 55.11 | 496/9 | 1300 | 1380 | 2243 | 10 | C612_0550 ME30 | 3200 | 2900 | 4500 | ≤38 | 11.0 | 74.0 |
| 63.46 | 48,739/768 | 1450 | 1650 | 2296 | 10 | C613_0630 ME30 | 3200 | 2900 | 4500 | ≤38 | 10.0 | 74.0 |
| 88.78 | 799/9 | 1300 | 1380 | 2600 | 10 | C613_0890 ME30 | 3200 | 2900 | 4500 | ≤38 | 10.0 | 74.0 |
| 97.63 | 243,695/2496 | 1450 | 1650 | 2900 | 10 | C613_0980 ME30 | 3200 | 2900 | 4500 | ≤38 | 10.0 | 74.0 |
| 134.8 | 15,776/117 | 1300 | 1376 | 1720 | 10 | C613_1350 ME20 | 3200 | 2900 | 4500 | ≤24 | 2.9 | 74.0 |
| 136.6 | 15,980/117 | 1300 | 1380 | 2600 | 10 | C613_1370 ME30 | 3200 | 2900 | 4500 | ≤38 | 10.0 | 74.0 |
| 213.1 | 28,768/135 | 1300 | 1380 | 2243 | 10 | C613_2130 ME20 | 3200 | 2900 | 4500 | ≤24 | 2.8 | 74.0 |

[1] *Maximum torque for continuous input 1500 RPM - horizontal output position.*
[2] *Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
* *Motor shaft adapter code (shaft diameter max - mm): ME10 (19), ME20 (32), ME30 (38), ME40 (48), ME50 (60)*

# Selection Data

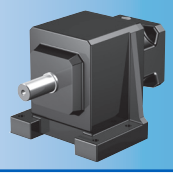


| Reducer Ratio (i) | | Output Torque | | | Backlash | Part Number | Max. Input Speed RPM (n1) | | | Motor Shaft Max Ø | Input Inertia | Tors. Stiffness |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Nom. [1] $M_{2N}$ | Accel. $M_{2acc}$ | Peak [2] $M_{2NOT}$ | $\Delta\phi_2$ | | Continuous | | Cyclic | $d_{MW}$ | $J_1$ | $C_2$ |
| Nom. | Exact | Nm | Nm | Nm | arcmin | (Gearhead + Input) | EL 1,2,3,4 | EL 5,6 | All | mm | kgcm² | Nm/ arcmin |
| **C7** | **(continued next page)** | | | | | | | | | | | |
| 4.259 | 477/112 | 1240 | 1240 | 1550 | 10 | C712_0043 ME40 | 2200 | 1900 | 2800 | ≤48 | 128.0 | 112.0 |
| | | | | | | C712_0043 ME50 | | | | ≤60 | 156.0 | 116.0 |
| 8.490 | 4347/512 | 1943 | 2471 | 3089 | 10 | C712_0085 ME40 | 2600 | 2300 | 3500 | ≤48 | 70.0 | 119.0 |
| | | | | | | C712_0085 ME50 | 2500 | | | ≤60 | 98.0 | 120.0 |
| 11.76 | 1035/88 | 2000 | 2300 | 4000 | 10 | C712_0120 ME40 | 2600 | 2300 | 3500 | ≤48 | 68.0 | 121.0 |
| | | | | | | C712_0120 ME50 | 2500 | | | ≤60 | 96.0 | |
| 13.18 | 4851/368 | 1250 | 1820 | 2275 | 10 | C712_0130 ME30 | 2900 | 2600 | 4000 | ≤38 | 31.0 | 121.0 |
| | | 2250 | 2760 | 4797 | | C712_0130 ME40 | | | | ≤48 | 54.0 | |
| | | | | | | C712_0130 ME50 | 2500 | 2500 | | ≤60 | 82.0 | |
| 18.26 | 420/23 | 1731 | 2300 | 3151 | 10 | C712_0185 ME30 | 2900 | 2600 | 4000 | ≤38 | 30.0 | 122.0 |
| | | 2000 | 2300 | 4000 | | C712_0185 ME40 | | | | ≤48 | 53.0 | |
| | | | | | | C712_0185 ME50 | 2500 | 2500 | | ≤60 | 81.0 | |
| 20.67 | 1323/64 | 1375 | 2257 | 2821 | 10 | C712_0210 ME30 | 3100 | 2900 | 4500 | ≤38 | 20.0 | 122.0 |
| | | 2400 | 2760 | 4800 | | C712_0210 ME40 | 3000 | | | ≤48 | 43.0 | |
| | | | | | | C712_0210 ME50 | 2500 | 2500 | 4000 | ≤60 | 71.0 | |
| 28.64 | 315/11 | 1905 | 2300 | 3908 | 10 | C712_0290 ME30 | 3100 | 2900 | 4500 | ≤38 | 20.0 | 122.0 |
| | | 2000 | | 4000 | | C712_0290 ME40 | 3000 | | | ≤48 | 43.0 | |
| | | | | | | C712_0290 ME50 | 2500 | 2500 | 4000 | ≤60 | 70.0 | |
| 33.80 | 2163/64 | 1486 | 2760 | 3710 | 10 | C712_0340 ME30 | 3100 | 2900 | 4500 | ≤38 | 14.0 | 122.0 |
| | | 2400 | | | | C712_0340 ME40 | 3000 | | | ≤48 | 36.0 | |
| | | | | | | C712_0340 ME50 | 2500 | 2500 | 4000 | ≤60 | 65.0 | |
| 41.02 | 2625/64 | 1531 | 2514 | 4081 | 10 | C712_0410 ME30 | 3100 | 2900 | 4500 | ≤38 | 13.0 | 122.0 |
| | | 2095 | | | | C712_0410 ME40 | 3000 | | | ≤48 | 35.0 | |
| | | | | | | C712_0410 ME50 | 2500 | 2500 | 4000 | ≤60 | 64.0 | |
| 46.82 | 515/11 | 2000 | 2300 | 4000 | 10 | C712_0470 ME30 | 3100 | 2900 | 4500 | ≤38 | 14.0 | 122.0 |
| | | | | | | C712_0470 ME40 | 3000 | | | ≤48 | 36.0 | |
| | | | | | | C712_0470 ME50 | 2500 | 2500 | 4000 | ≤60 | 65.0 | |
| 50.85 | 18,711/368 | 2400 | 2760 | 4797 | 10 | C713_0510 ME40 | 3000 | 2900 | 4500 | ≤48 | 34.0 | 122.0 |
| 56.82 | 625/11 | 2000 | 2300 | 4000 | 10 | C712_0570 ME30 | 3100 | 2900 | 4500 | ≤38 | 13.0 | 122.0 |
| | | | | | | C712_0570 ME40 | 3000 | | | ≤48 | 35.0 | |
| | | | | | | C712_0570 ME50 | 2500 | 2500 | 4000 | ≤60 | 64.0 | |
| 79.73 | 5103/64 | 2400 | 2760 | 4800 | 10 | C713_0800 ME40 | 3000 | 2900 | 4500 | ≤48 | 34.0 | 122.0 |
| 80.97 | 20,727/256 | 2224 | 2257 | 2821 | 10 | C713_0810 ME30 | 3100 | 2900 | 4500 | ≤38 | 11.0 | 122.0 |
| 110.5 | 1215/11 | 2000 | 2300 | 4000 | 10 | C713_1100 ME40 | 3000 | 2900 | 4500 | ≤48 | 34.0 | 122.0 |
| 130.4 | 8343/64 | 2400 | 2760 | 3710 | 10 | C713_1300 ME40 | 3000 | 2900 | 4500 | ≤48 | 33.0 | 122.0 |
| 132.4 | 33,887/256 | 2400 | 2760 | 3710 | 10 | C713_1320 ME30 | 3100 | 2900 | 4500 | ≤38 | 10.0 | 122.0 |
| 180.6 | 13,905/77 | 2000 | 2300 | 4000 | 10 | C713_1810 ME40 | 3000 | 2900 | 4500 | ≤48 | 33.0 | 122.0 |

[1] *Maximum torque for continuous input 1500 RPM - horizontal output position.*
[2] *Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
* *Motor shaft adapter code (shaft diameter max - mm): ME10 (19), ME20 (32), ME30 (38), ME40 (48), ME50 (60)*

| Reducer Ratio (i) | | Output Torque | | | Backlash | Part Number | Max. Input Speed RPM (n1) | | | Motor Shaft Max Ø | Input Inertia | Tors. Stiffness |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Nom. [1] $M_{2N}$ | Accel. $M_{2acc}$ | Peak [2] $M_{2NOT}$ | $\Delta\phi_2$ | | Continuous | | Cyclic | $d_{MW}$ | $J_1$ | $C_2$ |
| Nom. | Exact | Nm | Nm | Nm | arcmin | (Gearhead + Input) | EL 1,2,3,4 | EL 5,6 | All | mm | kgcm² | Nm/ arcmin |
| **C7** | | **(continued from previous page)** | | | | | | | | | | |
| 183.4 | 24,205/132 | 2000 | 2300 | 4000 | 10 | C713_1830 ME30 | 3100 | 2900 | 4500 | ≤38 | 10.0 | 122.0 |
| 219.2 | 16,875/77 | 2000 | 2300 | 4000 | 10 | C713_2190 ME40 | 3000 | 2900 | 4500 | ≤48 | 33.0 | 122.0 |
| 222.5 | 29,375/132 | 2000 | 2300 | 4000 | 10 | C713_2230 ME30 | 3100 | 2900 | 4500 | ≤38 | 10.0 | 122.0 |
| **C8** | | **(continued next page)** | | | | | | | | | | |
| 6.670 | 767/115 | 1942 | 1942 | 2427 | 10 | C812_0067 ME40 | 2500 | 2200 | 3500 | ≤48 | 164.0 | 139.0 |
| | | | | | | C812_0067 ME50 | | | | ≤60 | 192.0 | 142.0 |
| 9.043 | 208/23 | 2633 | 2633 | 3291 | 10 | C812_0090 ME40 | 2500 | 2200 | 3500 | ≤48 | 153.0 | 197.0 |
| | | | | | | C812_0090 ME50 | | | | ≤60 | 181.0 | 199.0 |
| 10.15 | 944/93 | 2677 | 2955 | 3693 | 10 | C812_0100 ME40 | 2700 | 2400 | 3800 | ≤48 | 106.0 | 143.0 |
| | | 2955 | | | | C812_0100 ME50 | 2500 | | | ≤60 | 134.0 | 144.0 |
| 12.75 | 5546/435 | 2537 | 3710 | 4638 | 10 | C812_0125 ME40 | 2700 | 2400 | 3800 | ≤48 | 86.0 | 144.0 |
| | | 3615 | | | | C812_0125 ME50 | 2500 | | | ≤60 | 114.0 | |
| 13.76 | 1280/93 | 3600 | 4006 | 5008 | 10 | C812_0140 ME40 | 2700 | 2400 | 3800 | ≤48 | 101.0 | 201.0 |
| | | | | | | C812_0140 ME50 | 2500 | | | ≤60 | 129.0 | 202.0 |
| 17.10 | 1180/69 | 3037 | 4800 | 6222 | 10 | C812_0170 ME40 | 2900 | 2700 | 4300 | ≤48 | 67.0 | 144.0 |
| | | 3986 | | | | C812_0170 ME50 | 2500 | 2500 | 4000 | ≤60 | 95.0 | 145.0 |
| 17.29 | 1504/87 | 3600 | 4140 | 6289 | 10 | C812_0175 ME40 | 2700 | 2400 | 3800 | ≤48 | 83.0 | 202.0 |
| | | | | | | C812_0175 ME50 | 2500 | | | ≤60 | 111.0 | |
| 20.26 | 6077/300 | 3137 | 4800 | 6759 | 10 | C812_0200 ME40 | 2900 | 2700 | 4300 | ≤48 | 59.0 | 145.0 |
| | | 4192 | | | | C812_0200 ME50 | 2500 | 2500 | 4000 | ≤60 | 87.0 | |
| 23.19 | 1600/69 | 3600 | 4140 | 7200 | 10 | C812_0230 ME40 | 2900 | 2700 | 4300 | ≤48 | 66.0 | 203.0 |
| | | | | | | C812_0230 ME50 | 2500 | 2500 | 4000 | ≤60 | 94.0 | |
| 26.06 | 3127/120 | 3241 | 4800 | 7453 | 10 | C812_0260 ME40 | 2900 | 2700 | 4300 | ≤48 | 50.0 | 145.0 |
| | | 4200 | | | | C812_0260 ME50 | 2500 | 2500 | 4000 | ≤60 | 78.0 | |
| 27.47 | 412/15 | 3600 | 4140 | 7200 | 10 | C812_0270 ME40 | 2900 | 2700 | 4300 | ≤48 | 58.0 | 203.0 |
| | | | | | | C812_0270 ME50 | 2500 | 2500 | 4000 | ≤60 | 86.0 | |
| 33.59 | 2183/65 | 3365 | 4800 | 8400 | 10 | C812_0340 ME40 | 2900 | 2700 | 4300 | ≤48 | 44.0 | 145.0 |
| | | 4200 | | | | C812_0340 ME50 | 2500 | 2500 | 4000 | ≤60 | 72.0 | |
| 35.33 | 106/3 | 3600 | 4140 | 7200 | 10 | C812_0350 ME40 | 2900 | 2700 | 4300 | ≤48 | 50.0 | 203.0 |
| | | | | | | C812_0350 ME50 | 2500 | 2500 | 4000 | ≤60 | 78.0 | |
| 39.94 | 2596/65 | 3470 | 3686 | 4608 | 10 | C812_0400 ME40 | 2900 | 2700 | 4300 | ≤48 | 40.0 | 145.0 |
| | | 3686 | | | | C812_0400 ME50 | 2500 | 2500 | 4000 | ≤60 | 69.0 | |
| 45.54 | 592/13 | 3600 | 4140 | 7200 | 10 | C812_0460 ME40 | 2900 | 2700 | 4300 | ≤48 | 44.0 | 203.0 |
| | | | | | | C812_0460 ME50 | 2500 | 2500 | 4000 | ≤60 | 72.0 | |
| 49.18 | 49,914/1015 | 3710 | 3710 | 4638 | 10 | C813_0490 ME40 | 2900 | 2700 | 4300 | ≤48 | 37.0 | 203.0 |
| 54.15 | 704/13 | 3600 | 4140 | 6248 | 10 | C812_0540 ME40 | 2900 | 2700 | 4300 | ≤48 | 40.0 | 203.0 |
| | | | | | | C812_0540 ME50 | 2500 | 2500 | 4000 | ≤60 | 69.0 | |

[1] *Maximum torque for continuous input 1500 RPM - horizontal output position.*
[2] *Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
* *Motor shaft adapter code (shaft diameter max - mm): ME10 (19), ME20 (32), ME30 (38), ME40 (48), ME50 (60)*

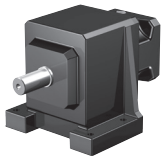


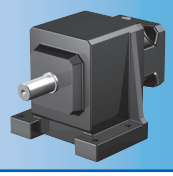
# Selection Data

| Reducer Ratio (i) | | Output Torque | | | Backlash | Part Number | Max. Input Speed RPM (n1) | | | Motor Shaft Max Ø | Input Inertia | Tors. Stiffness |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Nom. [1] | Accel. | Peak [2] | | | Continuous | | Cyclic | | | |
| | | $M_{2N}$ | $M_{2acc}$ | $M_{2NOT}$ | $\Delta\phi_2$ | | | | | $d_{MW}$ | $J_1$ | $C_2$ |
| Nom. | Exact | Nm | Nm | Nm | arcmin | (Gearhead + Input) | EL 1,2,3,4 | EL 5,6 | All | mm | kgcm² | Nm/ arcmin |
| **C8** | **(continued from previous page)** | | | | | | | | | | | |
| 65.96 | 10,620/161 | 4188 | 4800 | 6222 | 10 | C813_0660 ME40 | 2900 | 2700 | 4300 | ≤48 | 35.0 | 203.0 |
| 78.13 | 54,693/700 | 4200 | 4800 | 6759 | 10 | C813_0780 ME40 | 2900 | 2700 | 4300 | ≤48 | 35.0 | 204.0 |
| 79.34 | 285,619/3600 | 2456 | 2486 | 3108 | 10 | C813_0790 ME30 | 2900 | 2700 | 4300 | ≤38 | 12.0 | 203.0 |
| 89.44 | 14,400/161 | 3600 | 4140 | 7200 | 10 | C813_0890 ME40 | 2900 | 2700 | 4300 | ≤48 | 35.0 | 204.0 |
| 90.82 | 18,800/207 | 2812 | 2846 | 3558 | 10 | C813_0910 ME30 | 2900 | 2700 | 4300 | ≤38 | 12.0 | 204.0 |
| 100.5 | 28,143/280 | 4200 | 4800 | 7453 | 10 | C813_1010 ME40 | 2900 | 2700 | 4300 | ≤48 | 34.0 | 204.0 |
| 105.9 | 3708/35 | 3600 | 4140 | 7200 | 10 | C813_1060 ME40 | 2900 | 2700 | 4300 | ≤48 | 35.0 | 204.0 |
| 107.6 | 4841/45 | 3331 | 3371 | 4214 | 10 | C813_1080 ME30 | 2900 | 2700 | 4300 | ≤38 | 12.0 | 204.0 |
| 129.5 | 58,941/455 | 4200 | 4800 | 8400 | 10 | C813_1300 ME40 | 2900 | 2700 | 4300 | ≤48 | 34.0 | 204.0 |
| 136.3 | 954/7 | 3600 | 4140 | 7200 | 10 | C813_1360 ME40 | 2900 | 2700 | 4300 | ≤48 | 34.0 | 204.0 |
| 138.4 | 2491/18 | 3600 | 3718 | 4648 | 10 | C813_1380 ME30 | 2900 | 2700 | 4300 | ≤38 | 11.0 | 204.0 |
| 175.6 | 15,984/91 | 3600 | 4140 | 7200 | 10 | C813_1760 ME40 | 2900 | 2700 | 4300 | ≤48 | 34.0 | 204.0 |
| 178.4 | 6956/39 | 3600 | 4140 | 5251 | 10 | C813_1780 ME30 | 2900 | 2700 | 4300 | ≤38 | 11.0 | 204.0 |
| 208.9 | 19,008/91 | 3600 | 4140 | 6248 | 10 | C813_2090 ME40 | 2900 | 2700 | 4300 | ≤48 | 34.0 | 204.0 |
| 212.1 | 8272/39 | 3600 | 4140 | 6248 | 10 | C813_2120 ME30 | 2900 | 2700 | 4300 | ≤38 | 10.0 | 204.0 |
| **C9** | | | | | | | | | | | | |
| 20.15 | 2257/112 | 4802 | 5630 | 7037 | 10 | C912_0200 ME50 | 2500 | 2500 | 4000 | ≤60 | 120.0 | 260.0 |
| 28.63 | 2405/84 | 6000 | 6500 | 9997 | 10 | C912_0290 ME50 | 2500 | 2500 | 4000 | ≤60 | 116.0 | 391.0 |
| 32.13 | 3599/112 | 5136 | 6758 | 8448 | 10 | C912_0320 ME50 | 2500 | 2500 | 4000 | ≤60 | 88.0 | 261.0 |
| 39.30 | 4087/104 | 5195 | 7211 | 10378 | 10 | C912_0390 ME50 | 2500 | 2500 | 4000 | ≤60 | 80.0 | 261.0 |
| 45.66 | 3835/84 | 6000 | 6500 | 12000 | 10 | C912_0460 ME50 | 2500 | 2500 | 4000 | ≤60 | 87.0 | 392.0 |
| 55.83 | 335/6 | 6000 | 6500 | 12000 | 10 | C912_0560 ME50 | 2500 | 2500 | 4000 | ≤60 | 79.0 | 392.0 |
| 64.59 | 295,545/4576 | 7000 | 8000 | 12779 | 10 | C913_0650 ME50 | 2500 | 2500 | 4000 | ≤60 | 68.0 | 392.0 |
| 77.73 | 60,939/784 | 4988 | 5630 | 7037 | 10 | C913_0780 ME40 | 2800 | 2600 | 4000 | ≤48 | 37.0 | 392.0 |
| 79.06 | 115,107/1456 | 7000 | 8000 | 14000 | 10 | C913_0790 ME50 | 2500 | 2500 | 4000 | ≤60 | 67.0 | 392.0 |
| 91.76 | 8075/88 | 6000 | 6500 | 12000 | 10 | C913_0920 ME50 | 2500 | 2500 | 4000 | ≤60 | 68.0 | 393.0 |
| 99.42 | 20,679/208 | 7000 | 8000 | 14000 | 10 | C913_0990 ME50 | 2500 | 2500 | 4000 | ≤60 | 66.0 | 393.0 |
| 110.4 | 21,645/196 | 6000 | 6500 | 9997 | 10 | C913_1100 ME40 | 2800 | 2600 | 4000 | ≤48 | 37.0 | 392.0 |
| 112.3 | 3145/28 | 6000 | 6500 | 12000 | 10 | C913_1120 ME50 | 2500 | 2500 | 4000 | ≤60 | 67.0 | 393.0 |
| 126.1 | 183,549/1456 | 7000 | 8000 | 14000 | 10 | C913_1260 ME50 | 2500 | 2500 | 4000 | ≤60 | 65.0 | 393.0 |
| 141.3 | 565/4 | 6000 | 6500 | 12000 | 10 | C913_1410 ME50 | 2500 | 2500 | 4000 | ≤60 | 66.0 | 393.0 |
| 176.1 | 34,515/196 | 6000 | 6500 | 12000 | 10 | C913_1760 ME40 | 2800 | 2600 | 4000 | ≤48 | 35.0 | 393.0 |
| 179.1 | 5015/28 | 6000 | 6500 | 12000 | 10 | C913_1790 ME50 | 2500 | 2500 | 4000 | ≤60 | 65.0 | 393.0 |
| 215.4 | 3015/14 | 6000 | 6500 | 12000 | 10 | C913_2150 ME40 | 2800 | 2600 | 4000 | ≤48 | 35.0 | 393.0 |

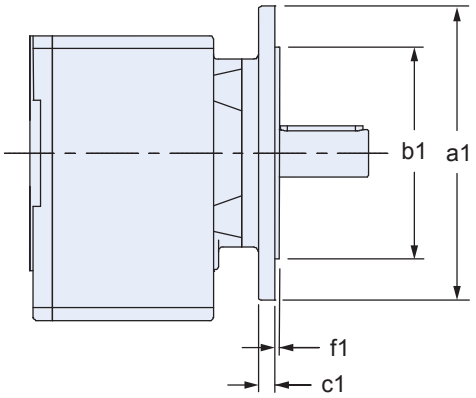
*[1] Maximum torque for continuous input 1500 RPM - horizontal output position.*
*[2] Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
** Motor shaft adapter code (shaft diameter max - mm): ME10 (19), ME20 (32), ME30 (38), ME40 (48), ME50 (60)*

# Notes





## SMS Reducer Optional Output Flange
## For "F" Round Output Flange Units Only
## (Note: optional flanges are not available on all sizes)



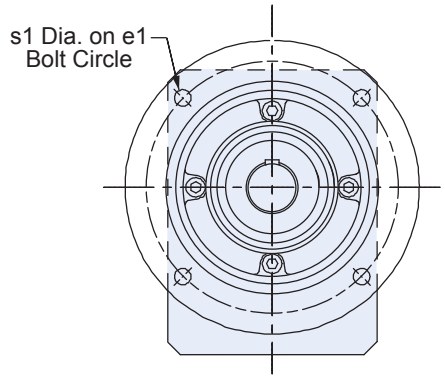




**Table 1 Dimensions (mm)**

| Unit | Accommodate NEMA C-Frame Motors | Flange Size a1 | b1 * | c1 | e1 | f1 | s1 |
|---|---|---|---|---|---|---|---|
| C0 | 050 | 120 | $80_{j6}$ | 10 | 100 | 3 | 7 |
| | 140 | 140 | $95_{j6}$ | 10 | 115 | 3 | 9 |
| C1 | 050<br>140<br>180 | 140 | $95_{j6}$ | 8 | 115 | 3.5 | 9 |
| | | 160 | $110_{j6}$ | 10 | 130 | 3.5 | 9 |
| C2 | | 160 | $110_{j6}$ | 10 | 130 | 3.5 | 9 |
| | | 250 | $180_{j6}$ | 12 | 215 | 4 | 14 |
| C3 | 050<br>140<br>180<br>210 | 160 | $110_{j6}$ | 10 | 130 | 3.5 | 9 |
| | | 200 | $130_{j6}$ | 12 | 165 | 3.5 | 11 |
| C4 | | 200 | $130_{j6}$ | 14 | 165 | 3.5 | 11 |
| | | 300 | $230_{j6}$ | 14 | 265 | 4 | 14 |
| C5 | 180<br>210<br>250<br>280 | 250 | $180_{j6}$ | 14 | 215 | 4 | 14 |
| C8 | | 350 | $250_{h6}$ | 18 | 300 | 5 | 18 |
| | | 450 | $350_{h6}$ | 20 | 400 | 5 | 18 |

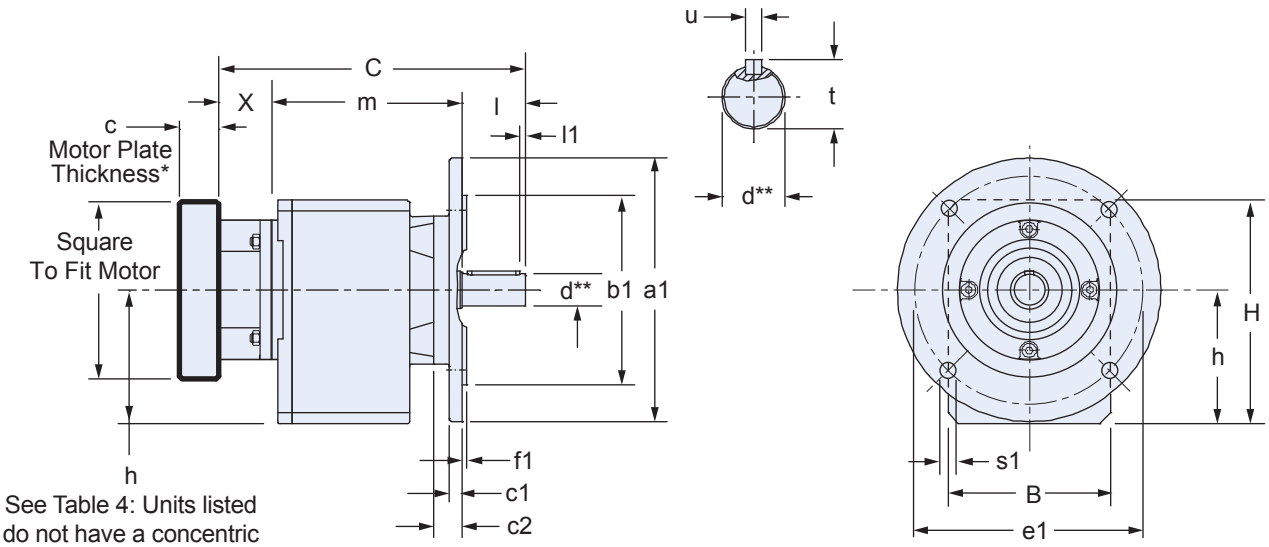
** h6, j6 = existing values*

Please contact STOBER for ordering assistance.

## "F" Round Output Flange —

*Optional SMS Reducer Output Flange available on most models, see page 93 for details.*

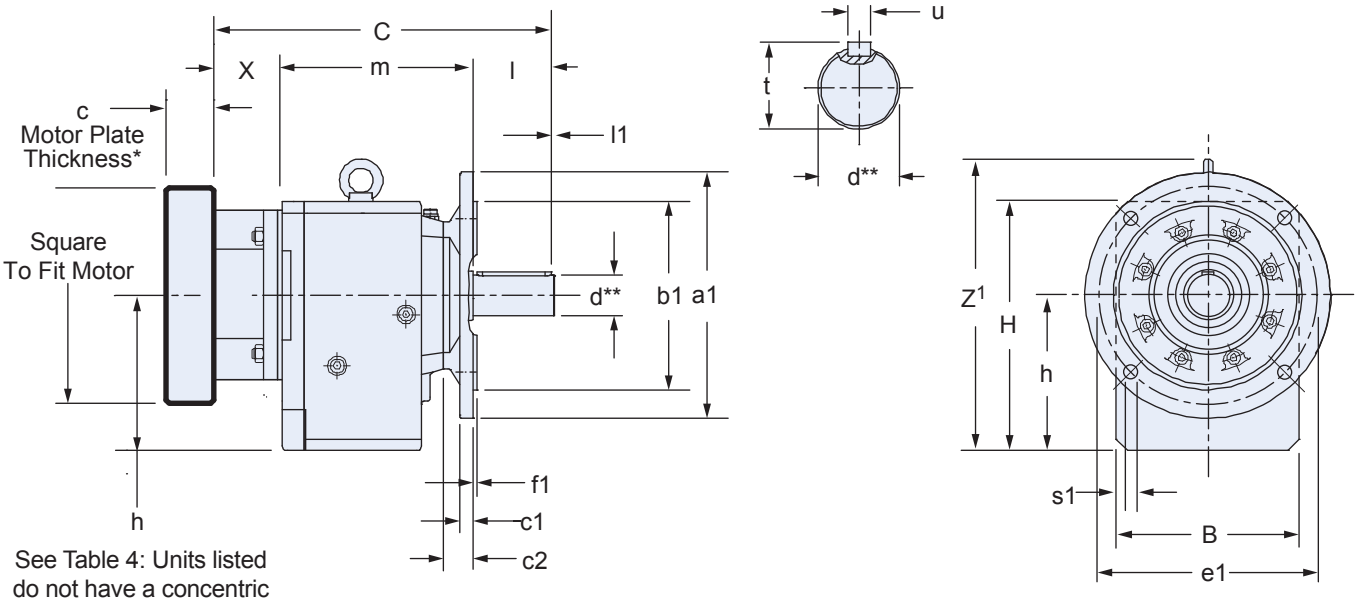
### C002F thru C503F




See Table 4: Units listed do not have a concentric input and output.

** See Motor Mounting Plate Option, page 76 for details.*
*** For optional output shaft options, see page 75.*

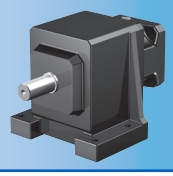
### C612F thru C913F




See Table 4: Units listed do not have a concentric input and output.

** See Motor Mounting Plate Option, page 76 for details.*
*** For optional output shaft options, see page 75.*

NOTE: Instead of 4 holes as shown in the drawing, the C912 and C913 output flange has 8 "J" dia. mounting holes on "F" bolt circle (located 22.5° from horizontal).



# Dimensional Data

## Table 1 Dimensions (mm)

| Unit | a1 | B | b1 * | c1 | c2 | e1 | f1 | H | h | l1 | s1 | Z[1] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C0 | 160 | 97 | $110_{j6}$ | 10 | 18 | 130 | 3 | 141 | 79 | 3 | 9 | – |
| C1 | 200 | 130 | $130_{j6}$ | 12 | 21 | 165 | 3.5 | 175 | 100 | 5 | 11 | – |
| C2 | 200 | 142 | $130_{j6}$ | 12 | 27 | 165 | 3.5 | 192 | 112[1)] | 5 | 11 | – |
| C3 | 250 | 154 | $180_{j6}$ | 12 | 27 | 215 | 4 | 212 | 127[1)] | 5 | 14 | – |
| C4 | 250 | 178 | $180_{j6}$ | 14 | 28 | 215 | 4 | 242.5 | 142.5 | 5 | 14 | – |
| C5 | 300 | 195 | $230_{j6}$ | 16 | 29 | 265 | 4 | 286 | 166 | 5 | 14 | – |
| C6 | 300 | 225 | $230_{j6}$ | 17 | 36 | 265 | 4 | 310 | 195[1)] | 5 | 14 | 362 |
| C7 | 350 | 265 | $250_{h6}$ | 18 | 44 | 300 | 5 | 371 | 231[1)] | 5 | 18 | 432 |
| C8 | 400 | 310 | $300_{h6}$ | 20 | 45 | 350 | 5 | 445 | 285 | 5 | 18 | 506 |
| C9 | 450 | 365 | $350_{h6}$ | 23 | 50 | 400 | 5 | 524 | 334 | 5 | 18 | 594 |

*[1)] Select units do not have a concentric input and output. See input dimension "h" for these units in Table 4.*

## Table 2 Metric output available on request.

| | Standard Shaft - inches | | | Optional Shaft - mm | | |
|---|---|---|---|---|---|---|
| Unit | $d_{h6}$ * | t | u | d * | t | u |
| C0 | 0.750 | 0.83 | 3⁄16 x 3⁄16 x 1–7⁄32 | $20_{k6}$ | 22.5 | A6x6x32 |
| C1 | 1.000 | 1.11 | 1/4 x 1/4 x 1–9/16 | $25_{k6}$ | 28 | A8x7x40 |
| C2 | 1.250 | 1.36 | 1/4 x 1/4 x 1–15/16 | $30_{k6}$ | 33 | A8x7x50 |
| C3 | 1.250 | 1.36 | 1/4 x 1/4 x 1–15/16 | $30_{k6}$ | 33 | A8x7x50 |
| C4 | 1.625 | 1.79 | 3/8 x 3/8 x 2–7/8 | $40_{k6}$ | 43 | A12x8x70 |
| C5 | 1.625 | 1.79 | 3/8 x 3/8 x 2–7/8 | $40_{k6}$ | 43 | A12x8x70 |
| C6 | 2.125 | 2.35 | 1/2 x 1/2 x 3–5/32 | $50_{k6}$ | 53.5 | A14x9x90 |
| C7 | 2.375 | 2.65 | 5/8 x 5/8 x 3–15/16 | $60_{m6}$ | 64 | A18x11x100 |
| C8 | 2.875 | 3.21 | 3/4 x 3/4 x 4–5/16 | $70_{m6}$ | 74.5 | A20x12x125 |
| C9 | 3.625 | 4.01 | 7/8 x 7/8 x 5–1/2 | $90_{m6}$ | 95 | A25x14x140 |

** h6, j6, k6, m6 = existing values*

## Table 3 Motor Adapter Dimensions (mm)

| Motor Adapter | Thickness c Min. [3)] | Motor Shaft d2 Max. [2)] | X | Wt. lbs. |
|---|---|---|---|---|
| ME10 | 21 | 19 | 40 | 5 |
| ME20 | 24 | 32 | 50 | 8 |
| ME30 | 25 | 38 | 60 | 15 |
| ME40 | 33 | 48 | 88 | 28 |
| ME50 | 43 | 60 | 81.5 | 42 |

*[2)] If an adapter bushing is required it will be supplied as a component of the motor mounting plate.*

*[3)] Motor plate maximum thickness "c" will vary with motor shaft length but will not be less than shown.*

*For approximate weight, add adapter weight from Table 3 and base module weight from Table 4.*

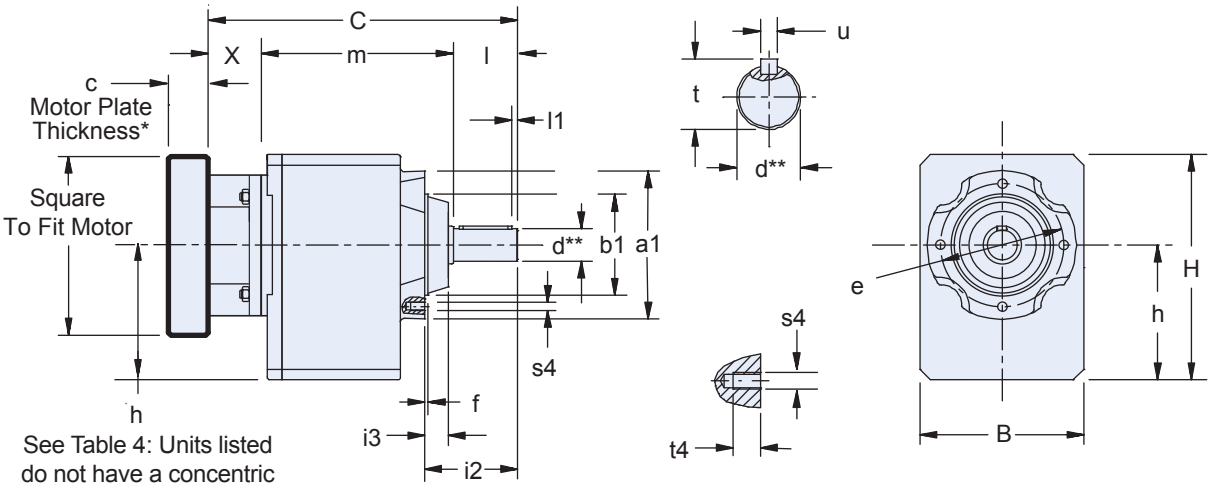
## Table 4 Dimensions (mm)

| | ME10 | | | | ME20 | | | | ME30 | | | | ME40 | | | | ME50 | | | | Approx. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Unit | C | h | l | m | C | h | l | m | C | h | l | m | C | h | l | m | C | h | l | m | Wt.(lbs.) |
| C002 | 194 | — | 40 | 114 | 208 | — | 40 | 118 | — | — | — | — | — | | — | — | — | | — | — | 18 |
| C102 | 227 | — | 50 | 137 | 241 | — | 50 | 141 | 253 | — | 50 | 143 | — | — | — | — | — | — | — | — | 29 |
| C103 | 264 | — | 50 | 174 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | 34 |
| C202 | 255 | — | 60 | 155 | 269 | — | 60 | 159 | 281 | — | 60 | 161 | — | — | — | — | — | — | — | — | 38 |
| C203 [4)] | 292 | 75.5 | 60 | 192 | 312 | 75.5 | 60 | 202 | — | — | — | — | — | — | — | — | — | — | — | — | 45 |
| C302 | — | — | — | — | 288 | — | 60 | 178 | 300 | — | 60 | 180 | 331 | — | 60 | 183 | — | — | — | — | 49 |
| C303 [4)] | 311 | 90 | 60 | 211 | 331 | 90 | 60 | 221 | — | — | — | — | — | — | — | — | — | — | — | — | 56 |
| C402 | — | — | — | — | 335.5 | — | 80 | 205.5 | 347.5 | — | 80 | 207.5 | 378.5 | — | 80 | 210.5 | — | — | — | — | 71 |
| C403 | — | — | — | — | 378.5 | — | 80 | 248.5 | — | — | — | — | — | — | — | — | — | — | — | — | 78 |
| C502 | — | — | — | — | 357 | — | 80 | 227 | 369 | — | 80 | 229 | 400 | — | 80 | 232 | 407.5 | — | 80 | 246 | 95 |
| C503 | — | — | — | — | 400 | — | 80 | 270 | — | — | — | — | — | — | — | — | — | — | — | — | 111 |
| C612 [4)] | — | — | — | — | — | — | — | — | 393 | 189 | 100 | 233 | 424 | 189 | 100 | 236 | 430.5 | 189 | 100 | 249 | 115 |
| C613 [4)] | — | — | — | — | 425 | — | 100 | 275 | 455 | — | 100 | 295 | — | 189 | — | — | — | — | — | — | 159 |
| C712 | — | — | — | — | — | — | — | — | 446 | — | 120 | 266 | 476 | — | 120 | 268 | 482.5 | — | 120 | 281 | 199 |
| C713 [4)] | — | — | — | — | — | — | — | — | 507 | — | 120 | 327 | 547 | 250 | 120 | 339 | — | — | — | — | 221 |
| C812 | — | — | — | — | — | — | — | — | — | — | — | — | 543 | — | 140 | 315 | 549.5 | — | 140 | 328 | 322 |
| C813 | — | — | — | — | — | — | — | — | 574 | — | 140 | 374 | 614 | — | 140 | 386 | — | — | — | — | 342 |
| C912 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | 616.5 | — | 170 | 365 | 596 |
| C913 | — | — | — | — | — | — | — | — | — | — | — | — | 681 | — | 170 | 423 | — | — | — | — | 678 |

*[4)] Select units do not have a concentric input and output dimension "h". Table 4 "h" values are for input side only on these select units. All concentric input and output units dimension "h" values are listed in Table 1 above.*

## "G" Pitch Circle Diameter (PCD) Tapped Holes —

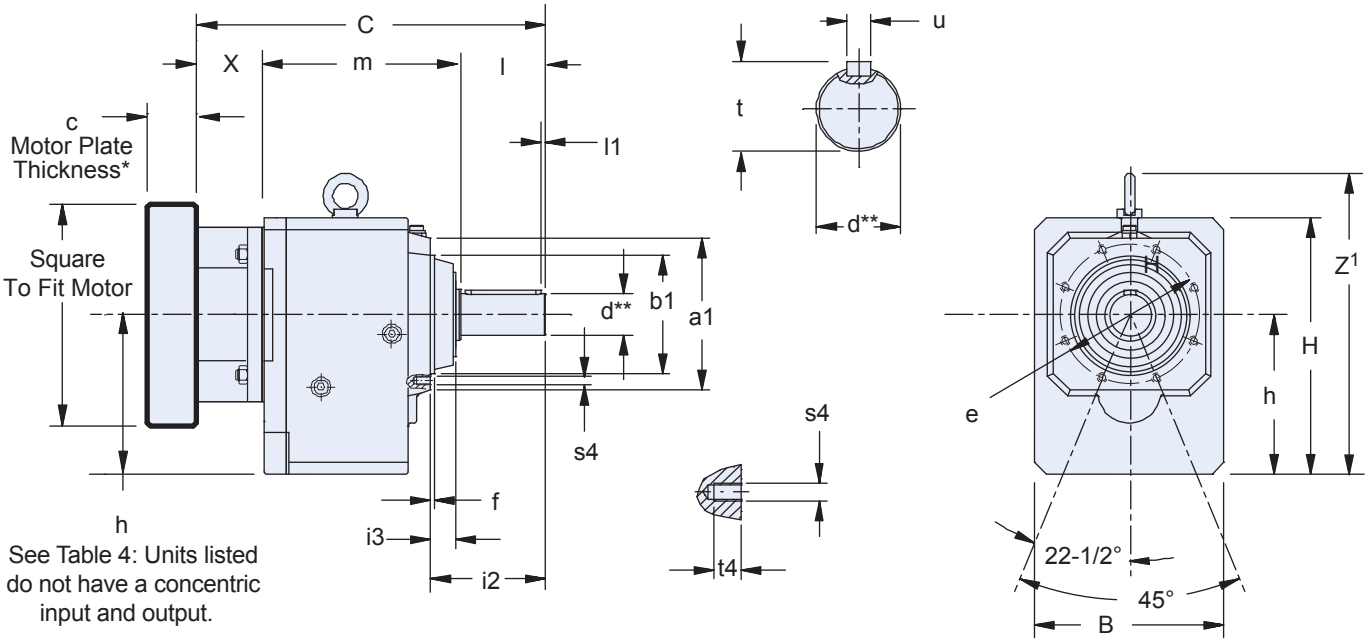
### C002G thru C503G



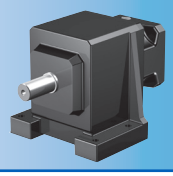

† NOTE: Instead of 4 holes as shown in the drawing, the C502/C503 has 8 holes located as shown on drawing for C612G – C913G.

** See Motor Mounting Plate Option, page 76 for details.*
*** For optional output shaft options, see page 75.*

### C612G thru C913G




** See Motor Mounting Plate Option, page 76 for details.*
*** For optional output shaft options, see page 75.*



# Dimensional Data

## Table 1 Dimensions (mm)

| Unit | a1 | B | $b1_{j6}$ | e | f | H | h | i2 | i3 | l1 | s4 | t4 | $Z^1$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C0 | 87 | 97 | 55 | 75 | 3 | 141 | 79 | 58 | 14 | 3 | M6x1 | 10 | – |
| C1 | 120 | 130 | 80 | 100 | 3 | 175 | 100 | 71 | 17 | 5 | M6x1 | 13 | – |
| C2 | 140 | 142 | 95 | 115 | 3 | 192 | 112 [1)] | 87 | 22 | 5 | M8x1.25 | 13 | – |
| C3 | 140 | 154 | 95 | 115 | 3 | 212 | 127 [1)] | 87 | 22 | 5 | M8x1.25 | 13 | – |
| C4 | 160 | 178 | 110 | 130 | 3.5 | 242.5 | 142.5 | 108 | 22 | 5 | M10x1.25 | 16 | – |
| C5 | 192 | 195 | 130 | 165 | 3.5 | 286 | 166 | 109 | 23 | 5 | M10x1.5† | 16 | – |
| C6 | 180 | 225 | 140 | 165 | 5 | 310 | 195 [1)] | 136 | 30 | 5 | M10x1.5 | 16 | 362 |
| C7 | 195 | 265 | 155 | 185 | 8 | 371 | 231 [1)] | 164 | 37 | 5 | M12x1.75 | 19 | 432 |
| C8 | 226 | 310 | 185 | 215 | 5 | 445 | 285 | 185 | 37 | 5 | M12x1.75 | 19 | 506 |
| C9 | 280 | 365 | 230 | 265 | 5 | 524 | 334 | 220 | 42 | 5 | M16x2 | 26 | 594 |

*[1)] Select units do not have a concentric input and output. See input dimension "h" for these units in Table 4.*

## Table 2 Metric output available on request.

| | Standard Shaft - inches | | | Optional Shaft - mm | | |
|---|---|---|---|---|---|---|
| Unit | $d_{h6}$ * | t | u | d * | t | u |
| C0 | 0.750 | 0.83 | 3⁄16 x 3⁄16 x 1–7⁄32 | $20_{k6}$ | 22.5 | A6x6x32 |
| C1 | 1.000 | 1.11 | 1/4 x 1/4 x 1–9/16 | $25_{k6}$ | 28 | A8x7x40 |
| C2 | 1.250 | 1.36 | 1/4 x 1/4 x 1–15/16 | $30_{k6}$ | 33 | A8x7x50 |
| C3 | 1.250 | 1.36 | 1/4 x 1/4 x 1–15/16 | $30_{k6}$ | 33 | A8x7x50 |
| C4 | 1.625 | 1.79 | 3/8 x 3/8 x 2–7/8 | $40_{k6}$ | 43 | A12x8x70 |
| C5 | 1.625 | 1.79 | 3/8 x 3/8 x 2–7/8 | $40_{k6}$ | 43 | A12x8x70 |
| C6 | 2.125 | 2.35 | 1/2 x 1/2 x 3–5/32 | $50_{k6}$ | 53.5 | A14x9x90 |
| C7 | 2.375 | 2.65 | 5/8 x 5/8 x 3–15/16 | $60_{m6}$ | 64 | A18x11x100 |
| C8 | 2.875 | 3.21 | 3/4 x 3/4 x 4–5/16 | $70_{m6}$ | 74.5 | A20x12x125 |
| C9 | 3.625 | 4.01 | 7/8 x 7/8 x 5–1/2 | $90_{m6}$ | 95 | A25x14x140 |

** h6, j6, k6, m6 = existing values*

## Table 3 Motor Adapter Dimensions (mm)

| Motor Adapter | Thickness c Min. [3)] | Motor Shaft d2 Max. [2)] | X | Wt. lbs. |
|---|---|---|---|---|
| ME10 | 21 | 19 | 40 | 5 |
| ME20 | 24 | 32 | 50 | 8 |
| ME30 | 26 | 38 | 60 | 15 |
| ME40 | 35 | 48 | 88 | 28 |
| ME50 | 43 | 60 | 81.5 | 42 |

*[2)] If an adapter bushing is required it will be supplied as a component of the motor mounting plate.*

*[3)] Motor plate maximum thickness "c" will vary with motor shaft length but will not be less than shown.*

*For approximate weight, add adapter weight from Table 3 and base module weight from Table 4.*

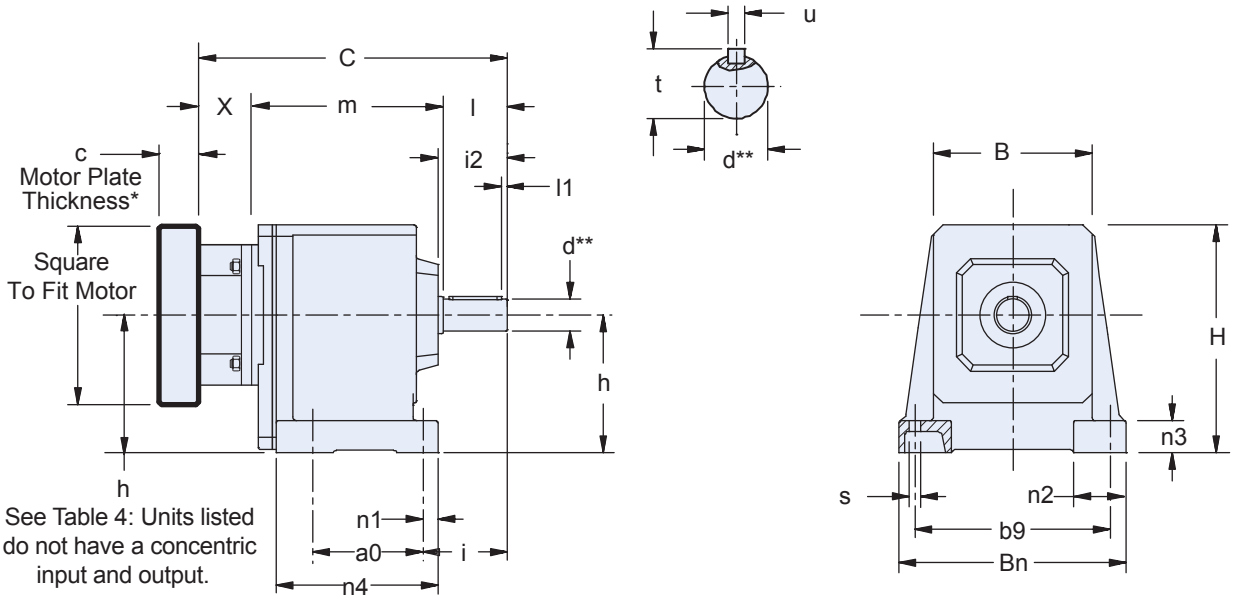
## Table 4 Dimensions (mm)

| | ME10 | | | | ME20 | | | | ME30 | | | | ME40 | | | | ME50 | | | | Approx. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Unit | C | h | l | m | C | h | l | m | C | h | l | m | C | h | l | m | C | h | l | m | Wt.(lbs.) |
| C002 | 194 | — | 40 | 114 | 208 | — | 40 | 118 | — | — | — | — | — | | — | — | — | | — | — | 18 |
| C102 | 227 | — | 50 | 137 | 241 | — | 50 | 141 | 253 | — | 50 | 143 | — | — | — | — | — | — | — | — | 29 |
| C103 | 264 | — | 50 | 174 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | 34 |
| C202 | 255 | — | 60 | 155 | 269 | — | 60 | 159 | 281 | — | 60 | 161 | — | — | — | — | — | — | — | — | 38 |
| C203 [4)] | 292 | 75.5 | 60 | 192 | 312 | 75.5 | 60 | 202 | — | — | — | — | — | — | — | — | — | — | — | — | 45 |
| C302 | — | — | — | — | 288 | — | 60 | 178 | 300 | — | 60 | 180 | 331 | — | 60 | 183 | — | — | — | — | 49 |
| C303 [4)] | 311 | 90 | 60 | 211 | 331 | 90 | 60 | 221 | — | — | — | — | — | — | — | — | — | — | — | — | 56 |
| C402 | — | — | — | — | 335.5 | — | 80 | 205.5 | 347.5 | — | 80 | 207.5 | 378.5 | — | 80 | 210.5 | — | — | — | — | 71 |
| C403 | — | — | — | — | 378.5 | — | 80 | 248.5 | — | — | — | — | — | — | — | — | — | — | — | — | 78 |
| C502 | — | — | — | — | 357 | — | 80 | 227 | 369 | — | 80 | 229 | 400 | — | 80 | 232 | 407.5 | — | 80 | 246 | 95 |
| C503 | — | — | — | — | 400 | — | 80 | 270 | — | — | — | — | — | — | — | — | — | — | — | — | 111 |
| C612 [4)] | — | — | — | — | — | — | — | — | 393 | 189 | 100 | 233 | 424 | 189 | 100 | 236 | 430.5 | 189 | 100 | 249 | 115 |
| C613 [4)] | — | — | — | — | 425 | — | 100 | 275 | 455 | — | 100 | 295 | — | 189 | — | — | — | — | — | — | 159 |
| C712 | — | — | — | — | — | — | — | — | 446 | — | 120 | 266 | 476 | — | 120 | 268 | 482.5 | — | 120 | 281 | 199 |
| C713 [4)] | — | — | — | — | — | — | — | — | 507 | — | 120 | 327 | 547 | 250 | 120 | 339 | — | — | — | — | 221 |
| C812 | — | — | — | — | — | — | — | — | — | — | — | — | 543 | — | 140 | 315 | 549.5 | — | 140 | 328 | 322 |
| C813 | — | — | — | — | — | — | — | — | 574 | — | 140 | 374 | 614 | — | 140 | 386 | — | — | — | — | 342 |
| C912 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | 616.5 | — | 170 | 365 | 596 |
| C913 | — | — | — | — | — | — | — | — | — | — | — | — | 681 | — | 170 | 423 | — | — | — | — | 678 |

*[4)] Select units do not have a concentric input and output dimension "h". Table 4 "h" values are for input side only on these select units. All concentric input and output units dimension "h" values are listed in Table 1 above.*

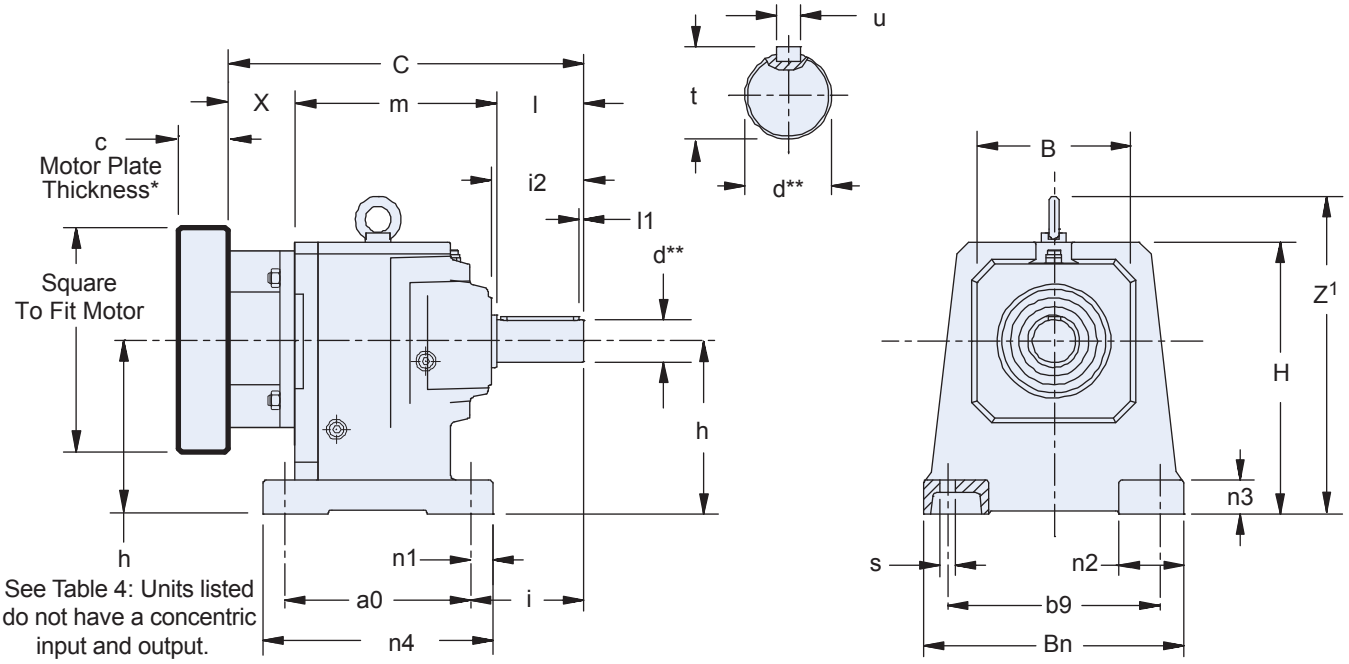
## "N" Foot Mount —

### C002N thru C503N

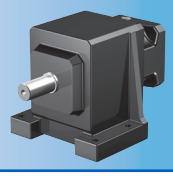



** See Motor Mounting Plate Option, page 76 for details.*
*** For optional output shaft options, see page 75.*

### C612N thru C913N




** See Motor Mounting Plate Option, page 76 for details.*
*** For optional output shaft options, see page 75.*



# Dimensional Data

## Table 1 Dimensions (mm)

| Unit | a0 | B | Bn | b9 | H | h | i | i2 | l1 | n1 | n2 | n3 | n4 | s | Z[1] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C0 | 62 | 92 | 132 | 110 | 144 | 82 | 55 | 44 | 3 | 11 | 35 | 20 | 95 | 7 | — |
| C1 | 70 | 124 | 176 | 150 | 177 | 102 | 67 | 54 | 5 | 13 | 42 | 25 | 118 | 9 | — |
| C2 | 85 | 138 | 200 | 170 | 195 | 115[1)] | 79 | 65 | 5 | 14 | 50 | 30 | 135 | 11 | — |
| C3 | 105 | 150 | 215 | 185 | 215 | 130[1)] | 79 | 65 | 5 | 14 | 50 | 30 | 154 | 11 | — |
| C4 | 110 | 175 | 255 | 220 | 245 | 145 | 105 | 86 | 5 | 19 | 60 | 35 | 180 | 14 | — |
| C5 | 130 | 192 | 290 | 245 | 290 | 170 | 108 | 86 | 5 | 22 | 70 | 40 | 197 | 18 | — |
| C6 | 215 | 225 | 300 | 245 | 315 | 200[1)] | 130 | 106 | 5 | 25 | 75 | 40 | 265 | 18 | 367 |
| C7 | 235 | 265 | 365 | 300 | 375 | 235[1)] | 163 | 127 | 5 | 25 | 90 | 50 | 285 | 18 | 436 |
| C8 | 300 | 310 | 435 | 340 | 450 | 290 | 190 | 148 | 5 | 29 | 95 | 55 | 360 | 22 | 511 |
| C9 | 340 | 365 | 510 | 400 | 530 | 340 | 222 | 178 | 5 | 34 | 110 | 60 | 410 | 26 | 600 |

*[1)] Select units do not have a concentric input and output. See input dimension "h" for these units in Table 4.*

## Table 2 Metric output available on request.

| | Standard Shaft - inches | | | Optional Shaft - mm | | |
|---|---|---|---|---|---|---|
| Unit | $d_{h6}$ * | t | u | d * | t | u |
| C0 | 0.750 | 0.83 | 3⁄16 x 3⁄16 x 1–7⁄32 | $20_{k6}$ | 22.5 | A6x6x32 |
| C1 | 1.000 | 1.11 | 1/4 x 1/4 x 1–9/16 | $25_{k6}$ | 28 | A8x7x40 |
| C2 | 1.250 | 1.36 | 1/4 x 1/4 x 1–15/16 | $30_{k6}$ | 33 | A8x7x50 |
| C3 | 1.250 | 1.36 | 1/4 x 1/4 x 1–15/16 | $30_{k6}$ | 33 | A8x7x50 |
| C4 | 1.625 | 1.79 | 3/8 x 3/8 x 2–7/8 | $40_{k6}$ | 43 | A12x8x70 |
| C5 | 1.625 | 1.79 | 3/8 x 3/8 x 2–7/8 | $40_{k6}$ | 43 | A12x8x70 |
| C6 | 2.125 | 2.35 | 1/2 x 1/2 x 3–5/32 | $50_{k6}$ | 53.5 | A14x9x90 |
| C7 | 2.375 | 2.65 | 5/8 x 5/8 x 3–15/16 | $60_{m6}$ | 64 | A18x11x100 |
| C8 | 2.875 | 3.21 | 3/4 x 3/4 x 4–5/16 | $70_{m6}$ | 74.5 | A20x12x125 |
| C9 | 3.625 | 4.01 | 7/8 x 7/8 x 5–1/2 | $90_{m6}$ | 95 | A25x14x140 |

** h6, j6, k6, m6 = existing values*

## Table 3 Motor Adapter Dimensions (mm)

| Motor Adapter | Thickness c Min. [3)] | Motor Shaft d2 Max. [2)] | X | Wt. lbs. |
|---|---|---|---|---|
| ME10 | 21 | 19 | 40 | 5 |
| ME20 | 24 | 32 | 50 | 8 |
| ME30 | 25 | 38 | 60 | 15 |
| ME40 | 33 | 48 | 88 | 28 |
| ME50 | 43 | 60 | 81.5 | 42 |

*[2)] If an adapter bushing is required it will be supplied as a component of the motor mounting plate.*

*[3)] Motor plate maximum thickness "c" will vary with motor shaft length but will not be less than shown.*

*For approximate weight, add adapter weight from Table 3 and base module weight from Table 4.*

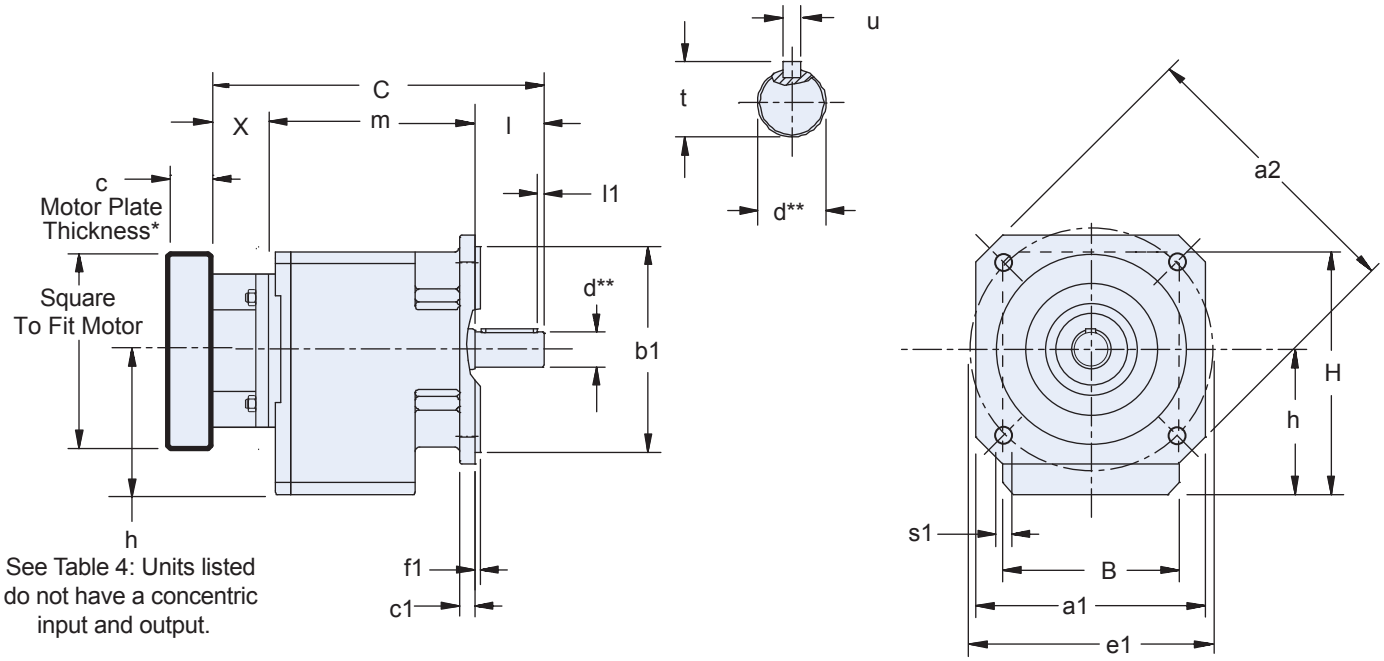
## Table 4 Dimensions (mm)

| | ME10 | | | | ME20 | | | | ME30 | | | | ME40 | | | | ME50 | | | | Approx. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Unit | C | h | l | m | C | h | l | m | C | h | l | m | C | h | l | m | C | h | l | m | Wt.(lbs.) |
| C002 | 194 | — | 40 | 114 | 208 | — | 40 | 118 | — | — | — | — | — | | — | — | — | | — | — | 18 |
| C102 | 227 | — | 50 | 137 | 241 | — | 50 | 141 | 253 | — | 50 | 143 | — | — | — | — | — | — | — | — | 29 |
| C103 | 264 | — | 50 | 174 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | 34 |
| C202 | 255 | — | 60 | 155 | 269 | — | 60 | 159 | 281 | — | 60 | 161 | — | — | — | — | — | — | — | — | 38 |
| C203 [4)] | 292 | 75.5 | 60 | 192 | 312 | 75.5 | 60 | 202 | — | — | — | — | — | — | — | — | — | — | — | — | 45 |
| C302 | — | — | — | — | 288 | — | 60 | 178 | 300 | — | 60 | 180 | 331 | — | 60 | 183 | — | — | — | — | 49 |
| C303 [4)] | 311 | 90 | 60 | 211 | 331 | 90 | 60 | 221 | — | — | — | — | — | — | — | — | — | — | — | — | 56 |
| C402 | — | — | — | — | 335.5 | — | 80 | 205.5 | 347.5 | — | 80 | 207.5 | 378.5 | — | 80 | 210.5 | — | — | — | — | 71 |
| C403 | — | — | — | — | 378.5 | — | 80 | 248.5 | — | — | — | — | — | — | — | — | — | — | — | — | 78 |
| C502 | — | — | — | — | 357 | — | 80 | 227 | 369 | — | 80 | 229 | 400 | — | 80 | 232 | 407.5 | — | 80 | 246 | 95 |
| C503 | — | — | — | — | 400 | — | 80 | 270 | — | — | — | — | — | — | — | — | — | — | — | — | 111 |
| C612 [4)] | — | — | — | — | — | — | — | — | 393 | 189 | 100 | 233 | 424 | 189 | 100 | 236 | 430.5 | 189 | 100 | 249 | 115 |
| C613 [4)] | — | — | — | — | 425 | — | 100 | 275 | 455 | — | 100 | 295 | — | 189 | — | — | — | — | — | — | 159 |
| C712 | — | — | — | — | — | — | — | — | 446 | — | 120 | 266 | 476 | — | 120 | 268 | 482.5 | — | 120 | 281 | 199 |
| C713 [4)] | — | — | — | — | — | — | — | — | 507 | — | 120 | 327 | 547 | 250 | 120 | 339 | — | — | — | — | 221 |
| C812 | — | — | — | — | — | — | — | — | — | — | — | — | 543 | — | 140 | 315 | 549.5 | — | 140 | 328 | 322 |
| C813 | — | — | — | — | — | — | — | — | 574 | — | 140 | 374 | 614 | — | 140 | 386 | — | — | — | — | 342 |
| C912 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | 616.5 | — | 170 | 365 | 596 |
| C913 | — | — | — | — | — | — | — | — | — | — | — | — | 681 | — | 170 | 423 | — | — | — | — | 678 |

*[4)] Select units do not have a concentric input and output dimension "h". Table 4 "h" values are for input side only on these select units. All concentric input and output units dimension "h" values are listed in Table 1 above.*

## "Q" Square Output Flange —

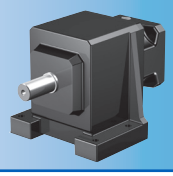
### C002Q thru C403Q Only




** See Motor Mounting Plate Option, page 76 for details.*
*** For optional output shaft options, see page 75.*

*Contact STOBER for availability.*

# Dimensional Data



## Table 1 Dimensions (mm)

| Unit | a1 | a2 | B | $b1_{j6}$ * | c1 | e1 | f1 | H | h | l1 | s1 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| C0 | 124 | 160 | 97 | 110 | 9 | 130 | 3 | 141 | 79 | 3 | 9 |
| C1 | 145 | 192 | 130 | 130 | 11 | 165 | 3.5 | 175 | 100 | 5 | 11 |
| C2 | 145 | 192 | 142 | 130 | 11 | 165 | 3.5 | 192 | 112 [1)] | 5 | 11 |
| C3 | 200 | 250 | 154 | 180 | 14 | 215 | 4 | 212 | 127 [1)] | 5 | 14 |
| C4 | 200 | 250 | 178 | 180 | 14 | 215 | 4 | 242.5 | 142.5 | 5 | 14 |

*[1)] Select units do not have a concentric input and output. See input dimension "h" for these units in Table 4.*

## Table 2 Metric output available on request.

| | Standard Shaft - inches | | | Optional Shaft - mm | | |
|---|---|---|---|---|---|---|
| Unit | $d_{h6}$ * | t | u | $d_{k6}$ * | T | u |
| C0 | 0.750 | 0.83 | 3⁄16 x 3⁄16 x 1–7⁄32 | 20 | 22.5 | A6x6x32 |
| C1 | 1.000 | 1.11 | 1/4 x 1/4 x 1–9/16 | 25 | 28 | A8x7x40 |
| C2 | 1.250 | 1.36 | 1/4 x 1/4 x 1–15/16 | 30 | 33 | A8x7x50 |
| C3 | 1.250 | 1.36 | 1/4 x 1/4 x 1–15/16 | 30 | 33 | A8x7x50 |
| C4 | 1.625 | 1.79 | 3/8 x 3/8 x 2–7/8 | 40 | 43 | A12x8x70 |

## Table 3 Motor Adapter Dimensions (mm)

| Motor Adapter | Thickness c Min. [3)] | Motor Shaft d2 Max. [2)] | X | Wt. (lbs.) |
|---|---|---|---|---|
| ME10 | 21 | 19 | 40 | 5 |
| ME20 | 24 | 32 | 50 | 8 |
| ME30 | 25 | 38 | 60 | 15 |
| ME40 | 33 | 48 | 88 | 28 |

*[2)] If an adapter bushing is required it will be supplied as a component of the motor mounting plate.*

*[3)] Motor plate maximum thickness "c" will vary with motor shaft length but will not be less than shown.*

** h6, j6, k6 = existing values*

*For approximate weight, add adapter weight from Table 3 and base module weight from Table 4.*

## Table 4 Dimensions (mm)

| | ME10 | | | | ME20 | | | | ME30 | | | ME40 | | | Approx. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Unit | C | h | l | m | C | h | l | m | C | l | m | C | l | m | Wt.(lbs.) |
| C002 | 194 | — | 40 | 114 | 208 | — | 40 | 118 | — | — | — | — | — | — | 18 |
| C102 | 227 | — | 50 | 137 | 241 | — | 50 | 141 | 253 | 50 | 143 | — | — | — | 29 |
| C103 | 264 | — | 50 | 174 | — | — | — | — | — | — | — | — | — | — | 34 |
| C202 | 255 | — | 60 | 155 | 269 | — | 60 | 159 | 281 | 60 | 161 | — | — | — | 38 |
| C203 [4)] | 292 | 75.5 | 60 | 192 | 312 | 75.5 | 60 | 202 | — | — | — | — | — | — | 45 |
| C302 | — | — | — | — | 288 | — | 60 | 178 | 300 | 60 | 180 | 331 | 60 | 183 | 49 |
| C303 [4)] | 311 | 90 | 60 | 211 | 331 | 90 | 60 | 221 | — | — | — | — | — | — | 56 |
| C402 | — | — | — | — | 335.5 | — | 80 | 205.5 | 347.5 | 80 | 207.5 | 378.5 | 80 | 210.5 | 71 |
| C403 | — | — | — | — | 378.5 | — | 80 | 248.5 | — | — | — | — | — | — | 78 |

*[4)] Select units do not have a concentric input and output dimension "h". Table 4 "h" values are for input side only on these select units. All concentric input and output units dimension "h" values are listed in Table 1 above.*

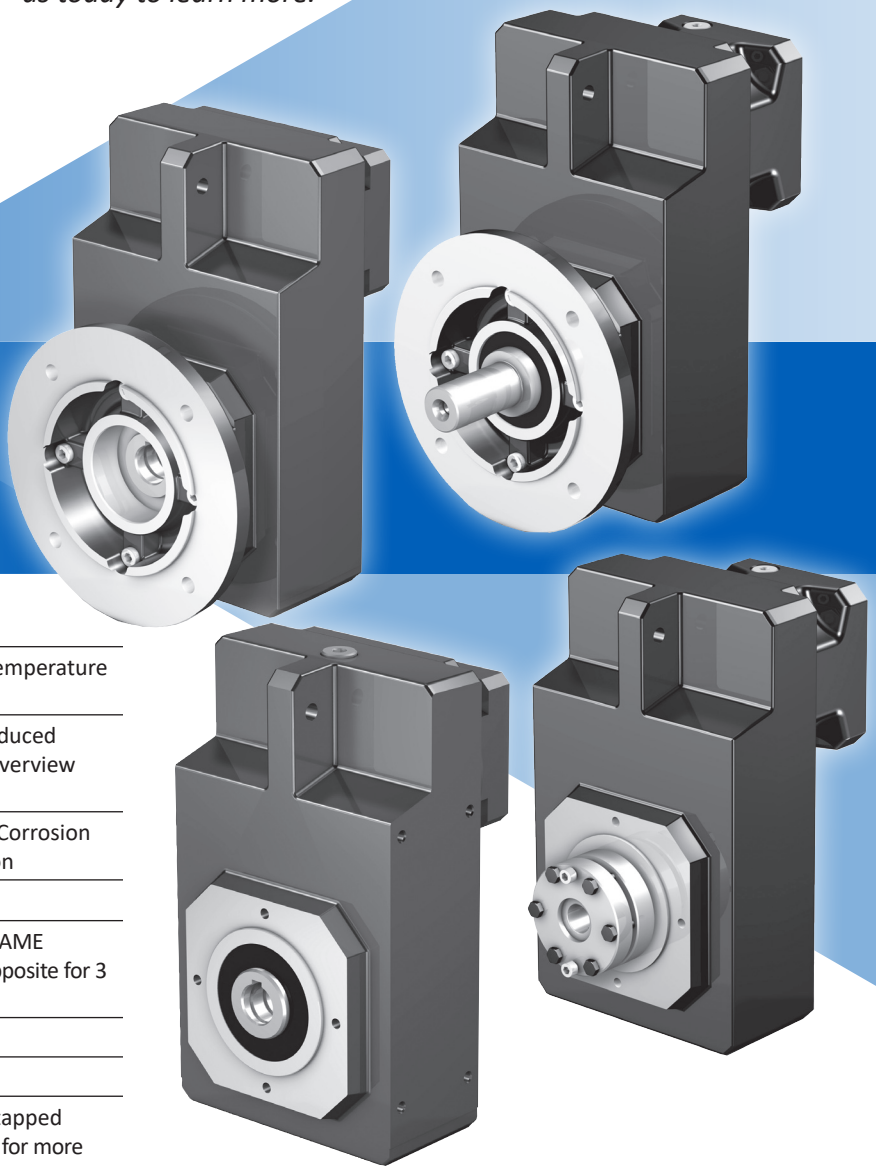
# F Series: OFFSET – Versatile Outputs

## F Features

- 4.3:1 to 552:1 ratios (higher ratios available. Contact STOBER.)
- Quiet running (<53dB(A))
- Reduced backlash option for increased precision
- Mounting flexibility to fit the application
- Adaptability: shafts available in metric or imperial, carbon or stainless steel to meet your requirements
- Optional food and corrosion resistant package
- Dual seals for extreme duty applications
- Error free motor mounting and quick changeover with toleranced pilot on motor plate
- Magnetic oil filtration to remove contaminants to prevent breakdowns
- Build and ship in one day
- Assembled in the USA

*Compact size and flexibility make F Series gear drives a popular choice for applications that require high performance, efficiency, and durability. F Series gear drives are available with a wide selection of configurations to match almost any mounting requirement. Every gearbox is made to order. STOBER will custom whatever you need to fit your application. Contact us today to learn more.*

**SHIPS in 1 DAY!**
NO EXPEDITE FEE FOR 24 HOUR SERVICE

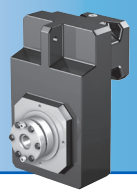


## General Specifications

| | |
|---|---|
| **Ambient Temperature** | 0°C to +40°C (104°F) [Unit temperature <80°C Max] |
| **Backlash** | ≤10 standard arcmins, ≤6 reduced arcmins (see performance overview chart, (page 104) |
| **Coating** | Standard Black (RAL-9005), Corrosion Resistant option, Food option |
| **Degree of Protection** | IP65 |
| **Direction of Rotation** | Input and output rotate the SAME direction got 2 stage units, opposite for 3 stage units (see page 104) |
| **Efficiency** | 2 stage 97%; 3 stage 96% |
| **Input RPM** | Up to 6,000 RPM |
| **Installation** | Requires 10.9 fasteners for tapped holes housing. See page 288 for more information |
| **Lubrication** | Lubricated for life - standard Mobil 600XP200, option food grade Mobil SHC CIBUS 220 |
| **Mounting Position** | Must be specified, see page 104 |
| **Warranty** | 5 Year Limited (2 Years on normal wear items: bearings, seals, etc.) |

### Benefits of NEW ME Motor Adapters

- Higher torques
- Higher input speeds
- More compact with square coupling housing
- More clamp ring options, so less need for adapter bushings
- Clamp ring with roll pin



# Overview

## Selection Options *At-a-Glance*

Using the **Selection Data** table later in this section, select the F Series Gearhead with the appropriate performance and design options tailored to your motor choice and exact application requirements. Use the part number guide below as a reference to build a part number for the complete gearhead assembly.

**Part Number Examples:**

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | |
|---|---|---|---|---|---|---|---|---|---|
| F | 1 | 0 | 2 | V | F | 0043 | ME10 | B | EL1 * |

| | Design Option | Part Number Code | Description |
|---|---|---|---|
| 1 | **Series** | F | Offset inline helical |
| 2 | **Size** | 1 2 3 4 6 | 5 sizes of gearhead |
| 3 | **Generation** | 0 | Version of gearhead |
| 4 | **# of Stages** | 2 | Two stage for ratios <150:1 |
| | | 3 | Three stage >150:1 |
| 5 | **Output** |  V | Shaft output (only available with housing option "F"; not available with food or corrosion resistant duty) |
| | |  A | Hollow output (available imperial or metric, stainless steel) |
| | |  W | Single or double wobble-free bushing (If single, specify side 5 or 6 only) |
| | |  S | Shrink ring |
| 6 | **Housing** |  F | Round output flange |
| | |  G | Pitch Circle Diameter (PCD) tapped holes |
| | |  NG | Foot mounting (with tapped holes for side mounting) |
| 7 | **Ratio** | 0043 | Ratios range from 4.3:1 to 552:1 (0043=4.3:1; 0063=6.3:1; 5520=520:1) |
| 8 | **Motor Adapter** | ME10 – ME40 | 4 input sizes (see also motor mounting plate option) |
| 9 | **Options** | B | Add when ordering Corrosion Resistant Duty |
| | | F | Add when ordering Food Duty |
| * | **Mounting Position** | EL1 EL2 EL3 EL4 EL5 EL6 | Required special instruction for all units, see page 104 |

## Options

### ME Adapter Option

- MSS1 Seal – special input seal for longer life. Contact factory for this option.
- Peak Torque Booster – pinion securing element for shock loads, increasing peak torque up to 80%.

### Lubrication Options

- Food grade or synthetic optionally available. Contact factory for this option.

### Integrated Safety Brake

- ServoStop – provides dynamic braking during power failures or emergency stops in hazardous situations. Contact factory for this option.

### Coating Option

- Corrosion Resistant Duty (**B** special option)
- Food Duty (**F** special option)

Food and Corrosion Resistant units are lubricated for life with double output seals (where possible), stainless output shaft, bore, or bushing, and heat cured paint.

### ATEX

- ATmosphere EXplosible – rated for explosive environments. Contact factory for this option and allow additional time for delivery.

## F Series Performance Overview

F Series performance is dependent on several factors including duty cycle, bearing design, gearhead size and stage configuration, among others. Use the chart below for preliminary evaluation, then use the following performance chart and selection information on the following pages for specific performance sizing and selection.

| Size/Generation | | | F10 | F20 | | F30 | | F40 | | F60 | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| # of Stages | | | 2 | 2 | 3 | 2 | 3 | 2 | 3 | 2 | 3 |
| **Acceleration Torque** $M_{2BMAX}$ | | Nm | 120 | 270 | | 450 | | 700 | | 1100 | |
| **Output Torque Nom.** $M_{2N}$ | | Nm | 120 | 240 | | 400 | | 700 | | 1100 | |
| **Torsional Stiffness** $C_2$ | | Nm/arcmin | <7.7 | <17.9 | <17.9 | <21.8 | <21.8 | <38.7 | <38.7 | <77.4 | <77.4 |
| **Torsional Backlash** [1] $\Delta\phi$ | arcmin | Standard | ≤11 | ≤11 | ≤11 | ≤11 | ≤11 | ≤10 | ≤10 | ≤10 | ≤10 |
| | | Reduced | ≤6 | ≤6 | ≤7 | ≤6 | ≤7 | ≤5 | ≤6 | ≤5 | ≤6 |
| **Input Speed Max.** $n_{1MAX}$ | Continuous | EL1,2,3,4 | 4000 | 4000 | 4000 | 4000 | 4000 | 3700 | 3800 | 3500 | 3500 |
| | | EL5,6 | 4000 | 3900 | 3900 | 3900 | 3900 | 3500 | 3500 | 3200 | 3200 |
| | Cyclic | | 7000 | 6500 | 6500 | 6500 | 6500 | 6000 | 6000 | 5500 | 5500 |
| **Efficiency (@nom torque)** | | % | 97 | 97 | 96 | 97 | 96 | 97 | 96 | 97 | 96 |
| **Weight** | | kg | 17.2 | 23.1 | 29.0 | 30.4 | 33.1 | 38.1 | 41.2 | 74.7 | 80.2 |
| | | lbs | 38 | 51 | 64 | 67 | 73 | 84 | 91 | 165 | 177 |
| **Noise** [2] | | dB(A) | ≤55 | ≤53 | | ≤53 | | ≤53 | | ≤61 | |
| **Size/Generation/# of Stage** | | | F102 | F202/F203 | | F302/F303 | | F402/F403 | | F602/F603 | |
| **Axial Load Max.** [3] $F_{2AMAX}$ | Solid Shaft | N | 1100 | 1400 | | 1900 | | 2350 | | 3100 | |
| | | lbs | 247 | 351 | | 427 | | 528 | | 697 | |
| | Hollow Bore | N | 900 | 1200 | | 1350 | | 1900 | | 2200 | |
| | | lbs | 203 | 270 | | 304 | | 428 | | 495 | |
| **Tilting Moment Max.**[3] $M_{2KMAX}$ | Solid Shaft | Nm | 260 | 400 | | 600 | | 800 | | 1200 | |
| | | in.lbs | 2301 | 3540 | | 5310 | | 7080 | | 10,620 | |
| | Hollow Bore | Nm | 175 | 250 | | 375 | | 550 | | 800 | |
| | | in.lbs | 1549 | 2213 | | 3319 | | 4858 | | 7080 | |

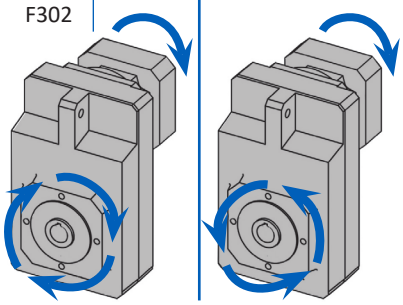
[1] *Tested at 1.5% of nominal torque and recorded on the output side of the gearhead. For lower backlash, contact STOBER technical support.*

[2] *Measurement at one (1) meter distance with input speed ($n_1$) of 2000 RPM. To calculate torque at higher input speeds, contact the factory.*

[3] *Rating based on output speed ($n_2$) of 20 RPM. For values at other speeds see page 107*

## F Series Direction of Rotation

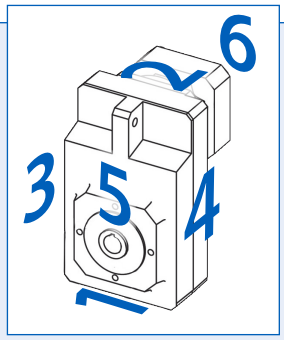
| 2 Stage Units | | 3 Stage Units | |
|---|---|---|---|
| F102 | F402 | F203 | F403 |
| F202 | F602 | F303 | F603 |
| F302 | | | |

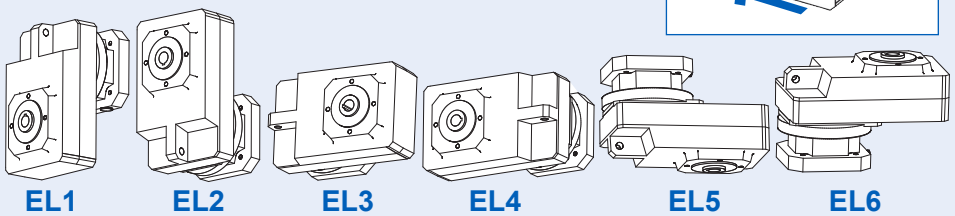


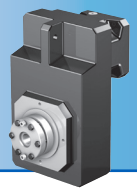
## F Series Mounting Position Options

**When ordering, the Mounting Position MUST BE SPECIFIED using one of the Mounting Position order codes below.**

*Note: the code relates to the unit's orientation side that faces down. For example, EL1 has side 1 facing down, EL2 has side 2 facing down, etc.*





## F Series Motor Mounting Plate Option (Motor information required with Motor Adapter option)

STOBER Servo Gearheads fit the motor of your choice with the appropriate motor mounting plate assembled between the motor and the gearhead.

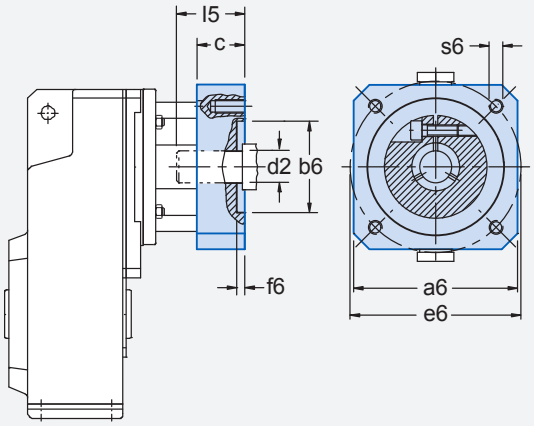
**NOTE: When ordering a gearhead:**

- Specify the motor manufacturer and part number
- Provide the motor drawing with dimensions, or specify the motor mounting dimensions (per the list shown at right)

For a precise dimension on a specific motor, or for general assistance, we recommend you contact STOBER Technical Support.

### Customer Required Dimensions for Properly Sized Motor Mounting Plate

| | |
|---|---|
| d2 | Motor Shaft Diameter (If an adapter bushing is required it will be supplied with the motor plate.) |
| b6 | Pilot Diameter |
| e6 | Bolt Circle Diameter |
| s6 | Bolt Diameter |
| l5 | Motor Shaft Length |
| f6 | Pilot Length |
| a6 | Square Flange (Optional – motor plate will typically be made to match this dimension.) |

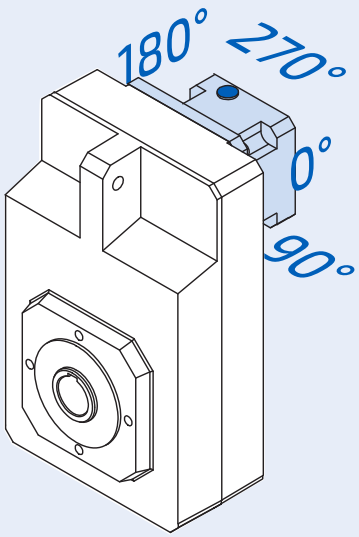



| Motor Mounting Plate Dimensions — mm(Gearhead Part Number Specific) | ME10 | ME20 | ME30 | ME40 |
|---|---|---|---|---|
| Maximum Allowed Motor Shaft Dia. d2 | 19 | 32 | 38 | 48 |
| Minimum Allowed Motor Plate Thickness c* | 21 | 24 | 26 | 35 |

** Note that the c motor plate thickness is determined by the motor shaft length. The minimum motor plate thickness is the value listed.*

## F Series Motor Mounting Plate Access Hole

Access to the clamping screw for the motor coupling is located on the 270° side of the motor mounting plate at the location shown. If necessary, the motor mounting plate can be rotated in the field, if a 0°, 90° or 180° orientation for the access hole is desirable.



## F Series Output Options

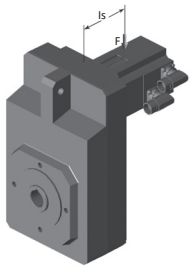
Diameters in **BOLD BLUE** are configurations readily available from inventory. Contact STOBER for delivery on other output sizes.

| | | | F1 | F2 | F3 | F4 | F6 |
|---|---|---|---|---|---|---|---|
| Solid Shaft | Carbon Steel | Inches | **1** | **1-1/4** | **1-3/8** | **1-5/8** | **2-1/8** |
| | | Metric | 25 | — | — | 40 | — |
| | Stainless Steel* | Inches | — | — | — | — | — |
| | | Metric | — | — | — | — | — |
| Hollow Bore | Carbon Steel | Inches | **3/4** | **1** | **1-1/4** | 1-7/16<br>**1-1/2** | **2** |
| | | Metric | 20 | 25 | 30 | 40 | 50 |
| | Stainless Steel* | Inches | — | — | **1-1/4** | **1-1/2** | — |
| | | Metric | — | — | — | — | — |
| Wobble Free Bushing<br>(Single & Double Bushings**) | Stainless Steel* | Inches | **3/4** | 1<br>**1-3/16** | 1<br>1-3/16<br>**1-1/4**<br>**1-7/16**<br>**1-1/2** | **1-7/16**<br>**1-1/2** | **1-7/16**<br>**1-1/2**<br>**1-15/16**<br>**2** |
| | | Metric | 20 | — | — | 40 | — |
| Shrink Ring | Carbon Steel | Metric | **20** | **25** | **30** | **40** | **50** |

** Stainless steel options are ideal for food and corrosion rsistant, harsh washdown environments.*
*** Double bushings only available with two stage units*
**** Double bushing only*

## Permissible Motor Tilting Torque

The permissible tilting torque of the motor attached to the gear unit is a result of the static and dynamic load "F" from the motor weight, mass acceleration, and vibration multiplied by the distance from the center of gravity "$l_S$" of the motor.



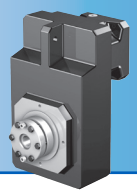

$M_{1k} = F \times l_S \leq M_{1K}$

| $M_{1K}$ | ME10 | ME20 | ME30 | ME40 | ME50 |
|---|---|---|---|---|---|
| Nm | 25 | 60 | 125 | 250 | 250 |

## Permissible Output Shaft Load and Tilting Moments*

| | V Solid Shaft Output | | | | A, S, W Hollow Output [1] | | |
|---|---|---|---|---|---|---|---|
| | $Z_2$ | $F_{2A}$ | $F_{2R}$ | $M_{2K}$ | $Z_2$ | $F_{2A}$ | $M_{2K}$ |
| Unit | mm | N | N | Nm | mm | N | Nm |
| F1 | 35 | 1100 | 4200 | 260 | 30 | 900 | 175 |
| F2 | 41 | 1400 | 5400 | 400 | 33 | 1200 | 250 |
| F3 | 43 | 1900 | 7500 | 600 | 33 | 1350 | 375 |
| F4 | 44 | 2350 | 9250 | 800 | 39 | 1900 | 550 |
| F6 | 44 | 3100 | 12,500 | 1200 | 45 | 2200 | 800 |

** Refer to illustration and definitions below.*
[1] Values shown for "W" Style are for double bushings. For single bushings use value $M_{2K}$ x 0.5 and $F_{2A}$ x 0.5



## Overhung Load Calculations

Pulling forces or overhung load of pulleys, sheaves, sprockets, etc. on the reducer output shaft must not exceed the allowable limits shown in the load/life/speed calculations below.

Note: Overhung load is measured at the center of the shaft extension. No overhung load is encountered when a reducer is flange mounted and/or coupling connected to another unit. However, the shafts of all components must be accurately aligned and secured to prevent pre-loading of the bearings and premature bearing failure.

Use the following formula to determine actual overhung load for a given drive:.

$$\textbf{Imperial OHL (lbs)} = \frac{126{,}000 \times HP \times K}{D \times n}$$

$$\textbf{Metric OHL (N)} = \frac{19{,}100 \times kW \times K}{D \times n}$$

Where:

| | |
|---|---|
| **OHL** | Overhung load (N or lbs) |
| **HP** | Horsepower |
| **kW** | Transmitted Kilowatt |
| **D** | Pitch Diameter (inches or meters) of Sprocket, Gear, Sheave, Pulley, etc. |
| **n** | Maximum Shaft RPM |
| **K** | 1.00 Single Chain Drive; 1.25 Timing Belt Drive; 1.25 Spur or Helical Gear Drive; 1.50 V-Belt Drive; 2.50 Flat Belt Drive |

## F Series Load/Life/Speed Calculations

The permissible load and tilting moment values are based on an output speed of 20 RPM. For higher speeds the following applies, where $n_2$ is the desired speed:

$$F_{2axN} = \frac{F_{2ax20}}{\sqrt[3]{\frac{n_{2m*}}{20\ rpm}}} \qquad F_{2radN} = \frac{F_{2rad20}}{\sqrt[3]{\frac{n_{2m*}}{20\ rpm}}} \qquad M_{2kN} = \frac{M_{2k20}}{\sqrt[3]{\frac{n_{2m*}}{20\ rpm}}}$$

The application output tilting moment should be determined by the following formula:

$$M_{2k*} = \frac{2 \bullet F_{2ax*} \bullet Y_2 + F_{2rad*} \bullet (x_2+z_2)}{1000} \leq M_{2kN}$$

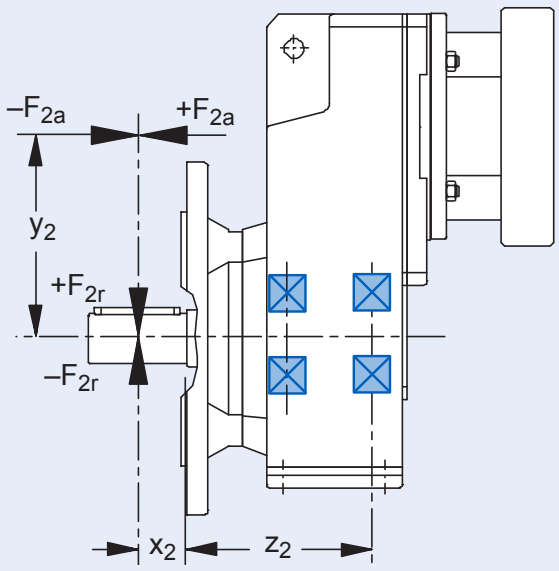
$$F_{2rad*} \leq F_{2radN} \qquad F_{2ax*} \leq F_{2axN}$$

Where:

| | |
|---|---|
| $z_2$ | Distance of Shaft Shoulder to Center of Output Bearing |
| $n_2$ | Actual Average Output Speed |
| $x_2$ | Distance of the Shaft Shoulder to the Force Application Point |
| $Y_2$ | Distance of the Shaft Axis to the Axial Force Application Point |
| $F_{2ax*}$ | Actual Axial Force at Gear Unit Output |
| $F_{2ax100}$ | Permitted Axial Force |
| $F_{2rad100}$ | Permitted Radial Force ≤100RPM |
| $F_{2rad,acc}$ | Radial Acceleration Force |
| $F_{2rad,acc*}$ | Radial Acceleration Force at Gear Unit Output |
| $M_{2K100}$ | Permitted Tilting Torque ≤100RPM |
| $M_{2K,acc}$ | Permitted Acceleration Tilting Torque |
| $M_{2k,acc*}$ | Permitted Acceleration Tilting Torque at Gear Unit Output |
| $C_{2K}$ | Tilting Stiffness |

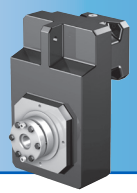
**All formulas shown are based on METRIC values**

*Upper case letters are permissible values. Lower case letters are for existing values.*



| Reducer Ratio (i) | | Output Torque | | | Backlash [3] | Part Number | Max. Input Speed RPM (n1) | | | Motor Shaft Max Ø | Input Inertia | Tors. Stiffness |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Nom. [1] | Accel. | Peak [2] | | | Continuous | | Cyclic | | | |
| | | $M_{2N}$ | $M_{2acc}$ | $M_{2NOT}$ | $\Delta\phi_2$ | (Gearhead + Input) | EL 1,2,3,4 | EL 5,6 | All | $d_{MW}$ | $J_1$ | $C_2$ |
| Nom. | Exact | Nm | Nm | Nm | arcmin | | | | | mm | kgcm² | Nm/ arcmin |
| **F1** | | | | | | | | | | | | |
| 4.308 | 56/13 | 69 | 100 | 125 | 11/8 | F102_0043 ME10 | 3500 | 3000 | 6000 | ≤19 | 2.1 | 6.2 |
| | | | | | | F102_0043 ME20 | | | | ≤24 | 4.0 | 6.4 |
| 7.156 | 322/45 | 81 | 105 | 200 | 11/8 | F102_0072 ME10 | 3700 | 3600 | 6000 | ≤19 | 1.3 | 6.4 |
| | | | | | | F102_0072 ME20 | | | | ≤24 | 3.2 | 6.5 |
| 10.92 | 273/25 | 94 | 105 | 200 | 11/8 | F102_0110 ME10 | 4000 | 4000 | 6500 | ≤19 | 0.9 | 6.5 |
| | | | | | | F102_0110 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.8 | |
| 18.46 | 1495/81 | 110 | 120 | 240 | 11/6 | F102_0185 ME10 | 3700 | 3600 | 6000 | ≤19 | 1.0 | 7.7 |
| | | | | | | F102_0185 ME20 | | | | ≤24 | 2.9 | |
| 28.17 | 169/6 | 120 | 120 | 240 | 11/6 | F102_0280 ME10 | 4000 | 4000 | 6500 | ≤19 | 0.8 | 7.7 |
| | | | | | | F102_0280 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.7 | |
| 46.43 | 325/7 | 120 | 120 | 240 | 11/6 | F102_0460 ME10 | 4000 | 4000 | 7000 | ≤19 | 0.7 | 7.7 |
| | | | | | | F102_0460 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.6 | |
| 55.97 | 2015/36 | 120 | 120 | 240 | 11/6 | F102_0560 ME10 | 4000 | 4000 | 7000 | ≤19 | 0.7 | 7.7 |
| | | | | | | F102_0560 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.6 | |
| 70.06 | 1261/18 | 120 | 120 | 240 | 11/6 | F102_0700 ME10 | 4000 | 4000 | 7000 | ≤19 | 0.7 | 7.7 |
| | | | | | | F102_0700 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.6 | |
| 93.63 | 7865/84 | 120 | 120 | 240 | 11/6 | F102_0940 ME10 | 4000 | 4000 | 7000 | ≤19 | 0.6 | 7.7 |
| 111.9 | 2015/18 | 120 | 120 | 240 | 11/6 | F102_1120 ME10 | 4000 | 4000 | 7000 | ≤19 | 0.6 | 7.7 |
| **F2** | | **(continued next page)** | | | | | | | | | | |
| 5.552 | 5341/962 | 149 | 210 | 400 | 11/8 | F202_0056 ME20 | 3100 | 2600 | 5000 | ≤32 | 7.1 | 15.0 |
| | | | | | | F202_0056 ME30 | | | | ≤38 | 12.0 | |
| 9.006 | 3161/351 | 160 | 210 | 262 | 11/8 | F202_0090 ME10 | 3600 | 3100 | 6000 | ≤19 | 1.9 | 15.0 |
| | | 175 | | 400 | | F202_0090 ME20 | | | | ≤32 | 5.3 | |
| | | | | | | F202_0090 ME30 | 3500 | | 5000 | ≤38 | 11.0 | |
| 10.80 | 7303/676 | 166 | 210 | 314 | 11/8 | F202_0110 ME10 | 3800 | 3500 | 6000 | ≤19 | 1.6 | 15.0 |
| | | 185 | | 400 | | F202_0110 ME20 | 3700 | | | ≤32 | 5.0 | |
| | | | | | | F202_0110 ME30 | 3500 | | 5000 | ≤38 | 10.0 | 16.0 |
| 13.63 | 109/8 | 180 | 210 | 397 | 11/8 | F202_0135 ME10 | 3800 | 3500 | 6000 | ≤19 | 1.3 | 15.0 |
| | | 200 | | 400 | | F202_0135 ME20 | 3700 | | | ≤32 | 4.7 | 16.0 |
| | | | | | | F202_0135 ME30 | 3500 | | 5000 | ≤38 | 10.0 | |
| 23.43 | 2320/99 | 240 | 270 | 480 | 11/6 | F202_0230 ME10 | 3600 | 3100 | 6000 | ≤19 | 1.3 | 18.0 |
| | | | | | | F202_0230 ME20 | | | | ≤32 | 4.7 | |
| | | | | | | F202_0230 ME30 | 3500 | | 5000 | ≤38 | 10.0 | |

[1] *Maximum torque for continuous input 1500 RPM - horizontal output position.*
[2] *Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
[3] *Backlash shown standard/reduced*



# Selection Data

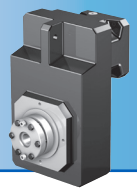
| Reducer Ratio (i) | | Output Torque | | | Backlash [3] | Part Number | Max. Input Speed RPM (n1) | | | Motor Shaft Max Ø | Input Inertia | Tors. Stiffness |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Nom. [1] | Accel. | Peak [2] | | | Continuous | | Cyclic | | | |
| Nom. | Exact | $M_{2N}$ Nm | $M_{2acc}$ Nm | $M_{2NOT}$ Nm | $\Delta\phi_2$ arcmin | (Gearhead + Input) | EL 1,2,3,4 | EL 5,6 | All | $d_{MW}$ mm | $J_1$ kgcm² | $C_2$ Nm/arcmin |
| **F2** | **(continued from previous page)** | | | | | | | | | | | |
| 28.11 | 4020/143 | 240 | 270 | 480 | 11/6 | F202_0280 ME10 | 3800 | 3500 | 6000 | ≤19 | 1.1 | 18.0 |
| | | | | | | F202_0280 ME20 | 3700 | | | ≤32 | 4.5 | |
| | | | | | | F202_0280 ME30 | 3500 | | 5000 | ≤38 | 9.9 | |
| 35.46 | 390/11 | 240 | 270 | 480 | 11/6 | F202_0350 ME10 | 3800 | 3500 | 6000 | ≤19 | 1.0 | 18.0 |
| | | | | | | F202_0350 ME20 | 3700 | | | ≤32 | 4.4 | |
| | | | | | | F202_0350 ME30 | 3500 | | 5000 | ≤38 | 9.7 | |
| 56.73 | 624/11 | 240 | 270 | 480 | 11/6 | F202_0570 ME10 | 4000 | 3900 | 6500 | ≤19 | 0.8 | 18.0 |
| | | | | | | F202_0570 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.7 | |
| 70.13 | 5400/77 | 240 | 270 | 480 | 11/6 | F202_0700 ME10 | 4000 | 3900 | 6500 | ≤19 | 0.8 | 18.0 |
| | | | | | | F202_0700 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.7 | |
| 93.82 | 1032/11 | 240 | 270 | 480 | 11/6 | F202_0940 ME10 | 4000 | 3900 | 6500 | ≤19 | 0.7 | 18.0 |
| | | | | | | F202_0940 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.6 | |
| 222.2 | 2444/11 | 240 | 270 | 480 | 11/7 | F203_2220 ME10 | 4000 | 3900 | 6500 | ≤19 | 0.7 | 18.0 |
| 274.7 | 21150/77 | 240 | 270 | 480 | 11/7 | F203_2750 ME10 | 4000 | 3900 | 6500 | ≤19 | 0.7 | 18.0 |
| 367.5 | 4042/11 | 240 | 270 | 480 | 11/7 | F203_3670 ME10 | 4000 | 3900 | 6500 | ≤19 | 0.7 | 18.0 |
| **F3** | **(continued next page)** | | | | | | | | | | | |
| 5.720 | 143/25 | 250 | 333 | 416 | 11/8 | F302_0057 ME20 | 3000 | 2600 | 4500 | ≤32 | 9.7 | 20.0 |
| | | | | | | F302_0057 ME30 | | | | ≤38 | 15.0 | |
| 8.986 | 5616/625 | 180 | 209 | 262 | 11/8 | F302_0090 ME10 | 3500 | 3100 | 5000 | ≤19 | 3.3 | 20.0 |
| | | 290 | 350 | 650 | | F302_0090 ME20 | | | | ≤32 | 6.7 | |
| | | | | | | F302_0090 ME30 | | | | ≤38 | 12.0 | |
| 10.79 | 1456/135 | 187 | 251 | 314 | 11/8 | F302_0110 ME10 | 3700 | 3500 | 5500 | ≤19 | 2.5 | 20.0 |
| | | 308 | 350 | 650 | | F302_0110 ME20 | | | | ≤32 | 5.9 | |
| | | | | | | F302_0110 ME30 | 3500 | | 5000 | ≤38 | 11.0 | |
| 13.38 | 7696/575 | 199 | 312 | 390 | 11/8 | F302_0135 ME10 | 3700 | 3500 | 5500 | ≤19 | 1.9 | 20.0 |
| | | 331 | 350 | 650 | | F302_0135 ME20 | | | | ≤32 | 5.3 | |
| | | | | | | F302_0135 ME30 | 3500 | | 5000 | ≤38 | 11.0 | |
| 23.52 | 588/25 | 400 | 450 | 685 | 11/6 | F302_0240 ME10 | 3500 | 3100 | 5000 | ≤19 | 2.0 | 22.0 |
| | | | | 800 | | F302_0240 ME20 | | | | ≤32 | 5.4 | |
| | | | | | | F302_0240 ME30 | | | | ≤38 | 11.0 | |
| 28.23 | 6860/243 | 400 | 450 | 800 | 11/6 | F302_0280 ME10 | 3700 | 3500 | 5500 | ≤19 | 1.7 | 22.0 |
| | | | | | | F302_0280 ME20 | | | | ≤32 | 5.1 | |
| | | | | | | F302_0280 ME30 | 3500 | | 5000 | ≤38 | 10.0 | |

[1] *Maximum torque for continuous input 1500 RPM - horizontal output position.*
[2] *Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
[3] *Backlash shown standard/reduced*

| Reducer Ratio (i) | | Output Torque | | | Backlash [3] | Part Number | Max. Input Speed RPM (n1) | | | Motor Shaft Max Ø | Input Inertia | Tors. Stiffness |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Nom. [1] | Accel. | Peak [2] | | | Continuous | | Cyclic | | | |
| Nom. | Exact | $M_{2N}$ | $M_{2acc}$ | $M_{2NOT}$ | $\Delta\phi_2$ | (Gearhead + Input) | EL 1,2,3,4 | EL 5,6 | All | $d_{MW}$ | $J_1$ | $C_2$ |
| | | Nm | Nm | Nm | arcmin | | | | | mm | kgcm² | Nm/ arcmin |
| **F3** | | **(continued from previous page)** | | | | | | | | | | |
| 35.03 | 7252/207 | 400 | 450 | 800 | 11/6 | F302_0350 ME10 | 3700 | 3500 | 5500 | ≤19 | 1.4 | 22.0 |
| | | | | | | F302_0350 ME20 | | | | ≤32 | 4.8 | |
| | | | | | | F302_0350 ME30 | 3500 | | 5000 | ≤38 | 10.0 | |
| 47.19 | 1274/27 | 400 | 450 | 800 | 11/6 | F302_0470 ME10 | 4000 | 3900 | 6500 | ≤19 | 1.1 | 22.0 |
| | | | | | | F302_0470 ME20 | 3700 | 3700 | 6000 | ≤32 | 4.5 | |
| | | | | | | F302_0470 ME30 | 3500 | 3500 | 5000 | ≤38 | 9.8 | |
| 56.49 | 4067/72 | 400 | 450 | 800 | 11/6 | F302_0560 ME10 | 4000 | 3900 | 6500 | ≤19 | 1.0 | 22.0 |
| | | | | | | F302_0560 ME20 | 3700 | 3700 | 6000 | ≤32 | 4.4 | |
| | | | | | | F302_0560 ME30 | 3500 | 3500 | 5000 | ≤38 | 9.7 | |
| 70.36 | 2744/39 | 400 | 450 | 800 | 11/6 | F302_0700 ME10 | 4000 | 3900 | 6500 | ≤19 | 0.9 | 22.0 |
| | | | | | | F302_0700 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.8 | |
| 93.64 | 4214/45 | 400 | 450 | 800 | 11/6 | F302_0940 ME10 | 4000 | 3900 | 6500 | ≤19 | 0.8 | 22.0 |
| | | | | | | F302_0940 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.7 | |
| 112.8 | 3724/33 | 400 | 450 | 800 | 11/6 | F302_1130 ME10 | 4000 | 3900 | 6500 | ≤19 | 0.7 | 22.0 |
| | | | | | | F302_1130 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.6 | |
| 182.4 | 73892/405 | 400 | 450 | 800 | 11/7 | F303_1820 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.7 | 22.0 |
| 218.4 | 117943/540 | 400 | 450 | 800 | 11/7 | F303_2180 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.7 | 22.0 |
| 272.1 | 159152/585 | 400 | 450 | 800 | 11/7 | F303_2720 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.7 | 22.0 |
| 275.6 | 32242/117 | 400 | 450 | 800 | 11/7 | F303_2760 ME10 | 4000 | 3900 | 6500 | ≤19 | 0.7 | 22.0 |
| 362.1 | 244412/675 | 400 | 450 | 800 | 11/7 | F303_3620 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.7 | 22.0 |
| 366.8 | 99029/270 | 400 | 450 | 800 | 11/7 | F303_3670 ME10 | 4000 | 3900 | 6500 | ≤19 | 0.7 | 22.0 |
| 442.0 | 43757/99 | 400 | 450 | 800 | 11/7 | F303_4420 ME10 | 4000 | 3900 | 6500 | ≤19 | 0.7 | 22.0 |
| **F4** | | **(continued next page)** | | | | | | | | | | |
| 5.813 | 3784/651 | 415 | 550 | 1100 | 10/7 | F402_0058 ME30 | 2700 | 2300 | 4000 | ≤38 | 20.0 | 38.0 |
| | | | | | | F402_0058 ME40 | | | | ≤48 | 42.0 | |
| 8.980 | 440/49 | 469 | 523 | 653 | 10/7 | F402_0090 ME20 | 3200 | 2800 | 4800 | ≤32 | 8.8 | 38.0 |
| | | 479 | 550 | 1100 | | F402_0090 ME30 | | | | ≤38 | 14.0 | |
| | | | | | | F402_0090 ME40 | 3000 | | 4500 | ≤48 | 36.0 | |
| 10.83 | 682/63 | 487 | 550 | 788 | 10/7 | F402_0110 ME20 | 3500 | 3100 | 5500 | ≤32 | 7.5 | 38.0 |
| | | 510 | | 1100 | | F402_0110 ME30 | | | 5000 | ≤38 | 13.0 | |
| | | | | | | F402_0110 ME40 | 3000 | 3000 | 4500 | ≤48 | 35.0 | |

[1] *Maximum torque for continuous input 1500 RPM - horizontal output position.*
[2] *Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
[3] *Backlash shown standard/reduced*

# Selection Data

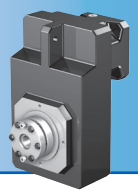


| Reducer Ratio (i) | | Output Torque | | | Backlash [3] | Part Number | Max. Input Speed RPM (n1) | | | Motor Shaft Max Ø | Input Inertia | Tors. Stiffness |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Nom. [1] | Accel. | Peak [2] | | | Continuous | | Cyclic | | | |
| Nom. | Exact | $M_{2N}$ Nm | $M_{2acc}$ Nm | $M_{2NOT}$ Nm | $\Delta\phi_2$ arcmin | (Gearhead + Input) | EL 1,2,3,4 | EL 5,6 | All | $d_{MW}$ mm | $J_1$ kgcm² | $C_2$ Nm/arcmin |
| **F4** | **(continued from previous page)** | | | | | | | | | | | |
| 13.57 | 5984/441 | 536 | 550 | 932 | 10/7 | F402_0135 ME20 | 3500 | 3100 | 5500 | ≤32 | 6.4 | 38.0 |
| | | 550 | | 1100 | | F402_0135 ME30 | | | 5000 | ≤38 | 12.0 | 39.0 |
| | | | | | | F402_0135 ME40 | 3000 | 3000 | 4500 | ≤48 | 34.0 | |
| 23.21 | 325/14 | 658 | 700 | 1400 | 10/5 | F402_0230 ME20 | 3200 | 2800 | 4800 | ≤32 | 6.4 | 39.0 |
| | | | | | | F402_0230 ME30 | | | | ≤38 | 12.0 | |
| | | | | | | F402_0230 ME40 | 3000 | | 4500 | ≤48 | 34.0 | |
| 27.99 | 2015/72 | 700 | 700 | 1400 | 10/5 | F402_0280 ME20 | 3500 | 3100 | 5500 | ≤32 | 5.9 | 39.0 |
| | | | | | | F402_0280 ME30 | | | 5000 | ≤38 | 11.0 | |
| | | | | | | F402_0280 ME40 | 3000 | 3000 | 4500 | ≤48 | 33.0 | |
| 35.08 | 2210/63 | 700 | 700 | 1400 | 10/5 | F402_0350 ME20 | 3500 | 3100 | 5500 | ≤32 | 5.3 | 39.0 |
| | | | | | | F402_0350 ME30 | | | 5000 | ≤38 | 11.0 | |
| | | | | | | F402_0350 ME40 | 3000 | 3000 | 4500 | ≤48 | 33.0 | |
| 55.97 | 2015/36 | 700 | 700 | 1400 | 10/5 | F402_0560 ME20 | 3700 | 3500 | 6000 | ≤32 | 4.7 | 39.0 |
| | | | | | | F402_0560 ME30 | 3500 | | 5000 | ≤38 | 10.0 | |
| 70.06 | 1261/18 | 700 | 700 | 1400 | 10/5 | F402_0700 ME20 | 3700 | 3500 | 6000 | ≤32 | 4.5 | 39.0 |
| | | | | | | F402_0700 ME30 | 3500 | | 5000 | ≤38 | 9.8 | |
| 93.33 | 280/3 | 700 | 700 | 1400 | 10/5 | F402_0930 ME20 | 3700 | 3500 | 6000 | ≤24 | 2.8 | 39.0 |
| 112.3 | 1235/11 | 700 | 700 | 1400 | 10/5 | F402_1120 ME20 | 3700 | 3500 | 6000 | ≤24 | 2.7 | 39.0 |
| 216.4 | 11687/54 | 700 | 700 | 1400 | 10/6 | F403_2160 ME20 | 3700 | 3500 | 6000 | ≤24 | 2.7 | 39.0 |
| 270.9 | 36569/135 | 700 | 700 | 1400 | 10/6 | F403_2710 ME20 | 3700 | 3500 | 6000 | ≤24 | 2.7 | 39.0 |
| 274.4 | 59267/216 | 700 | 700 | 1400 | 10/6 | F403_2740 ME10 | 3800 | 3500 | 6000 | ≤19 | 0.7 | 39.0 |
| 360.9 | 3248/9 | 700 | 700 | 1400 | 10/6 | F403_3610 ME20 | 3700 | 3500 | 6000 | ≤24 | 2.7 | 39.0 |
| 365.6 | 3290/9 | 700 | 700 | 1400 | 10/6 | F403_3660 ME10 | 3800 | 3500 | 6000 | ≤19 | 0.7 | 39.0 |
| 434.1 | 14326/33 | 700 | 700 | 1400 | 10/6 | F403_4340 ME20 | 3700 | 3500 | 6000 | ≤24 | 2.7 | 39.0 |
| 439.7 | 58045/132 | 700 | 700 | 1400 | 10/6 | F403_4400 ME10 | 3800 | 3500 | 6000 | ≤19 | 0.7 | 39.0 |

*[1] Maximum torque for continuous input 1500 RPM - horizontal output position.*
*[2] Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
*[3] Backlash shown standard/reduced*

| Reducer Ratio (i) | | Output Torque | | | Backlash [3] | Part Number | Max. Input Speed RPM (n1) | | | Motor Shaft Max Ø | Input Inertia | Tors. Stiffness |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Nom. [1] | Accel. | Peak [2] | | | Continuous | | Cyclic | | | |
| | | $M_{2N}$ | $M_{2acc}$ | $M_{2NOT}$ | $\Delta\phi_2$ | | | | | $d_{MW}$ | $J_1$ | $C_2$ |
| Nom. | Exact | Nm | Nm | Nm | arcmin | (Gearhead + Input) | EL 1,2,3,4 | EL 5,6 | All | mm | kgcm² | Nm/ arcmin |
| **F6** | | **(continued next page)** | | | | | | | | | | |
| 4.546 | 1273/280 | 581 | 706 | 883 | 10/7 | F602_0045 ME30 | 2500 | 2100 | 3500 | ≤38 | 46.0 | 69.0 |
| | | 638 | | | | F602_0045 ME40 | | | | ≤48 | 68.0 | |
| 7.159 | 3551/496 | 702 | 1000 | 1385 | 10/7 | F602_0072 ME30 | 2900 | 2500 | 4500 | ≤38 | 26.0 | 71.0 |
| | | 743 | | | | F602_0072 ME40 | | | | ≤48 | 48.0 | |
| 10.82 | 2077/192 | 564 | 630 | 787 | 10/7 | F602_0110 ME20 | 3300 | 2800 | 5000 | ≤32 | 12.0 | 71.0 |
| | | 819 | 1000 | 1600 | | F602_0110 ME30 | | | | ≤38 | 17.0 | 72.0 |
| | | 852 | | | | F602_0110 ME40 | 3000 | | 4500 | ≤48 | 39.0 | |
| 18.52 | 3445/186 | 1019 | 1100 | 2000 | 10/5 | F602_0185 ME30 | 2900 | 2500 | 4500 | ≤38 | 17.0 | 77.0 |
| | | | | | | F602_0185 ME40 | | | | ≤48 | 39.0 | |
| 27.99 | 2015/72 | 1100 | 1100 | 2000 | 10/5 | F602_0280 ME20 | 3300 | 2800 | 5000 | ≤32 | 8.2 | 77.0 |
| | | | | | | F602_0280 ME30 | | | | ≤38 | 14.0 | |
| | | | | | | F602_0280 ME40 | 3000 | | 4500 | ≤48 | 36.0 | |
| 46.72 | 1495/32 | 1100 | 1100 | 2000 | 10/5 | F602_0470 ME20 | 3500 | 3200 | 5500 | ≤32 | 6.0 | 77.0 |
| | | | | | | F602_0470 ME30 | | | 5000 | ≤38 | 11.0 | |
| | | | | | | F602_0470 ME40 | 3000 | 3000 | 4500 | ≤48 | 33.0 | |
| 55.71 | 390/7 | 1100 | 1100 | 2000 | 10/5 | F602_0560 ME20 | 3500 | 3200 | 5500 | ≤32 | 5.5 | 77.0 |
| | | | | | | F602_0560 ME30 | | | 5000 | ≤38 | 11.0 | |
| 93.33 | 280/3 | 1100 | 1100 | 2000 | 10/5 | F602_0930 ME20 | 3500 | 3200 | 5500 | ≤32 | 4.7 | 77.0 |
| | | | | | | F602_0930 ME30 | | | 5000 | ≤38 | 10.0 | |
| 112.2 | 9425/84 | 1100 | 1100 | 2000 | 10/5 | F602_1120 ME20 | 3500 | 3200 | 5500 | ≤24 | 3.0 | 77.0 |
| 180.6 | 8671/48 | 1100 | 1100 | 2000 | 10/6 | F603_1810 ME20 | 3500 | 3200 | 5500 | ≤24 | 2.8 | 77.0 |
| 215.4 | 1508/7 | 1100 | 1100 | 2000 | 10/6 | F603_2150 ME20 | 3500 | 3200 | 5500 | ≤24 | 2.8 | 77.0 |
| 360.9 | 3248/9 | 1100 | 1100 | 2000 | 10/6 | F603_3610 ME20 | 3500 | 3200 | 5500 | ≤24 | 2.7 | 77.0 |
| 433.8 | 54665/126 | 1100 | 1100 | 2000 | 10/6 | F603_4340 ME20 | 3500 | 3200 | 5500 | ≤24 | 2.7 | 77.0 |

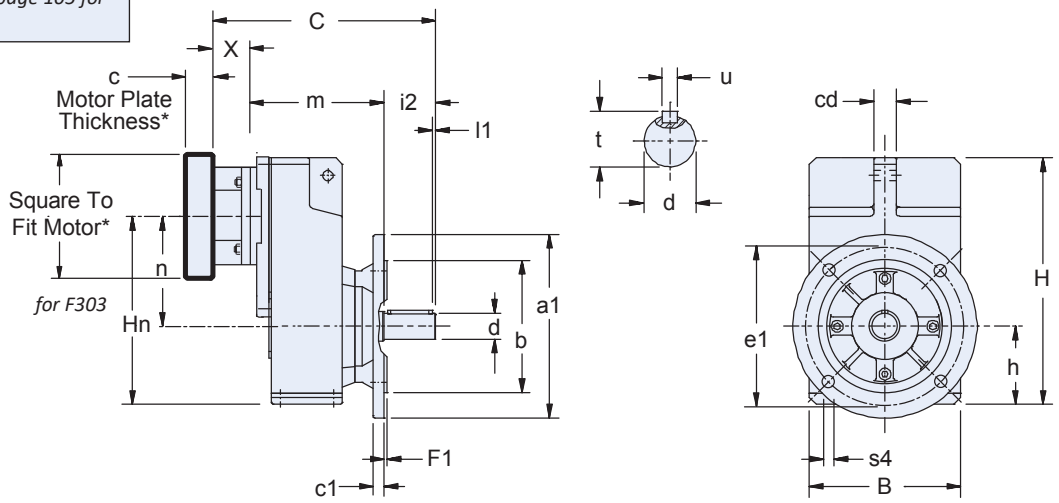
[1] *Maximum torque for continuous input 1500 RPM - horizontal output position.*
[2] *Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
[3] *Backlash shown standard/reduced*



# Dimensional Data

## "V" Shaft Output with "F" Output Flange — All Sizes

** See Motor Mounting Plate Option, page 105 for details.*




### Table 1 Dimensions (mm)

| Unit | a1 | B | $b_{j6}$ | c1 | cd | e1 | F1 | H | h | Hn | i2 | l1 | n | s4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| F1 | 160 | 145 | 110 | 10 | 20 | 130 | 3.5 | 238 | 74 | 176 | 50 | 5 | 102 | 9 |
| F2 | 200 | 180 | 130 | 14 | 22 | 165 | 3.5 | 299 | 93 | 224 | 60 | 5 | 131 | 11 |
| F3 | 250 | 206 | 180 | 15 | 30 | 215 | 4 | 335.5 | 106 | 219 | 70 | 5 | 149.5[1)] | 14 |
| F4 | 250 | 230 | 180 | 15 | 30 | 215 | 4 | 370 | 116 | 285[1)] | 80 | 5 | 169[1)] | 14 |
| F6 | 300 | 265 | 230 | 17 | 35 | 265 | 4 | 433 | 137 | 333 | 100 | 5 | 196 | 14 |

[1)] *For F303, n is 113 with ME20; For F403, n is 132 with ME20 and Hn is 248.*

### Table 2 "V" Shaft Output Dimensions

| | Standard Shaft - in | | | Optional Shaft* - mm | | |
|---|---|---|---|---|---|---|
| Unit | $d_{h6}$ | t | u | $d_{k6}$ | t | u |
| F1 | 1.000 | 1.11 | 1/4 x 1/4 x 1-9/16 | 25 | 28 | A8x7x40 |
| F2 | 1.250 | 1.36 | 1/4 x 1/4 x 1-15/16 | 30 | 33 | A8x7x50 |
| F3 | 1.375 | 1.51 | 5/16 x 5/16 x 2-5/16 | 35 | 38 | A10x8x60 |
| F4 | 1.625 | 1.79 | 3/8 x 3/8 x 2-7/8 | 40 | 43 | A12x8x70 |
| F6 | 2.125 | 2.35 | 1/2 x 1/2 x 3-5/32 | 50 | 53.5 | A14x9x90 |

**Metric output available on request*

### Table 3 Dimensions (mm)

| | ME10 | | ME20 | | ME30 | | ME40 | | Approx. |
|---|---|---|---|---|---|---|---|---|---|
| Unit | C | m | C | m | C | m | C | m | Wt. lbs. |
| F102 | 219.5 | 129.5 | 233.5 | 133.5 | — | — | — | — | 38 |
| F202 | 253 | 153 | 267 | 157 | 279 | 159 | — | — | 51 |
| F203 | 290 | 190 | — | — | — | — | — | — | 64 |
| F302 | 279.5 | 169.5 | 293.5 | 173.5 | 305.5 | 175.5 | — | — | 67 |
| F303 | 316.5 | 206.5 | 336.5 | 216.5 | — | — | — | — | 73 |
| F402 | — | — | 318.5 | 188.5 | 330.5 | 190.5 | 361.5 | 193.5 | 84 |
| F403 | 341.5 | 221.5 | 361.5 | 231.5 | — | — | — | — | 91 |
| F602 | — | — | 369.5 | 219.5 | 381.5 | 221.5 | 412.5 | 224.5 | 165 |
| F603 | — | — | 412.5 | 262.5 | — | — | — | | 177 |

### Table 4 Motor Adapter Dimensions (mm)

| Motor Adapter | Thickness[3)] c Min. | Motor Shaft d2 Max.[2)] | X | Wt. lbs. |
|---|---|---|---|---|
| ME10 | 21 | 19 | 40 | 5 |
| ME20 | 24 | 32 | 50 | 8 |
| ME30 | 25 | 38 | 60 | 12 |
| ME40 | 33 | 48 | 88 | 18 |

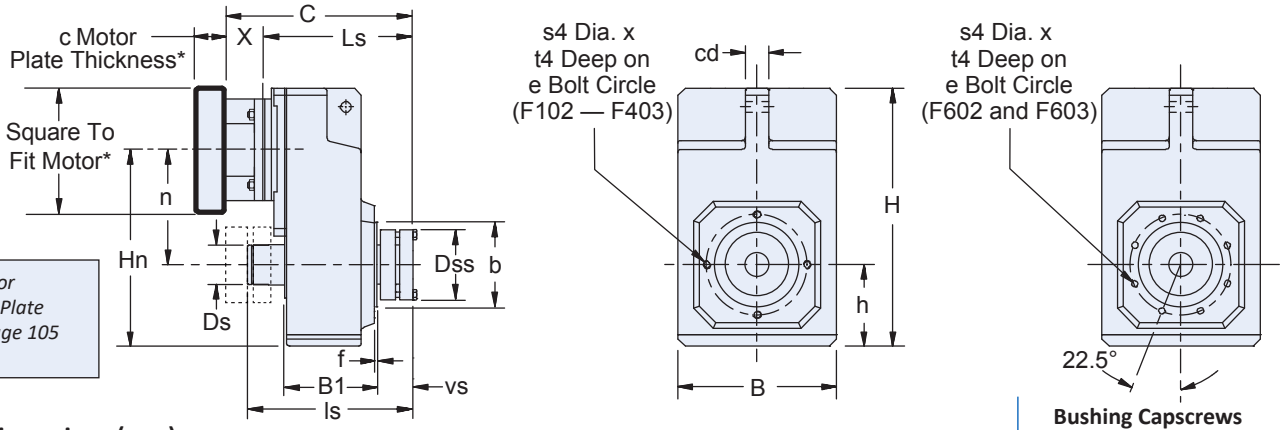
[2)] *If an adapter bushing is required it will be supplied as a component of the motor mounting plate.*

[3)] *Motor plate maximum thickness (c) will vary with motor shaft length but will not be less than shown.*

*For approximate weight, add unit weight from Table 3 and adapter weight from Table 4.*

## "W" Single Bushing with "G" Pitch Circle Diameter (PCD) Tapped Holes — All Sizes

**Important:** For ease of installation, a 1/32" x 45° chamfer (minimum) is recommended for the output shaft end.




** See Motor Mounting Plate Option, page 105 for details.*

### Table 1 Dimensions (mm)

| Unit | B | $b_{j6}$ | B1 | cd | Ds | Ds | Dss | e | f | H | h | Hn | ls | n | s4 | t4 | vs | Bushing Capscrews No. – Size Metric | Bushing Capscrews Tightening Torque – Nm |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| F1 | 145 | 75 | 87 | 20 | 34.5 | 34.5 | 68 | 85 | 2.5 | 238 | 74 | 176 | 170.9 | 102 | M8x1.25 | 13 | 30 | 6 – M6x25 | 10 |
| F2 | 180 | 95 | 105 | 22 | 44.5 | 44.5 | 78 | 115 | 3 | 299 | 93 | 224 | 197.4 | 131 | M8x1.25 | 13 | 39 | 8 – M6x30 | 10 |
| F3 | 206 | 110 | 120 | 30 | 48 | 48 | 84 | 130 | 3.5 | 335.5 | 106 | 255.5 | 218.9 | 149.5[1)] | M10x1.5 | 16 | 39 | 8 – M6x30 | 10 |
| F4 | 230 | 110 | 135 | 30 | 54.5 | 54.5 | 97 | 130 | 3.5 | 370 | 116 | 285[1)] | 243.1 | 169[1)] | M10x1.5 | 16 | 45 | 8 – M8x30 | 25 |
| F6 | 265 | 130 | 166 | 35 | 64.5 | 64.5 | 105 | 165 | 3.5 | 433 | 137 | 333 | 275.3 | 196 | M10x1.5 | 16 | 45 | 8 – M8x30 | 25 |

[1)] *For F303, n is 113 with ME20; For F403, n is 132 with ME20 and Hn is 248.*

### Table 2 "WF" Single Side Bushings* — Stock Bores Sizes

| Unit | Metric | | | Inches | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 20 | 30 | 35 | 3/4 | 1 | 1-3/16 | 1-1/4 | 1-3/8 | 1-7/16 | 1-1/2 | 1-5/8 | 1-11/16 | 1-3/4 | 1-7/8 | 1-15/16 | 2 |
| F1 | WF1-20 | — | — | WF1-075 | — | — | — | — | — | — | — | — | — | — | — | — |
| F2 | — | WF2-30 | — | — | WF2-100 | WF2-103 | — | — | — | — | — | — | — | — | — | — |
| F3 | — | WF3-30 | WF3-35 | — | WF3-100 | WF3-103 | WF3-104 | WF3-106 | WF3-107 | WF3-108 | — | — | — | — | — | — |
| F4 | — | — | — | — | WF4-100 | WF4-103 | WF4-104 | WF4-106 | WF4-107 | WF4-108 | — | — | — | — | — | — |
| F6** | — | — | — | — | — | — | — | — | WF5-107 | WF5-108 | WF5-110 | WF5-111 | WF5-112 | WF5-114 | WF5-115 | WF5-200 |

**A complete bushing kit includes the locking ring assembly, tapered cone, support ring, and all hardware to mount the kit into the reducer. The bushing will accept a shaft with a tolerance of +0.000/-0.005.*
*** Bushing on side 6 is only available for 2 stage gear reducers without a cover.*

### Table 3 Dimensions (mm)

| Unit | ME10 | | ME20 | | ME30 | | ME40 | | Approx. Wt. lbs. |
|---|---|---|---|---|---|---|---|---|---|
| | C | Ls | C | Ls | C | Ls | C | Ls | |
| F102 | 170 | 130 | 184 | 134 | — | — | — | — | 38 |
| F202 | 197 | 157 | 211 | 161 | 223 | 163 | — | — | 51 |
| F203 | 234 | 194 | — | — | — | — | — | — | 64 |
| F302 | 212 | 172 | 226 | 176 | 238 | 178 | — | — | 67 |
| F303 | 249 | 209 | 269 | 219 | — | — | — | — | 73 |
| F402 | — | — | 247 | 197 | 259 | 199 | 290 | 202 | 84 |
| F403 | 270 | 230 | 290 | 240 | — | — | — | — | 91 |
| F602 | — | — | 278 | 228 | 290 | 230 | 321 | 233 | 165 |
| F603 | — | — | 321 | 271 | — | — | — | — | 177 |

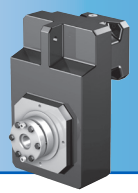
### Table 4 Motor Adapter Dimensions (mm)

| Motor Adapter | Thickness[3)] c Min. | Motor Shaft d2 Max.[2)] | X | Wt. lbs. |
|---|---|---|---|---|
| ME10 | 21 | 19 | 40 | 5 |
| ME20 | 24 | 32 | 50 | 8 |
| ME30 | 25 | 38 | 60 | 12 |
| ME40 | 33 | 48 | 88 | 18 |

[2)] *If an adapter bushing is required it will be supplied as a component of the motor mounting plate.*

[3)] *Motor plate maximum thickness (c) will vary with motor shaft length but will not be less than shown.*

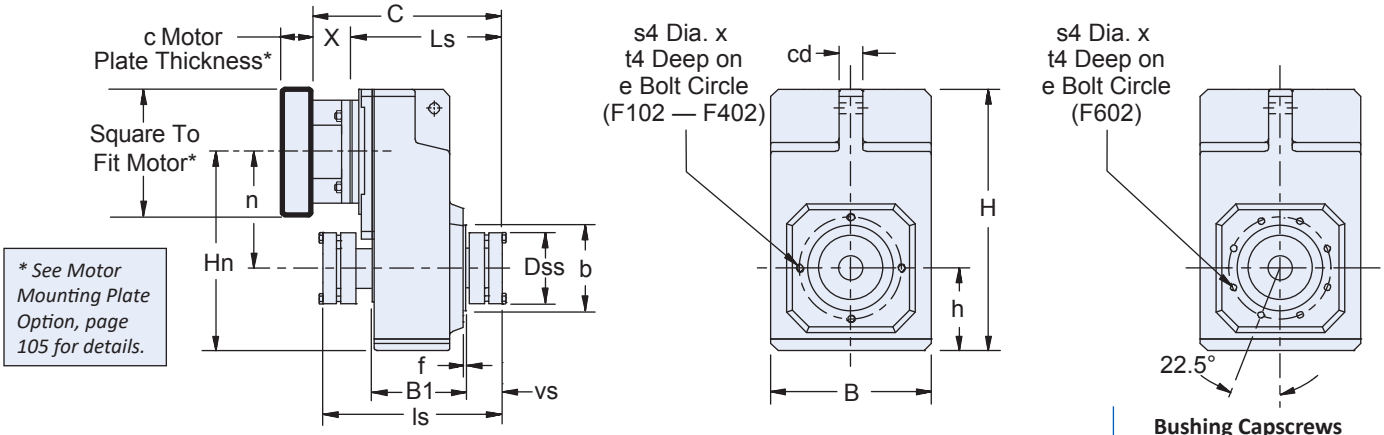
*For approximate weight, add unit weight from Table 3 and adapter weight from Table 4.*



# Dimensional Data

## "W" Double Bushing with "G" Pitch Circle Diameter (PCD) Tapped Holes — Two Stage Units Only

**Important:** For ease of installation, a 1/32" x 45° chamfer (minimum) is recommended for the output shaft end.The double bushing cannot be mounted in sizes F203, F303, F403, or F603.




### Table 1 Dimensions (mm)

| Unit | B | $b_{i6}$ | B1 | cd | Dss | e | f | H | h | Hn | ls | n | s4 | t4 | vs | Bushing Capscrews No. – Size Metric | Bushing Capscrews Tightening Torque – Nm |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| F102 | 145 | 75 | 87 | 20 | 68 | 85 | 2.5 | 238 | 74 | 176 | 170.9 | 102 | M8x1.25 | 13 | 30 | 6 – M6x25 | 10 |
| F202 | 180 | 95 | 105 | 22 | 78 | 115 | 3 | 299 | 93 | 224 | 197.4 | 131 | M8x1.25 | 13 | 39 | 8 – M6x30 | 10 |
| F302 | 206 | 110 | 120 | 30 | 84 | 130 | 3.5 | 335.5 | 106 | 255.5 | 218.9 | 149.5 | M10x1.5 | 16 | 39 | 8 – M6x30 | 10 |
| F402 | 230 | 110 | 135 | 30 | 97 | 130 | 3.5 | 370 | 116 | 285 | 243.1 | 169 | M10x1.5 | 16 | 45 | 8 – M8x30 | 25 |
| F602 | 265 | 130 | 166 | 35 | 105 | 165 | 3.5 | 433 | 137 | 333 | 275.3 | 196 | M10x1.5 | 16 | 45 | 8 – M8x30 | 25 |

### Table 2 "WFN" Double Side Bushings* — Stock Bores Sizes

| | Metric | | | | Inches | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Unit | 20 | 30 | 35 | 40 | 3/4 | 1 | 1-3/16 | 1-1/4 | 1-3/8 | 1-7/16 | 1-1/2 | 1-5/8 | 1-11/16 | 1-3/4 | 1-7/8 | 1-15/16 | 2 |
| F102 | WFN1-20 | — | — | — | WFN1-075 | — | — | — | — | — | — | — | — | — | — | — | — |
| F202 | — | WFN2-30 | — | — | — | WFN2-100 | WFN2-103 | — | — | — | — | — | — | — | — | — | — |
| F302 | — | WFN3-30 | WFN3-35 | — | — | WFN3-100 | WFN3-103 | WFN3-104 | WFN3-106 | WFN3-107 | WFN3-108 | — | — | — | — | — | — |
| F402 | — | — | — | WFN4-40 | — | WFN4-100 | WFN4-103 | WFN4-104 | WFN4-106 | WFN4-107 | WFN4-108 | — | — | — | — | — | — |
| F602 | — | — | — | WFN5-40 | — | — | — | — | — | WFN5-107 | WFN5-108 | WFN5-110 | WFN5-111 | WFN5-112 | WFN5-114 | WFN5-115 | WFN5-200 |

**A complete bushing kit includes the locking ring assembly, tapered cone, support ring, and all hardware to mount the kit into the reducer. The bushing will accept a shaft with a tolerance of +0.000/-0.005.*

### Table 3 Dimensions (mm)

| | ME10 | | ME20 | | ME30 | | ME40 | | Approx. |
|---|---|---|---|---|---|---|---|---|---|
| Unit | C | Ls | C | Ls | C | Ls | C | Ls | Wt. lbs. |
| F102 | 170 | 130 | 184 | 134 | — | — | — | — | 38 |
| F202 | 197 | 157 | 211 | 161 | 223 | 163 | — | — | 51 |
| F302 | 212 | 172 | 226 | 176 | 238 | 178 | — | — | 67 |
| F402 | — | — | 247 | 197 | 259 | 199 | — | — | 84 |
| F602 | — | — | 278 | 228 | 290 | 230 | 321 | 233 | 165 |

*For approximate weight, add unit weight from Table 3 and adapter weight from Table 4.*

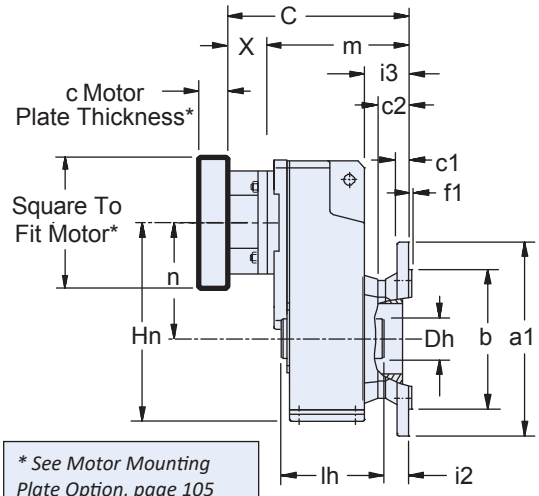
### Table 4 Motor Adapter Dimensions (mm)

| Motor Adapter | Thickness [3] c Min. | Motor Shaft d2 Max. [2] | X | Wt. lbs. |
|---|---|---|---|---|
| ME10 | 21 | 19 | 40 | 5 |
| ME20 | 24 | 32 | 50 | 8 |
| ME30 | 25 | 38 | 60 | 12 |
| ME40 | 33 | 48 | 88 | 18 |

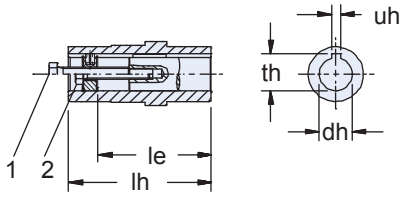
*[2] If an adapter bushing is required it will be supplied as a component of the motor mounting plate.*

*[3] Motor plate maximum thickness (c) will vary with motor shaft length but will not be less than shown.*

## "A" Hollow Output with "F" Output Flange — All Sizes



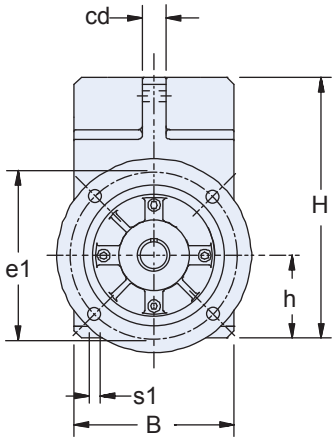

** See Motor Mounting Plate Option, page 105 for details.*




*1. Removal Bolt: not supplied. See Installation Guide for details.*

*2. Mounting Bolt: must be smaller than removal bolt.*

*See installation guide for installation of hollow output.*




### Table 1 Dimensions (mm)

| Unit | a1 | B | $b_{j6}$ | c1 | c2 | cd | Dh | e1 | f1 | H | h | Hn | i2 | i3 | le | lh | s1 | n |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| F1 | 160 | 145 | 110 | 10 | 32 | 20 | 35 | 130 | 3.5 | 238 | 74 | 176 | 25.5 | 44.5 | 73 | 95 | 9 | 102 |
| F2 | 200 | 180 | 130 | 14 | 38 | 22 | 45 | 165 | 3.5 | 299 | 993 | 224 | 30 | 53 | 92 | 115 | 11 | 131 |
| F3 | 250 | 206 | 180 | 15 | 40 | 30 | 50 | 215 | 4 | 335.5 | 106 | 255.5[1)] | 31.5 | 56.5 | 103 | 130 | 14 | 149.5[1)] |
| F4 | 250 | 230 | 180 | 15 | 40 | 30 | 55 | 215 | 4 | 370 | 116 | 285[1)] | 31.5 | 56.5 | 114 | 145 | 14 | 169[1)] |
| F6 | 300 | 265 | 230 | 17 | 40 | 35 | 70 | 265 | 4 | 433 | 137 | 333 | 29.5 | 60.5 | 143 | 180 | 14 | 196 |

*[1)] For F303, Hn is 219 and n is 113 with ME20 For F403, Hn is 248 and n is 132 with ME20*

### Table 2 "A" Hollow Bore Dimensions (mm)

| | Standard Bore - inches | | | Optional Bore* - mm | | |
|---|---|---|---|---|---|---|
| Unit | $dh_{g7}$ | th | uh | $dh_{H7}$ | th | $uh_{JS9}$ |
| F1 | 0.750 | 0.84 | 0.187 | 20 | 22.8 | 6 |
| F2 | 1.000 | 1.12 | 0.250 | 25 | 28.3 | 8 |
| F3 | 1.250 | 1.37 | 0.250 | 30 | 33.3 | 8 |
| F4 | 1.500 | 1.67 | 0.375 | 40 | 43.3 | 12 |
| F6 | 2.000 | 2.23 | 0.500 | 50 | 53.8 | 14 |

**Metric output available on request.*

*For approximate weight, add unit weight from Table 3 and adapter weight from Table 4.*

### Table 3 Dimensions (mm)

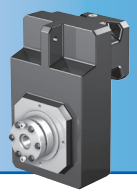
| | ME10 | | ME20 | | ME30 | | ME40 | | Approx. |
|---|---|---|---|---|---|---|---|---|---|
| Unit | C | m | C | m | C | m | C | m | Wt. lbs. |
| F102 | 169.5 | 129.5 | 183.5 | 133.5 | — | — | — | — | 38 |
| F202 | 193 | 153 | 207 | 157 | 219 | 159 | — | — | 51 |
| F203 | 230 | 190 | — | — | — | — | — | — | 64 |
| F302 | 209.5 | 169.5 | 223.5 | 173.5 | 235.5 | 175.5 | — | — | 67 |
| F303 | 246.5 | 206.5 | 266.5 | 216.5 | — | — | — | — | 73 |
| F402 | — | — | 238.5 | 188.5 | 250.5 | 190.5 | 281.5 | 193.5 | 84 |
| F403 | 261.5 | 221.5 | 281.5 | 231.5 | — | — | — | — | 91 |
| F602 | — | — | 269.5 | 219.5 | 281.5 | 221.5 | 312.5 | 224.5 | 165 |
| F603 | — | — | 312.5 | 262.5 | — | — | — | — | 177 |

### Table 4 Motor Adapter Dimensions (mm)

| Motor Adapter | Thickness[3)] c Min. | Motor Shaft d2 Max.[2)] | X | Wt. lbs. |
|---|---|---|---|---|
| ME10 | 21 | 19 | 40 | 5 |
| ME20 | 24 | 32 | 50 | 8 |
| ME30 | 25 | 38 | 60 | 12 |
| ME40 | 33 | 48 | 88 | 18 |

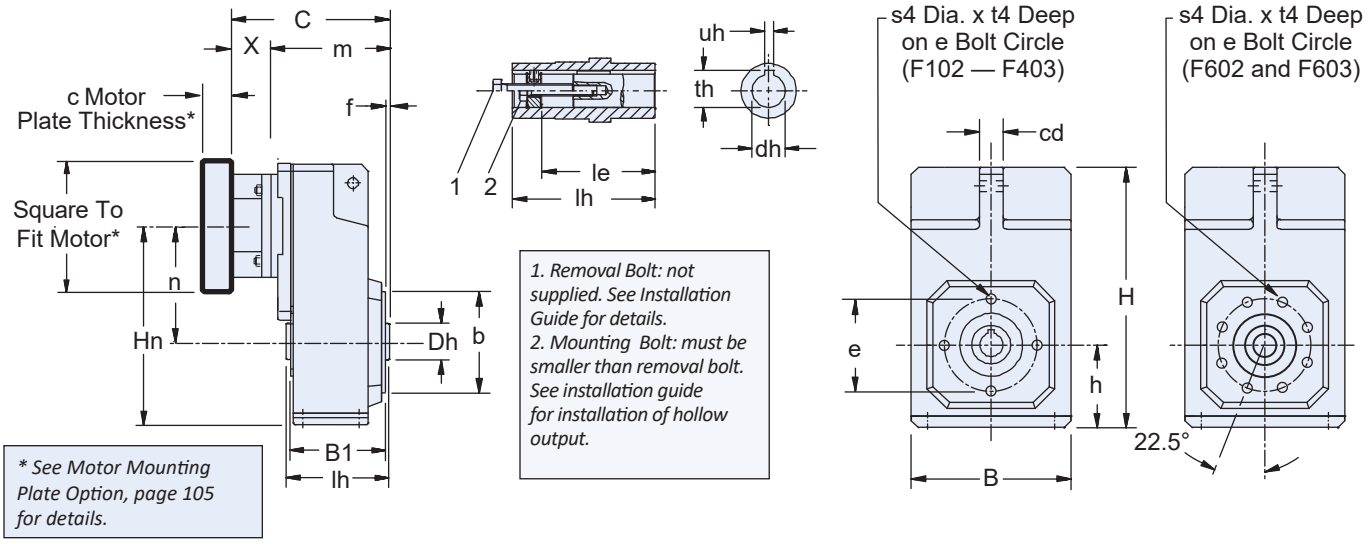
*[2)] If an adapter bushing is required it will be supplied as a component of the motor mounting plate.*

*[3)] Motor plate maximum thickness (c) will vary with motor shaft length but will not be less than shown.*



# Dimensional Data

## "A" Hollow Output with "G" Pitch Circle Diameter (PCD) Tapped Holes — All Sizes




*1. Removal Bolt: not supplied. See Installation Guide for details.*
*2. Mounting Bolt: must be smaller than removal bolt. See installation guide for installation of hollow output.*

** See Motor Mounting Plate Option, page 105 for details.*

### Table 1 "Dimensions (mm)

| Unit | B | B1 | $b_{j6}$ | cd | Dh | e | f | H | h | Hn | le | lh | n | s4 | t4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| F1 | 145 | 87 | 70 | 20 | 35 | 85 | 2.5 | 238 | 74 | 176 | 73 | 95 | 102 | M8x1.25 | 13 |
| F2 | 180 | 105 | 95 | 22 | 45 | 115 | 3 | 299 | 93 | 224 | 92 | 115 | 131 | M8x1.25 | 13 |
| F3 | 206 | 120 | 110 | 30 | 50 | 130 | 3.5 | 335.5 | 106 | 255.5[1)] | 103 | 130 | 149.5[1)] | M10x1.5 | 16 |
| F4 | 230 | 135 | 110 | 30 | 55 | 130 | 3.5 | 370 | 116 | 285[1)] | 114 | 145 | 169[1)] | M10x1.5 | 16 |
| F6 | 265 | 166 | 130 | 35 | 70 | 165 | 3.5 | 433 | 137 | 333 | 143 | 180 | 196 | M10x1.5 | 16 |

*[1)] For F303, Hn is 219 with ME20 and n is 113; For F403, Hn is 248 with ME20 and n is 132*

### Table 2 "A" Hollow Bore Dimensions (mm)

| | Standard Bore - inches | | | Optional Bore* - mm | | |
|---|---|---|---|---|---|---|
| Unit | $dh_{g7}$ | th | uh | $dh_{H7}$ | th | $uh_{JS9}$ |
| F1 | 0.750 | 0.84 | 0.187 | 20 | 22.8 | 6 |
| F2 | 1.000 | 1.12 | 0.250 | 25 | 28.3 | 8 |
| F3 | 1.250 | 1.37 | 0.250 | 30 | 33.3 | 8 |
| F4 | 1.500 | 1.67 | 0.375 | 40 | 43.3 | 12 |
| F6 | 2.000 | 2.23 | 0.500 | 50 | 53.8 | 14 |

**Metric output available on request.*

*For approximate weight, add unit weight from Table 3 and adapter weight from Table 4.*

### Table 3 Dimensions (mm)

| | ME10 | | ME20 | | ME30 | | ME40 | | Approx. |
|---|---|---|---|---|---|---|---|---|---|
| Unit | C | m | C | m | C | m | C | m | Wt. lbs. |
| F102 | 144 | 104 | 158 | 108 | — | — | — | — | 38 |
| F202 | 163 | 123 | 177 | 127 | 189 | 129 | — | — | 51 |
| F203 | 200 | 160 | — | — | — | — | — | — | 64 |
| F302 | 178 | 138 | 192 | 142 | 204 | 144 | — | — | 67 |
| F303 | 215 | 175 | 235 | 185 | — | — | — | — | 73 |
| F402 | — | — | 207 | 157 | 219 | 159 | 250 | 162 | 84 |
| F403 | 230 | 190 | 250 | 200 | — | — | — | — | 91 |
| F602 | — | — | 240 | 190 | 252 | 192 | 283 | 195 | 165 |
| F603 | — | — | 283 | 233 | — | — | — | — | 177 |

### Table 4 Motor Adapter Dimensions (mm)

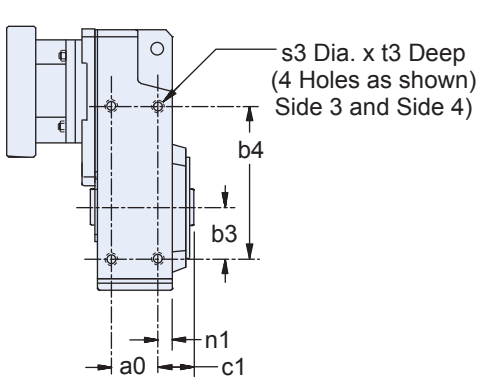
| Motor Adapter | Thickness[3)] c Min. | Motor Shaft d2 Max.[2)] | X | Wt. lbs. |
|---|---|---|---|---|
| ME10 | 21 | 19 | 40 | 5 |
| ME20 | 24 | 32 | 50 | 8 |
| ME30 | 25 | 38 | 60 | 12 |
| ME40 | 33 | 48 | 88 | 18 |

*[2)] If an adapter bushing is required it will be supplied as a component of the motor mounting plate.*

*[3)] Motor plate maximum thickness (c) will vary with motor shaft length but will not be less than shown.*

## "A" Hollow Output with "NG" Foot Mounting — All Sizes

*See Rubber Buffer Option below for mounting torque arms.*



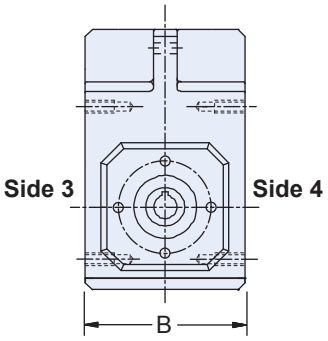




**Table 1** Dimensions (mm)

| Unit | a0 | B | b3 | b4 | c1 | n1 | s3 | t3 |
|---|---|---|---|---|---|---|---|---|
| F1 | 50 | 142 | 40 | 140 | 29 | 10 | M6 | 11 |
| F2 | 64 | 176 | 55 | 175 | 33.5 | 10.5 | M8 | 13 |
| F3 | 72 | 204 | 60 | 200 | 37.5 | 12.5 | M10 | 16 |
| F4 | 87 | 228 | 70 | 220 | 37.5 | 12.5 | M10 | 16 |
| F6 | 108 | 262 | 85 | 270 | 46.5 | 15.5 | M12 | 19 |

## Rubber Buffer Option

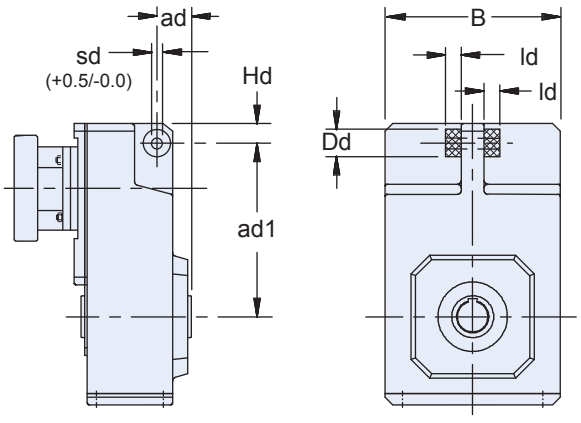
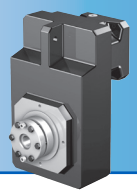



**Table 2** "Rubber Buffer Dimensions (mm)

| Unit | Part No. | ad | ad1 | B | Dd | Hd | ld | sd |
|---|---|---|---|---|---|---|---|---|
| F1 | 25192 | 35 | 150 | 142 | 30 | 14 | 15 | 11 |
| F2 | 25192 | 40 | 181 | 176 | 30 | 25 | 15 | 11 |
| F3 | 25193 | 45 | 205 | 204 | 40 | 24.5 | 20 | 12.5 |
| F4 | 25193 | 45 | 228 | 228 | 40 | 26 | 20 | 12.5 |
| F6 | 25194 | 55 | 270 | 262 | 60 | 26 | 30 | 21 |

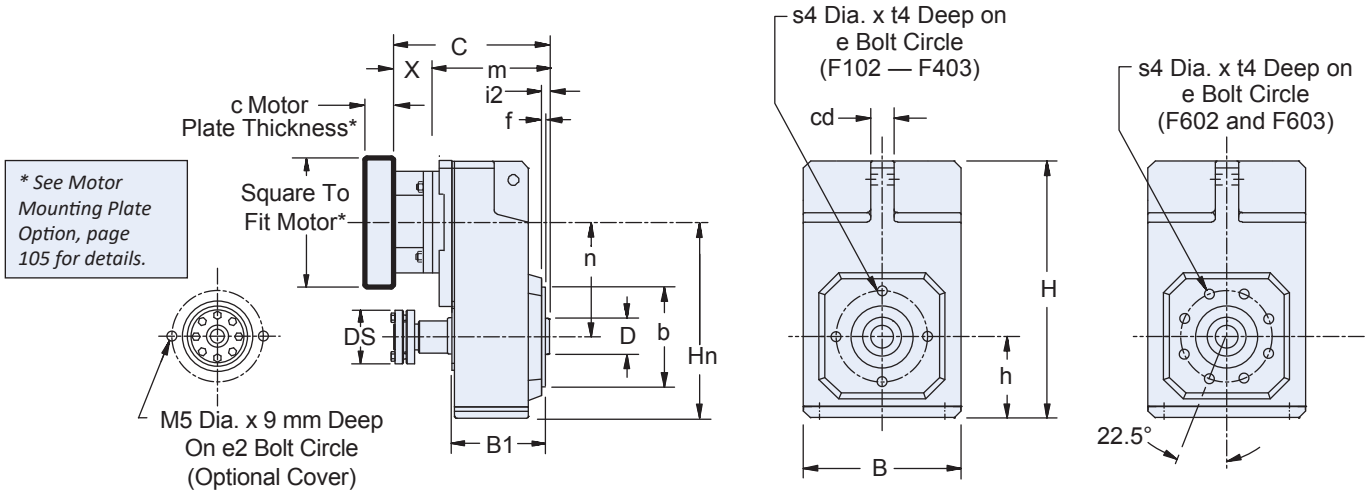
*Order two (2) rubber buffers for each unit.*

*Torque arms are not supplied by STOBER.*

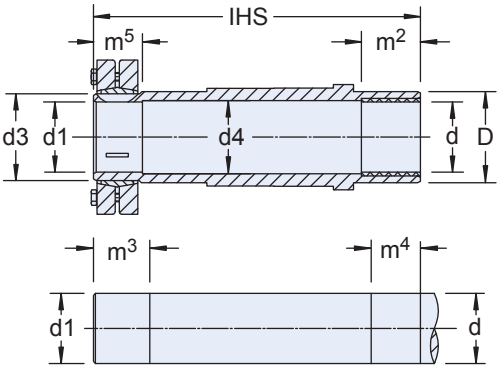


# Dimensional Data

## "S" Shrink Ring with "G" Pitch Circle Diameter (PCD) Tapped Holes — All Sizes




** See Motor Mounting Plate Option, page 105 for details.*




*See Installation Guide for shrink ring installation.*

### Table 1 Shaft Dimensions (mm)

| Unit | B | B1 | $b_{j6}$ | cd | $d_{h9}$ | D | Bore d H7 | Shaft d1 h9 | d3 | d4 |
|---|---|---|---|---|---|---|---|---|---|---|
| F1 | 145 | 87 | 70 | 20 | 20 | 35 | 20 | 20 | 24 | 20.5 |
| F2 | 180 | 105 | 95 | 22 | 25 | 45 | 25 | 25 | 30 | 25.5 |
| F3 | 206 | 120 | 110 | 30 | 30 | 50 | 30 | 30 | 36 | 30.5 |
| F4 | 230 | 135 | 110 | 30 | 40 | 55 | 40 | 40 | 50 | 40.5 |
| F6 | 265 | 166 | 130 | 35 | 50 | 70 | 50 | 50 | 62 | 50.5 |

### Table 2 Dimensions (mm)

| Unit | DS | e | e2 | f | H | h | Hn | i2 | IHS | $m^2$ | $m^3$ | $m^4$ | $m^5$ | n | s4 | t4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| F1 | 50 | 85 | 58 | 2.5 | 238 | 74 | 176 | 6.5 | 146 | 20 | 31 | 25 | 26 | 102 | M8x1.25 | 13 |
| F2 | 60 | 115 | 72 | 3 | 299 | 93 | 224 | 8 | 175 | 20 | 37 | 25 | 32 | 131 | M8x1.25 | 13 |
| F3 | 72 | 130 | 78 | 3.5 | 335.5 | 106 | 255.5 | 8.5 | 192 | 25 | 37 | 30 | 32 | 149.5 | M10x1.5 | 16 |
| F4 | 90 | 130 | 83 | 3.5 | 370 | 116 | 285[2] | 8.5 | 210 | 40 | 45 | 45 | 40 | 169[1] | M10x1.5 | 16 |
| F6 | 106 | 165 | 102 | 3.5 | 433 | 137 | 333 | 10.5 | 248 | 40 | 47 | 45 | 42 | 196 | M10x1.5 | 16 |

[1] *For F303, Hn is 219 with ME20 and n is 113; For F403, Hn is 248 with ME20 and n is 132*

### Table 3 Dimensions (mm)

| | ME10 | | ME20 | | ME30 | | ME40 | | Approx. |
|---|---|---|---|---|---|---|---|---|---|
| Unit | C | m | C | m | C | m | C | m | Wt. lbs. |
| F102 | 144 | 104 | 158 | 108 | — | — | — | — | 38 |
| F202 | 163 | 123 | 177 | 127 | 189 | 129 | — | — | 51 |
| F203 | 200 | 160 | — | — | — | — | — | — | 64 |
| F302 | 178 | 138 | 192 | 142 | 204 | 144 | — | — | 67 |
| F303 | 215 | 175 | 235 | 185 | — | — | — | — | 73 |
| F402 | — | — | 207 | 157 | 219 | 159 | 250 | 162 | 84 |
| F403 | 230 | 190 | 250 | 200 | — | — | — | — | 91 |
| F602 | — | — | 240 | 190 | 252 | 192 | 283 | 195 | 165 |
| F603 | — | — | 283 | 233 | — | — | — | — | 177 |

### Table 4 Motor Adapter Dimensions (mm)

| Motor Adapter | Thickness[3] c Min. | Motor Shaft d2 Max.[2] | X | Wt. lbs. |
|---|---|---|---|---|
| ME10 | 21 | 19 | 40 | 5 |
| ME20 | 24 | 32 | 50 | 8 |
| ME30 | 25 | 38 | 60 | 12 |
| ME40 | 33 | 48 | 88 | 18 |

[2] *If an adapter bushing is required it will be supplied as a component of the motor mounting plate.*

[3] *Motor plate maximum thickness (c) will vary with motor shaft length but will not be less than shown.*

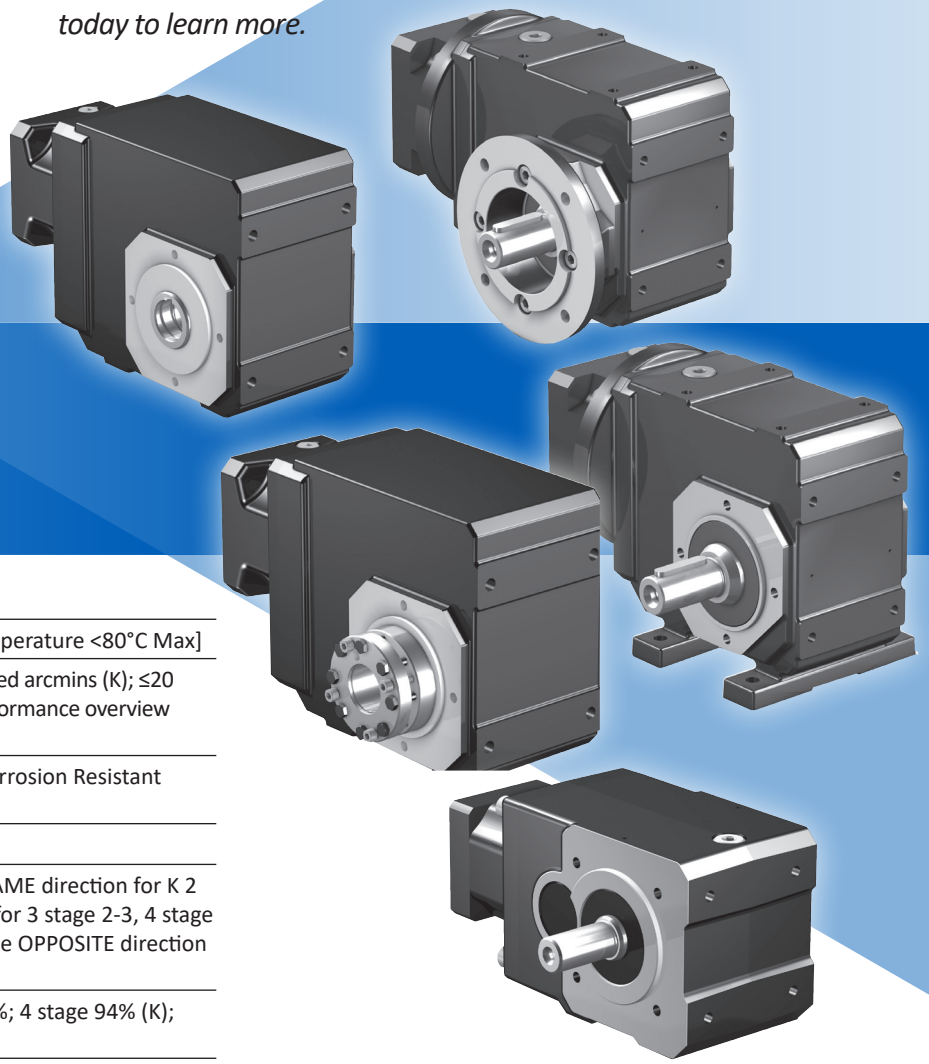
*For approximate weight, add unit weight from Table 3 and adapter weight from Table 4.*

# K/KL Series: RIGHT ANGLE — Versatile Outputs

## K Features

- 4:1 to 381:1 ratios (K) or 4:1 to 32:1 ratios (KL) (higher ratios available. Contact STOBER.)
- Quiet running (<51dB(A))
- Reduced backlash option for increased precision (K)
- Symmetrical design for universal mounting (KL)
- Mounting flexibility to fit the application
- Adaptability: shafts available in metric or imperial, carbon or stainless steel to meet your requirements
- Optional food and corrosion resistant package
- Dual seals for extreme duty applications
- Error free motor mounting and quick changeover with toleranced pilot on motor plate
- Magnetic oil filtration to remove contaminants to prevent breakdowns
- Build and ship in one day
- Assembled in the USA

*STOBER K Series helical/bevel gear drives are the most versatile Servo right angle gearheads. With mounting flexibility and a variety of output options, they are **the** optimal drive when you need configuration choices. The K hollow bore can easily replace a belt and pulley, eliminating additional components and accessories. Every gearbox is made to order. STOBER will custom whatever you need to fit your application. Contact us today to learn more.*



SHIPS in 1 DAY!
NO EXPEDITE FEE FOR 24 HOUR SERVICE

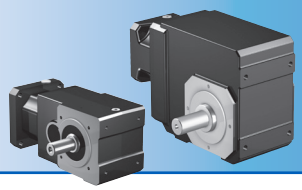
## General Specifications

| | |
|---|---|
| **Ambient Temperature** | 0°C to +40°C (104°F) [Unit temperature <80°C Max] |
| **Backlash** | ≤10 standard arcmins, ≤4 reduced arcmins (K); ≤20 standard arcmins (KL); (see performance overview chart, (see page 123) |
| **Coating** | Standard Black (RAL-9005), Corrosion Resistant option, Food option |
| **Degree of Protection** | IP65 |
| **Direction of Rotation** | Input and output rotate the SAME direction for K 2 stage, 3 stage, 5-10, opposite for 3 stage 2-3, 4 stage (K); Input and output rotate the OPPOSITE direction (KL); (see page 122) |
| **Efficiency** | 1 and 2 stage 97%; 3 stage 96%; 4 stage 94% (K); 97% (KL) |
| **Input RPM** | Up to 6,000 RPM |
| **Installation** | Requires 10.9 fasteners for tapped holes housing. See page 288 for more information |
| **Lubrication** | Lubricated for life* - standard Mobil 600XP200, option food grade Mobil SHC CIBUS 220 |
| **Mounting Position** | Must be specified, (see page 123) (K); unrestricted (KL) |
| **Warranty** | 5 Year Limited (2 Years on normal wear items: bearings, seals, etc.) |

** Scheduled lubrication is required for some larger frame K Series units (excluding F Food Duty and B Corrosion Resistant option). See page 124 for lubrication details.*

### Benefits of NEW ME Motor Adapters

- Higher torques
- Higher input speeds
- More compact with square coupling housing
- More clamp ring options, so less need for adapter bushings
- Clamp ring with roll pin



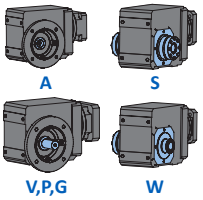
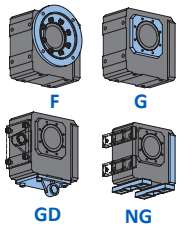
# Overview

## Selection Options *At-a-Glance*

Using the **Selection Data** table later in this section, select the K/KL Series Gearhead with the appropriate performance and design options tailored to your motor choice and exact application requirements. Use the part number guide below as a reference to build a part number for the complete gearhead assembly.

**Part Number Examples:**

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | |
|---|---|---|---|---|---|---|---|---|---|
| K | 1 | 0 | 2 | V | NG | 0040 | ME10 | B | EL1 * |
| KL | 1 | 0 | 2 | P | N | 0040 | MQ | F | |

| | Design Option | | Part Number Code | Description |
|---|---|---|---|---|
| 1 | **Series** | | K | Right angle helical/bevel |
| | | | KL | Compact right angle helical/bevel (size 1 and 2 only) |
| 2 | **Size** | | 1 2 3 4 5<br>6 7 8 9 10 | 10 sizes of gearhead (KL sizes 1 and 2 only) |
| 3 | **Generation** | | 0 1 | Version of gearhead |
| 4 | **# of Stages** | | 2 | Two stage (determined by ratio) |
| | | | 3 | Three stage (determined by ratio) |
| | | | 4 | Four stage (determined by ratio |
| 5 | **Output** |  A S V,P,G W | A | Hollow bore* |
| | | | S | Shrink ring* — (specify side 3 or 4) |
| | | | V | Shaft output* — K Series only (specify side 3 and/or 4) |
| | | | P | Shaft with key* — KL Series only (specify side 3 or 4) |
| | | | G | Shaft without key* — KL Series only (specify side 3 or 4) — metric only |
| | | | W | Single or double wobble-free bushing* — KL2 & K1-8 only (If single bushing, specify side 3 or 4) |
| 6 | **Housing** |  F G GD NG | F | Output Flange (Round for K series, Square for KL) (side 3 or 4 only, please specify) |
| | | | G | Pitch Circle Diameter (PCD) tapped holes |
| | | | GD | Tear drop bracket - KL2 series only<br>Torque arm bracket mounting - K series only, specify bracket placement - side 1 or 5, also on K1 side 2 |
| | | | NG | Foot mounting — (side 1 or 5 only; or side 2 on size K1, please specify) |
| 7 | **Ratio** | | 0040 | Ratios range from 4:1 to 32:1 for KL Series and 4:1 to 381:1 for K Series (0040=4:1; 0063=6.3:1; 2700=270:1) |
| 8 | **Motor Adapter** | | MQ | MQ input for KL Series |
| | | | ME10 – ME50 | ME 5 input sizes for K Series (see also motor mounting plate option, page 168) |
| 9 | **Special Options** | | B | Add when ordering Corrosion Resistant Duty |
| | | | F | Add when ordering Food Duty (size KL1 and 2; K1 thru K9 only) |
| * | **Mounting Position** | | EL1 EL2 EL3 EL4<br>EL5 EL6 | Required special instruction for all K Series units only, see page 123 |

## Options

### ME Adapter Option — K Series only

- MSS1 Seal – special input seal for longer life. Contact factory for this option.
- Peak Torque Booster – pinion securing element for shock loads, increasing peak torque up to 80%.

### Lubrication Options

- Food grade or synthetic optionally available. Contact factory for this option.

### Integrated Safety Brake

- ServoStop – provides dynamic braking during power failures or emergency stops in hazardous situations. Contact factory for this option.

### Coating Option

- Corrosion Resistant Duty (**B** special option)
- Food Duty (**F** special option)

Food and Corrosion Resistant units are lubricated for life with double output seals (where possible), stainless output shaft, bore, or bushing, and heat cured paint.

### ATEX — K Series only

- ATmosphere EXplosible – rated for explosive environments. Contact factory for this option and allow additional time for delivery.

## K/KL Series Performance Overview

K/KL Series performance is dependent on several factors including duty cycle, bearing design, gearhead size and stage configuration, among others. Use the chart below for preliminary evaluation, then use the following performance chart and selection information on the following pages for specific performance sizing and selection.

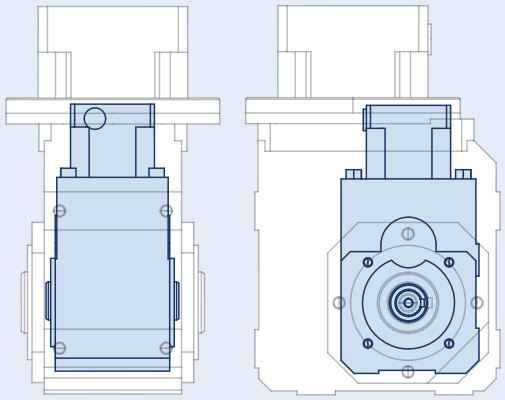
| | | | Size/Generation | KL10 | KL20 | K10 | K20 | | K30 | | K40 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | # of Stages | 2 | 2 | 2 | 2 | 3 | 2 | 3 | 2 | 3 |
| **Permissible Acceleration Torque** $M_{2BMAX}$ | | | Nm | 32 | 65 | 135 | 220 | | 385 | | 600 | |
| **Output Torque Nom.** $M_{2N}$ | | | Nm | 25 | 50 | 120 | 200 | | 350 | | 550 | |
| **Torsional Stiffness** $C_2$ | | | Nm/arcmin | ≤1.8 | ≤3.9 | ≤6.8 | ≤11.0 | | ≤16.0 | | ≤31.0 | |
| **Torsional Backlash** [1] $\Delta\phi$ | arcmin | Standard | | ≤25 | ≤20 | ≤10 | ≤10 | ≤10 | ≤10 | ≤10 | ≤10 | ≤10 |
| | | Reduced | | — | — | ≤5 | ≤5 | ≤6 | ≤4 | ≤5 | ≤4 | ≤5 |
| **Input Speed Max.** $n_{1MAX}$ | Continuous | EL3, 4, 5, 6 | | 4000 | 4000 | 4000 | 4000 | | 3800 | | 3600 | |
| | | EL1,2 | | 4000 | 4000 | 4000 | 3900 | | 3500 | | 3300 | |
| | Cyclic | | | 6000 | 6000 | 7000 | 6500 | | 6000 | | 5500 | |
| **Efficiency (@nom torque)** | | | % | 97 | 97 | 97 | 97 | 96 | 97 | 96 | 97 | 96 |
| **Weight** | | | kg | 6.3 | 9.5 | 14.0 | 18.1 | 24.0 | 30.4 | 33.1 | 42.1 | 45.3 |
| | | | lbs | 14 | 21 | 31 | 40 | 53 | 67 | 73 | 93 | 100 |
| **Noise** [2] | | | dB(A) | ≤59 | ≤65 | ≤65 | ≤53 | | ≤53 | | ≤51 | |
| **Axial Load Max.** $F_{2AMAX}$ | Solid Shaft | | N | 280 | 560 | 1900 | 2100 | | 2400 | | 3500 | |
| | Hollow Bore | | N | 250 | 560 | 1900 | 2100 | | 2400 | | 3500 | |
| **Radial Load Max.** [3] $F_{2RMAX}$ | | | N | 1900 | 2800 | 5000 | 6000 | | 7000 | | 11,200 | |
| **Tilting Moment Max.** [3] $M_{2KMAX}$ | Solid Shaft | | Nm | 43 | 118 | 360 | 430 | | 525 | | 1050 | |
| | Hollow Bore | | Nm | 43 | 118 | 240 | 310 | | 380 | | 740 | |

[1] *Tested at 1.5% of nominal torque and recorded on the output side of the gearhead. For lower backlash, contact STOBER technical support.*

[2] *Measurement at one (1) meter distance with input speed ($n_1$) of 1500 RPM. To calculate torque at higher input speeds, contact the factory.*

[3] *Rating based on output speed ($n_2$) of 20 RPM for K Series, 100 RPM for KL Series. For values at other speeds see page 126.*

## KL Series for a Compact Fit



*Size comparison of KL102 with K102*

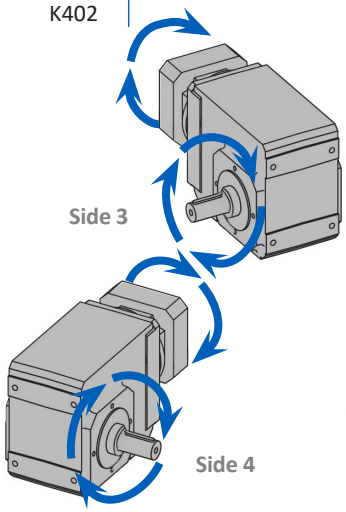
The STOBER KL Series is a much more compact version of the K Series. Available in 4:1 to 32:1 ratios with backlash of <16 arcmins, the KL Series offers an alternative right angle helical/bevel gearhead for smaller gearhead size applications. Like the K Series, the KL is available in hollow, solid shaft, and wobble free bushing output options.

All units are lubricated for life with synthetic oil. Food grade oil available.

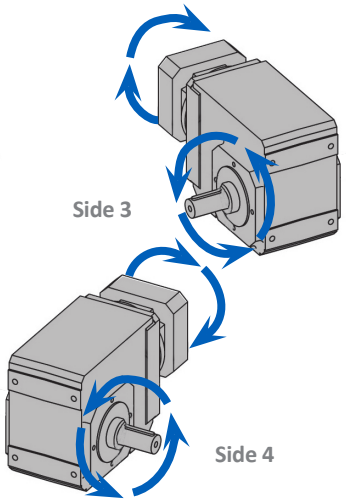
## K/KL Series Direction of Rotation

Output available on side 3, 4 or both. Note: With a double output, the shaft rotation of Side 3 will be the OPPOSITE direction of Side 4 when viewed from Side 5.

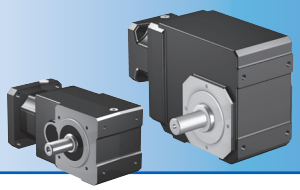
| 2 Stage | 3 Stage | |
|---|---|---|
| K102 | K513 | K813 |
| K202 | K613 | K913 |
| K302 | K713 | K1013 |
| K402 | | |




| 2 Stage | 3 Stage | 4 Stage | |
|---|---|---|---|
| KL102 | K203 | K514 | K814 |
| KL202 | K303 | K614 | K914 |
| | K403 | K714 | K1014 |

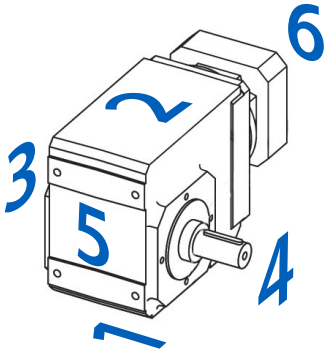


# Overview



| | K51 | | K61 | | K71 | | K81 | | K91 | | K101 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 | 3 | 4 |
| | 1000 | | 1600 | | 2600 | | 4650 | | 7700 | | 13,200 | |
| | 900 | | 1450 | | 2400 | | 4200 | | 7000 | | 11,893 | 12,000 |
| | ≤50.0 | | ≤82.0 | | ≤126.0 | | ≤196.0 | | ≤379.0 | | ≤724.0 | ≤725.0 |
| | ≤10<br>≤5 | ≤10<br>≤6 | ≤10<br>≤5 | ≤10<br>≤6 | ≤10<br>≤5 | ≤10<br>≤6 | ≤10<br>≤5 | ≤10<br>≤6 | ≤10<br>≤5 | | ≤10<br>≤5 | |
| | 3400 | | 3100 | | 2900 | | 2800 | | 2600 | | 2500 | |
| | 3000 | | 2800 | | 2600 | | 2500 | | 2500 | | 2300 | |
| | 5000 | | 4500 | | 4200 | | 4000 | | 3800 | | 3500 | |
| | 96 | 94 | 96 | 94 | 96 | 94 | 96 | 94 | 96 | 94 | 96 | 94 |
| | 48.0<br>106 | 49.4<br>109 | 77.0<br>170 | 80.2<br>177 | 100.1<br>221 | 106.0<br>234 | 140.0<br>309 | 149.9<br>331 | 230.1<br>508 | 240.1<br>530 | 477.9<br>1055 | 488.8<br>1079 |
| | ≤61 | | ≤61 | | ≤59 | | ≤65 | | ≤65 | | ≤65 | |
| | 3500 | | 4000 | | 5500 | | 7250 | | 16,500 | | 25,000 | |
| | 2500 | | 3000 | | 4100 | | 5300 | | 7000 | | 9000 | |
| | 13,450 | | 16,000 | | 22,000 | | 29,000 | | 65,000 | | 80,000 | |
| | 1580 | | 1960 | | 3200 | | 3800 | | 11,200 | | 15,200 | |
| | 1000 | | 1300 | | 2100 | | 2600 | | 3600 | | 5000 | |

**K units have the shaft on Side 3 and/or Side 4 (shown). IMPORTANT: Shaft side must be specified when ordering.**

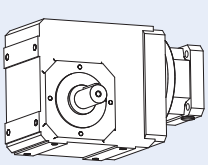



## K Series Mounting Position Options

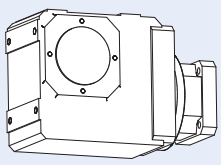
**(KL units have unrestricted positioning)**

**When ordering, the Mounting Position MUST BE SPECIFIED using one of the Mounting Position order codes below.**

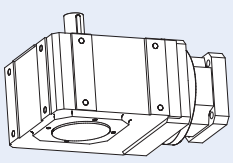
*Note: the code relates to the orientation side that faces down. For example, EL1 has side 1 facing down, EL2 has side 2 facing down, etc.*



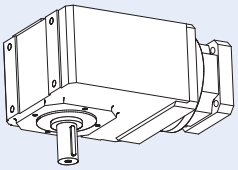
EL1



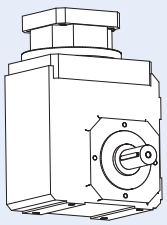
EL2



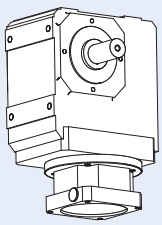
EL3



EL4



EL5



EL6

## K/KL Series Motor Mounting Plate Option (Motor information required with Motor Adapter option)

STOBER Servo Gearheads fit the motor of your choice with the appropriate motor mounting plate assembled between the motor and the gearhead.

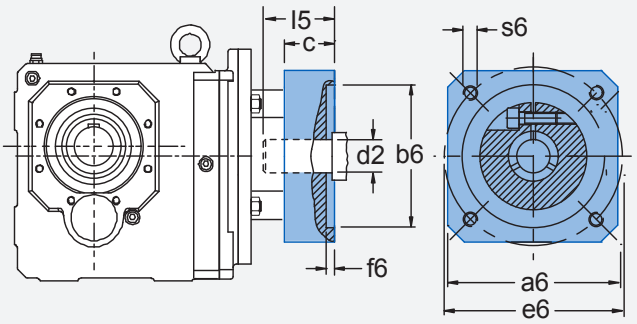
**NOTE: When ordering a gearhead:**

- Specify the motor manufacturer and part number
- Provide the motor drawing with dimensions, or specify the motor mounting dimensions (per the list shown at right)

For a precise dimension on a specific motor, or for general assistance, we recommend you contact STOBER Technical Support.

### Customer Required Dimensions for Properly Sized Motor Mounting Plate

| | |
|---|---|
| d2 | Motor Shaft Diameter (If an adapter bushing is required it will be supplied with the motor plate.) |
| b6 | Pilot Diameter |
| e6 | Bolt Circle Diameter |
| s6 | Bolt Diameter |
| l5 | Motor Shaft Length |
| f6 | Pilot Length |
| a6 | Square Flange (Optional – motor plate will typically be made to match this dimension.) |

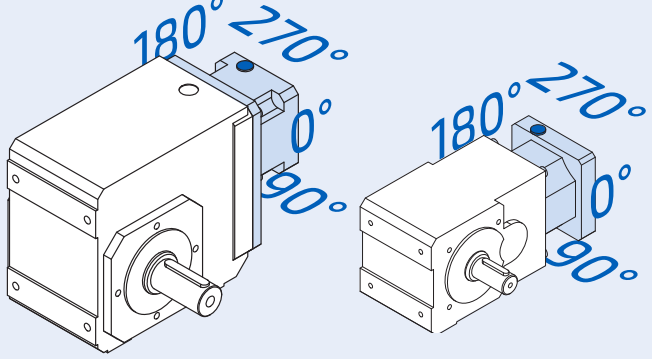



| Motor Mounting Plate Dimensions — mm(Gearhead Part Number Specific) | KL1_MQ | KL2_MQ ME10 | ME20 | ME30 | ME40 | ME50 |
|---|---|---|---|---|---|---|
| Maximum Allowed Motor Shaft Dia. d2 | 16 | 19 | 32 | 38 | 48 | 60 |
| Minimum Allowed Motor Plate Thickness c* | 15 | 21 | 24 | 25 | 33 | 43 |

** Note that the c motor plate thickness is determined by the motor shaft length. The minimum motor plate thickness is the value listed.*

## K/KL Series Motor Mounting Plate Access Hole

Access to the clamping screw for the motor coupling is located on the 270° side of the motor mounting plate at the location shown. If necessary, the motor mounting plate can be rotated in the field, if a 0°, 90° or 180° orientation for the access hole is desirable.

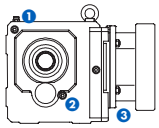



K Series KL Series

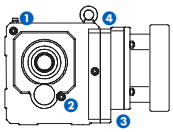
## K Series Lubrication Maintenance

With STOBER reducers very little maintenance is required under normal operating conditions. Units K102 thru K403 are supplied without breathers and are lubricated for life and maintenance free. Breathers are provided on standard units K513 thru K1014, located as shown to the right*. STOBER recommends changing the lubrication in breather supplied units after 10,000 hours for normal operating conditions or every 5000 hours for wet operating conditions.

**K513/K514 and larger units with the Food & Corrosion Resistant option exclude a breather. Contact STOBER for details.*




**3 Stage Units**
(K513 thru K1013)

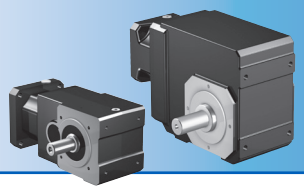



**4 Stage Units**
(K514 thru K1014)

### Drain Plug and Vent Location

| Mounting Position | | 1 | 2 * | 2a * | 3 | 4 |
|---|---|---|---|---|---|---|
| EL1 | | Vent | | | Drain | |
| EL2 | | Drain | | | Vent | |
| EL3 | | | Vent | Drain | | |
| EL4 | | | Drain | Vent | | |
| EL5 | K513-K1013 | Drain | | | Vent | |
| | K514-K1014 | Drain | | | | Vent |
| EL6 | K513-K1013 | Vent | | | Drain | |
| | K514-K1014 | Vent | | | | Drain |

** Position 2a is on the opposite side of 2.*



# Overview

## K/KL Series Output Options

Diameters in **BOLD BLUE** are configurations readily available from inventory. Contact STOBER for delivery on other output sizes.

| | | | KL1 | KL2 | K1 | K2 | K3 | K4 | K5 | K6 | K7 | K8 | K9 | K10 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Solid Shaft | Carbon Steel | Inches | **5/8** | **3/4*** | **1** | **1-1/4** | **1-1/4** | **1-3/8** | **1-3/4** | **1-3/4** | **2-3/8** | **2-7/8** | **3-5/8** | **4-3/8** |
| | | Metric | 16 | 20 | 25 | 30 | 30 | 40 | 45 | 50 | 60 | 70 | 90 | — |
| | Stainless Steel | Inches | **5/8** | **3/4** | **1** | **1-1/4** | **1-1/4** | **1-3/8** | **1-3/4** | **1-3/4** | **2-3/8** | **2-7/8** | **3-5/8** | — |
| | | Metric | 16 | 20 | 25 | — | — | — | 45 | — | — | — | — | — |
| Hollow Bore | Carbon Steel | Inches | 5/8 | **3/4** | **1** | **1-3/16** | **1-3/8** | **1-1/2** | **2** | **2** | **2-3/8** | **2-3/4** | **3-1/4** | **4** |
| | | Metric | **16** | 20 | 25 | 30 | 35 | 40 | 50 | 50 | 60 | 70 | 90 | — |
| | Stainless Steel | Inches | 5/8 | **3/4** | **1** | **1-1/4** | **1-3/8** | **1-1/2** | **2** | **2** | **2-3/8** | — | 2-15/16<br>3<br>3-7/16 | — |
| | | Metric | **16** | 20 | 25 | 30 | 35 | 40 | 50 | — | 60 | — | — | — |
| Wobble Free Bushing<br><br>(Single and Double Bushings**) | Stainless Steel* | Inches | — | **3/4** | **1** | 1<br>**1-3/16**<br>**1-1/4** | 1<br>1-3/16<br>**1-1/4**<br>1-3/8<br>**1-7/16**<br>**1-1/2** | 1-1/4<br>**1-7/16**<br>**1-1/2** | **1-7/16**<br>**1-1/2**<br>**1-15/16**<br>**2** | 1-7/16<br>1-1/2<br>1-15/16<br>**2**<br>2-3/16 | 1-15/16<br>**2**<br>**2-3/8** | 2-3/16<br>2-3/8<br>**2-7/16**<br>**2-3/4** | — | — |
| | | Metric | — | — | — | — | — | 40 | 40 | — | — | — | — | — |
| Shrink Ring | Carbon Steel | Metric | **16** | **20** | **25** | **30** | **35** | **40** | **50** | **50** | **60** | **70** | **90** | **100** |

** Shaft with key only (part number code P)*
***Also available in carbon steel*

## K Series Standard & Optional Output Flange Sizes

| Base Module | Flange Size |
|---|---|
| **K1** | 140, 160* |
| **K2** | 160, 200* |
| **K3** | 160, 200*, 250 |
| **K4** | 250* |
| **K5** | 250* |
| **K6** | 300* |
| **K7** | 300, 350* |
| **K8** | 350 400* 450 |
| **K9** | 450* |
| **K10** | 550* |

** This is the standard flange size shipped with the unit unless otherwise specified. Optional flanges are not available for all sizes.*

## Overhung Load Calculations

Pulling forces or overhung load of pulleys, sheaves, sprockets, etc. on the reducer output shaft must not exceed the allowable limits shown in the load/life/speed calculations below.

Note: Overhung load is measured at the center of the shaft extension. No overhung load is encountered when a reducer is flange mounted and/or coupling connected to another unit. However, the shafts of all components must be accurately aligned and secured to prevent pre-loading of the bearings and premature bearing failure.

Use the following formula to determine actual overhung load for a given drive:

**Imperial OHL** (lbs) = $\frac{126{,}000 \times HP \times K}{D \times n}$

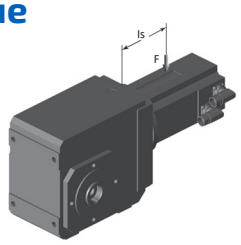
**Metric OHL** (N) = $\frac{19{,}100 \times kW \times K}{D \times n}$

Where:

| | |
|---|---|
| **OHL** | Overhung load (N or lbs) |
| **HP** | Horsepower |
| **kW** | Transmitted Kilowatt |
| **D** | Pitch Diameter (inches or meters) of Sprocket, Gear, Sheave, Pulley, etc. |
| **n** | Maximum Shaft RPM |
| **K** | 1.00 Single Chain Drive; 1.25 Timing Belt Drive; 1.25 Spur or Helical Gear Drive; 1.50 V-Belt Drive; 2.50 Flat Belt Drive |

## Permissible Motor Tilting Torque

The permissible tilting torque of the motor attached to the gear unit is a result of the static and dynamic load "F" from the motor weight, mass acceleration, and vibration multiplied by the distance from the center of gravity "$l_S$" of the motor.




$$M_{1k} = F \times l_S \leq M_{1K}$$

| $M_{1K}$ | ME10 | ME20 | ME30 | ME40 | ME50 |
|---|---|---|---|---|---|
| Nm | 25 | 60 | 125 | 250 | 600 |

## Permissible Output Shaft Load and Tilting Moments*

| | P, G, V Solid Shaft Output [1] | | | | A, S, W Hollow Output [2] | | |
|---|---|---|---|---|---|---|---|
| | $Z_2$ | $F_{2A}$ | $F_{2R}$ | $M_{2K}$ | $Z_2$ | $F_{2A}$ | $M_{2K}$ |
| Unit | mm | N | N | Nm | mm | N | Nm |
| KL1 | 20 | 380 | 1900 | 68 | 18.5 | 250 | 43 |
| KL2 | 22 | 560 | 2800 | 118 | 22 | 560 | 118 |
| K1 | 40 | 1900 | 5000 | 360 | 40 | 1900 | 240 |
| K2 | 42 | 2100 | 6000 | 430 | 42 | 2100 | 310 |
| K3 | 45 | 2400 | 7000 | 525 | 45 | 2400 | 380 |
| K4 | 52 | 3500 | 11,200 | 1050 | 52 | 3500 | 740 |
| K5 | 72 | 3500 | 13,450 | 1580 | 39 | 2500 | 1000 |
| K6 | 72 | 4000 | 16,000 | 1960 | 42 | 3000 | 1300 |
| K7 | 85 | 5500 | 22,000 | 3200 | 45 | 4100 | 2100 |
| K8 | 60 | 7250 | 29,000 | 3800 | 50 | 5300 | 2600 |
| K9 | 87 | 16,500 | 65,000 | 11,200 | 56 | 7000 | 3600 |
| K10 | 84[3] | 25,000 | 80,000[3] | 15,200 | 56 | 9000 | 5000 |

** Refer to illustration and definitions below.*

[1] For DOUBLE output shaft: $F_{2R}$ x 0.7

[2] Values shown for "W" Style are for double bushings. For single bushings use value $M_{2K}$ x 0.5 and $F_{2A}$ x 0.5

[3] Solid Shaft unit with a Flange – $Z_2$ value is 132mm/5.20"; $F_{2R}$ value is 64,000N/14,400 lbs.

## K/KL Series Load/Life/Speed Calculations

The permissible load and tilting moment values are based on an output speed of 20 RPM (K Series) or 100 RPM (KL Series). For higher speeds the following applies, where $n_2$ is the desired speed:

**All formulas shown are based on METRIC values**

*Upper case letters are permissible values. Lower case letters are for existing values.*

**K Series**

$$F_{2axN} = \frac{F_{2ax20}}{\sqrt[3]{\frac{n_{2m*}}{20\ rpm}}} \qquad F_{2radN} = \frac{F_{2rad20}}{\sqrt[3]{\frac{n_{2m*}}{20\ rpm}}} \qquad M_{2kN} = \frac{M_{2k20}}{\sqrt[3]{\frac{n_{2m*}}{20\ rpm}}}$$

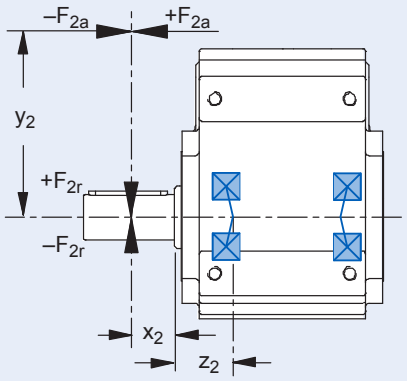
**KL Series**

$$F_{2axN} = \frac{F_{2ax20}}{\sqrt[3]{\frac{n_{2m*}}{100\ rpm}}} \qquad F_{2radN} = \frac{F_{2rad20}}{\sqrt[3]{\frac{n_{2m*}}{100\ rpm}}} \qquad M_{2kN} = \frac{M_{2k20}}{\sqrt[3]{\frac{n_{2m*}}{100\ rpm}}}$$

The application output tilting moment should be determined by the following formula:

$$M_{2k*} = \frac{2 \bullet F_{2ax*} \bullet Y_2 + F_{2rad*} \bullet (x_2 + z_2)}{1000} \leq M_{2kN}$$

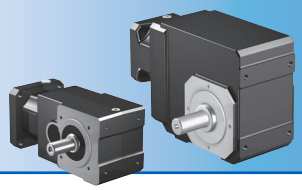
$$F_{2rad*} \leq F_{2radN} \qquad F_{2ax*} \leq F_{2axN}$$




Where:

| | |
|---|---|
| **$Z_2$** | Distance of Shaft Shoulder to Center of Output Bearing |
| **$n_2$** | Actual Average Output Speed |
| **$X_2$** | Distance of the Shaft Shoulder to the Force Application Point |
| **$Y_2$** | Distance of the Shaft Axis to the Axial Force Application Point |
| **$F_{2ax*}$** | Actual Axial Force at Gear Unit Output |
| **$F_{2ax100}$** | Permitted Axial Force |
| **$F_{2rad100}$** | Permitted Radial Force ≤100RPM |
| **$F_{2rad,acc}$** | Radial Acceleration Force |
| **$F_{2rad,acc*}$** | Radial Acceleration Force at Gear Unit Output |
| **$M_{2K100}$** | Permitted Tilting Torque ≤100RPM |
| **$M_{2K,acc}$** | Permitted Acceleration Tilting Torque |
| **$M_{2k,acc*}$** | Permitted Acceleration Tilting Torque at Gear Unit Output |
| **$C_{2K}$** | Tilting Stiffness |

# Selection Data



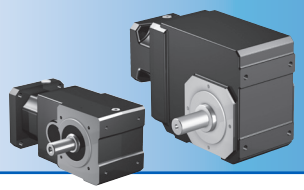
| Reducer Ratio (i) | | Output Torque | | | Backlash [3] | Part Number* (Gearhead + Input) | Maximum Input Speed RPM | | | Input Inertia $J_1$ | Torsional Stiffness C2 (per arcmin) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Nominal [1] $M_{2N}$ ≤ 2000 RPM | Acceleration $M_{2B}$ | Peak [2] $M_{2PEAK}$ | | | Continuous | | Cyclic | | |
| Nom. | Exact | Nm | Nm | Nm | arcmin | | EL 1,2,3,4 | EL 5,6 | All | kgcm² | Nm |
| **KL1** | | | | | | | | | | | |
| 4.000 | 4/1 | 15 | 22 | 30 | 25 | KL102_0040 MQ | 3500 | 3500 | 6000 | 0.40 | 1.0 |
| 8.000 | 8/1 | 23 | 30 | 59 | 20 | KL102_0080 MQ | 3500 | 3500 | 6000 | 0.37 | 1.6 |
| 16.00 | 16/1 | 25 | 30 | 60 | 20 | KL102_0160 MQ | 4000 | 4000 | 6000 | 0.31 | 1.8 |
| 32.00 | 32/1 | 25 | 32 | 64 | 20 | KL102_0320 MQ | 4000 | 4000 | 6000 | 0.30 | 1.7 |
| **KL2** | | | | | | | | | | | |
| 4.000 | 4/1 | 35 | 50 | 83 | 20 | KL202_0040 MQ | 3500 | 3500 | 6000 | 1.00 | 1.8 |
| 8.000 | 8/1 | 50 | 60 | 120 | 16 | KL202_0080 MQ | 3500 | 3500 | 6000 | 0.89 | 3.5 |
| 16.00 | 16/1 | 50 | 60 | 120 | 16 | KL202_0160 MQ | 4000 | 4000 | 6000 | 0.66 | 3.9 |
| 32.00 | 32/1 | 50 | 65 | 130 | 16 | KL202_0320 MQ | 4000 | 4000 | 6000 | 0.64 | 3.2 |

[1] *Maximum torque for continuous input 1500 RPM - horizontal output position.*
[2] *Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
* *Square motor adapter code (shaft diameter max - mm): For KL102 MQ (16), For KL202 MQ (19)*

| Reducer Ratio (i) | | Output Torque | | | Backlash [3] | Part Number* (Gearhead + Input) | Max. Input Speed RPM (n1) | | | Motor Shaft Max Ø | Input Inertia | Tors. Stiffness |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Nom. [1] | Accel. | Peak [2] | | | Continuous | | Cyclic | | | |
| | | $M_{2N}$ | $M_{2acc}$ | $M_{2NOT}$ | $\Delta\phi_2$ | | EL 1,2 | EL 3,4,5,6 | All | $d_{MW}$ | $J_1$ | $C_2$ |
| Nom. | Exact | Nm | Nm | Nm | arcmin | | | | | mm | kgcm² | Nm/ arcmin |
| **K1** | | | | | | | | | | | | |
| 4.000 | 4/1 | 65 | 93 | 116 | 12/6 | K102_0040 ME10 | 3300 | 2800 | 5000 | ≤19 | 1.5 | 6.3 |
| | | | | | | K102_0040 ME20 | | | | ≤24 | 3.4 | 6.6 |
| 5.568 | 1520/273 | 73 | 109 | 162 | 12/6 | K102_0056 ME10 | 3300 | 2800 | 5000 | ≤19 | 1.3 | 6.6 |
| | | | | | | K102_0056 ME20 | | | | ≤24 | 3.2 | 6.7 |
| 6.644 | 299/45 | 77 | 116 | 193 | 12/6 | K102_0066 ME10 | 3600 | 3300 | 5500 | ≤19 | 1.0 | 6.6 |
| | | | | | | K102_0066 ME20 | | | | ≤24 | 2.9 | 6.7 |
| 9.249 | 1748/189 | 86 | 129 | 240 | 12/6 | K102_0092 ME10 | 3600 | 3300 | 5500 | ≤19 | 1.0 | 6.7 |
| | | | | | | K102_0092 ME20 | | | | ≤24 | 2.9 | |
| 10.14 | 507/50 | 89 | 125 | 220 | 12/6 | K102_0100 ME10 | 4000 | 3800 | 6000 | ≤19 | 0.8 | 6.7 |
| | | | | | | K102_0100 ME20 | 3700 | 3700 | | ≤24 | 2.7 | 6.8 |
| 14.11 | 494/35 | 99 | 135 | 240 | 12/6 | K102_0140 ME10 | 4000 | 3800 | 6000 | ≤19 | 0.8 | 6.8 |
| | | | | | | K102_0140 ME20 | 3700 | 3700 | | ≤24 | 2.7 | |
| 16.71 | 117/7 | 105 | 125 | 220 | 12/6 | K102_0165 ME10 | 4000 | 4000 | 7000 | ≤19 | 0.7 | 6.8 |
| | | | | | | K102_0165 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.6 | |
| 20.15 | 403/20 | 110 | 125 | 220 | 12/6 | K102_0200 ME10 | 4000 | 4000 | 7000 | ≤19 | 0.7 | 6.8 |
| | | | | | | K102_0200 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.6 | |
| 23.27 | 1140/49 | 117 | 135 | 240 | 12/6 | K102_0230 ME10 | 4000 | 4000 | 7000 | ≤19 | 0.7 | 6.8 |
| | | | | | | K102_0230 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.6 | |
| 25.22 | 1261/50 | 96 | 115 | 192 | 12/6 | K102_0250 ME10 | 4000 | 4000 | 7000 | ≤19 | 0.7 | 6.8 |
| | | | | | | K102_0250 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.6 | |
| 28.05 | 589/21 | 120 | 135 | 240 | 12/6 | K102_0280 ME10 | 4000 | 4000 | 7000 | ≤19 | 0.7 | 6.8 |
| | | | | | | K102_0280 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.6 | |
| 33.71 | 4719/140 | 73 | 88 | 146 | 12/6 | K102_0340 ME10 | 4000 | 4000 | 7000 | ≤19 | 0.6 | 6.8 |
| 35.11 | 3686/105 | 120 | 135 | 240 | 12/6 | K102_0350 ME10 | 4000 | 4000 | 7000 | ≤19 | 0.7 | 6.8 |
| | | | | | | K102_0350 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.6 | |
| 40.30 | 403/10 | 61 | 74 | 123 | 12/6 | K102_0400 ME10 | 4000 | 4000 | 7000 | ≤19 | 0.6 | 6.8 |
| 46.92 | 2299/49 | 102 | 122 | 203 | 12/6 | K102_0470 ME10 | 4000 | 4000 | 7000 | ≤19 | 0.6 | 6.8 |
| 56.10 | 1178/21 | 86 | 103 | 171 | 12/6 | K102_0560 ME10 | 4000 | 4000 | 7000 | ≤19 | 0.6 | 6.8 |

[1] *Maximum torque for continuous input 1500 RPM - horizontal output position.*
[2] *Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
[3] *Backlash shown standard/reduced*
* *Motor adapter order code (shaft diameter max - mm): ME10 (19), ME20 (32), ME30 (38), ME40 (48), ME50 (60)*

# Selection Data





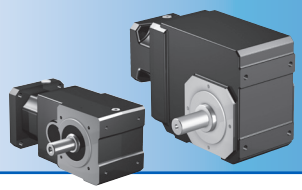
| Reducer Ratio (i) | | Output Torque | | | Backlash [3] | Part Number* (Gearhead + Input) | Max. Input Speed RPM (n1) | | | Motor Shaft Max Ø | Input Inertia | Tors. Stiffness |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Nom. [1] | Accel. | Peak [2] | | | Continuous | | Cyclic | | | |
| Nom. | Exact | $M_{2N}$ | $M_{2acc}$ | $M_{2NOT}$ | $\Delta\phi_2$ | | EL 1,2 | EL 3,4,5,6 | All | $d_{MW}$ | $J_1$ | $C_2$ |
| | | Nm | Nm | Nm | arcmin | | | | | mm | kgcm² | Nm/ arcmin |
| **K2** | **(continued next page)** | | | | | | | | | | | |
| 4.000 | 4/1 | 116 | 174 | 291 | 10/5 | K202_0040 ME20 | 3000 | 2600 | 4500 | ≤32 | 6.4 | 10.0 |
| | | | | | | K202_0040 ME30 | | | | ≤38 | 12.0 | |
| 5.177 | 2107/407 | 127 | 190 | 377 | 10/5 | K202_0052 ME20 | 3000 | 2600 | 4500 | ≤32 | 5.7 | 10.0 |
| | | | | | | K202_0052 ME30 | | | | ≤38 | 11.0 | 11.0 |
| 7.118 | 2107/296 | 141 | 211 | 400 | 10/5 | K202_0071 ME20 | 3000 | 2600 | 4500 | ≤32 | 5.4 | 11.0 |
| | | | | | | K202_0071 ME30 | | | | ≤38 | 11.0 | |
| 8.397 | 2494/297 | 149 | 196 | 244 | 10/5 | K202_0084 ME10 | 3500 | 3100 | 5000 | ≤19 | 1.4 | 10.0 |
| | | | 220 | 400 | | K202_0084 ME20 | | | | ≤32 | 4.8 | 11.0 |
| | | | | | | K202_0084 ME30 | | | | ≤38 | 10.0 | |
| 10.07 | 2881/286 | 155 | 220 | 293 | 10/5 | K202_0100 ME10 | 3900 | 3500 | 5500 | ≤19 | 1.2 | 10.0 |
| | | 158 | | 400 | | K202_0100 ME20 | 3700 | | | ≤32 | 4.6 | 11.0 |
| | | | | | | K202_0100 ME30 | 3500 | | 5000 | ≤38 | 9.9 | |
| 11.55 | 1247/108 | 166 | 220 | 336 | 10/5 | K202_0115 ME10 | 3500 | 3100 | 5000 | ≤19 | 1.3 | 11.0 |
| | | | | 400 | | K202_0115 ME20 | | | | ≤32 | 4.7 | |
| | | | | | | K202_0115 ME30 | | | | ≤38 | 10.0 | |
| 12.71 | 559/44 | 168 | 220 | 370 | 10/5 | K202_0125 ME10 | 3900 | 3500 | 5500 | ≤19 | 1.0 | 11.0 |
| | | 171 | | 400 | | K202_0125 ME20 | 3700 | | | ≤32 | 4.4 | |
| | | | | | | K202_0125 ME30 | 3500 | | 5000 | ≤38 | 9.8 | |
| 13.85 | 2881/208 | 176 | 220 | 400 | 10/5 | K202_0140 ME10 | 3900 | 3500 | 5500 | ≤19 | 1.1 | 11.0 |
| | | | | | | K202_0140 ME20 | 3700 | | | ≤32 | 4.5 | |
| | | | | | | K202_0140 ME30 | 3500 | | 5000 | ≤38 | 9.9 | |
| 17.47 | 559/32 | 190 | 220 | 400 | 10/5 | K202_0175 ME10 | 3900 | 3500 | 5500 | ≤19 | 1.0 | 11.0 |
| | | | | | | K202_0175 ME20 | 3700 | | | ≤32 | 4.4 | |
| | | | | | | K202_0175 ME30 | 3500 | | 5000 | ≤38 | 9.7 | |
| 20.33 | 1118/55 | 182 | 220 | 400 | 10/5 | K202_0200 ME10 | 4000 | 3900 | 6500 | ≤19 | 0.8 | 11.0 |
| | | 200 | | | | K202_0200 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.7 | |
| | | | | | | K202_0200 ME30 | 3500 | 3500 | 5000 | ≤32 | 7.8 | |
| 25.13 | 1935/77 | 187 | 220 | 400 | 10/5 | K202_0250 ME10 | 4000 | 3900 | 6500 | ≤19 | 0.8 | 11.0 |
| | | 200 | | | | K202_0250 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.7 | |
| 27.95 | 559/20 | 200 | 220 | 400 | 10/5 | K202_0280 ME10 | 4000 | 3900 | 6500 | ≤19 | 0.8 | 11.0 |
| | | | | | | K202_0280 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.7 | |
| 33.62 | 1849/55 | 154 | 185 | 308 | 10/5 | K202_0340 ME10 | 4000 | 3900 | 6500 | ≤19 | 0.7 | 11.0 |
| | | | | | | K202_0340 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.6 | |
| 34.55 | 1935/56 | 200 | 220 | 400 | 10/5 | K202_0350 ME10 | 4000 | 3900 | 6500 | ≤19 | 0.8 | 11.0 |
| | | | | | | K202_0350 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.7 | |
| 39.45 | 135,407/3432 | 200 | 202 | 253 | 10/6 | K203_0390 ME10 | 4000 | 3900 | 6500 | ≤19 | 0.7 | 11.0 |

[1] *Maximum torque for continuous input 1500 RPM - horizontal output position.*
[2] *Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
[3] *Backlash shown standard/reduced*
* *Motor adapter order code (shaft diameter max - mm): ME10 (19), ME20 (32), ME30 (38), ME40 (48), ME50 (60)*

| Reducer Ratio (i) | | Output Torque | | | Backlash [3] | Part Number* (Gearhead + Input) | Max. Input Speed RPM (n1) | | | Motor Shaft Max Ø | Input Inertia | Tors. Stiffness |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Nom. [1] | Accel. | Peak [2] | | | Continuous | | Cyclic | | | |
| | | $M_{2N}$ | $M_{2acc}$ | $M_{2NOT}$ | $\Delta\phi_2$ | | EL 1,2 | EL 3,4,5,6 | All | $d_{MW}$ | $J_1$ | $C_2$ |
| Nom. | Exact | Nm | Nm | Nm | arcmin | | | | | mm | kgcm² | Nm/ arcmin |
| **K2** | **(continued from previous page)** | | | | | | | | | | | |
| 46.23 | 1849/40 | 200 | 220 | 400 | 10/5 | K202_0460 ME10 | 4000 | 3900 | 6500 | ≤19 | 0.7 | 11.0 |
| | | | | | | K202_0460 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.6 | |
| 49.76 | 26,273/528 | 200 | 220 | 319 | 10/6 | K203_0500 ME10 | 4000 | 3900 | 6500 | ≤19 | 0.7 | 11.0 |
| 50.49 | 6665/132 | 96 | 116 | 184 | 10/5 | K202_0500 ME10 | 4000 | 3900 | 6500 | ≤19 | 0.6 | 11.0 |
| 54.25 | 135,407/2496 | 200 | 220 | 348 | 10/6 | K203_0540 ME10 | 4000 | 3900 | 6500 | ≤19 | 0.7 | 11.0 |
| 68.42 | 26,273/384 | 200 | 220 | 400 | 10/6 | K203_0680 ME10 | 4000 | 3900 | 6500 | ≤19 | 0.7 | 11.0 |
| 79.62 | 26,273/330 | 200 | 220 | 394 | 10/6 | K203_0800 ME10 | 4000 | 3900 | 6500 | ≤19 | 0.7 | 11.0 |
| 109.5 | 26,273/240 | 200 | 220 | 394 | 10/6 | K203_1090 ME10 | 4000 | 3900 | 6500 | ≤19 | 0.7 | 11.0 |
| 135.3 | 30,315/224 | 200 | 220 | 394 | 10/6 | K203_1350 ME10 | 4000 | 3900 | 6500 | ≤19 | 0.7 | 11.0 |
| 181.0 | 86,903/480 | 200 | 220 | 394 | 10/6 | K203_1810 ME10 | 4000 | 3900 | 6500 | ≤19 | 0.7 | 11.0 |
| **K3** | **(continued next page)** | | | | | | | | | | | |
| 4.000 | 4/1 | 204 | 233 | 291 | 10/4 | K302_0040 ME20 | 2700 | 2300 | 4000 | ≤32 | 9.0 | 16.0 |
| | | | 306 | 700 | | K302_0040 ME30 | | | | ≤38 | 14.0 | |
| 5.375 | 43/8 | 225 | 313 | 391 | 10/4 | K302_0054 ME20 | 2700 | 2300 | 4000 | ≤32 | 7.2 | 16.0 |
| | | | | | | K302_0054 ME30 | | | | ≤38 | 13.0 | |
| 7.391 | 473/64 | 250 | 375 | 538 | 10/4 | K302_0074 ME20 | 2700 | 2300 | 4000 | ≤32 | 6.7 | 16.0 |
| | | | | | | K302_0074 ME30 | | | | ≤38 | 12.0 | |
| 8.444 | 2322/275 | 169 | 197 | 246 | 10/4 | K302_0084 ME10 | 3200 | 2800 | 4500 | ≤19 | 2.2 | 16.0 |
| | | 261 | 385 | 614 | | K302_0084 ME20 | | | | ≤32 | 5.6 | |
| | | | | | | K302_0084 ME30 | | | | ≤38 | 11.0 | |
| 10.14 | 3010/297 | 176 | 236 | 295 | 10/4 | K302_0100 ME10 | 3500 | 3100 | 5000 | ≤19 | 1.8 | 16.0 |
| | | 278 | 385 | 700 | | K302_0100 ME20 | | | | ≤32 | 5.2 | |
| | | | | | | K302_0100 ME30 | | | | ≤38 | 11.0 | |
| 11.61 | 1161/100 | 232 | 270 | 338 | 10/4 | K302_0115 ME10 | 3200 | 2800 | 4500 | ≤19 | 2.0 | 16.0 |
| | | 291 | 385 | 700 | | K302_0115 ME20 | | | | ≤32 | 5.4 | |
| | | | | | | K302_0115 ME30 | | | | ≤38 | 11.0 | |
| 12.58 | 3182/253 | 187 | 293 | 366 | 10/4 | K302_0125 ME10 | 3500 | 3100 | 5000 | ≤19 | 1.5 | 16.0 |
| | | 298 | 385 | 700 | | K302_0125 ME20 | | | | ≤32 | 4.9 | |
| | | | | | | K302_0125 ME30 | | | | ≤38 | 10.0 | |
| 13.94 | 1505/108 | 242 | 325 | 406 | 10/4 | K302_0140 ME10 | 3500 | 3100 | 5000 | ≤19 | 1.7 | 16.0 |
| | | 309 | 385 | 700 | | K302_0140 ME20 | | | | ≤32 | 5.1 | |
| | | | | | | K302_0140 ME30 | | | | ≤38 | 10.0 | |

[1] *Maximum torque for continuous input 1500 RPM - horizontal output position.*
[2] *Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
[3] *Backlash shown standard/reduced*
* *Motor adapter order code (shaft diameter max - mm): ME10 (19), ME20 (32), ME30 (38), ME40 (48), ME50 (60)*

# Selection Data



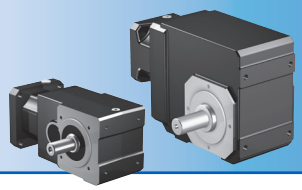
| Reducer Ratio (i) | | Output Torque | | | Backlash [3] | Part Number* (Gearhead + Input) | Max. Input Speed RPM (n1) | | | Motor Shaft Max Ø | Input Inertia | Tors. Stiffness |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Nom. [1] | Accel. | Peak [2] | | | Continuous | | Cyclic | | | |
| Nom. | Exact | $M_{2N}$ | $M_{2acc}$ | $M_{2NOT}$ | $\Delta\phi_2$ | | EL 1,2 | EL 3,4,5,6 | All | $d_{MW}$ | $J_1$ | $C_2$ |
| | | Nm | Nm | Nm | arcmin | | | | | mm | kgcm² | Nm/ arcmin |
| **K3** | **(continued next page)** | | | | | | | | | | | |
| 16.94 | 559/33 | 198 | 375 | 469 | 10/4 | K302_0170 ME10 | 3800 | 3500 | 6000 | ≤19 | 1.2 | 16.0 |
| | | 330 | 385 | 700 | | K302_0170 ME20 | 3700 | | | ≤32 | 4.6 | |
| | | | | | | K302_0170 ME30 | 3500 | | 5000 | ≤38 | 9.9 | |
| 17.29 | 1591/92 | 257 | 385 | 503 | 10/4 | K302_0175 ME10 | 3500 | 3100 | 5000 | ≤19 | 1.4 | 16.0 |
| | | 332 | | 700 | | K302_0175 ME20 | | | | ≤32 | 4.8 | |
| | | | | | | K302_0175 ME30 | | | | ≤38 | 10.0 | |
| 20.28 | 3569/176 | 208 | 385 | 513 | 10/4 | K302_0200 ME10 | 3800 | 3500 | 6000 | ≤19 | 1.0 | 16.0 |
| | | 350 | | 700 | | K302_0200 ME20 | 3700 | | | ≤32 | 4.4 | |
| | | | | | | K302_0200 ME30 | 3500 | | 5000 | ≤38 | 9.8 | |
| 23.29 | 559/24 | 272 | 385 | 645 | 10/4 | K302_0230 ME10 | 3800 | 3500 | 6000 | ≤19 | 1.1 | 16.0 |
| | | 350 | | 700 | | K302_0230 ME20 | 3700 | | | ≤32 | 4.5 | |
| | | | | | | K302_0230 ME30 | 3500 | | 5000 | ≤38 | 9.8 | |
| 25.26 | 3612/143 | 211 | 385 | 602 | 10/4 | K302_0250 ME10 | 3800 | 3500 | 6000 | ≤19 | 0.9 | 16.0 |
| | | 347 | | | | K302_0250 ME20 | 3700 | | | ≤24 | 2.8 | |
| 27.88 | 3569/128 | 287 | 385 | 700 | 10/4 | K302_0280 ME10 | 3800 | 3500 | 6000 | ≤19 | 1.0 | 16.0 |
| | | 350 | | | | K302_0280 ME20 | 3700 | | | ≤32 | 4.4 | |
| | | | | | | K302_0280 ME30 | 3500 | | 5000 | ≤38 | 9.7 | |
| 32.65 | 44,892/1375 | 350 | 379 | 577 | 10/5 | K303_0330 ME20 | 3700 | 3500 | 6000 | ≤24 | 2.8 | 16.0 |
| 33.62 | 1849/55 | 219 | 300 | 501 | 10/4 | K302_0340 ME10 | 3800 | 3500 | 6000 | ≤19 | 0.8 | 16.0 |
| | | 250 | | | | K302_0340 ME20 | 3700 | | | ≤24 | 2.7 | |
| 34.73 | 903/26 | 291 | 385 | 700 | 10/4 | K302_0350 ME10 | 3800 | 3500 | 6000 | ≤19 | 0.9 | 16.0 |
| | | 350 | | | | K302_0350 ME20 | 3700 | | | ≤24 | 2.8 | |
| 39.19 | 34,916/891 | 350 | 385 | 692 | 10/5 | K303_0390 ME20 | 3700 | 3500 | 6000 | ≤24 | 2.7 | 16.0 |
| 40.51 | 4902/121 | 193 | 231 | 385 | 10/4 | K302_0410 ME10 | 3800 | 3500 | 6000 | ≤19 | 0.8 | 16.0 |
| | | | | | | K302_0410 ME20 | 3700 | | | ≤24 | 2.7 | |
| 44.89 | 11,223/250 | 350 | 385 | 700 | 10/5 | K303_0450 ME20 | 3700 | 3500 | 6000 | ≤24 | 2.8 | 16.0 |
| 46.23 | 1849/40 | 301 | 385 | 688 | 10/4 | K302_0460 ME10 | 3800 | 3500 | 6000 | ≤19 | 0.8 | 16.0 |
| | | 344 | | | | K302_0460 ME20 | 3700 | | | ≤24 | 2.7 | |
| 48.63 | 184,556/3795 | 350 | 385 | 700 | 10/5 | K303_0490 ME20 | 3700 | 3500 | 6000 | ≤24 | 2.7 | 16.0 |
| 49.26 | 74,777/1518 | 253 | 253 | 316 | 10/5 | K303_0490 ME10 | 3800 | 3500 | 6000 | ≤19 | 0.7 | 16.0 |
| 53.88 | 8729/162 | 350 | 385 | 700 | 10/5 | K303_0540 ME20 | 3700 | 3500 | 6000 | ≤24 | 2.7 | 16.0 |
| 55.71 | 2451/44 | 265 | 318 | 529 | 10/4 | K302_0560 ME10 | 3800 | 3500 | 6000 | ≤19 | 0.8 | 16.0 |
| | | | | | | K302_0560 ME20 | 3700 | | | ≤24 | 2.6 | |

[1] *Maximum torque for continuous input 1500 RPM - horizontal output position.*
[2] *Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
[3] *Backlash shown standard/reduced*
* *Motor adapter order code (shaft diameter max - mm): ME10 (19), ME20 (32), ME30 (38), ME40 (48), ME50 (60)*

| Reducer Ratio (i) | | Output Torque | | | Backlash [3] | Part Number* (Gearhead + Input) | Max. Input Speed RPM (n1) | | | Motor Shaft Max Ø | Input Inertia | Tors. Stiffness |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Nom. [1] | Accel. | Peak [2] | | | Continuous | | Cyclic | | | |
| | | $M_{2N}$ | $M_{2acc}$ | $M_{2NOT}$ | $\Delta\phi_2$ | | EL 1,2 | EL 3,4,5,6 | All | $d_{MW}$ | $J_1$ | $C_2$ |
| Nom. | Exact | Nm | Nm | Nm | arcmin | | | | | mm | kgcm² | Nm/ arcmin |
| **K3** | **(continued from previous page)** | | | | | | | | | | | |
| 65.50 | 32,422/495 | 350 | 385 | 700 | 10/5 | K303_0650 ME20 | 3700 | 3500 | 6000 | ≤24 | 2.7 | 16.0 |
| 66.87 | 46,139/690 | 350 | 385 | 700 | 10/5 | K303_0670 ME20 | 3700 | 3500 | 6000 | ≤24 | 2.7 | 16.0 |
| 78.41 | 103,501/1320 | 350 | 385 | 700 | 10/5 | K303_0780 ME20 | 3700 | 3500 | 6000 | ≤24 | 2.7 | 16.0 |
| 90.06 | 16,211/180 | 385 | 379 | 700 | 10/5 | K303_0900 ME20 | 3700 | 3500 | 6000 | ≤24 | 2.7 | 16.0 |
| 107.8 | 103,501/960 | 350 | 385 | 700 | 10/5 | K303_1080 ME20 | 3700 | 3500 | 6000 | ≤24 | 2.7 | 16.0 |
| 134.3 | 8729/65 | 350 | 385 | 700 | 10/5 | K303_1340 ME20 | 3700 | 3500 | 6000 | ≤24 | 2.7 | 16.0 |
| 136.0 | 14,147/104 | 350 | 385 | 700 | 10/5 | K303_1360 ME10 | 3800 | 3500 | 6000 | ≤19 | 0.7 | 16.0 |
| 178.7 | 53,621/300 | 344 | 385 | 688 | 10/5 | K303_1790 ME20 | 3700 | 3500 | 6000 | ≤24 | 2.7 | 16.0 |
| 181.0 | 86,903/480 | 344 | 385 | 688 | 10/5 | K303_1810 ME10 | 3800 | 3500 | 6000 | ≤19 | 0.7 | 16.0 |
| 218.2 | 38,399/176 | 265 | 318 | 529 | 10/5 | K303_2180 ME10 | 3800 | 3500 | 6000 | ≤19 | 0.7 | 16.0 |
| **K4** | **(continued next page)** | | | | | | | | | | | |
| 4.000 | 4/1 | 306 | 459 | 776 | 10/4 | K402_0040 ME30 | 2600 | 2200 | 3800 | ≤38 | 19.0 | 30.0 |
| | | | | | | K402_0040 ME40 | | | | ≤48 | 41.0 | |
| 5.422 | 1849/341 | 338 | 508 | 1052 | 10/4 | K402_0054 ME30 | 2600 | 2200 | 3800 | ≤38 | 16.0 | 30.0 |
| | | | | | | K402_0054 ME40 | | | | ≤48 | 37.0 | |
| 7.456 | 1849/248 | 376 | 564 | 1100 | 10/4 | K402_0075 ME30 | 2600 | 2200 | 3800 | ≤38 | 15.0 | 31.0 |
| | | | | | | K402_0075 ME40 | | | | ≤48 | 36.0 | |
| 8.377 | 645/77 | 391 | 488 | 610 | 10/4 | K402_0084 ME20 | 3000 | 2600 | 4500 | ≤32 | 7.0 | 30.0 |
| | | | 587 | 1100 | | K402_0084 ME30 | | | | ≤38 | 13.0 | 31.0 |
| | | | | | | K402_0084 ME40 | | | | ≤48 | 34.0 | |
| 10.10 | 1333/132 | 416 | 588 | 735 | 10/4 | K402_0100 ME20 | 3400 | 3000 | 5000 | ≤32 | 6.3 | 30.0 |
| | | | 600 | 1100 | | K402_0100 ME30 | | | | ≤38 | 12.0 | 31.0 |
| | | | | | | K402_0100 ME40 | 3000 | | 4500 | ≤48 | 34.0 | |
| 11.52 | 645/56 | 435 | 600 | 838 | 10/4 | K402_0115 ME20 | 3000 | 2600 | 4500 | ≤32 | 6.6 | 31.0 |
| | | | | 1100 | 10/4 | K402_0115 ME30 | | | | ≤38 | 12.0 | |
| | | | | | | K402_0115 ME40 | | | | ≤48 | 34.0 | |
| 12.66 | 2924/231 | 449 | 600 | 869 | 10/4 | K402_0125 ME20 | 3400 | 3000 | 5000 | ≤32 | 5.6 | 31.0 |
| | | | | 1100 | | K402_0125 ME30 | | | | ≤38 | 11.0 | |
| | | | | | | K402_0125 ME40 | 3000 | | 4500 | ≤48 | 33.0 | |
| 13.89 | 1333/96 | 463 | 600 | 1010 | 10/4 | K402_0140 ME20 | 3400 | 3000 | 5000 | ≤32 | 6.0 | 31.0 |
| | | | | 1100 | | K402_0140 ME30 | | | | ≤38 | 11.0 | |
| | | | | | | K402_0140 ME40 | 3000 | | 4500 | ≤48 | 33.0 | |

[1] *Maximum torque for continuous input 1500 RPM - horizontal output position.*
[2] *Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
[3] *Backlash shown standard/reduced*
* *Motor adapter order code (shaft diameter max - mm): ME10 (19), ME20 (32), ME30 (38), ME40 (48), ME50 (60)*

# Selection Data



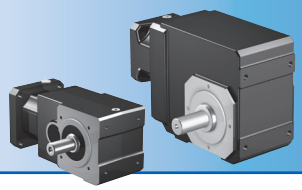
| Reducer Ratio (i) | | Output Torque | | | Backlash [3] | Part Number* (Gearhead + Input) | Max. Input Speed RPM (n1) | | | Motor Shaft Max Ø | Input Inertia | Tors. Stiffness |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Nom. [1] | Accel. | Peak [2] | | | Continuous | | Cyclic | | | |
| Nom. | Exact | $M_{2N}$ | $M_{2acc}$ | $M_{2NOT}$ | $\Delta\phi_2$ | | EL 1,2 | EL 3,4,5,6 | All | $d_{MW}$ | $J_1$ | $C_2$ |
| | | Nm | Nm | Nm | arcmin | | | | | mm | kgcm² | Nm/ arcmin |
| **K4** | **(continued next page)** | | | | | | | | | | | |
| 17.41 | 731/42 | 499 | 600 | 1100 | 10/4 | K402_0175 ME20 | 3400 | 3000 | 5000 | ≤32 | 5.4 | 31.0 |
| | | | | | | K402_0175 ME30 | | | | ≤38 | 11.0 | |
| | | | | | | K402_0175 ME40 | 3000 | | 4500 | ≤48 | 33.0 | |
| 20.20 | 1333/66 | 524 | 600 | 1100 | 10/4 | K402_0200 ME20 | 3600 | 3300 | 5500 | ≤32 | 4.8 | 31.0 |
| | | | | | | K402_0200 ME30 | 3500 | | 5000 | ≤38 | 10.0 | |
| 25.28 | 4171/165 | 501 | 600 | 1001 | 10/4 | K402_0250 ME20 | 3600 | 3300 | 5500 | ≤32 | 4.5 | 31.0 |
| | | | | | | K402_0250 ME30 | 3500 | | 5000 | ≤38 | 9.9 | |
| 27.77 | 1333/48 | 550 | 600 | 1100 | 10/4 | K402_0280 ME20 | 3600 | 3300 | 5500 | ≤32 | 4.7 | 31.0 |
| | | | | | | K402_0280 ME30 | 3500 | | 5000 | ≤38 | 10.0 | |
| 32.39 | 2494/77 | 458 | 458 | 572 | 10/5 | K403_0320 ME20 | 3600 | 3300 | 5500 | ≤24 | 2.9 | 31.0 |
| 33.68 | 4816/143 | 389 | 467 | 716 | 10/4 | K402_0340 ME20 | 3600 | 3300 | 5500 | ≤24 | 2.8 | 31.0 |
| 34.76 | 4171/120 | 550 | 600 | 1100 | 10/4 | K402_0350 ME20 | 3600 | 3300 | 5500 | ≤32 | 4.5 | 31.0 |
| | | | | | | K402_0350 ME30 | 3500 | | 5000 | ≤38 | 9.8 | |
| 39.05 | 38,657/990 | 550 | 552 | 690 | 10/5 | K403_0390 ME20 | 3600 | 3300 | 5500 | ≤24 | 2.8 | 31.0 |
| 40.51 | 4902/121 | 308 | 370 | 616 | 10/4 | K402_0410 ME20 | 3600 | 3300 | 5500 | ≤24 | 2.7 | 31.0 |
| 44.54 | 1247/28 | 550 | 600 | 787 | 10/5 | K403_0450 ME20 | 3600 | 3300 | 5500 | ≤24 | 2.8 | 31.0 |
| 46.31 | 602/13 | 535 | 600 | 985 | 10/4 | K402_0460 ME20 | 3600 | 3300 | 5500 | ≤24 | 2.8 | 31.0 |
| 53.69 | 38,657/720 | 550 | 600 | 949 | 10/5 | K403_0540 ME20 | 3600 | 3300 | 5500 | ≤24 | 2.8 | 31.0 |
| 55.71 | 2451/44 | 424 | 508 | 847 | 10/4 | K402_0560 ME20 | 3600 | 3300 | 5500 | ≤24 | 2.7 | 31.0 |
| 78.10 | 38,657/495 | 550 | 600 | 1100 | 10/5 | K403_0780 ME20 | 3600 | 3300 | 5500 | ≤24 | 2.7 | 31.0 |
| 107.4 | 38,657/360 | 550 | 600 | 1100 | 10/5 | K403_1070 ME20 | 3600 | 3300 | 5500 | ≤24 | 2.7 | 31.0 |
| 134.4 | 120,959/900 | 550 | 600 | 1100 | 10/5 | K403_1340 ME20 | 3600 | 3300 | 5500 | ≤24 | 2.7 | 31.0 |
| 136.1 | 196,037/1440 | 550 | 600 | 807 | 10/5 | K403_1360 ME10 | 3600 | 3300 | 5500 | ≤19 | 0.7 | 31.0 |
| 179.1 | 34,916/195 | 535 | 600 | 985 | 10/5 | K403_1790 ME20 | 3600 | 3300 | 5500 | ≤24 | 2.7 | 31.0 |
| 181.4 | 14,147/78 | 535 | 600 | 985 | 10/5 | K403_1810 ME10 | 3600 | 3300 | 5500 | ≤19 | 0.7 | 31.0 |
| 215.4 | 23,693/110 | 424 | 508 | 847 | 10/5 | K403_2150 ME20 | 3600 | 3300 | 5500 | ≤24 | 2.7 | 31.0 |
| 218.2 | 38,399/176 | 424 | 508 | 847 | 10/5 | K403_2180 ME10 | 3600 | 3300 | 5500 | ≤19 | 0.7 | 31.0 |

[1] *Maximum torque for continuous input 1500 RPM - horizontal output position.*
[2] *Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
[3] *Backlash shown standard/reduced*
* *Motor adapter order code (shaft diameter max - mm): ME10 (19), ME20 (32), ME30 (38), ME40 (48), ME50 (60)*

| Reducer Ratio (i) | | Output Torque | | | Backlash [3] | Part Number* (Gearhead + Input) | Max. Input Speed RPM (n1) | | | Motor Shaft Max Ø | Input Inertia | Tors. Stiffness |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Nom. [1] | Accel. | Peak [2] | | | Continuous | | Cyclic | | | |
| | | $M_{2N}$ | $M_{2acc}$ | $M_{2NOT}$ | $\Delta\phi_2$ | | | | | $d_{MW}$ | $J_1$ | $C_2$ |
| Nom. | Exact | Nm | Nm | Nm | arcmin | | EL 1,2 | EL 3,4,5,6 | All | mm | kgcm² | Nm/ arcmin |
| **K5** | **(continued next page)** | | | | | | | | | | | |
| 7.347 | 551/75 | 694 | 1000 | 1405 | 10/5 | K513_0073 ME30 | 1900 | 1800 | 3200 | ≤38 | 25.0 | 49.0 |
| | | | | | | K513_0073 ME40 | | | | ≤48 | 47.0 | |
| 8.134 | 17,081/2100 | 718 | 1000 | 1555 | 10/5 | K513_0081 ME30 | 1900 | 1800 | 3200 | ≤38 | 24.0 | 49.0 |
| | | | | | | K513_0081 ME40 | | | | ≤48 | 46.0 | |
| 11.57 | 10,759/930 | 808 | 1000 | 1800 | 10/5 | K513_0115 ME30 | 2300 | 2200 | 3600 | ≤38 | 17.0 | 49.0 |
| | | | | | | K513_0115 ME40 | | | | ≤48 | 39.0 | |
| 12.81 | 1537/120 | 836 | 1000 | 1800 | 10/5 | K513_0130 ME30 | 2300 | 2200 | 3600 | ≤38 | 17.0 | 49.0 |
| | | | | | | K513_0130 ME40 | | | | ≤48 | 39.0 | |
| 17.48 | 6293/360 | 899 | 1000 | 1253 | 10/5 | K513_0175 ME20 | 2800 | 2500 | 4200 | ≤32 | 8.4 | 49.0 |
| | | 900 | | 1800 | | K513_0175 ME30 | | | | ≤38 | 14.0 | |
| | | | | | | K513_0175 ME40 | | | | ≤48 | 36.0 | |
| 19.35 | 27,869/1440 | 900 | 1000 | 1387 | 10/5 | K513_0195 ME20 | 2800 | 2500 | 4200 | ≤32 | 8.1 | 49.0 |
| | | | | 1800 | | K513_0195 ME30 | | | | ≤38 | 14.0 | |
| | | | | | | K513_0195 ME40 | | | | ≤48 | 35.0 | |
| 29.18 | 4669/160 | 900 | 1000 | 1656 | 10/5 | K513_0290 ME20 | 3400 | 3000 | 5000 | ≤32 | 6.0 | 49.0 |
| | | | | 1800 | | K513_0290 ME30 | | | | ≤38 | 12.0 | |
| | | | | | | K513_0290 ME40 | 3000 | | 4500 | ≤48 | 33.0 | |
| 32.31 | 20,677/640 | 900 | 1000 | 1800 | 10/5 | K513_0320 ME20 | 3400 | 3000 | 5000 | ≤32 | 5.9 | 49.0 |
| | | | | | | K513_0320 ME30 | | | | ≤38 | 11.0 | |
| | | | | | | K513_0320 ME40 | 3000 | | 4500 | ≤48 | 33.0 | |
| 34.80 | 174/5 | 900 | 1000 | 1781 | 10/5 | K513_0350 ME20 | 3400 | 3000 | 5000 | ≤32 | 5.6 | 49.0 |
| | | | | | | K513_0350 ME30 | | | | ≤38 | 11.0 | |
| 38.53 | 2697/70 | 900 | 1000 | 1800 | 10/5 | K513_0390 ME20 | 3400 | 3000 | 5000 | ≤32 | 5.5 | 49.0 |
| | | | | | | K513_0390 ME30 | | | | ≤38 | 11.0 | |
| 58.30 | 11,368/195 | 900 | 1000 | 1800 | 10/5 | K513_0580 ME20 | 3400 | 3000 | 5000 | ≤32 | 4.7 | 49.0 |
| | | | | | | K513_0580 ME30 | | | | ≤38 | 10.0 | 50.0 |
| 64.54 | 12,586/195 | 900 | 1000 | 1800 | 10/5 | K513_0650 ME20 | 3400 | 3000 | 5000 | ≤32 | 4.6 | 49.0 |
| | | | | | | K513_0650 ME30 | | | | ≤38 | 10.0 | 50.0 |
| 70.08 | 841/12 | 821 | 985 | 1261 | 10/5 | K513_0700 ME20 | 3400 | 3000 | 5000 | ≤24 | 3.0 | 49.0 |
| 77.59 | 26,071/336 | 900 | 1000 | 1396 | 10/5 | K513_0780 ME20 | 3400 | 3000 | 5000 | ≤24 | 3.0 | 49.0 |
| 112.8 | 135,401/1200 | 900 | 1000 | 1656 | 10/6 | K514_1130 ME20 | 3400 | 3000 | 5000 | ≤24 | 2.8 | 50.0 |
| 124.9 | 599,633/4800 | 900 | 1000 | 1800 | 10/6 | K514_1250 ME20 | 3400 | 3000 | 5000 | ≤24 | 2.8 | 50.0 |
| 134.6 | 3364/25 | 900 | 1000 | 1781 | 10/6 | K514_1350 ME20 | 3400 | 3000 | 5000 | ≤24 | 2.8 | 50.0 |

[1] *Maximum torque for continuous input 1500 RPM - horizontal output position.*
[2] *Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
[3] *Backlash shown standard/reduced*
* *Motor adapter order code (shaft diameter max - mm): ME10 (19), ME20 (32), ME30 (38), ME40 (48), ME50 (60)*

# Selection Data



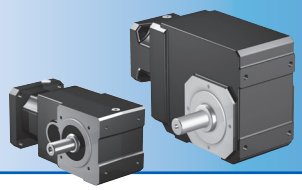
| Reducer Ratio (i) | | Output Torque | | | Backlash [3] | Part Number* (Gearhead + Input) | Max. Input Speed RPM (n1) | | | Motor Shaft Max Ø | Input Inertia | Tors. Stiffness |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Nom. [1] | Accel. | Peak [2] | | | Continuous | | Cyclic | | | |
| Nom. | Exact | $M_{2N}$ | $M_{2acc}$ | $M_{2NOT}$ | $\Delta\phi_2$ | | EL 1,2 | EL 3,4,5,6 | All | $d_{MW}$ | $J_1$ | $C_2$ |
| | | Nm | Nm | Nm | arcmin | | | | | mm | kgcm² | Nm/ arcmin |
| **K5** | **(continued from previous page)** | | | | | | | | | | | |
| 149.0 | 26,071/175 | 900 | 1000 | 1800 | 10/6 | K514_1490 ME20 | 3400 | 3000 | 5000 | ≤24 | 2.8 | 50.0 |
| 225.4 | 659,344/2925 | 900 | 1000 | 1800 | 10/6 | K514_2250 ME20 | 3400 | 3000 | 5000 | ≤24 | 2.7 | 50.0 |
| 249.6 | 729,988/2925 | 900 | 1000 | 1800 | 10/6 | K514_2500 ME20 | 3400 | 3000 | 5000 | ≤24 | 2.7 | 50.0 |
| 271.0 | 24,389/90 | 821 | 985 | 1261 | 10/6 | K514_2710 ME20 | 3400 | 3000 | 5000 | ≤24 | 2.7 | 50.0 |
| 300.0 | 756,059/2520 | 900 | 1000 | 1396 | 10/6 | K514_3000 ME20 | 3400 | 3000 | 5000 | ≤24 | 2.7 | 50.0 |
| **K6** | **(continued next page)** | | | | | | | | | | | |
| 7.323 | 19,215/2624 | 916 | 1120 | 1400 | 10/5 | K613_0073 ME30 | 1800 | 1700 | 3000 | ≤38 | 39.0 | 81.0 |
| | | | 1375 | 2625 | | K613_0073 ME40 | | | | ≤48 | 61.0 | |
| | | | | | | K613_0073 ME50 | | | | ≤60 | 89.0 | |
| 8.107 | 85,095/10,496 | 948 | 1240 | 1550 | 10/5 | K613_0081 ME30 | 1800 | 1700 | 3000 | ≤38 | 36.0 | 81.0 |
| | | | 1422 | 2900 | | K613_0081 ME40 | | | | ≤48 | 59.0 | |
| | | | | | | K613_0081 ME50 | | | | ≤60 | 87.0 | 82.0 |
| 11.41 | 22,631/1984 | 1062 | 1594 | 2181 | 10/5 | K613_0115 ME30 | 2200 | 2000 | 3500 | ≤38 | 25.0 | 82.0 |
| | | | | | | K613_0115 ME40 | | | | ≤48 | 46.0 | |
| | | | | | | K613_0115 ME50 | | | | ≤60 | 75.0 | |
| 12.63 | 3233/256 | 1099 | 1600 | 2414 | 10/5 | K613_0125 ME30 | 2200 | 2000 | 3500 | ≤38 | 24.0 | 82.0 |
| | | | | | | K613_0125 ME40 | | | | ≤48 | 45.0 | |
| | | | | | | K613_0125 ME50 | | | | ≤60 | 75.0 | |
| 17.16 | 549/32 | 984 | 984 | 1229 | 10/5 | K613_0170 ME20 | 2600 | 2300 | 4000 | ≤32 | 12.0 | 82.0 |
| | | 1217 | 1600 | 2900 | | K613_0170 ME30 | | | | ≤38 | 18.0 | |
| | | | | | | K613_0170 ME40 | | | | ≤48 | 39.0 | |
| | | | | | | K613_0170 ME50 | 2500 | | | ≤60 | 69.0 | |
| 18.99 | 17,019/896 | 1089 | 1089 | 1361 | 10/5 | K613_0190 ME20 | 2600 | 2300 | 4000 | ≤32 | 12.0 | 82.0 |
| | | 1259 | 1600 | 2900 | | K613_0190 ME30 | | | | ≤38 | 17.0 | |
| | | | | | | K613_0190 ME40 | | | | ≤48 | 39.0 | |
| | | | | | | K613_0190 ME50 | 2500 | | | ≤60 | 68.0 | |
| 28.77 | 29,463/1024 | 1169 | 1448 | 1809 | 10/5 | K613_0290 ME20 | 3100 | 2800 | 4500 | ≤32 | 7.8 | 82.0 |
| | | 1446 | 1600 | 2900 | | K613_0290 ME30 | | | | ≤38 | 13.0 | |
| | | | | | | K613_0290 ME40 | 3000 | | | ≤48 | 35.0 | |
| | | | | | | K613_0290 ME50 | 2500 | 2500 | 4000 | ≤60 | 64.0 | |

[1] *Maximum torque for continuous input 1500 RPM - horizontal output position.*
[2] *Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
[3] *Backlash shown standard/reduced*
* *Motor adapter order code (shaft diameter max - mm): ME10 (19), ME20 (32), ME30 (38), ME40 (48), ME50 (60)*

| Reducer Ratio (i) | | Output Torque | | | Backlash [3] | Part Number* (Gearhead + Input) | Max. Input Speed RPM (n1) | | | Motor Shaft Max Ø | Input Inertia | Tors. Stiffness |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Nom. [1] | Accel. | Peak [2] | | | Continuous | | Cyclic | | | |
| | | $M_{2N}$ | $M_{2acc}$ | $M_{2NOT}$ | $\Delta\phi_2$ | | EL 1,2 | EL 3,4,5,6 | All | $d_{MW}$ | $J_1$ | $C_2$ |
| Nom. | Exact | Nm | Nm | Nm | arcmin | | | | | mm | kgcm² | Nm/ arcmin |
| **K6** | **(continued from previous page)** | | | | | | | | | | | |
| 31.86 | 130,479/4096 | 1294 | 1600 | 2003 | 10/5 | K613_0320 ME20 | 3100 | 2800 | 4500 | ≤32 | 7.6 | 82.0 |
| | | 1450 | | 2900 | | K613_0320 ME30 | | | | ≤38 | 13.0 | |
| | | | | | | K613_0320 ME40 | 3000 | | | ≤48 | 35.0 | |
| | | | | | | K613_0320 ME50 | 2500 | 2500 | 4000 | ≤60 | 64.0 | |
| 43.11 | 8967/208 | 1227 | 1600 | 2072 | 10/5 | K613_0430 ME20 | 3100 | 2800 | 4500 | ≤32 | 6.0 | 82.0 |
| | | 1450 | | | | K613_0430 ME30 | | | | ≤38 | 11.0 | |
| 47.73 | 39,711/832 | 1359 | 1600 | 2294 | 10/5 | K613_0480 ME20 | 3100 | 2800 | 4500 | ≤32 | 5.9 | 82.0 |
| | | 1450 | | | | K613_0480 ME30 | | | | ≤38 | 11.0 | |
| 68.77 | 28,609/416 | 1311 | 1577 | 2628 | 10/5 | K613_0690 ME20 | 3100 | 2800 | 4500 | ≤32 | 4.9 | 82.0 |
| | | 1314 | | | | K613_0690 ME30 | | | | ≤38 | 10.0 | |
| 76.14 | 126,697/1664 | 1450 | 1600 | 2900 | 10/5 | K613_0760 ME20 | 3100 | 2800 | 4500 | ≤32 | 4.9 | 82.0 |
| | | | | | | K613_0760 ME30 | | | | ≤38 | 10.0 | |
| 111.3 | 284,809/2560 | 1448 | 1448 | 1809 | 10/6 | K614_1110 ME20 | 3100 | 2800 | 4500 | ≤24 | 2.9 | 82.0 |
| 123.2 | 1,261,297/10,240 | 1450 | 1600 | 2003 | 10/6 | K614_1230 ME20 | 3100 | 2800 | 4500 | ≤24 | 2.9 | 82.0 |
| 166.7 | 86,681/520 | 1450 | 1600 | 2072 | 10/6 | K614_1670 ME20 | 3100 | 2800 | 4500 | ≤24 | 2.8 | 83.0 |
| 184.6 | 383,873/2080 | 1450 | 1600 | 2294 | 10/6 | K614_1850 ME20 | 3100 | 2800 | 4500 | ≤24 | 2.8 | 83.0 |
| 265.9 | 829,661/3120 | 1314 | 1577 | 2628 | 10/6 | K614_2660 ME20 | 3100 | 2800 | 4500 | ≤24 | 2.8 | 83.0 |
| 294.4 | 3,674,213/12,480 | 1450 | 1600 | 2900 | 10/6 | K614_2940 ME20 | 3100 | 2800 | 4500 | ≤24 | 2.7 | 83.0 |
| **K7** | **(continued next page)** | | | | | | | | | | | |
| 7.563 | 19,845/2624 | 1516 | 2169 | 2712 | 10/5 | K713_0076 ME40 | 1700 | 1600 | 2700 | ≤48 | 91.0 | 122.0 |
| | | | | | | K713_0076 ME50 | | | | ≤60 | 119.0 | 123.0 |
| 8.373 | 87,885/10,496 | 1568 | 2353 | 3002 | 10/5 | K713_0084 ME40 | 1700 | 1600 | 2700 | ≤48 | 87.0 | 123.0 |
| | | | | | | K713_0084 ME50 | | | | ≤60 | 115.0 | 124.0 |
| 11.78 | 23,373/1984 | 1477 | 1802 | 2252 | 10/5 | K713_0120 ME30 | 2000 | 1900 | 3200 | ≤38 | 40.0 | 124.0 |
| | | 1758 | 2600 | 4223 | | K713_0120 ME40 | | | | ≤48 | 63.0 | |
| | | | | | | K713_0120 ME50 | | | | ≤60 | 91.0 | 125.0 |
| 13.04 | 3339/256 | 1636 | 1995 | 2493 | 10/5 | K713_0130 ME30 | 2000 | 1900 | 3200 | ≤38 | 39.0 | 124.0 |
| | | 1818 | 2600 | 4675 | | K713_0130 ME40 | | | | ≤48 | 61.0 | |
| | | | | | | K713_0130 ME50 | | | | ≤60 | 89.0 | 125.0 |
| 18.28 | 26,901/1472 | 1719 | 2562 | 3202 | 10/5 | K713_0185 ME30 | 2400 | 2200 | 3600 | ≤38 | 26.0 | 125.0 |
| | | 2034 | 2600 | 4800 | | K713_0185 ME40 | | | | ≤48 | 49.0 | |
| | | | | | | K713_0185 ME50 | | | | ≤60 | 77.0 | |

[1] *Maximum torque for continuous input 1500 RPM - horizontal output position.*
[2] *Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
[3] *Backlash shown standard/reduced*
* *Motor adapter order code (shaft diameter max - mm): ME10 (19), ME20 (32), ME30 (38), ME40 (48), ME50 (60)*

# Selection Data



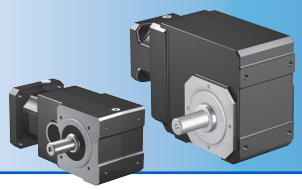
| Reducer Ratio (i) | | Output Torque | | | Backlash [3] | Part Number* (Gearhead + Input) | Max. Input Speed RPM (n1) | | | Motor Shaft Max Ø | Input Inertia | Tors. Stiffness |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Nom. [1] | Accel. | Peak [2] | | | Continuous | | Cyclic | | | |
| Nom. | Exact | $M_{2N}$ | $M_{2acc}$ | $M_{2NOT}$ | $\Delta\phi_2$ | | EL 1,2 | EL 3,4,5,6 | All | $d_{MW}$ | $J_1$ | $C_2$ |
| | | Nm | Nm | Nm | arcmin | | | | | mm | kgcm² | Nm/ arcmin |
| **K7** | **(continued from previous page)** | | | | | | | | | | | |
| 20.23 | 119,133/5888 | 1903 | 2600 | 3545 | 10/5 | K713_0200 ME30 | 2400 | 2200 | 3600 | ≤38 | 26.0 | 125.0 |
| | | 2105 | | 4800 | | K713_0200 ME40 | | | | ≤48 | 48.0 | |
| | | | | | | K713_0200 ME50 | | | | ≤60 | 76.0 | |
| 29.29 | 7497/256 | 1934 | 2600 | 4087 | 10/5 | K713_0290 ME30 | 2900 | 2600 | 4200 | ≤38 | 18.0 | 125.0 |
| | | 2381 | | 4800 | | K713_0290 ME40 | | | | ≤48 | 40.0 | |
| | | | | | | K713_0290 ME50 | 2500 | 2500 | 4000 | ≤60 | 68.0 | |
| 32.42 | 33,201/1024 | 2141 | 2600 | 4524 | 10/5 | K713_0320 ME30 | 2900 | 2600 | 4200 | ≤38 | 17.0 | 125.0 |
| | | 2400 | | 4800 | | K713_0320 ME40 | | | | ≤48 | 40.0 | |
| | | | | | | K713_0320 ME50 | 2500 | 2500 | 4000 | ≤60 | 68.0 | |
| 45.05 | 37,485/832 | 2082 | 2600 | 4800 | 10/5 | K713_0450 ME30 | 2900 | 2600 | 4200 | ≤38 | 14.0 | 126.0 |
| | | 2400 | | | | K713_0450 ME40 | | | | ≤48 | 35.0 | 125.0 |
| | | | | | | K713_0450 ME50 | 2500 | 2500 | 4000 | ≤60 | 64.0 | 126.0 |
| 49.88 | 166,005/3328 | 2306 | 2600 | 4800 | 10/5 | K713_0500 ME30 | 2900 | 2600 | 4200 | ≤38 | 13.0 | 126.0 |
| | | 2400 | | | | K713_0500 ME40 | | | | ≤48 | 35.0 | |
| | | | | | | K713_0500 ME50 | 2500 | 2500 | 4000 | ≤60 | 64.0 | |
| 71.20 | 4557/64 | 2173 | 2283 | 2884 | 10/5 | K713_0710 ME30 | 2900 | 2600 | 4200 | ≤38 | 11.0 | 126.0 |
| 78.83 | 20,181/256 | 2400 | 2528 | 3160 | 10/5 | K713_0790 ME30 | 2900 | 2600 | 4200 | ≤38 | 11.0 | 126.0 |
| 114.7 | 117,453/1024 | 2400 | 2600 | 4087 | 10/6 | K714_1150 ME30 | 2900 | 2600 | 4200 | ≤38 | 10.0 | 126.0 |
| 127.0 | 520,149/4096 | 2400 | 2600 | 4524 | 10/6 | K714_1270 ME30 | 2900 | 2600 | 4200 | ≤38 | 10.0 | 126.0 |
| 174.2 | 72,471/416 | 1751 | 1751 | 2189 | 10/6 | K714_1740 ME20 | 2900 | 2600 | 4200 | ≤24 | 3.0 | 126.0 |
| 176.5 | 587,265/3328 | 2400 | 2600 | 4800 | 10/6 | K714_1760 ME30 | 2900 | 2600 | 4200 | ≤38 | 10.0 | 126.0 |
| 192.9 | 320,943/1664 | 1938 | 1938 | 2423 | 10/6 | K714_1930 ME20 | 2900 | 2600 | 4200 | ≤24 | 3.0 | 126.0 |
| 195.4 | 2,600,745/13,312 | 2400 | 2600 | 4800 | 10/6 | K714_1950 ME30 | 2900 | 2600 | 4200 | ≤38 | 10.0 | 126.0 |
| 275.3 | 44,051/160 | 2173 | 2283 | 2854 | 10/6 | K714_2750 ME20 | 2900 | 2600 | 4200 | ≤24 | 2.8 | 126.0 |
| 304.8 | 195,083/640 | 2400 | 2528 | 3160 | 10/6 | K714_3050 ME20 | 2900 | 2600 | 4200 | ≤24 | 2.8 | 126.0 |

[1] *Maximum torque for continuous input 1500 RPM - horizontal output position.*
[2] *Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
[3] *Backlash shown standard/reduced*
* *Motor adapter order code (shaft diameter max - mm): ME10 (19), ME20 (32), ME30 (38), ME40 (48), ME50 (60)*

| Reducer Ratio (i) | | Output Torque | | | Backlash [3] | Part Number* (Gearhead + Input) | Max. Input Speed RPM (n1) | | | Motor Shaft Max Ø | Input Inertia | Tors. Stiffness |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Nom. [1] | Accel. | Peak [2] | | | Continuous | | Cyclic | | | |
| | | $M_{2N}$ | $M_{2acc}$ | $M_{2NOT}$ | $\Delta\phi_2$ | | | | | $d_{MW}$ | $J_1$ | $C_2$ |
| Nom. | Exact | Nm | Nm | Nm | arcmin | | EL 1,2 | EL 3,4,5,6 | All | mm | kgcm² | Nm/ arcmin |
| **K8** | **(continued next page)** | | | | | | | | | | | |
| 7.445 | 3127/420 | 2135 | 2135 | 2669 | 10/5 | K813_0074 ME40 | 1600 | 1500 | 2600 | ≤48 | 174.0 | 187.0 |
| | | | | | | K813_0074 ME50 | | | | ≤60 | 202.0 | 191.0 |
| 8.243 | 96,937/11,760 | 2364 | 2364 | 2955 | 10/5 | K813_0082 ME40 | 1600 | 1500 | 2600 | ≤48 | 161.0 | 189.0 |
| | | | | | | K813_0082 ME50 | | | | ≤60 | 189.0 | 192.0 |
| 14.84 | 9499/640 | 3286 | 4255 | 5318 | 10/5 | K813_0150 ME40 | 1900 | 1800 | 3000 | ≤48 | 82.0 | 194.0 |
| | | | | | | K813_0150 ME50 | | | | ≤60 | 110.0 | 195.0 |
| 16.43 | 42,067/2560 | 3399 | 4650 | 5888 | 10/5 | K813_0165 ME40 | 1900 | 1800 | 3000 | ≤48 | 79.0 | 194.0 |
| | | | | | | K813_0165 ME50 | | | | ≤60 | 106.0 | 195.0 |
| 23.04 | 31,801/1380 | 2153 | 3133 | 3917 | 10/5 | K813_0230 ME30 | 2300 | 2100 | 3500 | ≤38 | 36.0 | 195.0 |
| | | 3805 | 4650 | 8259 | | K813_0230 ME40 | | | | ≤48 | 58.0 | |
| | | | | | | K813_0230 ME50 | | | | ≤60 | 86.0 | 196.0 |
| 25.51 | 140,833/5520 | 2383 | 3469 | 4337 | 10/5 | K813_0260 ME30 | 2300 | 2100 | 3500 | ≤38 | 35.0 | 195.0 |
| | | 3936 | 4650 | 8400 | | K813_0260 ME40 | | | | ≤48 | 57.0 | 196.0 |
| | | | | | | K813_0260 ME50 | | | | ≤60 | 85.0 | |
| 36.14 | 2891/80 | 2370 | 3885 | 4856 | 10/5 | K813_0360 ME30 | 2800 | 2500 | 4000 | ≤38 | 22.0 | 196.0 |
| | | 4200 | 4650 | 8400 | | K813_0360 ME40 | | | | ≤48 | 45.0 | |
| | | | | | | K813_0360 ME50 | 2500 | | | ≤60 | 73.0 | |
| 40.01 | 12,803/320 | 2624 | 4302 | 5377 | 10/5 | K813_0400 ME30 | 2800 | 2500 | 4000 | ≤38 | 22.0 | 196.0 |
| | | 4200 | 4650 | 8400 | | K813_0400 ME40 | | | | ≤48 | 44.0 | |
| | | | | | | K813_0400 ME50 | 2500 | | | ≤60 | 72.0 | |
| 59.08 | 42,539/720 | 2560 | 4650 | 6388 | 10/5 | K813_0590 ME30 | 2800 | 2500 | 4000 | ≤38 | 15.0 | 196.0 |
| | | 4200 | | | | K813_0590 ME40 | | | | ≤48 | 37.0 | |
| | | | | | | K813_0590 ME50 | 2500 | | | ≤60 | 66.0 | |
| 65.41 | 188,387/2880 | 2835 | 4650 | 7073 | 10/5 | K813_0650 ME30 | 2800 | 2500 | 4000 | ≤38 | 15.0 | 196.0 |
| | | 4200 | | | | K813_0650 ME40 | | | | ≤48 | 37.0 | |
| | | | | | | K813_0650 ME50 | 2500 | | | ≤60 | 66.0 | |
| 71.70 | 10,325/144 | 2638 | 4327 | 7026 | 10/5 | K813_0720 ME30 | 2800 | 2500 | 4000 | ≤38 | 13.0 | 196.0 |
| | | 3606 | | | | K813_0720 ME40 | | | | ≤48 | 35.0 | |
| | | | | | | K813_0720 ME50 | 2500 | | | ≤60 | 64.0 | |
| 79.38 | 45,725/576 | 2920 | 4650 | 7779 | 10/5 | K813_0790 ME30 | 2800 | 2500 | 4000 | ≤38 | 13.0 | 196.0 |
| | | 3993 | | | | K813_0790 ME40 | | | | ≤48 | 35.0 | |
| | | | | | | K813_0790 ME50 | 2500 | | | ≤60 | 64.0 | |
| 88.89 | 40,887/460 | 4200 | 4650 | 8259 | 10/6 | K814_0890 ME40 | 2800 | 2500 | 4000 | ≤48 | 35.0 | 196.0 |

[1] *Maximum torque for continuous input 1500 RPM - horizontal output position.*
[2] *Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
[3] *Backlash shown standard/reduced*
* *Motor adapter order code (shaft diameter max - mm): ME10 (19), ME20 (32), ME30 (38), ME40 (48), ME50 (60)*

# Selection Data



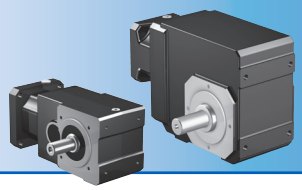
| Reducer Ratio (i) | | Output Torque | | | Backlash [3] | Part Number* (Gearhead + Input) | Max. Input Speed RPM (n1) | | | Motor Shaft Max Ø | Input Inertia | Tors. Stiffness |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Nom. [1] | Accel. | Peak [2] | | | Continuous | | Cyclic | | | |
| Nom. | Exact | $M_{2N}$ | $M_{2acc}$ | $M_{2NOT}$ | $\Delta\phi_2$ | | EL 1,2 | EL 3,4,5,6 | All | $d_{MW}$ | $J_1$ | $C_2$ |
| | | Nm | Nm | Nm | arcmin | | | | | mm | kgcm² | Nm/ arcmin |
| **K8** | **(continued from previous page)** | | | | | | | | | | | |
| 98.41 | 181,071/1840 | 4200 | 4650 | 8400 | 10/6 | K814_0980 ME40 | 2800 | 2500 | 4000 | ≤48 | 35.0 | 196.0 |
| 139.4 | 11,151/80 | 4200 | 4650 | 8400 | 10/6 | K814_1390 ME40 | 2800 | 2500 | 4000 | ≤48 | 34.0 | 196.0 |
| 141.5 | 135,877/960 | 3832 | 3885 | 4856 | 10/6 | K814_1420 ME30 | 2800 | 2500 | 4000 | ≤38 | 11.0 | 196.0 |
| 154.3 | 49,383/320 | 4200 | 4650 | 8400 | 10/6 | K814_1540 ME40 | 2800 | 2500 | 4000 | ≤48 | 34.0 | 196.0 |
| 156.7 | 601,741/3840 | 4200 | 4302 | 5377 | 10/6 | K814_1570 ME30 | 2800 | 2500 | 4000 | ≤38 | 11.0 | 196.0 |
| 227.9 | 18,231/80 | 4200 | 4650 | 6388 | 10/6 | K814_2280 ME40 | 2800 | 2500 | 4000 | ≤48 | 33.0 | 196.0 |
| 252.3 | 565,161/2240 | 4200 | 4650 | 7073 | 10/6 | K814_2520 ME40 | 2800 | 2500 | 4000 | ≤48 | 33.0 | 196.0 |
| 256.2 | 8,854,189/34,560 | 4200 | 4650 | 7073 | 10/6 | K814_2560 ME30 | 2800 | 2500 | 4000 | ≤38 | 10.0 | 196.0 |
| 276.6 | 4425/16 | 3606 | 4327 | 7026 | 10/6 | K814_2770 ME40 | 2800 | 2500 | 4000 | ≤48 | 33.0 | 196.0 |
| 280.8 | 485,275/1728 | 3606 | 4327 | 7026 | 10/6 | K814_2810 ME30 | 2800 | 2500 | 4000 | ≤38 | 10.0 | 196.0 |
| 306.2 | 137,175/448 | 3993 | 4650 | 7779 | 10/6 | K814_3060 ME40 | 2800 | 2500 | 4000 | ≤48 | 33.0 | 196.0 |
| 310.9 | 2,149,075/6912 | 3993 | 4650 | 7779 | 10/6 | K814_3110 ME30 | 2800 | 2500 | 4000 | ≤38 | 10.0 | 196.0 |
| **K9** | **(continued next page)** | | | | | | | | | | | |
| 12.53 | 73,749/5888 | 3592 | 3592 | 4490 | 10/5 | K913_0125 ME40 | 1800 | 1800 | 2800 | ≤48 | 190.0 | 367.0 |
| | | | | | | K913_0125 ME50 | | | | ≤60 | 218.0 | 372.0 |
| 19.06 | 305/16 | 4955 | 5466 | 6833 | 10/5 | K913_0190 ME40 | 2200 | 2100 | 3300 | ≤48 | 117.0 | 374.0 |
| | | 5466 | | | | K913_0190 ME50 | | | | ≤60 | 145.0 | 376.0 |
| 23.94 | 88,877/3712 | 5252 | 6864 | 8580 | 10/5 | K913_0240 ME40 | 2200 | 2100 | 3300 | ≤48 | 93.0 | 376.0 |
| | | 6867 | | | | K913_0240 ME50 | | | | ≤60 | 121.0 | 377.0 |
| 32.12 | 47,275/1472 | 5621 | 7700 | 11511 | 10/5 | K913_0320 ME40 | 2600 | 2500 | 3800 | ≤48 | 71.0 | 377.0 |
| | | 7000 | | | | K913_0320 ME50 | 2500 | | | ≤60 | 99.0 | 378.0 |
| 38.04 | 194,773/5120 | 5807 | 7700 | 12504 | 10/5 | K913_0380 ME40 | 2600 | 2500 | 3800 | ≤48 | 62.0 | 378.0 |
| | | 7000 | | | | K913_0380 ME50 | 2500 | | | ≤60 | 90.0 | |
| 48.94 | 100,223/2048 | 5999 | 7700 | 13787 | 10/5 | K913_0490 ME40 | 2600 | 2500 | 3800 | ≤48 | 52.0 | 378.0 |
| | | 7000 | | | | K913_0490 ME50 | 2500 | | | ≤60 | 80.0 | 379.0 |
| 63.07 | 209,901/3328 | 6229 | 7700 | 14000 | 10/5 | K913_0630 ME40 | 2600 | 2500 | 3800 | ≤48 | 45.0 | 379.0 |
| | | 7000 | | | | K913_0630 ME50 | 2500 | | | ≤60 | 73.0 | |
| 75.00 | 62,403/832 | 6422 | 6820 | 8525 | 10/5 | K913_0750 ME40 | 2600 | 2500 | 3800 | ≤48 | 41.0 | 379.0 |
| | | 6822 | | | | K913_0750 ME50 | 2500 | | | ≤60 | 70.0 | |
| 92.35 | 2,399,679/25,984 | 6864 | 6864 | 8580 | 10/5 | K914_0920 ME40 | 2600 | 2500 | 3800 | ≤48 | 37.0 | 379.0 |
| 123.9 | 1,276,425/10,304 | 7000 | 7700 | 11511 | 10/5 | K914_1240 ME40 | 2600 | 2500 | 3800 | ≤48 | 36.0 | 379.0 |
| 125.8 | 2,221,925/17,664 | 3837 | 3883 | 4854 | 10/5 | K914_1260 ME30 | 2600 | 2500 | 3800 | ≤38 | 12.0 | 379.0 |

[1] *Maximum torque for continuous input 1500 RPM - horizontal output position.*
[2] *Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
[3] *Backlash shown standard/reduced*
* *Motor adapter order code (shaft diameter max - mm): ME10 (19), ME20 (32), ME30 (38), ME40 (48), ME50 (60)*

| Reducer Ratio (i) | | Output Torque | | | Backlash [3] | Part Number* (Gearhead + Input) | Max. Input Speed RPM (n1) | | | Motor Shaft Max Ø | Input Inertia | Tors. Stiffness |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Nom. [1] | Accel. | Peak [2] | | | Continuous | | Cyclic | | | |
| Nom. | Exact | $M_{2N}$ | $M_{2acc}$ | $M_{2NOT}$ | $\Delta\phi_2$ | | EL 1,2 | EL 3,4,5,6 | All | $d_{MW}$ | $J_1$ | $C_2$ |
| | | Nm | Nm | Nm | arcmin | | | | | mm | kgcm² | Nm/ arcmin |
| **K9** | **(continued from previous page)** | | | | | | | | | | | |
| 146.7 | 5,258,871/35,840 | 7000 | 7700 | 12504 | 10/5 | K914_1470 ME40 | 2600 | 2500 | 3800 | ≤48 | 35.0 | 379.0 |
| 149.0 | 9,154,331/61,440 | 4545 | 4600 | 5750 | 10/5 | K914_1490 ME30 | 2600 | 2500 | 3800 | ≤38 | 12.0 | 379.0 |
| 188.8 | 2,706,021/14,336 | 7000 | 7700 | 13787 | 10/5 | K914_1890 ME40 | 2600 | 2500 | 3800 | ≤48 | 34.0 | 379.0 |
| 191.7 | 4,710,481/24,576 | 5073 | 5073 | 6341 | 10/5 | K914_1920 ME30 | 2600 | 2500 | 3800 | ≤38 | 11.0 | 379.0 |
| 243.3 | 5,667,327/23,296 | 7000 | 7700 | 14000 | 10/5 | K914_2430 ME40 | 2600 | 2500 | 3800 | ≤48 | 34.0 | 379.0 |
| 247.0 | 3,288,449/13,312 | 5474 | 5731 | 7164 | 10/5 | K914_2470 ME30 | 2600 | 2500 | 3800 | ≤38 | 11.0 | 379.0 |
| 293.8 | 977,647/3328 | 5704 | 6820 | 8525 | 10/5 | K914_2940 ME30 | 2600 | 2500 | 3800 | ≤38 | 10.0 | 379.0 |
| **K10** | | | | | | | | | | | | |
| 38.60 | 8029/208 | 9066 | 10621 | 13276 | 10/5 | K1013_0390 ME50 | 2500 | 2300 | 3500 | ≤60 | 126.0 | 722.0 |
| 61.55 | 12,803/208 | 9696 | 12750 | 15937 | 10/5 | K1013_0620 ME50 | 2500 | 2300 | 3500 | ≤60 | 91.0 | 724.0 |
| 75.28 | 101,773/1352 | 9807 | 13200 | 19578 | 10/5 | K1013_0750 ME50 | 2500 | 2300 | 3500 | ≤60 | 82.0 | 724.0 |
| 123.7 | 7,359,555/59,488 | 12000 | 13200 | 24000 | 10/5 | K1014_1240 ME50 | 2500 | 2300 | 3500 | ≤60 | 69.0 | 724.0 |
| 148.9 | 30,969/208 | 9417 | 10621 | 13276 | 10/5 | K1014_1490 ME40 | 2500 | 2300 | 3500 | ≤48 | 38.0 | 724.0 |
| 151.4 | 409,479/2704 | 12000 | 13200 | 24000 | 10/5 | K1014_1510 ME50 | 2500 | 2300 | 3500 | ≤60 | 67.0 | 724.0 |
| 237.4 | 49,383/208 | 10425 | 12750 | 15937 | 10/5 | K1014_2370 ME40 | 2500 | 2300 | 3500 | ≤48 | 35.0 | 725.0 |
| 290.4 | 392,553/1352 | 10727 | 13200 | 19578 | 10/5 | K1014_2900 ME40 | 2500 | 2300 | 3500 | ≤48 | 35.0 | 725.0 |

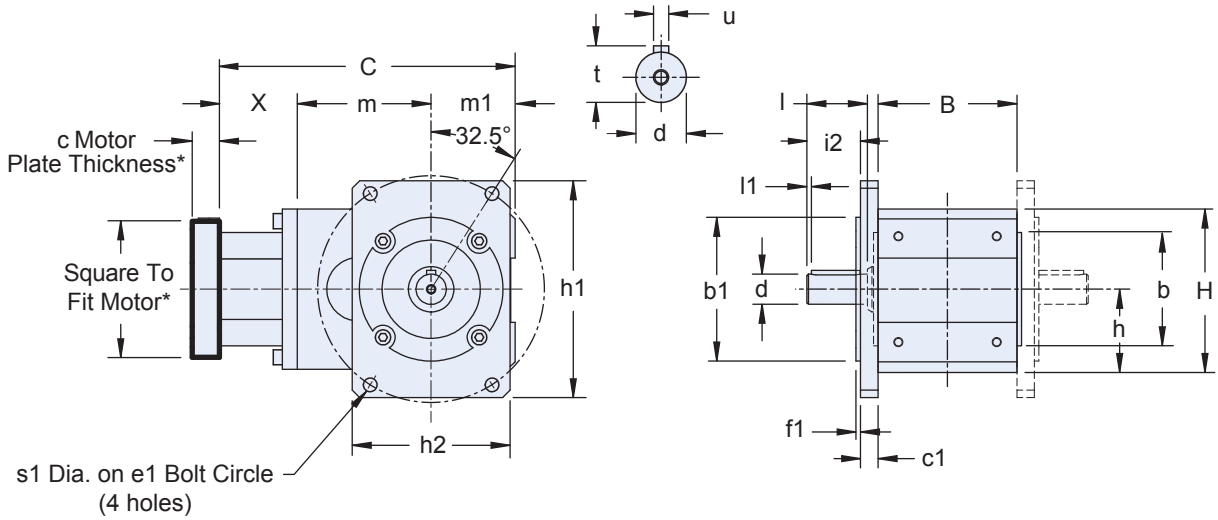
[1] *Maximum torque for continuous input 1500 RPM - horizontal output position.*
[2] *Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
[3] *Backlash shown standard/reduced*
* *Motor adapter order code (shaft diameter max - mm): ME10 (19), ME20 (32), ME30 (38), ME40 (48), ME50 (60)*

# Notes



## KL Series with "P" or "G" Solid Shaft Output Option

### "F" Output Flange Housing Option




** See Motor Mounting Plate Option, page 124 for details.*
*** See Output Shaft Options, page xx for details.*

**Table 1** KL Series Unit Dimensions (mm) – "F" Round Flange Housing Option

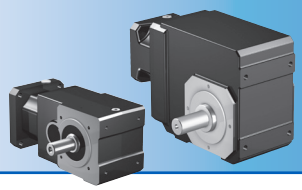
| Unit | B | b1 | b | C | c1 | e1 | f1 | H | h | h1 | h2 | i2 | l | l1 | m | m1 | s1 | X |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| KL1 | 75 | $60_{j6}$ | $60_{j6}$ | 160 | 11.5 | 130 | 3 | 90 | 46 | 128.5 | 88.5 | 26.5 | 32 | 3 | 67.5 | 46 | 9 | 46.5 |
| KL2 | 92 | $95_{j6}$ | $75_{j6}$ | 195 | 11.5 | 150 | 3 | 108 | 55 | 143.5 | 104.5 | 35.5 | 40 | 3 | 88.5 | 55 | 9 | 51.5 |

**Table 2** Standard "P" Solid Shaft

| Unit | Shaft – inches | | | Metric Shaft – mm | | | Stainless Shaft | | Wt.* lbs. |
|---|---|---|---|---|---|---|---|---|---|
| | $d_{k6}$ | u – Key | t | $d_{k6}$ | u – Key | t | Inches | mm | |
| KL1 | 5/8 | 3/16 x 3/16 x 1 | 0.709 | 16 | M5 x 5 x 22 | 18 | 5/8 | 16 | 14 |
| KL2 | 0.750 | 3/16 x 3/16 x 1-1/4 | 0.832 | 20 | M6 x 6 x 32 | 23 | 0.750 | 20 | 21 |

**Weight is approximate.*

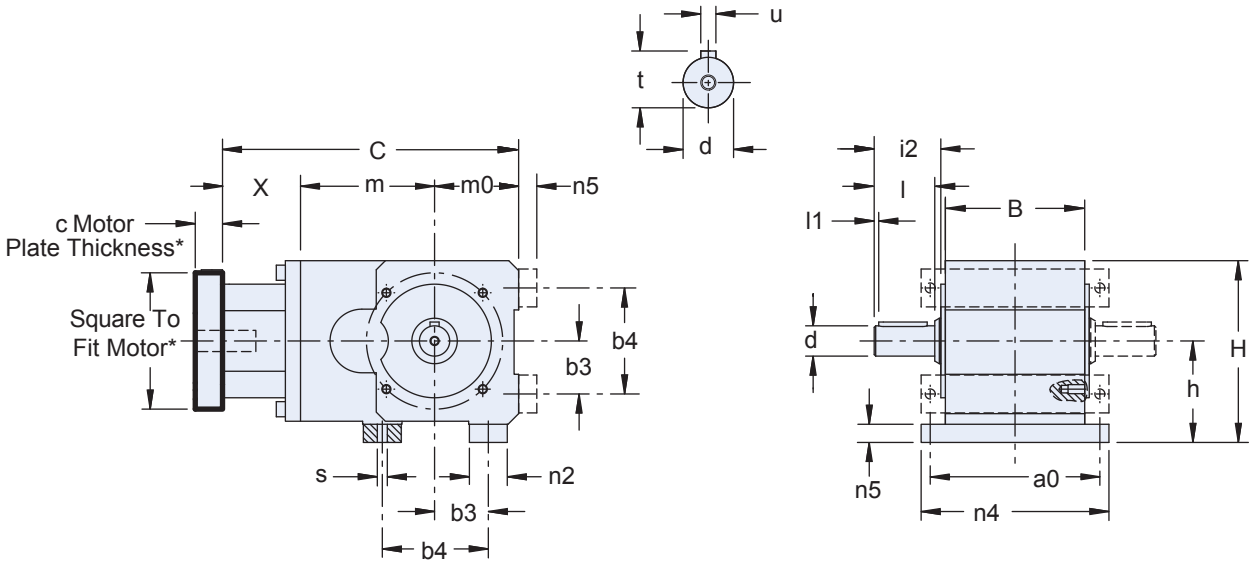
*k6 = existing values*



# Dimensional Data

## KL Series with "P" or "G" Solid Shaft Output Option

### "NG" Foot Mounting Housing Option




** See Motor Mounting Plate Option, page 124 for details.*
*** See Output Shaft Options, page xx for details.*

**Table 1** KL Series Unit Dimensions (mm) – "NG" Foot Mounting Housing Option

| Unit | a0 | B | b3 | b4 | C | H | h | l | l1 | l2 | m | m0 | n2 | n4 | n5 | s | X |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| KL1 | 95 | 75 | 27.5 | 55 | 160 | 102 | 58 | 32 | 3 | 38 | 67.5 | 46 | 20 | 107 | 12 | 6.6 | 46.5 |
| KL2 | 112 | 92 | 35 | 70 | 195 | 120 | 67 | 40 | 3 | 47 | 88.5 | 55 | 25 | 124 | 12 | 6.6 | 51.5 |

**Table 2** Standard "P" Solid Shaft

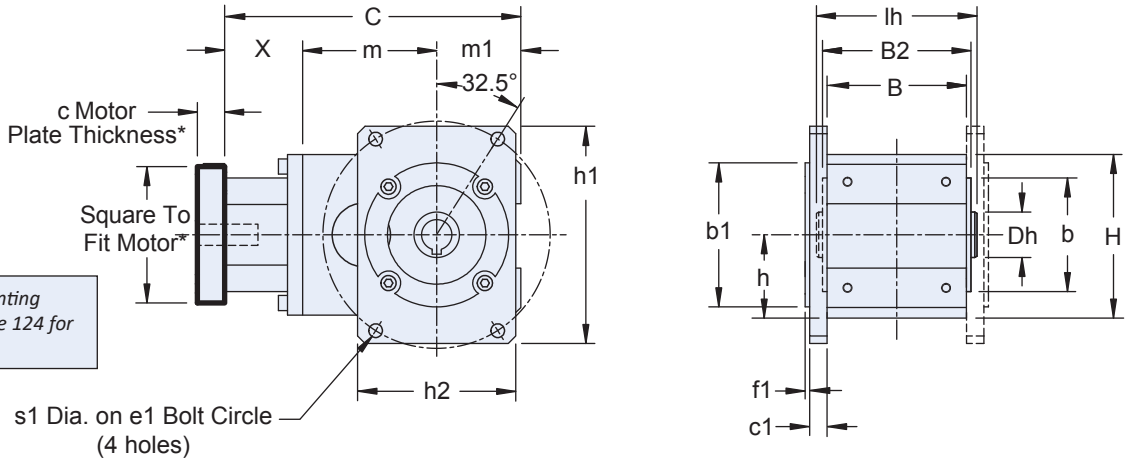
| Unit | Shaft – inches | | | Metric Shaft – mm | | | Stainless Shaft | | Wt.* lbs. |
|---|---|---|---|---|---|---|---|---|---|
| | $d_{k6}$ | u – Key | t | $d_{k6}$ | u – Key | t | Inches | mm | |
| KL1 | 5/8 | 3/16 x 3/16 x 1 | – | 16 | M5 x 5 x 22 | 18 | 5/8 | 16 | 14 |
| KL2 | 0.750 | 3/16 x 3/16 x 1-1/4 | 0.832 | 20 | M6 x 6 x 32 | 23 | 0.750 | 20 | 21 |

**Weight is approximate.*

*k6 = existing values*

## KL Series with "A" Hollow Output

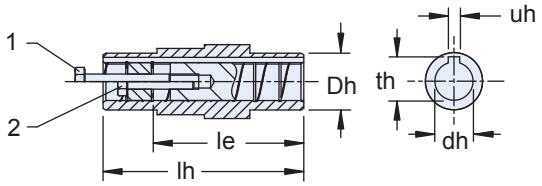
### "F" Output Flange Housing




** See Motor Mounting Plate Option, page 124 for details.*

*1. Removal Bolt – not supplied. See Installation instructions for details*

*2. Mounting Bolt – must be smaller than removal bolt*




**See hollow output installation instructions for further details**

**Table 1** **KL Series Unit Dimensions (mm) – "F" Round Flange Housing**

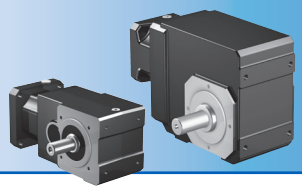
| Unit | B | B2 | b1 | b | C | c1 | Dh | e1 | f1 | H | h | h1 | h2 | le | lh | m | m1 | s1 | X |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| KL1 | 75 | 81 | $60_{j6}$ | $60_{j6}$ | 160 | 11.5 | 25 | 130 | 3 | 90 | 46 | 128.5 | 88.5 | 60.5 | 87 | 67.5 | 46 | 9 | 46.5 |
| KL2 | 92 | 98 | $95_{j6}$ | $75_{j6}$ | 195 | 11.5 | 30 | 150 | 3 | 108 | 55 | 143.5 | 104.5 | 79.5 | 106 | 88.5 | 55 | 9 | 51.5 |

**Table 2** **Standard "A" Hollow Bore**

| | Bore - inches | | | Metric Bore - mm | | | Stainless Bore | | Wt.* |
|---|---|---|---|---|---|---|---|---|---|
| Unit | $dh_{G7}$ | uh | th | $dh_{H7}$ | $uh_{JS9}$ | th | Inches | mm | lbs. |
| KL1 | 0.625 | 0.188 | 0.713 | 16 | 5 | 18.3 | 0.625 | 16 | 14 |
| KL2 | 0.750 | 0.188 | 0.832 | 20 | 6 | 22.8 | 0.750 | 20 | 21 |

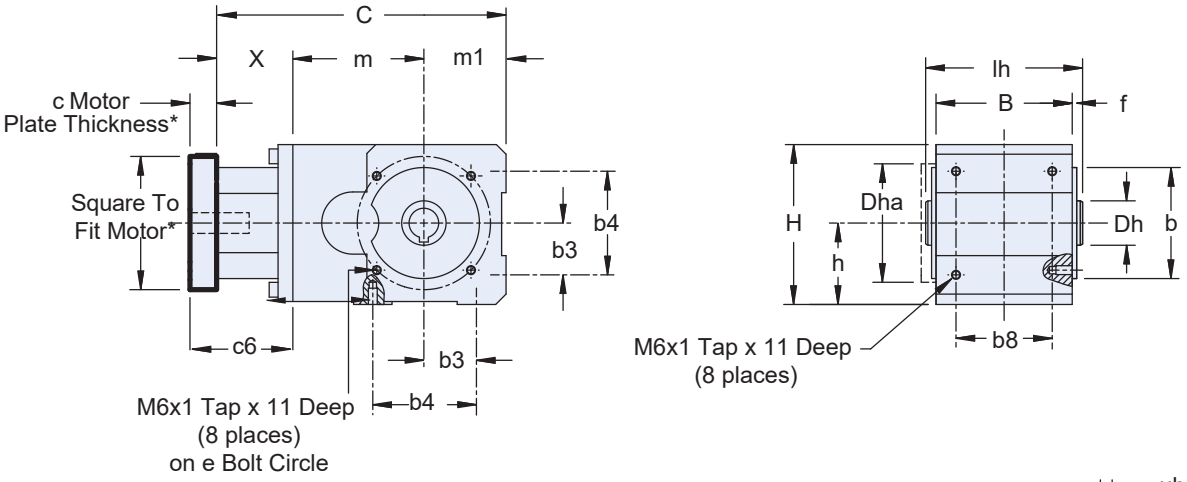
**Weight is approximate.*

*G7, H7, JS9 = actual values*



# Dimensional Data

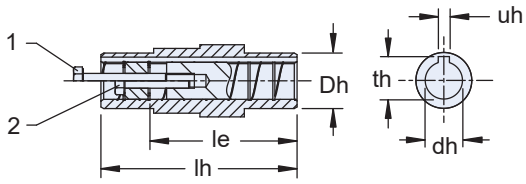
## KL Series with "A" Hollow Output
## "G" Pitch Circle Diameter (PCD) Tapped Holes




** See Motor Mounting Plate Option, page 124 for details.*

*1. Removal Bolt – not supplied. See Installation instructions for details*

*2. Mounting Bolt – must be smaller than removal bolt*




**See hollow output installation instructions for further details**

**Table 1** KL Series Unit Dimensions (mm) – "G" Pitch Circle Diameter (PCD) Tapped Holes

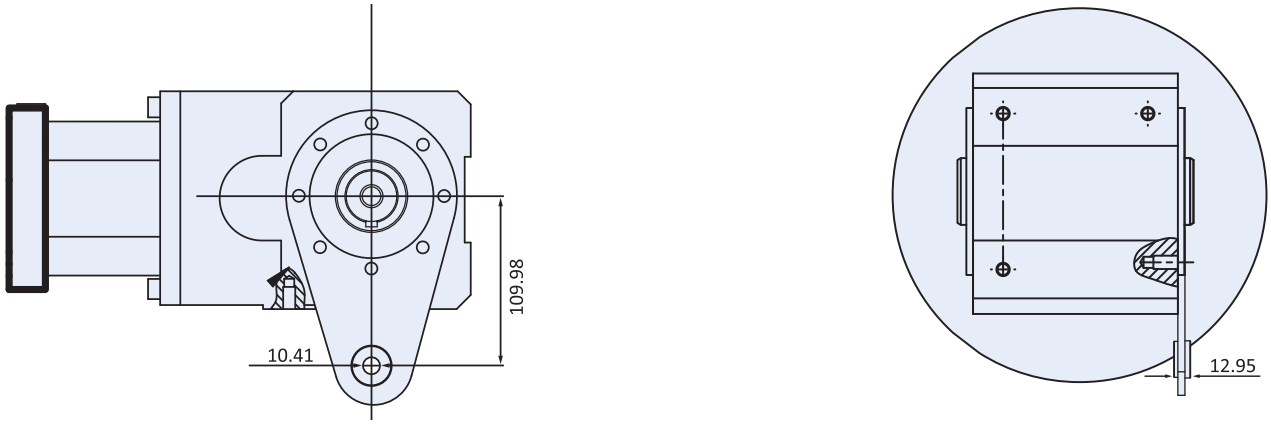
| Unit | B | b | b3 | b4 | b8 | C | c6 | Dh | Dha | e | f | H | h | le | lh | m | m1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| KL1 | 75 | $60_{j6}$ | 27.5 | 55 | 50 | 160 | 61.5 | 25 | 70 | 75 | 3 | 90 | 46 | 60.5 | 87 | 67.5 | 46 |
| KL2 | 92 | $75_{j6}$ | 35 | 70 | 65 | 195 | 69.5 | 30 | 80 | 90 | 3 | 108 | 55 | 79.5 | 106 | 88.5 | 55 |

**Table 2** Standard "A" Hollow Bore

| | Bore - inches | | | Metric Bore - mm | | | Stainless Bore | | Wt.* |
|---|---|---|---|---|---|---|---|---|---|
| Unit | $dh_{G7}$ | uh | th | $dh_{H7}$ | $uh_{JS9}$ | th | Inches | mm | lbs. |
| KL1 | 0.625 | 0.188 | 0.713 | 16 | 5 | 18.3 | 0.625 | 16 | 14 |
| KL2 | 0.750 | 0.188 | 0.832 | 20 | 6 | 22.8 | 0.750 | 20 | 21 |

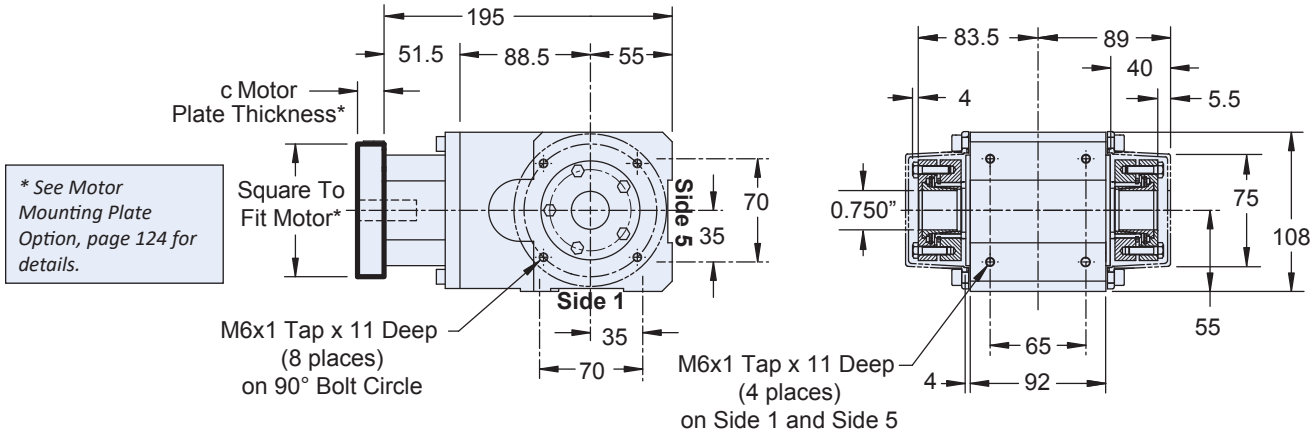
**Weight is approximate.* *G7, H7, JS9 = actual values*

## "A" Hollow Bore Output "GD" Torque Arm Bracket KL2 Only



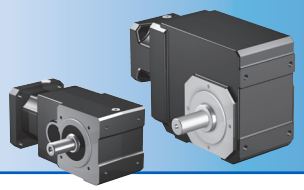
## KL Series (KL202 only) with "W" Wobble Free Bushing Output

### "G" Pitch Circle Diameter (PCD) Tapped Holes



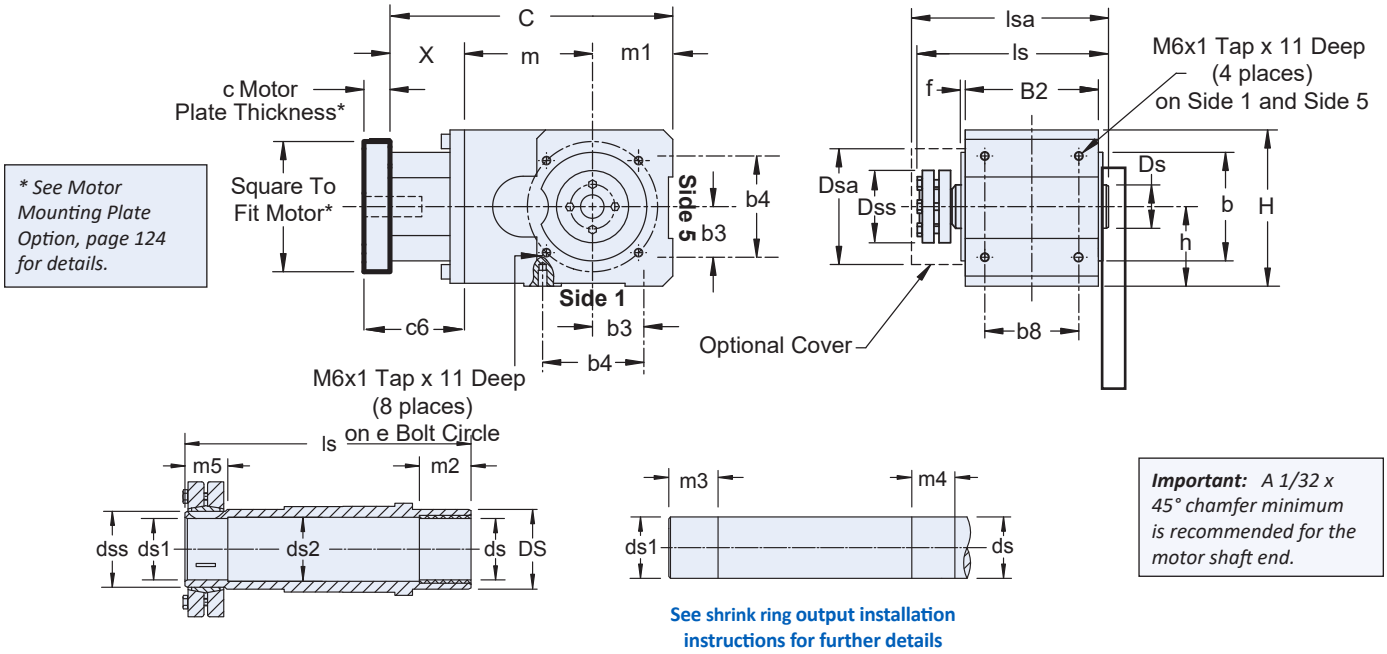

** See Motor Mounting Plate Option, page 124 for details.*

***Important:*** *A 1/32" x 45° chamfer minimum is recommended for the shaft end. The bushing will accept a shaft with a tolerance of +0.000/-0.005 inches.*



# Dimensional Data

## KL Series with "S" Shrink Ring Output
### "G" Pitch Circle Diameter (PCD) Tapped Holes




See shrink ring output installation instructions for further details

**Table 1** KL Series Unit Dimensions (mm) – "S" Shrink Ring Output

| Unit | B2 | b | b3 | b4 | b8 | C | c6 | Dsa | Dss | e | f | H | h | lsa | m1 | m |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| KL1 | 75 | $60_{j6}$ | 27.5 | 55 | 50 | 160 | 46.5 | 64 | 46.2 | 75 | 3 | 90 | 46 | 114.5 | 46 | 67.5 |
| KL2 | 92 | $75_{j6}$ | 35 | 70 | 65 | 195 | 51.5 | 79 | 50.0 | 90 | 3 | 108 | 55 | 139 | 55 | 88.5 |

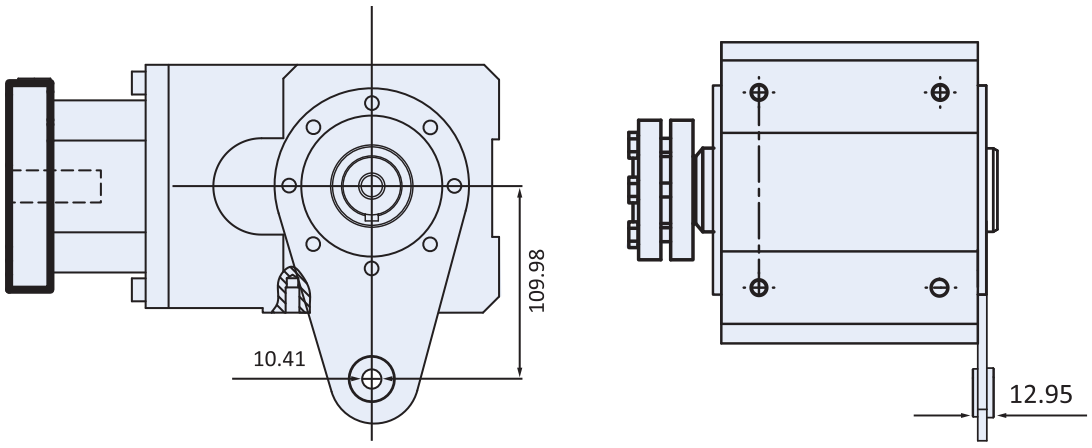
**Table 2** Bore/Shaft Dimensions (mm)

| Unit | DS | Ds | $ds_{H7}$ | ds1 Bore | ds1 Shaft | ds2 | dss | ls | m2 | m3 | m4 | m5 | Wt.* lbs. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| KL1 | 46.2 | 25 | 16 | $16_{H7}$ | $16_{h6}$ | 17.5 | 20 | 109 | 17 | 22 | 28 | 23 | 14 |
| KL2 | 50 | 30 | 20 | $20_{H7}$ | $20_{h6}$ | 21.5 | 24 | 131 | 22 | 27 | 31 | 26 | 21 |

**Weight is approximate*

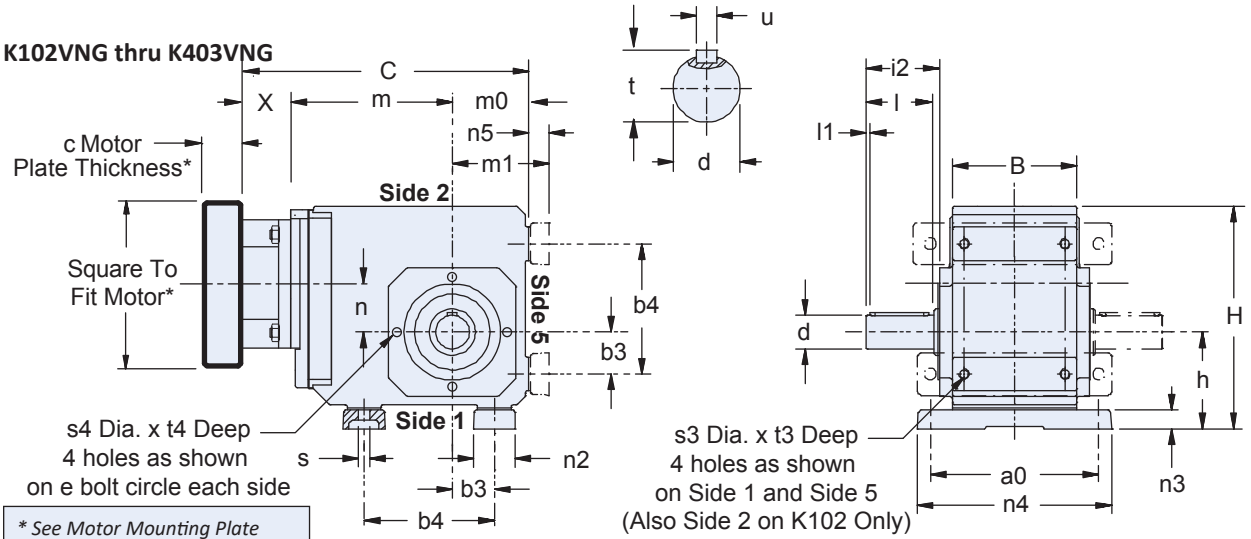
*h6 = existing value; H7 = actual values*

## "A" Hollow Bore Output "GD" Torque Arm Bracket KL2 Only



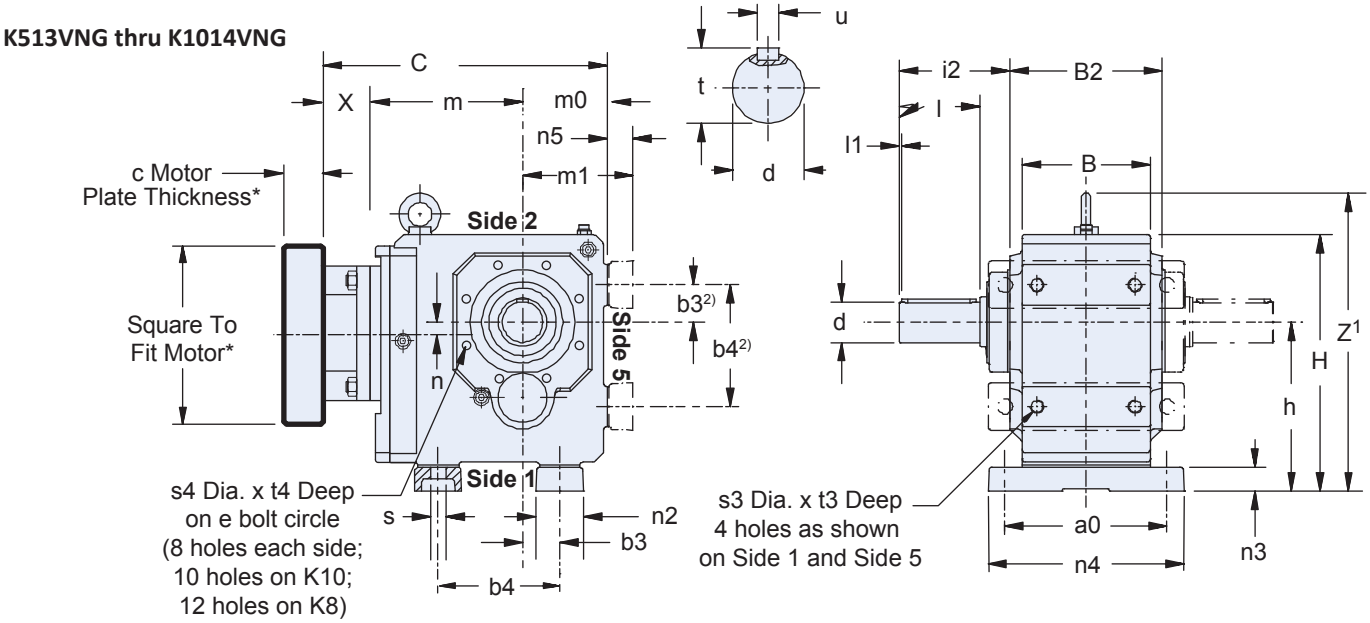
## K Series with "V" Solid Shaft Output Option, "NG" Foot Mounting Housing & "G" Pitch Circle Diameter (PCD) Tapped Holes

**K102VNG thru K403VNG**

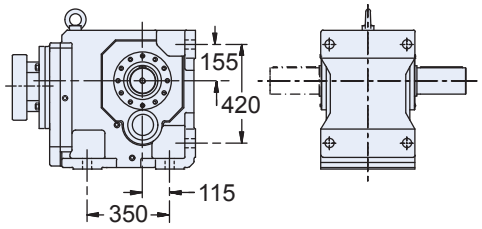



** See Motor Mounting Plate Option, page 124 for details.*

**K513VNG thru K1014VNG**




**Size K10 Mounting Feet** (Dimensions b3 and b4)



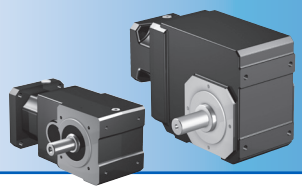

*2) Mounting feet are integral on the K10 housing. Note that b3 = 155 and b4= 420 on Side 5 of the K10. Hole locations are as shown above.*

**Table 4 Motor Adapter Dimensions (mm)**

| Motor Adapter | Thickness[4] c Min. | Motor Shaft d2 Max.[3] | X | Wt. lbs. |
|---|---|---|---|---|
| ME10 | 21 | 19 | 40 | 5 |
| ME20 | 24 | 32 | 50 | 8 |
| ME30 | 25 | 38 | 60 | 15 |
| ME40 | 33 | 48 | 88 | 28 |
| ME50 | 43 | 60 | 81.5 | 42 |

*3) If an adapter bushing is required it will be supplied as a component of the motor mounting plate.*

*4) Motor plate maximum thickness (c) will vary with motor shaft length but will not be less than shown.*



# Dimensional Data



**Table 1 K Series Unit Dimensions (mm) — "NG" Foot Mounting Housing**

| Unit | a0 | B | B2 | b3 | b4 | H | h | i2 | l | l1 | m0 | m1 | n2 | n3 | n4 | n5 | s | Z[1] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| K1 | 115 | 90 | — | 30 | 90[1)] | 175 | 75 | 62 | 50 | 4 | 60 | 75 | 32 | 13 | 140 | 15 | 9 | — |
| K2 | 155 | 115 | — | 35 | 115 | 213 | 88 | 68 | 60 | 4 | 65 | 88 | 40 | 20 | 185 | 23 | 11 | — |
| K3 | 170 | 130 | — | 40 | 130 | 236 | 98 | 69 | 60 | 4 | 75 | 98 | 45 | 20 | 200 | 23 | 11 | — |
| K4 | 200 | 148 | — | 50 | 155 | 265 | 115 | 89.5 | 80 | 4 | 90 | 115 | 50 | 22 | 230 | 25 | 14 | — |
| K5 | 200 | 160 | 185 | 40 | 140 | 290 | 190 | 129.5 | 100 | 4 | 100 | 130 | 60 | 27 | 240 | 30 | 18 | 342 |
| K6 | 210 | 168 | 200 | 50 | 160 | 340 | 220 | 136 | 90 | 4 | 120 | 150 | 65 | 27 | 250 | 30 | 18.5 | 392 |
| K7 | 241[2)] | 190 | 226 | 55 | 180 | 380 | 250 | 164 | 120 | 4 | 125 | 163 | 70 | 35 | 290 | 38 | 23 | 441 |
| K8 | 300 | 235 | 282 | 75 | 240 | 455 | 310 | 185 | 140 | 5 | 145 | 190 | 85 | 41 | 360 | 45 | 27 | 516 |
| K9 | 360 | 285 | 330 | 95 | 280 | 545 | 365 | 220 | 170 | 8 | 180 | 230 | 95 | 46 | 430 | 50 | 31 | 615 |
| K10 | 330 | 356 | 400 | 115[3)] | 350[3)] | 680 | 420 | 240 | 210 | 15 | 225 | 225 | 120 | 45 | 400 | 45 | 39 | 680 |

*[1)] Mounting holes are also located on Side 1 of the K1 unit ONLY.*
*[2)] For a0 with mounting on side 1 only; a0 when mounting on optional side 5 is 241 mm.*
*[3)] Mounting feet are integral on the K10 housing as shown in drawing, facing page. Note b3 = 155 and b4 = 420 on* **Side 5** *of the K10.*

**Table 2 K Series Unit Dimensions (mm) – "G" Pitch Circle Diameter (PCD) Tapped Holes**

| Unit | e | s3 | s4 | t3 | t4 |
|---|---|---|---|---|---|
| K1 | 90 | M8x1.25 | M8x1.25 | 13 | 13 |
| K2 | 100 | M10x1.5 | M8x1.25 | 16 | 16 |
| K3 | 115 | M10x1.5 | M8x1.25 | 16 | 16 |
| K4 | 130 | M12x1.75 | M10x1.5 | 19 | 19 |
| K5 | 130 | M16x2 | M10x1.5 | 26 | 26 |
| K6 | 165 | M16x2 | M10x1.5 | 26 | 26 |
| K7 | 185 | M20x2.5 | M12x1.75 | 31 | 31 |
| K8 | 215 | M24x3 | M12x1.75 | 38 | 38 |
| K9 | 265 | M30x3.5 | M16x2 | 48 | 48 |
| K10 | 300 | 39 [1)] | 10-M20 | 45 | 33 |

*[1)] s3 on K10 are thru holes, not tapped.*

**Table 3 K Series Unit Dimensions (mm) — "V" Solid Shaft Output**

Shaft outputs in stainless or carbon steel. See page 125 for available shaft output options.

| | Inches | | | Metric (mm) | | | Stainless | |
|---|---|---|---|---|---|---|---|---|
| Unit | $d_{h6}$* | t | u – Key | d* | t | u – Key | Inches | mm |
| K1 | 1.000 | 1.11 | 1/4 x 1/4 x 1-9/16 | $25_{k6}$ | 28 | M8×7×40 | 1.000 | 25 |
| K2 | 1.250 | 1.36 | 1/4 x 1/4 x 1-15/16 | $30_{k6}$ | 33 | M8×7×50 | 1.250 | 30 |
| K3 | 1.250 | 1.36 | 1/4 x 1/4 x 1-15/16 | $30_{k6}$ | 33 | M8×7×50 | 1.250 | 40 |
| K4 | 1.375 | 1.51 | 5/16 x 5/16 x 2-5/16 | $40_{k6}$ | 43 | M12×8×70 | 1.375 | – |
| K5 | 1.750 | 1.92 | 3/8 x 3/8 x 3-5/32 | $45_{k6}$ | 48.5 | M14×9×80 | 1.750 | 45 |
| K6 | 1.750 | 1.92 | 3/8 x 3/8 x 3-5/32 | $50_{k6}$ | 53.5 | M14×9×90 | 1.750 | – |
| K7 | 2.375 | 2.65 | 5/8 x 5/8 x 3-15/16 | $60_{k6}$ | 64 | M18×11×110 | 2.375 | – |
| K8 | 2.875 | 3.21 | 3/4 x 3/4 x 4-5/16 | $70_{m6}$ | 74.5 | M20×12×125 | 2.875 | 70 |
| K9 | 3.625 | 4.01 | 7/8 x 7/8 x 5-1/2 | $90_{m6}$ | 95 | M25×14×140 | – | 90 |
| K10 | 4.375 | 4.82 | 1 x 1 x 7-1/8 | $110_{m6}$ | 116 | M28×16×180 | – | – |

**h6, k6, m6 = existing value*

**Table 5 K Series Unit Dimensions (mm)**

| | ME10 | | | ME20 | | | ME30 | | | ME40 | | | ME50 | | | Wt. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Unit | C | m | n | C | m | n | C | m | n | C | m | n | C | m | n | lbs. |
| K102 | 224 | 124 | 36 | 238 | 128 | 36 | — | — | — | — | — | — | — | — | — | 31 |
| K202 | 248 | 143 | 46 | 262 | 147 | 46 | 274 | 149 | 46 | — | — | — | — | — | — | 40 |
| K203 | 285 | 180 | 46 | — | — | — | — | — | — | — | — | — | — | — | — | 53 |
| K302 | 278 | 163 | 52.5 | 292 | 167 | 52.5 | 304 | 169 | 52.5 | — | — | — | — | — | — | 67 |
| K303 | 315 | 200 | 52.5 | 335 | 210 | 16 | — | — | — | — | — | — | — | — | — | 73 |
| K402 | — | — | — | 327 | 187 | 60 | 339 | 189 | 60 | 370 | 192 | 60 | — | — | — | 93 |
| K403 | 350 | 220 | 60 | 370 | 230 | 23 | — | — | — | — | — | — | — | — | — | 100 |
| K513 | — | — | — | 322 | 172 | 15 | 334 | 174 | 15 | 365 | 177 | 15 | — | — | — | 106 |
| K514 | — | — | — | 365 | 215 | 15 | — | — | — | — | — | — | — | — | — | 109 |
| K613 | — | — | — | 361 | 191 | 18 | 373 | 193 | 18 | 404 | 196 | 18 | 411.5 | 210 | 18 | 170 |
| K614 | — | — | — | 404 | 234 | 18 | — | — | — | — | — | — | — | — | — | 177 |
| K713 | — | — | — | — | — | — | 406 | 221 | 20 | 437 | 224 | 20 | 443.5 | 237 | 20 | 221 |
| K714 | — | — | — | 438 | 263 | 20 | 468 | 283 | 20 | — | — | — | — | — | — | 234 |
| K813 | — | — | — | — | — | — | 452 | 247 | 24 | 482 | 249 | 24 | 488.5 | 262 | 24 | 309 |
| K814 | — | — | — | — | — | — | 513 | 308 | 24 | 553 | 320 | 5 | — | — | — | 331 |
| K913 | — | — | — | — | — | — | — | — | — | 562 | 294 | 25 | 568.5 | 307 | 25 | 508 |
| K914 | — | — | — | — | — | — | 593 | 353 | 25 | 633 | 365 | 25 | — | — | — | 530 |
| K1013 | — | — | — | — | — | — | — | — | — | — | — | — | 698.5 | 392 | 28 | 1055 |
| K1014 | — | — | — | — | — | — | — | — | — | 763 | 450 | 28 | 781.5 | 475 | 28 | 1079 |

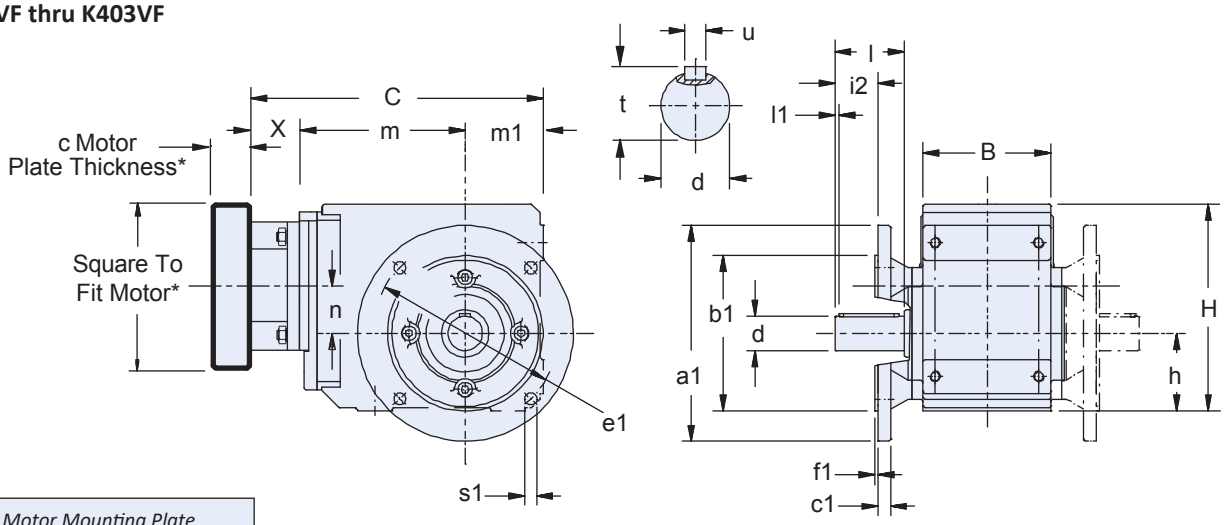
*For approximate weight, add adapter weight from Table 3 and unit weight from Table 4.*

## K Series with "V" Solid Shaft Output

### "F" Round Flange Housing

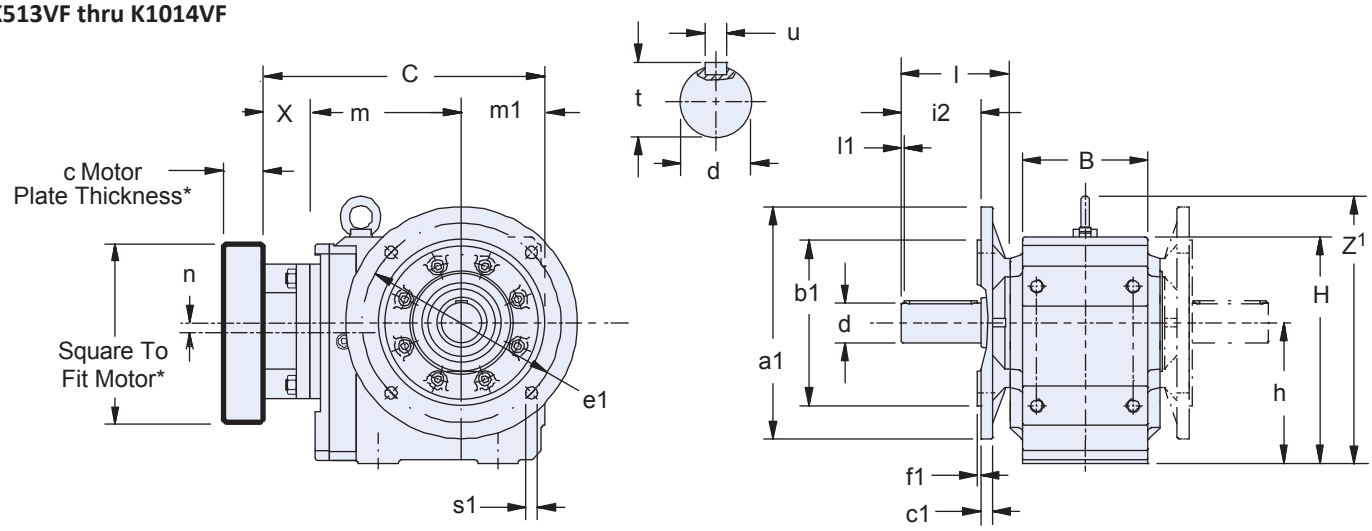
*Other flange sizes available: for details see "Optional "F" Round Flange Housing Options for K Series" on page 163 .*

**K102VF thru K403VF**

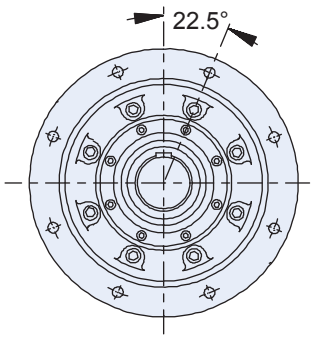



** See Motor Mounting Plate Option, page 124 for details.*

**K513VF thru K1014VF**




**Size K9 and K10 Flange**




K913 thru K1014 has 8 mounting holes in the output flange located as shown.

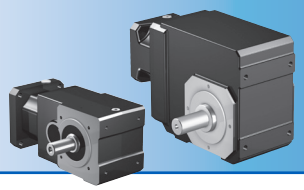
**Table 3 Motor Adapter Dimensions (mm)**

| Motor Adapter | Thickness[2] c Min. | Motor Shaft d2 Max.[1] | X | Wt. lbs. |
|---|---|---|---|---|
| ME10 | 21 | 19 | 40 | 5 |
| ME20 | 24 | 32 | 50 | 8 |
| ME30 | 25 | 38 | 60 | 15 |
| ME40 | 33 | 48 | 88 | 28 |
| ME50 | 43 | 60 | 81.5 | 42 |

*1) If an adapter bushing is required it will be supplied as a component of the motor mounting plate.*

*2) Motor plate maximum thickness (c) will vary with motor shaft length but will not be less than shown.*

# Dimensional Data



## Table 1 K Series Unit Dimensions (mm) – "F" Round Flange Housing

| Unit | a1 | B | b1 | c1 | e1 | f1 | H | h | i2 | l | l1 | m1 | s1 | Z[1] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| K1 | 160 | 90 | $110_{j6}$ | 10 | 130 | 3.5 | 160 | 60 | 30.0 | 50 | 4 | 60 | 9 | — |
| K2 | 200 | 115 | $130_{j6}$ | 12 | 165 | 3.5 | 190 | 65 | 36.0 | 60 | 4 | 65 | 11 | — |
| K3 | 200 | 130 | $130_{j6}$ | 14 | 165 | 3.5 | 213 | 75 | 31.0 | 60 | 4 | 75 | 11 | — |
| K4 | 250 | 148 | $180_{j6}$ | 15 | 215 | 4 | 240 | 90 | 49.5 | 80 | 4 | 90 | 14 | — |
| K5 | 250 | 160 | $180_{j6}$ | 15 | 215 | 4 | 260 | 160 | 89.9 | 90 | 4 | 100 | 14 | 312 |
| K6 | 300 | 168 | $230_{j6}$ | 17 | 265 | 4 | 310 | 190 | 100.0 | 100 | 4 | 120 | 14 | 362 |
| K7 | 350 | 190 | $250_{h6}$ | 18 | 300 | 5 | 342 | 212 | 119.9 | 120 | 4 | 125 | 18 | 403 |
| K8 | 400 | 235 | $300_{h6}$ | 20 | 350 | 5 | 410 | 265 | 140.0 | 140 | 5 | 145 | 18 | 471 |
| K9 | 450 | 285 | $350_{h6}$ | 23 | 400 | 5 | 495 | 315 | 169.9 | 170 | 8 | 180 | 18 | 565 |
| K10 | 550 | 356 | $450_{h6}$ | 25 | 500 | 5 | 591 | 375 | 210.0 | 210 | 15 | 225 | 18 | 680 |

## Table 2 K Series Unit Dimensions (mm) — "V" Solid Shaft Output

Shaft outputs in stainless or carbon steel. See page 125 for available shaft output options.

| | Inches | | | Metric (mm) | | | Stainless | |
|---|---|---|---|---|---|---|---|---|
| Unit | $d_{h6}$* | t | u – Key | d* | t | u – Key | Inches | mm |
| K1 | 1.000 | 1.11 | 1/4 x 1/4 x 1-9/16 | $25_{k6}$ | 28 | M8×7×40 | 1.000 | 25 |
| K2 | 1.250 | 1.36 | 1/4 x 1/4 x 1-15/16 | $30_{k6}$ | 33 | M8×7×50 | 1.250 | 30 |
| K3 | 1.250 | 1.36 | 1/4 x 1/4 x 1-15/16 | $30_{k6}$ | 33 | M8×7×50 | 1.250 | 40 |
| K4 | 1.375 | 1.51 | 5/16 x 5/16 x 2-5/16 | $40_{k6}$ | 43 | M12×8×70 | 1.375 | – |
| K5 | 1.750 | 1.92 | 3/8 x 3/8 x 3-5/32 | $45_{k6}$ | 48.5 | M14×9×80 | 1.750 | 45 |
| K6 | 1.750 | 1.92 | 3/8 x 3/8 x 3-5/32 | $50_{k6}$ | 53.5 | M14×9×90 | 1.750 | – |
| K7 | 2.375 | 2.65 | 5/8 x 5/8 x 3-15/16 | $60_{k6}$ | 64 | M18×11×110 | 2.375 | – |
| K8 | 2.875 | 3.21 | 3/4 x 3/4 x 4-5/16 | $70_{m6}$ | 74.5 | M20×12×125 | 2.875 | 70 |
| K9 | 3.625 | 4.01 | 7/8 x 7/8 x 5-1/2 | $90_{m6}$ | 95 | M25×14×140 | – | 90 |
| K10 | 4.375 | 4.82 | 1 x 1 x 7-1/8 | $110_{m6}$ | 116 | M28×16×180 | – | – |

**h6, j6, k6, m6 = existing value*

## Table 4 K Series Unit Dimensions (mm)

| | ME10 | | | ME20 | | | ME30 | | | ME40 | | | ME50 | | | Wt. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Unit | C | m | n | C | m | n | C | m | n | C | m | n | C | m | n | lbs. |
| K102 | 224 | 124 | 36 | 238 | 128 | 36 | — | — | — | — | — | — | — | — | — | 31 |
| K202 | 248 | 143 | 46 | 262 | 147 | 46 | 274 | 149 | 46 | — | — | — | — | — | — | 40 |
| K203 | 285 | 180 | 46 | — | — | — | — | — | — | — | — | — | — | — | — | 53 |
| K302 | 278 | 163 | 52.5 | 292 | 167 | 52.5 | 304 | 169 | 52.5 | — | — | — | — | — | — | 67 |
| K303 | 315 | 200 | 52.5 | 335 | 210 | 16 | — | — | — | — | — | — | — | — | — | 73 |
| K402 | — | — | — | 327 | 187 | 60 | 339 | 189 | 60 | 370 | 192 | 60 | — | — | — | 93 |
| K403 | 350 | 220 | 60 | 370 | 230 | 23 | — | — | — | — | — | — | — | — | — | 100 |
| K513 | — | — | — | 322 | 172 | 15 | 334 | 174 | 15 | 365 | 177 | 15 | — | — | — | 106 |
| K514 | — | — | — | 365 | 215 | 15 | — | — | — | — | — | — | — | — | — | 109 |
| K613 | — | — | — | 361 | 191 | 18 | 373 | 193 | 18 | 404 | 196 | 18 | 411.5 | 210 | 18 | 170 |
| K614 | — | — | — | 404 | 234 | 18 | — | — | — | — | — | — | — | — | — | 177 |
| K713 | — | — | — | — | — | — | 406 | 221 | 20 | 437 | 224 | 20 | 443.5 | 237 | 20 | 221 |
| K714 | — | — | — | 438 | 263 | 20 | 468 | 283 | 20 | — | — | — | — | — | — | 234 |
| K813 | — | — | — | — | — | — | 452 | 247 | 24 | 482 | 249 | 24 | 488.5 | 262 | 24 | 309 |
| K814 | — | — | — | — | — | — | 513 | 308 | 24 | 553 | 320 | 5 | — | — | — | 331 |
| K913 | — | — | — | — | — | — | — | — | — | 562 | 294 | 25 | 568.5 | 307 | 25 | 508 |
| K914 | — | — | — | — | — | — | 593 | 353 | 25 | 633 | 365 | 25 | — | — | — | 530 |
| K1013 | — | — | — | — | — | — | — | — | — | — | — | — | 698.5 | 392 | 28 | 1055 |
| K1014 | — | — | — | — | — | — | — | — | — | 763 | 450 | 28 | 781.5 | 475 | 28 | 1079 |

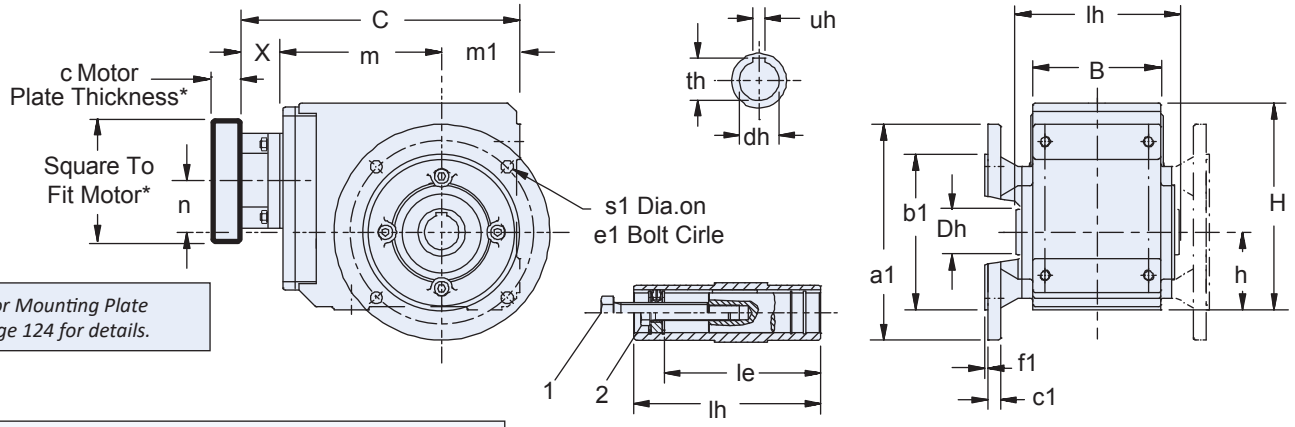
*For approximate weight, add adapter weight from Table 3 and unit weight from Table 4.*

## K Series with "A" Hollow Output

### "F" Round Flange Housing

*Other flange sizes available: for details see "Optional "F" Round Flange Housing Options for K Series" on page 163.*

**K102AF thru K403AF**

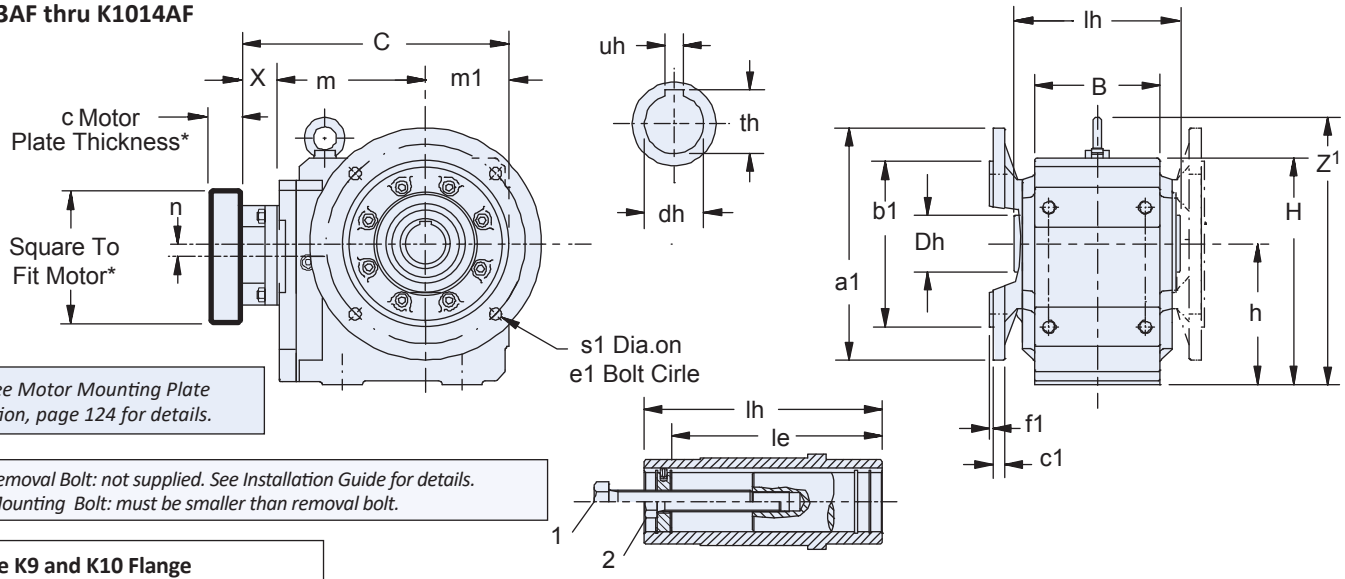



** See Motor Mounting Plate Option, page 124 for details.*

*1. Removal Bolt: not supplied. See Installation Guide for details.*
*2. Mounting Bolt: must be smaller than removal bolt.*

**See hollow output installation instructions for further details**

**K513AF thru K1014AF**

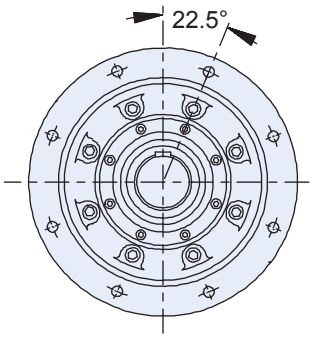



** See Motor Mounting Plate Option, page 124 for details.*

*1. Removal Bolt: not supplied. See Installation Guide for details.*
*2. Mounting Bolt: must be smaller than removal bolt.*

**See hollow output installation instructions for further details**

**Size K9 and K10 Flange**




K913 thru K1014 has 8 mounting holes in the output flange located as shown.

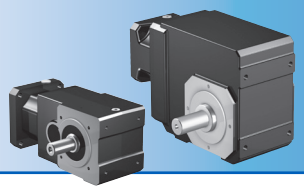
**Table 3 Motor Adapter Dimensions (mm)**

| Motor Adapter | Thickness [2] c Min. | Motor Shaft d2 Max. [1] | X | Wt. lbs. |
|---|---|---|---|---|
| ME10 | 21 | 19 | 40 | 5 |
| ME20 | 24 | 32 | 50 | 8 |
| ME30 | 25 | 38 | 60 | 15 |
| ME40 | 33 | 48 | 88 | 28 |
| ME50 | 43 | 60 | 81.5 | 42 |

*1) If an adapter bushing is required it will be supplied as a component of the motor mounting plate.*

*2) Motor plate maximum thickness (c) will vary with motor shaft length but will not be less than shown.*

# Dimensional Data



## Table 1 K Series Unit Dimensions (mm) – "F" Round Flange Housing

| Unit | a1 | B | b1* | c1 | Dh | e1 | f1 | H | h | le | lh | m1 | s1 | $Z_1$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| K1 | 160 | 90 | $110_{j6}$ | 10 | 40 | 130 | 3.5 | 160 | 60 | 98 | 120 | 60 | 9 | — |
| K2 | 200 | 115 | $130_{j6}$ | 12 | 45 | 165 | 3.5 | 190 | 65 | 121.5 | 148 | 65 | 11 | — |
| K3 | 200 | 130 | $130_{j6}$ | 14 | 50 | 165 | 3.5 | 213 | 75 | 125 | 160 | 75 | 11 | — |
| K4 | 250 | 148 | $180_{j6}$ | 15 | 55 | 215 | 4 | 240 | 90 | 157 | 188 | 90 | 14 | — |
| K5 | 250 | 160 | $180_{j6}$ | 15 | 65 | 215 | 4 | 260 | 160 | 164 | 200 | 100 | 14 | 312 |
| K6 | 300 | 168 | $230_{j6}$ | 17 | 70 | 265 | 4 | 310 | 190 | 179 | 215 | 120 | 14 | 362 |
| K7 | 350 | 190 | $250_{h6}$ | 18 | 85 | 300 | 5 | 342 | 212 | 214 | 242 | 125 | 18 | 403 |
| K8 | 400 | 235 | $300_{h6}$ | 20 | 100 | 350 | 5 | 410 | 265 | 263 | 300 | 145 | 18 | 471 |
| K9 | 450 | 285 | $350_{h6}$ | 23 | 120 | 400 | 5 | 495 | 315 | 302 | 350 | 180 | 18 | 565 |
| K10 | 550 | 356 | $450_{h6}$ | 25 | 130 | 500 | 5 | 591 | 375 | 361 | 410 | 225 | 18 | 680 |

## Table 2 K Series Unit Dimensions (mm) — "A" Hollow Bore Output

Dimensions in **BOLD BLUE** (standard). Contact STOBER for delivery on other sizes listed.

| | Carbon Steel | | | | | | Stainless | |
|---|---|---|---|---|---|---|---|---|
| | Inches | | | Metric (mm) | | | | |
| Unit | $dh_{G7}$* | th | uh | $dh_{H7}$* | th | $uh_{JS9}$* | Inches | mm |
| K1 | **1.000** | 1.11 | 0.250 | 25 | 28.3 | 8 | **1.000** | 25 |
| K2 | **1.1875** | 1.31 | 0.250 | 30 | 33.3 | 8 | 1.125, 1.1875, **1.250** | 30 |
| K3 | **1.375** | 1.52 | 0.312 | 35 | 38.3 | 10 | 1.25, **1.375** | 35 |
| K4 | **1.500** | 1.67 | 0.375 | 40 | 43.3 | 12 | 1.375, **1.500** | **40** |
| K5 | **2.000** | 2.13 | 0.500 | 50 | 53.8 | 14 | 1.4375, 1.9375, **2.000** | **40**, **50** |
| K6 | **2.000** | 2.23 | 0.500 | 50 | 53.8 | 14 | 1.4375, 1.9375, **2.000**, 2.1875 | 40, 50, 60 |
| K7 | **2.375** | 2.66 | 0.625 | 60 | 64.4 | 18 | 1.9375, 2.00, 2.1875, 2.375 | **60** |
| K8 | **2.750** | 3.03 | 0.625 | 70 | 74.9 | 20 | 2.1875, 2.375, 2.5, 2.6875, 2.750 | 60, **70** |
| K9 | **3.250** | 3.59 | 0.750 | 90 | 95.4 | 25 | 2.6875, **2.9375**, **3.000**, 3.25, **3.4375** | 90 |
| K10 | **4.000** | 4.25 | 1.000 | 100 | 108 | 28 | 3.4375, 4.00 | – |

** h6, j6 = existing values; G7, H7, JS9 = actual values*

## Table 4 K Series Unit Dimensions (mm)

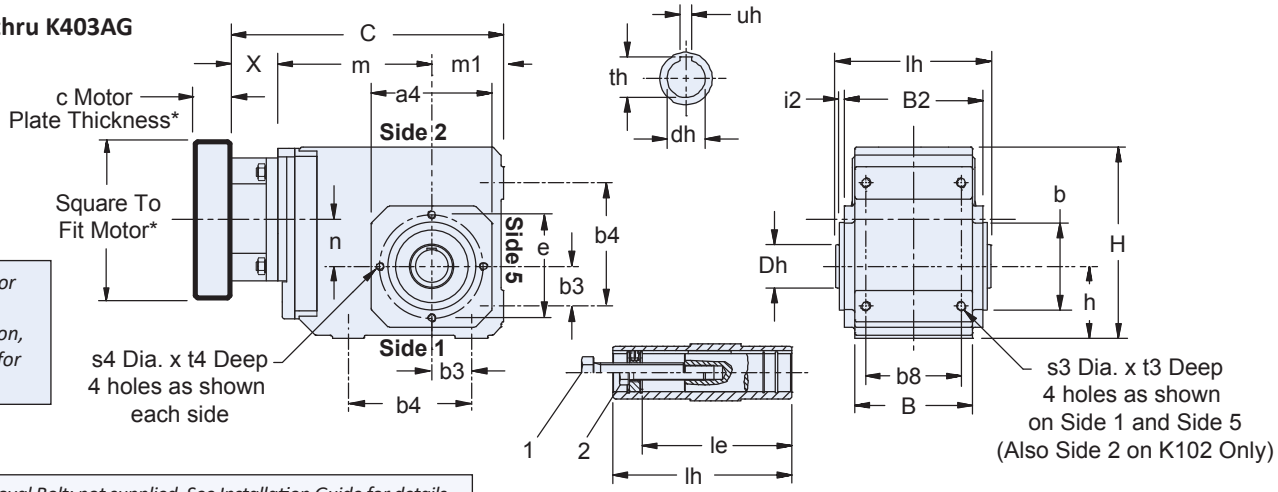
| | ME10 | | | ME20 | | | ME30 | | | ME40 | | | ME50 | | | Wt. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Unit | C | m | n | C | m | n | C | m | n | C | m | n | C | m | n | lbs. |
| K102 | 224 | 124 | 36 | 238 | 128 | 36 | — | — | — | — | — | — | — | — | — | 31 |
| K202 | 248 | 143 | 46 | 262 | 147 | 46 | 274 | 149 | 46 | — | — | — | — | — | — | 40 |
| K203 | 285 | 180 | 46 | — | — | — | — | — | — | — | — | — | — | — | — | 53 |
| K302 | 278 | 163 | 52.5 | 292 | 167 | 52.5 | 304 | 169 | 52.5 | — | — | — | — | — | — | 67 |
| K303 | 315 | 200 | 52.5 | 335 | 210 | 16 | — | — | — | — | — | — | — | — | — | 73 |
| K402 | — | — | — | 327 | 187 | 60 | 339 | 189 | 60 | 370 | 192 | 60 | — | — | — | 93 |
| K403 | 350 | 220 | 60 | 370 | 230 | 23 | — | — | — | — | — | — | — | — | — | 100 |
| K513 | — | — | — | 322 | 172 | 15 | 334 | 174 | 15 | 365 | 177 | 15 | — | — | — | 106 |
| K514 | — | — | — | 365 | 215 | 15 | — | — | — | — | — | — | — | — | — | 109 |
| K613 | — | — | — | 361 | 191 | 18 | 373 | 193 | 18 | 404 | 196 | 18 | 411.5 | 210 | 18 | 170 |
| K614 | — | — | — | 404 | 234 | 18 | — | — | — | — | — | — | — | — | — | 177 |
| K713 | — | — | — | — | — | — | 406 | 221 | 20 | 437 | 224 | 20 | 443.5 | 237 | 20 | 221 |
| K714 | — | — | — | 438 | 263 | 20 | 468 | 283 | 20 | — | — | — | — | — | — | 234 |
| K813 | — | — | — | — | — | — | 452 | 247 | 24 | 482 | 249 | 24 | 488.5 | 262 | 24 | 309 |
| K814 | — | — | — | — | — | — | 513 | 308 | 24 | 553 | 320 | 5 | — | — | — | 331 |
| K913 | — | — | — | — | — | — | — | — | — | 562 | 294 | 25 | 568.5 | 307 | 25 | 508 |
| K914 | — | — | — | — | — | — | 593 | 353 | 25 | 633 | 365 | 25 | — | — | — | 530 |
| K1013 | — | — | — | — | — | — | — | — | — | — | — | — | 698.5 | 392 | 28 | 1055 |
| K1014 | — | — | — | — | — | — | — | — | — | 763 | 450 | 28 | 781.5 | 475 | 28 | 1079 |

*For approximate weight, add adapter weight from Table 3 and unit weight from Table 4.*

## K Series with "A" Hollow Output

### "G" Pitch Circle Diameter (PCD) Tapped Holes

**K102AG thru K403AG**

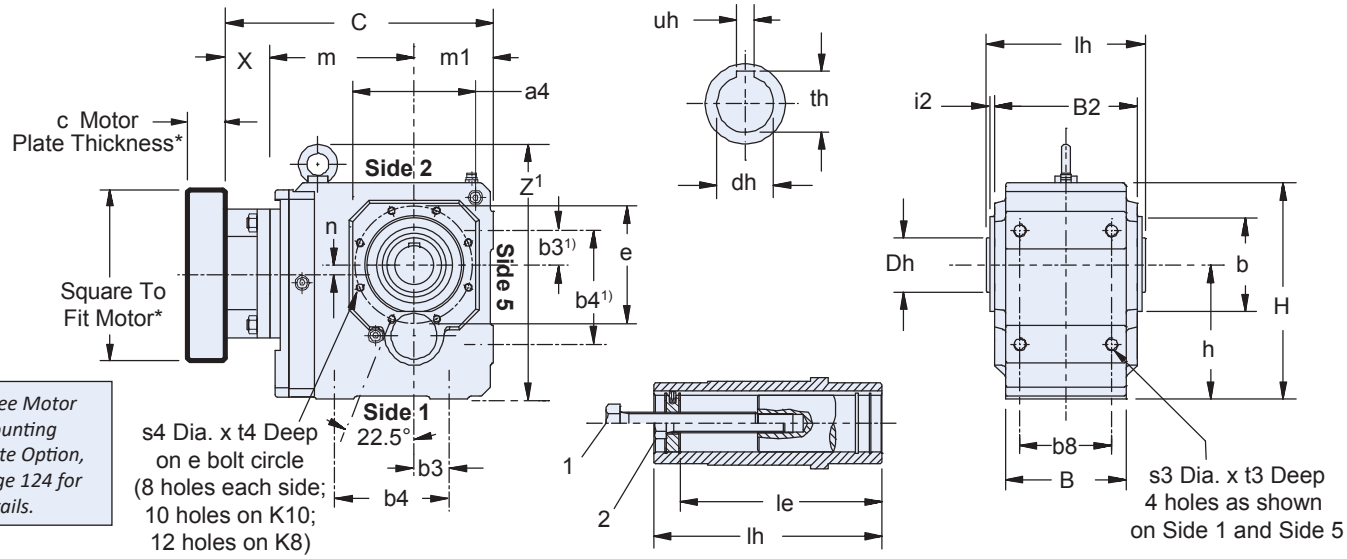



** See Motor Mounting Plate Option, page 124 for details.*

*1. Removal Bolt: not supplied. See Installation Guide for details.*
*2. Mounting Bolt: must be smaller than removal bolt.*

See hollow output installation instructions for further details

**K513AG thru K1014AG**

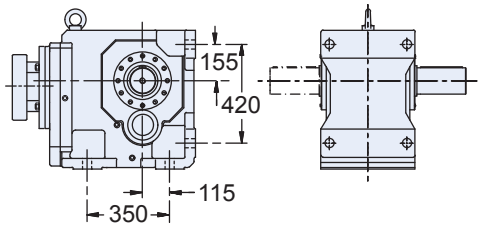



** See Motor Mounting Plate Option, page 124 for details.*

*1. Removal Bolt: not supplied. See Installation Guide for details.*
*2. Mounting Bolt: must be smaller than removal bolt.*

See hollow output installation instructions for further details

**Size K10 Mounting Feet** (Dimensions b3 and b4)




*1) Mounting feet are integral on the K10 housing. Note that b3 = 155 and b4 = 420 on Side 5 of the K10. Hole locations are as shown above.*

**Table 3 Motor Adapter Dimensions (mm)**

| Motor Adapter | Thickness [3] c Min. | Motor Shaft d2 Max. [2] | X | Wt. lbs. |
|---|---|---|---|---|
| ME10 | 21 | 19 | 40 | 5 |
| ME20 | 24 | 32 | 50 | 8 |
| ME30 | 25 | 38 | 60 | 15 |
| ME40 | 33 | 48 | 88 | 28 |
| ME50 | 43 | 60 | 81.5 | 42 |

*[2] If an adapter bushing is required it will be supplied as a component of the motor mounting plate.*

*[3] Motor plate maximum thickness (c) will vary with motor shaft length but will not be less than shown.*

# Dimensional Data

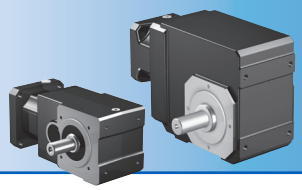


**Table 1 K Series Unit Dimensions (mm) – "G" Pitch Circle Diameter (PCD) Tapped Holes**

| Unit | a4 | B | B2 | b* | b3 | b4 | b8 | Dh | e | H | h | i2 | le | lh | m1 | s3 | s4 | t3 | t4 | Z[1] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| K1 | 105 | 90 | 106 | $75_{j6}$ | 30 | 90 | 70 | 40 | 90 | 160 | 60 | 3 | 98 | 120 | 60 | M8x1.25 | M8x1.25 | 13 | 13 | – |
| K2 | 116 | 115 | 134 | $82_{j6}$ | 35 | 115 | 90 | 45 | 100 | 190 | 65 | 3 | 121.5 | 148 | 65 | M10x1.5 | M8x1.25 | 16 | 16 | – |
| K3 | 132 | 130 | 146 | $95_{j6}$ | 40 | 130 | 105 | 50 | 115 | 213 | 75 | 3 | 125 | 160 | 75 | M10x1.5 | M8x1.25 | 16 | 16 | – |
| K4 | 152 | 148 | 173 | $110_{j6}$ | 50 | 155 | 120 | 55 | 130 | 240 | 90 | 3.5 | 157 | 188 | 90 | M12x1.75 | M10x1.5 | 19 | 19 | – |
| K5 | 145 | 160 | 185 | $110_{j6}$ | 40 | 140 | 125 | 65 | 130 | 260 | 160 | 3.5 | 164 | 200 | 100 | M16x2 | M10x1.5 | 26 | 26 | 312 |
| K6 | 180 | 168 | 200 | $140_{j6}$ | 50 | 160 | 130 | 70 | 165 | 310 | 190 | 3.5 | 179 | 215 | 120 | M16x2 | M10x1.5 | 26 | 26 | 362 |
| K7 | 195 | 190 | 226 | $155_{j6}$ | 55 | 180 | 145 | 85 | 185 | 342 | 212 | 3.5 | 214 | 242 | 125 | M20x2.5 | M12x1.75 | 33 | 31 | 403 |
| K8 | 226 | 235 | 282 | $185_{j6}$ | 75 | 240 | 185 | 100 | 215 | 410 | 265 | 4 | 263 | 300 | 145 | M24x3 | M12x1.75 | 38 | 38 | 471 |
| K9 | 280 | 285 | 330 | $230_{j6}$ | 95 | 280 | 225 | 120 | 265 | 495 | 315 | 5 | 302 | 350 | 180 | M30x3.5 | M16x2 | 48 | 48 | 565 |
| K10 | 340 | 356 | 400 | $250_{h6}$ | 115 [1] | 350 [1] | 330 | 130 | 300 | 591 | 375 | 5 | 361 | 410 | 225 | 39 [2] | 10-M20 | 45 | 33 | 680 |

[1] *Mounting feet are integral on the K10 housing as shown in drawing, facing page. Note b3 = 155 and b4 = 420 on* **Side 5** *of the K10.*
[2] *s3 on K10 are thru holes, not tapped.*

**Table 2 K Series Unit Dimensions (mm) — "A" Hollow Bore Output**

Dimensions in **BOLD BLUE** (standard). Contact STOBER for delivery on other sizes listed.

| | Carbon Steel | | | | | | Stainless | |
|---|---|---|---|---|---|---|---|---|
| | Inches | | | Metric (mm) | | | | |
| Unit | $dh_{G7}$* | th | uh | $dh_{H7}$* | th | $uh_{JS9}$* | Inches | mm |
| K1 | **1.000** | 1.11 | 0.250 | 25 | 28.3 | 8 | **1.000** | 25 |
| K2 | **1.1875** | 1.31 | 0.250 | 30 | 33.3 | 8 | 1.125, 1.1875, **1.250** | 30 |
| K3 | **1.375** | 1.52 | 0.312 | 35 | 38.3 | 10 | 1.25, **1.375** | 35 |
| K4 | **1.500** | 1.67 | 0.375 | 40 | 43.3 | 12 | 1.375, **1.500** | **40** |
| K5 | **2.000** | 2.13 | 0.500 | 50 | 53.8 | 14 | 1.4375, 1.9375, **2.000** | **40**, **50** |
| K6 | **2.000** | 2.23 | 0.500 | 50 | 53.8 | 14 | 1.4375, 1.9375, **2.000**, 2.1875 | 40, 50, 60 |
| K7 | **2.375** | 2.66 | 0.625 | 60 | 64.4 | 18 | 1.9375, 2.00, 2.1875, 2.375 | **60** |
| K8 | **2.750** | 3.03 | 0.625 | 70 | 74.9 | 20 | 2.1875, 2.375, 2.5, 2.6875, 2.750 | 60, **70** |
| K9 | **3.250** | 3.59 | 0.750 | 90 | 95.4 | 25 | 2.6875, **2.9375**, **3.000**, 3.25, **3.4375** | 90 |
| K10 | **4.000** | 4.25 | 1.000 | 100 | 108 | 28 | 3.4375, 4.00 | – |

** h6, j6 = existing values; G7, H7, JS9 = actual values*

**Table 4 K Series Unit Dimensions (mm)**

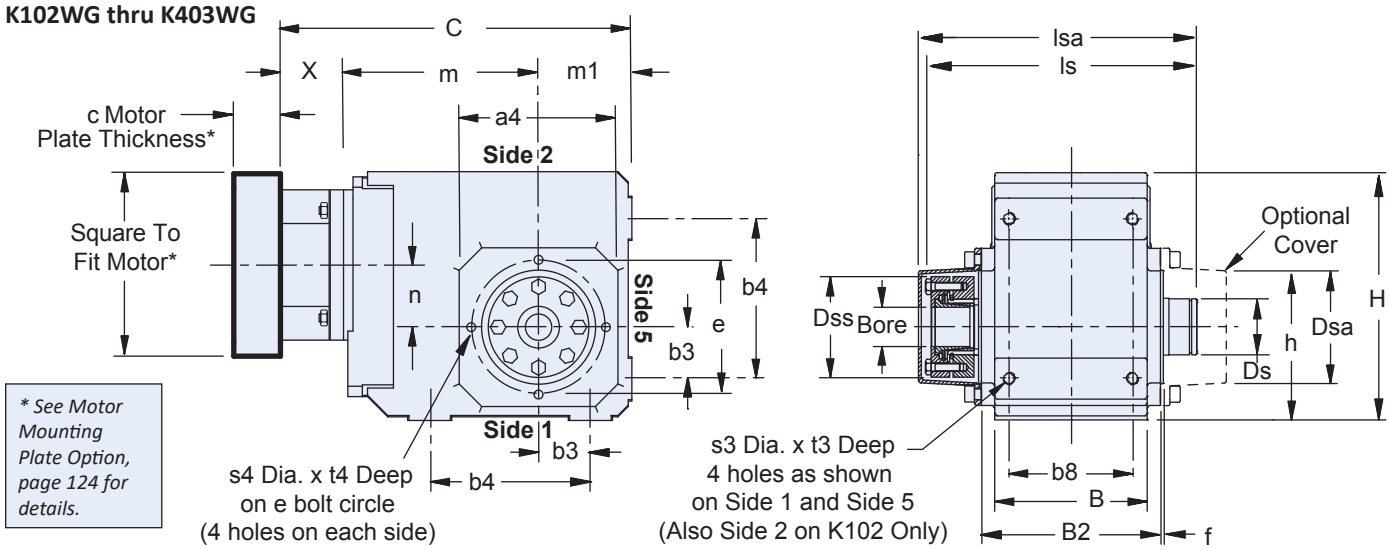
| | ME10 | | | ME20 | | | ME30 | | | ME40 | | | ME50 | | | Wt. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Unit | n | C | m | n | C | m | n | C | m | n | C | m | n | C | m | lbs. |
| K102 | 36 | 224 | 124 | 36 | 238 | 128 | — | — | — | — | — | — | — | — | — | 31 |
| K202 | 46 | 248 | 143 | 46 | 262 | 147 | 46 | 274 | 149 | — | — | — | — | — | — | 40 |
| K203 | 46 | 285 | 180 | — | — | — | — | — | — | — | — | — | — | — | — | 53 |
| K302 | 52.5 | 278 | 163 | 52.5 | 292 | 167 | 52.5 | 304 | 169 | — | — | — | — | — | — | 67 |
| K303 | 52.5 | 315 | 200 | 16 | 335 | 210 | — | — | — | — | — | — | — | — | — | 73 |
| K402 | — | — | — | 60 | 327 | 187 | 60 | 339 | 189 | 60 | 370 | 192 | — | — | — | 93 |
| K403 | 60 | 350 | 220 | 23 | 370 | 230 | — | — | — | — | — | — | — | — | — | 100 |
| K513 | — | — | — | 15 | 322 | 172 | 15 | 334 | 174 | 15 | 365 | 177 | — | — | — | 106 |
| K514 | — | — | — | 15 | 365 | 215 | — | — | — | — | — | — | — | — | — | 109 |
| K613 | — | — | — | 18 | 361 | 191 | 18 | 373 | 193 | 18 | 404 | 196 | 18 | 411.5 | 210 | 170 |
| K614 | — | — | — | 18 | 404 | 234 | — | — | — | — | — | — | — | — | — | 177 |
| K713 | — | — | — | — | — | — | 20 | 406 | 221 | 20 | 437 | 224 | 20 | 443.5 | 237 | 221 |
| K714 | — | — | — | 20 | 438 | 263 | 20 | 468 | 283 | — | — | — | — | — | — | 234 |
| K813 | — | — | — | — | — | — | 24 | 452 | 247 | 24 | 482 | 249 | 24 | 488.5 | 262 | 309 |
| K814 | — | — | — | — | — | — | 24 | 513 | 308 | 5 | 553 | 320 | — | — | — | 331 |
| K913 | — | — | — | — | — | — | — | — | — | 25 | 562 | 294 | 25 | 568.5 | 307 | 508 |
| K914 | — | — | — | — | — | — | 25 | 593 | 353 | 25 | 633 | 365 | — | — | — | 530 |
| K1013 | — | — | — | — | — | — | — | — | — | — | — | — | 28 | 698.5 | 392 | 1055 |
| K1014 | — | — | — | — | — | — | — | — | — | 28 | 763 | 450 | 28 | 781.5 | 475 | 1079 |

*For approximate weight, add adapter weight from Table 3 and unit weight from Table 4.*

## K Series with SINGLE "W" Wobble Free Bushing Output

### "G" Pitch Circle Diameter (PCD) Tapped Holes

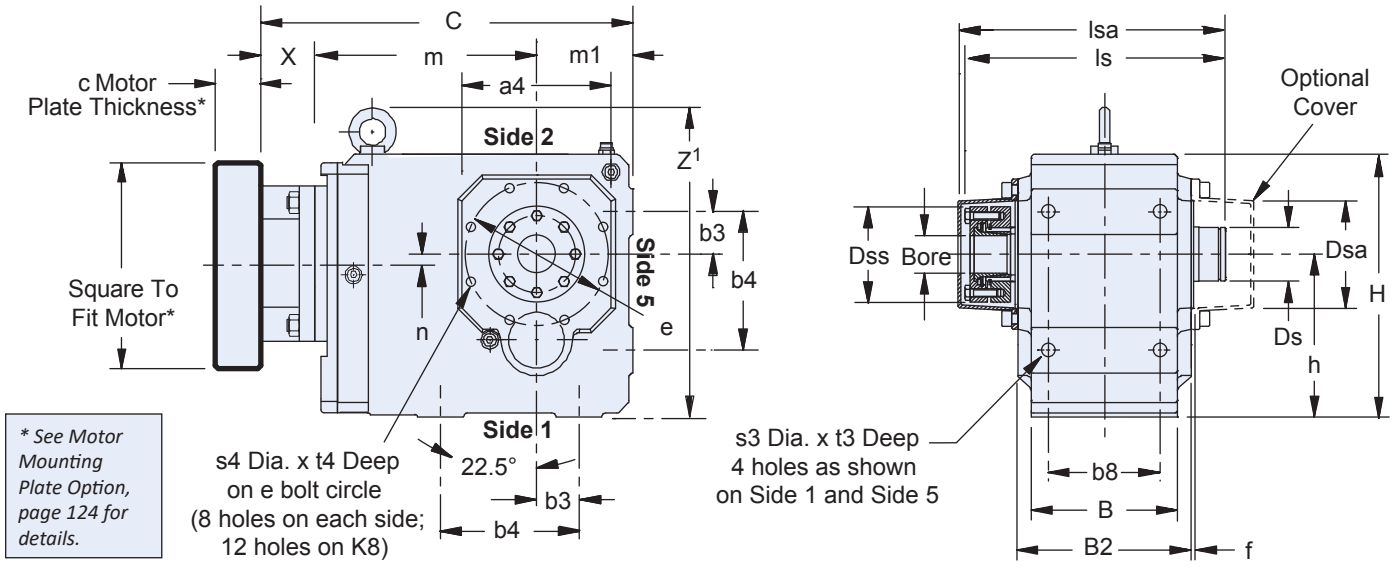
**K102WG thru K403WG**




** See Motor Mounting Plate Option, page 124 for details.*

**Important:** A **1/32"** x 45° chamfer minimum is recommended for the shaft end. The bushing will accept a shaft with a tolerance of +0.000/-0.005 inches.

**K513WG thru K814WG**



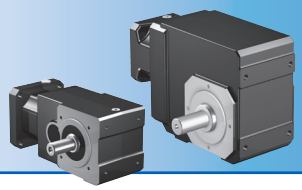

** See Motor Mounting Plate Option, page 124 for details.*

**Table 3 Motor Adapter Dimensions (mm)**

| Motor Adapter | Thickness [2] c Min. | Motor Shaft d2 Max. [1] | X | Wt. lbs. |
|---|---|---|---|---|
| ME10 | 21 | 19 | 40 | 5 |
| ME20 | 24 | 32 | 50 | 8 |
| ME30 | 25 | 38 | 60 | 15 |
| ME40 | 33 | 48 | 88 | 28 |
| ME50 | 43 | 60 | 81.5 | 42 |

*1) If an adapter bushing is required it will be supplied as a component of the motor mounting plate.*

*2) Motor plate maximum thickness (c) will vary with motor shaft length but will not be less than shown.*



# Dimensional Data



**Table 1** K Series Unit Dimensions (mm) – "G" Pitch Circle Diameter (PCD) Tapped Holes

| Unit | a4 | B | B2 | b3 | b4 | b8 | Ds | Dsa | Dss | e | H | h | ls | lsa | m1 | s3 | s4 | t3 | t4 | $Z_1$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| K1 | 105 | 90 | 106 | 30 | 90 | 70 | 39 | 78 | 70 | 90 | 160 | 60 | 149 | 163 | 60 | M8x1.25 | M8x1.25 | 13 | 13 | — |
| K2 | 116 | 115 | 134 | 35 | 115 | 90 | 44 | 88 | 78 | 100 | 190 | 65 | 178 | 193 | 65 | M10x1.5 | M8x1.25 | 16 | 16 | — |
| K3 | 132 | 130 | 146 | 40 | 130 | 105 | 44 | 88 | 84 | 115 | 213 | 75 | 190 | 206 | 75 | M10x1.5 | M8x1.25 | 16 | 16 | — |
| K4 | 152 | 148 | 173 | 50 | 155 | 120 | 54 | 110 | 97 | 130 | 240 | 90 | 220 | 243 | 90 | M12x1.75 | M10x1.5 | 19 | 19 | — |
| K5 | 145 | 160 | 185 | 40 | 140 | 125 | 65 | 115 | 105 | 130 | 260 | 160 | 237 | 254 | 100 | M16x2 | M10x1.5 | 26 | 26 | 312 |
| K6 | 180 | 168 | 200 | 50 | 160 | 130 | 74 | 127 | 118 | 165 | 310 | 190 | 254 | 276 | 120 | M16x2 | M10x1.5 | 26 | 26 | 362 |
| K7 | 195 | 190 | 226 | 55 | 180 | 145 | 85 | 146 | 138 | 185 | 342 | 212 | 278 | 288 | 125 | M20x2.5 | M12x1.75 | 31 | 31 | 403 |
| K8 | 226 | 235 | 282 | 75 | 240 | 185 | 100 | 176.5 | 158 | 215 | 410 | 265 | 352 | 363 | 145 | M24x3 | M12x1.75 | 38 | 38 | 471 |

**Table 2** "WF" Single Side Bushing – Stock Bore Sizes

| | Metric (mm) | Inches | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Unit | 40 | 1 | 1-3/16 | 1-1/4 | 1-3/8 | 1-7/16 | 1-1/2 | 1-5/8 | 1-11/16 | 1-3/4 | 1-7/8 | 1-15/16 | 2 | 2-3/16 | 2-3/8 | 2-7/16 | 2-3/4 |
| K1 | — | WF1-100 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| K2 | — | WFK2-100 | WFK2-103 | WFK2-104 | — | — | — | — | — | — | — | — | — | — | — | — | — |
| K3 | — | WF3-100 | WF3-103 | WF3-104 | WF3-106 | WF3-107 | WF3-108 | — | — | — | — | — | — | — | — | — | — |
| K4 | WF4-40 | — | — | WF4-104 | — | WF4-107 | WF4-108 | — | — | — | — | — | — | — | — | — | — |
| K5 | WF5-40 | — | — | — | — | WF5-107 | WF5-108 | — | — | — | — | WF5-115 | WF5-200 | — | — | — | — |
| K6 | — | — | — | — | — | WF6-107 | WF6-108 | — | — | — | — | WF6-115 | WF6-200 | WF6-203 | — | — | — |
| K7 | — | — | — | — | — | — | — | — | — | — | — | WF7-115 | WF7-200 | — | WF7-206 | — | — |
| K8 | — | — | — | — | — | — | — | — | — | — | — | — | — | WF8-203 | WF8-206 | WF8-207 | WF8-212 |

***NOTE:*** *A complete bushing kit includes the locking ring assembly, tapered cone, support ring, and all hardware to mount the kit into the reducer. The WF1-100 bushing does not have a tapered cone. The optional cover caps can be ordered separately*

**Table 4** K Series Unit Dimensions (mm)

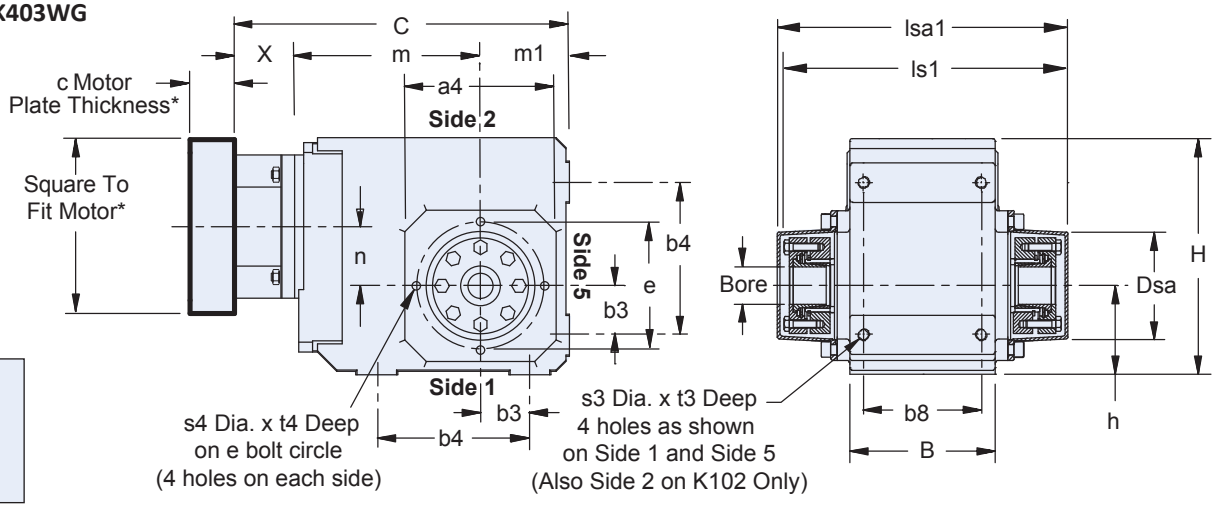
| | ME10 | | | ME20 | | | ME30 | | | ME40 | | | ME50 | | | Wt. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Unit | C | m | n | C | m | n | C | m | n | C | m | n | C | m | n | lbs. |
| K102 | 224 | 124 | 36 | 238 | 128 | 36 | — | — | — | — | — | — | — | — | — | 31 |
| K202 | 248 | 143 | 46 | 262 | 147 | 46 | 274 | 149 | 46 | — | — | — | — | — | — | 40 |
| K203 | 285 | 180 | 46 | — | — | — | — | — | — | — | — | — | — | — | — | 53 |
| K302 | 278 | 163 | 52.5 | 292 | 167 | 52.5 | 304 | 169 | 52.5 | — | — | — | — | — | — | 67 |
| K303 | 315 | 200 | 52.5 | 335 | 210 | 16 | — | — | — | — | — | — | — | — | — | 73 |
| K402 | — | — | — | 327 | 187 | 60 | 339 | 189 | 60 | 370 | 192 | 60 | — | — | — | 93 |
| K403 | 350 | 220 | 60 | 370 | 230 | 23 | — | — | — | — | — | — | — | — | — | 100 |
| K513 | — | — | — | 322 | 172 | 15 | 334 | 174 | 15 | 365 | 177 | 15 | — | — | — | 106 |
| K514 | — | — | — | 365 | 215 | 15 | — | — | — | — | — | — | — | — | — | 109 |
| K613 | — | — | — | 361 | 191 | 18 | 373 | 193 | 18 | 404 | 196 | 18 | 411.5 | 210 | 18 | 170 |
| K614 | — | — | — | 404 | 234 | 18 | — | — | — | — | — | — | — | — | — | 177 |
| K713 | — | — | — | — | — | — | 406 | 221 | 20 | 437 | 224 | 20 | 443.5 | 237 | 20 | 221 |
| K714 | — | — | — | 438 | 263 | 20 | 468 | 283 | 20 | — | — | — | — | — | — | 234 |
| K813 | — | — | — | — | — | — | 452 | 247 | 24 | 482 | 249 | 24 | 488.5 | 262 | 24 | 309 |
| K814 | — | — | — | — | — | — | 513 | 308 | 24 | 553 | 320 | 5 | — | — | — | 331 |

*For approximate weight, add adapter weight from Table 3 and unit weight from Table 4.*

## K Series with DOUBLE "W" Wobble Free Bushing Output

### "G" Pitch Circle Diameter (PCD) Tapped Holes

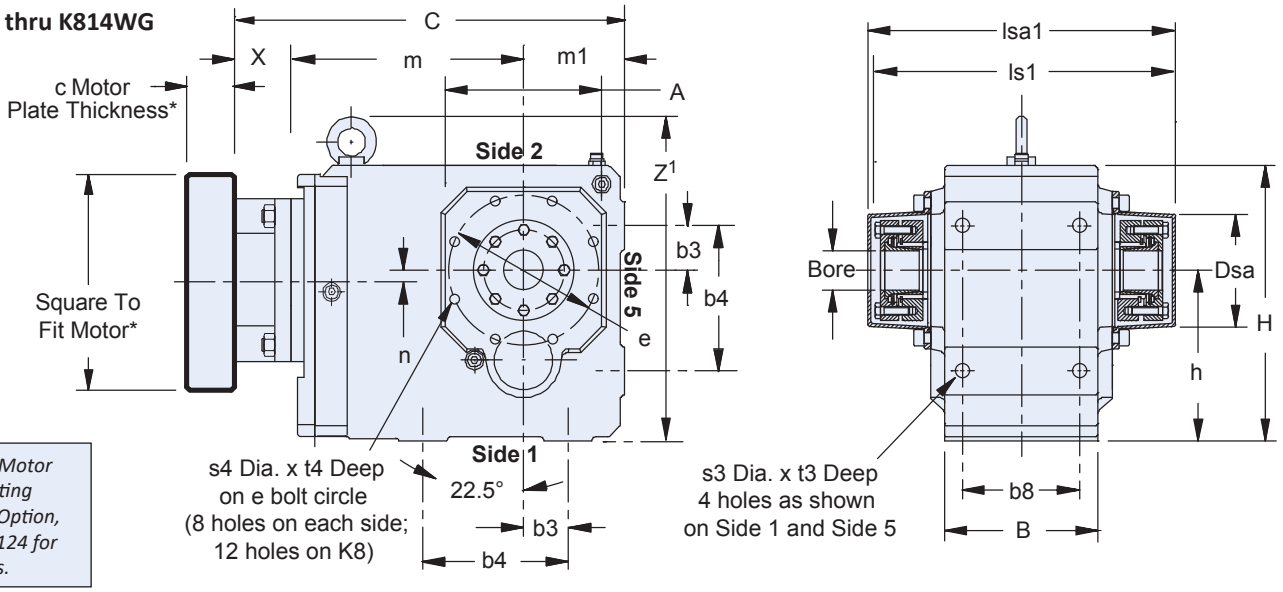
**K102WG thru K403WG**




** See Motor Mounting Plate Option, page 124 for details.*

**Important:** A **1/32"** x 45° chamfer minimum is recommended for the shaft end.
The bushing will accept a shaft with a tolerance of +0.000/-0.005 inches.

**K513WG thru K814WG**




** See Motor Mounting Plate Option, page 124 for details.*

**Table 3 Motor Adapter Dimensions (mm)**

| Motor Adapter | Thickness [2] c Min. | Motor Shaft d2 Max. [1] | X | Wt. lbs. |
|---|---|---|---|---|
| ME10 | 21 | 19 | 40 | 5 |
| ME20 | 24 | 32 | 50 | 8 |
| ME30 | 25 | 38 | 60 | 15 |
| ME40 | 33 | 48 | 88 | 28 |
| ME50 | 43 | 60 | 81.5 | 42 |

*1) If an adapter bushing is required it will be supplied as a component of the motor mounting plate.*
*2) Motor plate maximum thickness (c) will vary with motor shaft length but will not be less than shown.*

# Dimensional Data

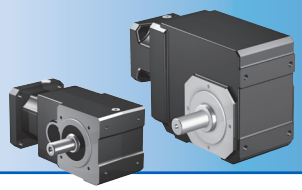


**Table 1** K Series Unit Dimensions (mm) – "G" Pitch Circle Diameter (PCD) Tapped Holes

| Unit | a4 | B | b3 | b4 | b8 | Dsa | e | H | h | ls1 | lsa1 | m1 | s3 | s4 | t3 | t4 | Z[1] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| K1 | 105 | 90 | 30 | 90 | 70 | 78 | 90 | 160 | 60 | 194 | 198 | 60 | M8x1.25 | M8x1.25 | 13 | 13 | — |
| K2 | 116 | 115 | 35 | 115 | 90 | 88 | 100 | 190 | 65 | 226 | 238 | 65 | M10x1.5 | M8x1.25 | 16 | 16 | — |
| K3 | 132 | 130 | 40 | 130 | 105 | 88 | 115 | 213 | 75 | 239 | 253 | 75 | M10x1.5 | M8x1.25 | 16 | 16 | — |
| K4 | 152 | 148 | 50 | 155 | 120 | 110 | 130 | 240 | 90 | 281 | 295 | 90 | M12x1.75 | M10x1.5 | 19 | 19 | — |
| K5 | 145 | 160 | 40 | 140 | 125 | 115 | 130 | 260 | 160 | 295 | 307 | 100 | M16x2 | M10x1.5 | 26 | 26 | 312 |
| K6 | 180 | 168 | 50 | 160 | 130 | 127 | 165 | 310 | 190 | 322 | 336 | 120 | M16x2 | M10x1.5 | 26 | 26 | 362 |
| K7 | 195 | 190 | 55 | 180 | 145 | 146 | 185 | 342 | 212 | 383 | 390 | 125 | M20x2.5 | M12x1.75 | 31 | 31 | 403 |
| K8 | 226 | 235 | 75 | 240 | 185 | 176.5 | 215 | 410 | 265 | 458 | 474 | 145 | M24x3 | M12x1.75 | 38 | 38 | 471 |

**Table 2** "WFB" Double Side Bushing – Stock Bore Sizes

| | Metric (mm) | Inches | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Unit | 40 | 1 | 1-3/16 | 1-1/4 | 1-3/8 | 1-7/16 | 1-1/2 | 1-5/8 | 1-11/16 | 1-3/4 | 1-7/8 | 1-15/16 | 2 | 2-3/16 | 2-3/8 | 2-7/16 | 2-3/4 |
| K1 | — | WFB1-100 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| K2 | — | WFBK2-100 | WFBK2-103 | WFBK2-104 | — | — | — | — | — | — | — | — | — | — | — | — | — |
| K3 | — | WFB3-100 | WFB3-103 | WFB3-104 | WFB3-106 | WFB3-107 | WFB3-108 | — | — | — | — | — | — | — | — | — | — |
| K4 | WFB4-40 | — | — | WFB4-104 | — | WFB4-107 | WFB4-108 | — | — | — | — | — | — | — | — | — | — |
| K5 | WFB5-40 | — | — | — | — | WFB5-107 | WFB5-108 | — | — | — | — | WFB5-115 | WFB5-200 | — | — | — | — |
| K6 | — | — | — | — | — | WFB6-107 | WFB6-108 | — | — | — | — | WFB6-115 | WFB6-200 | WFB6-203 | — | — | — |
| K7 | — | — | — | — | — | — | — | — | — | — | — | WFB7-115 | WFB7-200 | — | WFB7-206 | — | — |
| K8 | — | — | — | — | — | — | — | — | — | — | — | — | — | WFB8-203 | WFB8-206 | WFB8-207 | WFB8-212 |

***NOTE:*** *A complete bushing kit includes the locking ring assembly, tapered cone, support ring, and all hardware to mount the kit into the reducer. The WFB1-100 bushing does not have a tapered cone.*

**Table 4** K Series Unit Dimensions (mm)

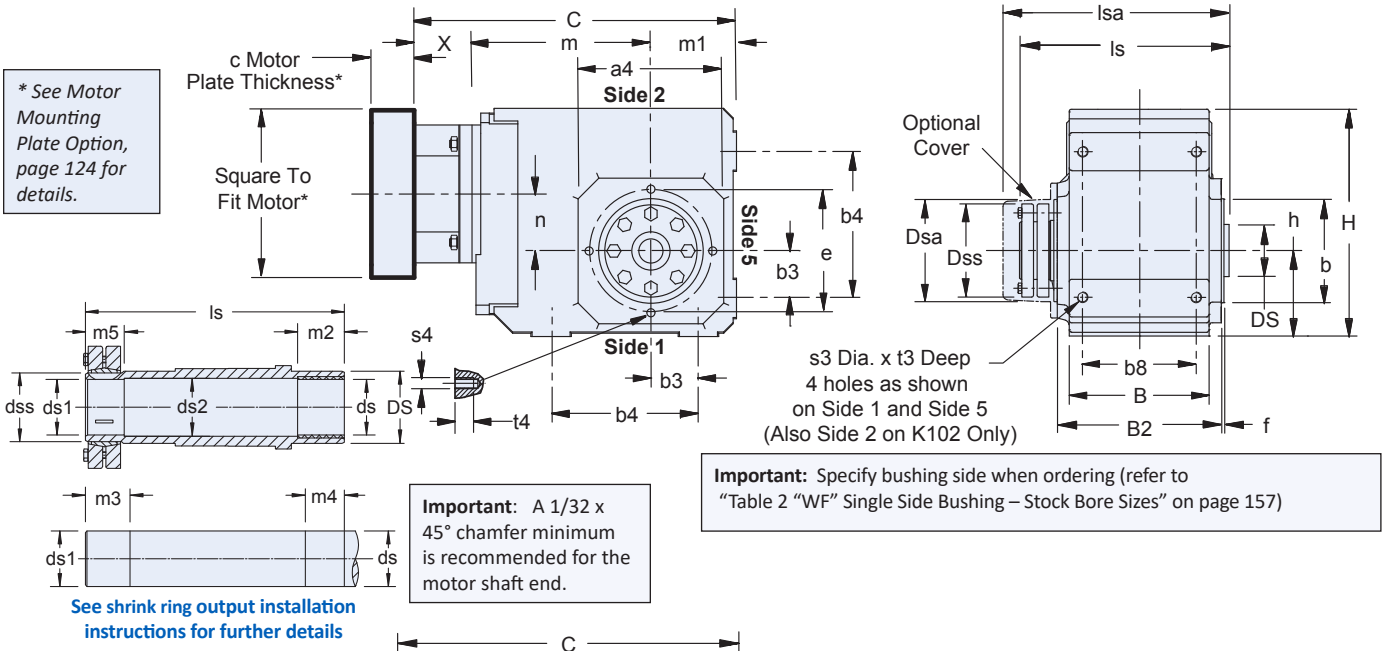
| | ME10 | | | ME20 | | | ME30 | | | ME40 | | | ME50 | | | Wt. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Unit | C | m | n | C | m | n | C | m | n | C | m | n | C | m | n | lbs. |
| K102 | 224 | 124 | 36 | 238 | 128 | 36 | — | — | — | — | — | — | — | — | — | 31 |
| K202 | 248 | 143 | 46 | 262 | 147 | 46 | 274 | 149 | 46 | — | — | — | — | — | — | 40 |
| K203 | 285 | 180 | 46 | — | — | — | — | — | — | — | — | — | — | — | — | 53 |
| K302 | 278 | 163 | 52.5 | 292 | 167 | 52.5 | 304 | 169 | 52.5 | — | — | — | — | — | — | 67 |
| K303 | 315 | 200 | 52.5 | 335 | 210 | 16 | — | — | — | — | — | — | — | — | — | 73 |
| K402 | — | — | — | 327 | 187 | 60 | 339 | 189 | 60 | 370 | 192 | 60 | — | — | — | 93 |
| K403 | 350 | 220 | 60 | 370 | 230 | 23 | — | — | — | — | — | — | — | — | — | 100 |
| K513 | — | — | — | 322 | 172 | 15 | 334 | 174 | 15 | 365 | 177 | 15 | — | — | — | 106 |
| K514 | — | — | — | 365 | 215 | 15 | — | — | — | — | — | — | — | — | — | 109 |
| K613 | — | — | — | 361 | 191 | 18 | 373 | 193 | 18 | 404 | 196 | 18 | 411.5 | 210 | 18 | 170 |
| K614 | — | — | — | 404 | 234 | 18 | — | — | — | — | — | — | — | — | — | 177 |
| K713 | — | — | — | — | — | — | 406 | 221 | 20 | 437 | 224 | 20 | 443.5 | 237 | 20 | 221 |
| K714 | — | — | — | 438 | 263 | 20 | 468 | 283 | 20 | — | — | — | — | — | — | 234 |
| K813 | — | — | — | — | — | — | 452 | 247 | 24 | 482 | 249 | 24 | 488.5 | 262 | 24 | 309 |
| K814 | — | — | — | — | — | — | 513 | 308 | 24 | 553 | 320 | 5 | — | — | — | 331 |

*For approximate weight, add adapter weight from Table 3 and unit weight from Table 4.*

## K Series with "S" Shrink Ring Output

### "G" Pitch Circle Diameter (PCD) Tapped Holes

**K102SG thru K403SG**



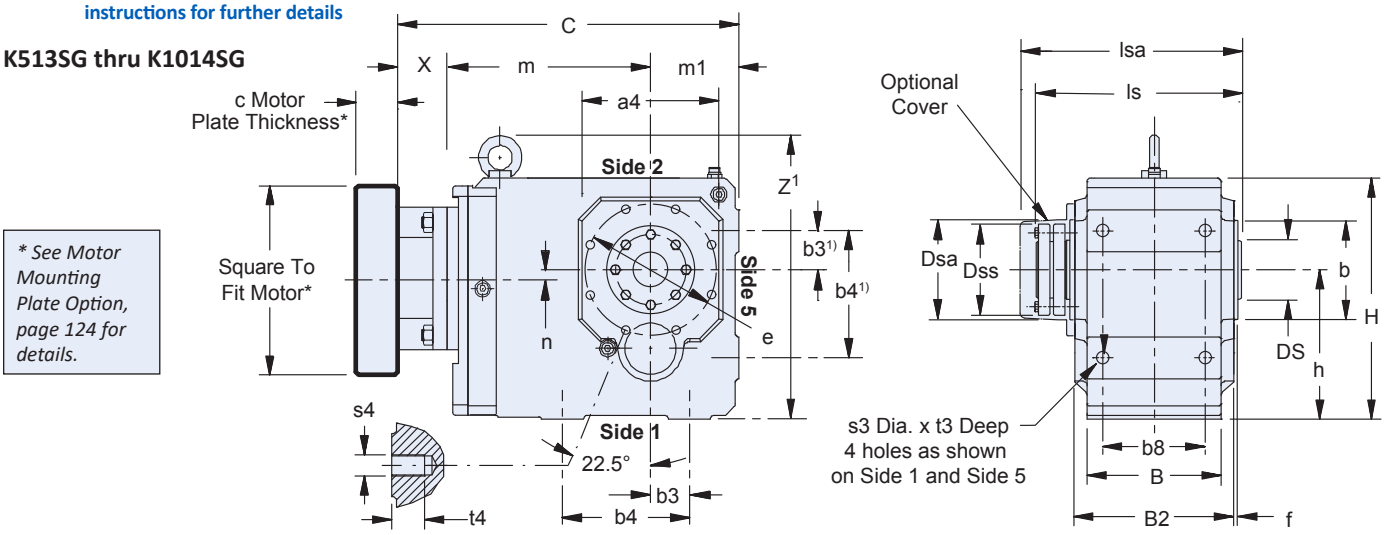

** See Motor Mounting Plate Option, page 124 for details.*

**Important**: A 1/32 x 45° chamfer minimum is recommended for the motor shaft end.

**Important:** Specify bushing side when ordering (refer to "Table 2 "WF" Single Side Bushing – Stock Bore Sizes" on page 157)

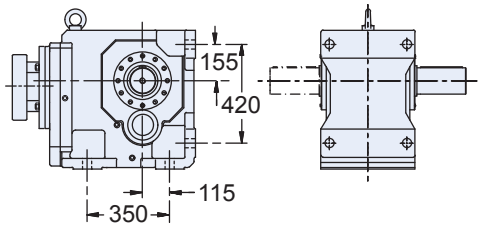
See shrink ring output installation instructions for further details

**K513SG thru K1014SG**




** See Motor Mounting Plate Option, page 124 for details.*

**Size K10 Mounting Feet** (Dimensions b3 and b4)



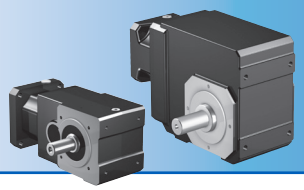

*2) Mounting feet are integral on the K10 housing. Note that b3 = 155 and b4 = 420 on Side 5 of the K10. Hole locations are as shown above.*

**Table 3 Motor Adapter Dimensions (mm)**

| Motor Adapter | Thickness [3] c Min. | Motor Shaft d2 Max. [2] | X | Wt. lbs. |
|---|---|---|---|---|
| ME10 | 21 | 19 | 40 | 5 |
| ME20 | 24 | 32 | 50 | 8 |
| ME30 | 25 | 38 | 60 | 15 |
| ME40 | 33 | 48 | 88 | 28 |
| ME50 | 43 | 60 | 81.5 | 42 |

*[2] If an adapter bushing is required it will be supplied as a component of the motor mounting plate.*

*[3] Motor plate maximum thickness (c) will vary with motor shaft length but will not be less than shown.*



# Dimensional Data



**Table 1** K Series Unit Dimensions (mm) – "S" Shrink Ring Output

| Unit | a4 | B | B2 | b | b4 | b8 | e | f | H | h | ls | lsa | m1 | s3 | s4 | t3 | t4 | $Z_1$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| K1 | 105 | 90 | 106 | $75_{j6}$ | 90 | 70 | 90 | 3 | 160 | 60 | 149 | 163 | 60 | M8x1.25 | M8x1.25 | 13 | 13 | — |
| K2 | 116 | 115 | 134 | $82_{j6}$ | 115 | 90 | 100 | 3 | 190 | 65 | 178 | 193 | 65 | M10x1.5 | M8x1.25 | 16 | 16 | — |
| K3 | 132 | 130 | 146 | $95_{j6}$ | 130 | 105 | 115 | 3 | 213 | 75 | 190 | 206 | 75 | M10x1.5 | M8x1.25 | 16 | 16 | — |
| K4 | 152 | 148 | 173 | $110_{j6}$ | 155 | 120 | 130 | 3.5 | 240 | 90 | 220 | 243 | 90 | M12x1.75 | M10x1.5 | 19 | 19 | — |
| K5 | 145 | 160 | 185 | $110_{j6}$ | 140 | 125 | 130 | 3.5 | 260 | 160 | 237 | 254 | 100 | M16x2 | M10x1.5 | 26 | 26 | 312 |
| K6 | 180 | 168 | 200 | $140_{j6}$ | 160 | 130 | 165 | 3.5 | 310 | 190 | 254 | 276 | 120 | M16x2 | M10x1.5 | 26 | 26 | 362 |
| K7 | 195 | 190 | 226 | $155_{j6}$ | 180 | 145 | 185 | 3.5 | 342 | 212 | 278 | 314 | 125 | M20x2.5 | M12x1.75 | 33 | 31 | 403 |
| K8 | 226 | 235 | 282 | $185_{j6}$ | 240 | 185 | 215 | 4 | 410 | 265 | 352 | 378 | 145 | M24x3 | M12x1.75 | 38 | 38 | 471 |
| K9 | 280 | 285 | 330 | $230_{j6}$ | 280 | 225 | 265 | 5 | 495 | 315 | 418 | 428 | 180 | M30x3.5 | M16x2 | 48 | 48 | 565 |
| K10 | 340 | 356 | 400 | $250_{h6}$ | 350 [1] | 330 | 300 | 5 | 591 | 375 | 483 | 497 | 225 | 39 [2] | 10-M20 | 45 | 33 | 680 |

[1] *Mounting feet are integral on the K10 housing as shown in drawing, facing page. Note b3 = 155 and b4 = 420 on* **Side 5** *of the K10.*
[2] *s3 on K10 are thru holes, not tapped.*

**Table 2** K Series Unit Dimensions (mm) – "S" Shrink Ring Output

| | | | | ds1 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Unit | b3 | DS | ds | $Bore^{H7}$ | Shaft | ds2 | Dsa | Dss | dss | m2 | m3 | m4 | m5 |
| K1 | 30 | 40 | $25_{h9}$ | 25 | $25_{h9}$ | 25.5 | 80 | 60 | 30 | 20 | 34 | 25 | 29 |
| K2 | 35 | 45 | $30_{h9}$ | 30 | $30_{h9}$ | 30.5 | 88 | 72 | 36 | 25 | 39 | 30 | 34 |
| K3 | 40 | 50 | $35_{h9}$ | 35 | $35_{h9}$ | 35.5 | 101 | 80 | 44 | 30 | 39 | 35 | 34 |
| K4 | 50 | 55 | $40_{h9}$ | 40 | $40_{h9}$ | 40.5 | 114 | 88 | 50 | 40 | 39 | 45 | 34 |
| K5 | 40 | 65 | $50_{h9}$ | 50 | $50_{h9}$ | 50.5 | 116 | 106 | 62 | 40 | 44 | 45 | 39 |
| K6 | 50 | 70 | $50_{h9}$ | 50 | $50_{h9}$ | 50.5 | 128 | 106 | 62 | 40 | 45 | 45 | 40 |
| K7 | 55 | 85 | $60_{h6}$ | 60 | $60_{h6}$ | 62 | 161.5 | 138 | 75 | 40 | 45 | 45 | 40 |
| K8 | 75 | 100 | $70_{h6}$ | 70 | $70_{h6}$ | 72 | 193 | 155 | 90 | 50 | 60 | 60 | 50 |
| K9 | 95 | 120 | $90_{h6}$ | 90 | $90_{h6}$ | 92 | 244 | 200 | 120 | 60 | 70 | 70 | 60 |
| K10 | 115[1] | 130 | $100_{h6}$ | 100 | $100_{h6}$ | 102 | 274 | 230 | 130 | 60 | 80 | 70 | 70 |

[1] *Mounting feet are integral on the K10 housing as shown in drawing, facing page. Note F = 420 and FA = 155 on* **Side 5** *of the K10.*

**Table 4** K Series Unit Dimensions (mm)

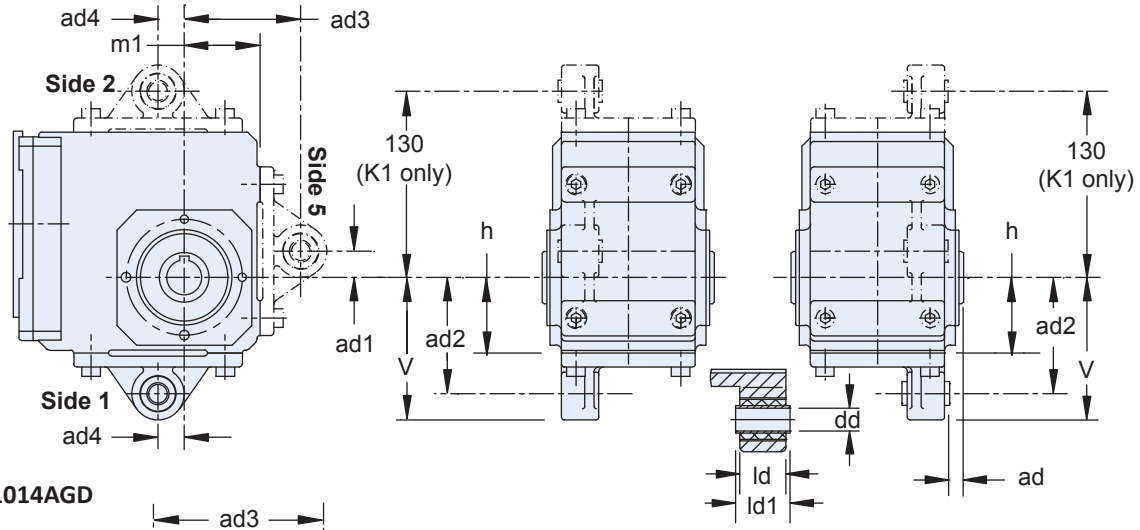
| | ME10 | | | ME20 | | | ME30 | | | ME40 | | | ME50 | | | Wt. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Unit | C | m | n | C | m | n | C | m | n | C | m | n | C | m | n | lbs. |
| K102 | 224 | 124 | 36 | 238 | 128 | 36 | — | — | — | — | — | — | — | — | — | 31 |
| K202 | 248 | 143 | 46 | 262 | 147 | 46 | 274 | 149 | 46 | — | — | — | — | — | — | 40 |
| K203 | 285 | 180 | 46 | — | — | — | — | — | — | — | — | — | — | — | — | 53 |
| K302 | 278 | 163 | 52.5 | 292 | 167 | 52.5 | 304 | 169 | 52.5 | — | — | — | — | — | — | 67 |
| K303 | 315 | 200 | 52.5 | 335 | 210 | 16 | — | — | — | — | — | — | — | — | — | 73 |
| K402 | — | — | — | 327 | 187 | 60 | 339 | 189 | 60 | 370 | 192 | 60 | — | — | — | 93 |
| K403 | 350 | 220 | 60 | 370 | 230 | 23 | — | — | — | — | — | — | — | — | — | 100 |
| K513 | — | — | — | 322 | 172 | 15 | 334 | 174 | 15 | 365 | 177 | 15 | — | — | — | 106 |
| K514 | — | — | — | 365 | 215 | 15 | — | — | — | — | — | — | — | — | — | 109 |
| K613 | — | — | — | 361 | 191 | 18 | 373 | 193 | 18 | 404 | 196 | 18 | 411.5 | 210 | 18 | 170 |
| K614 | — | — | — | 404 | 234 | 18 | — | — | — | — | — | — | — | — | — | 177 |
| K713 | — | — | — | — | — | — | 406 | 221 | 20 | 437 | 224 | 20 | 443.5 | 237 | 20 | 221 |
| K714 | — | — | — | 438 | 263 | 20 | 468 | 283 | 20 | — | — | — | — | — | — | 234 |
| K813 | — | — | — | — | — | — | 452 | 247 | 24 | 482 | 249 | 24 | 488.5 | 262 | 24 | 309 |
| K814 | — | — | — | — | — | — | 513 | 308 | 24 | 553 | 320 | 5 | — | — | — | 331 |
| K913 | — | — | — | — | — | — | — | — | — | 562 | 294 | 25 | 568.5 | 307 | 25 | 508 |
| K914 | — | — | — | — | — | — | 593 | 353 | 25 | 633 | 365 | 25 | — | — | — | 530 |
| K1013 | — | — | — | — | — | — | — | — | — | — | — | — | 698.5 | 392 | 28 | 1055 |
| K1014 | — | — | — | — | — | — | — | — | — | 763 | 450 | 28 | 781.5 | 475 | 28 | 1079 |

*For approximate weight, add adapter weight from Table 3 and unit weight from Table 4.*

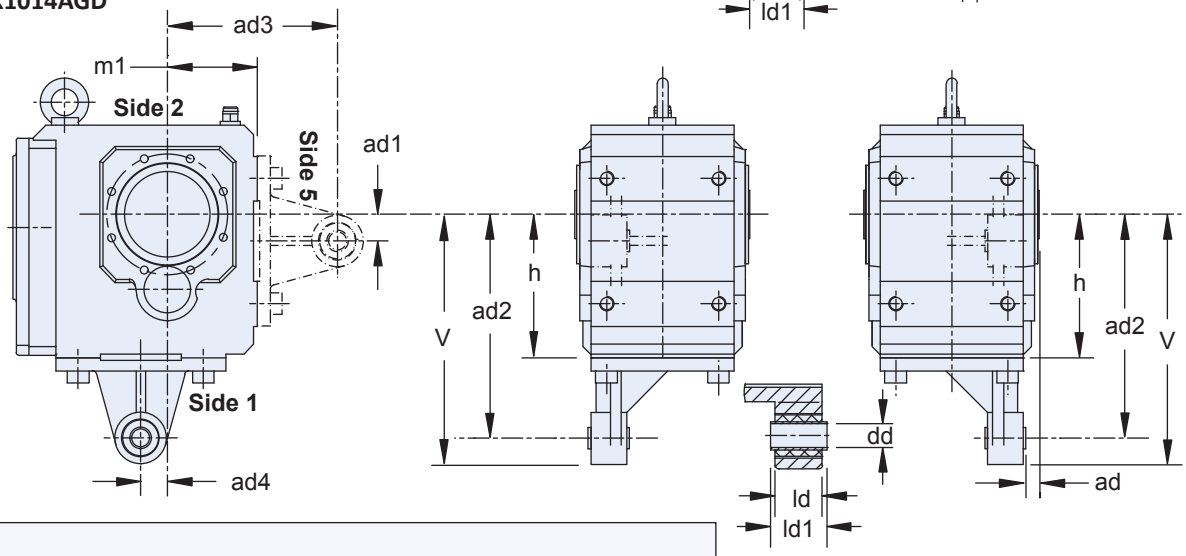
## K Series with "A" Hollow Output

### "GD" Torque Arm Bracket Housing (Torque arm supplied by others)

**K102AGD thru K403AGD**




**K513AGD thru K1014AGD**




**Important:**
On K102 thru K1014, brackets can be mounted on Side 1 (shown) or Side 5 (opposite input side). On K102 ONLY, the bracket can also be mounted on Side 2 (top).

**Table 1 K Series Unit Dimensions (mm) — "GD" Torque Arm Bracket Housing Option**

| Unit | ad | ad1 | ad2 | ad3 | ad4 | dd | h | ld | ld1 | m1 | V |
|---|---|---|---|---|---|---|---|---|---|---|---|
| K1 | 13 | 15 | 90 | 90 | 15 | $12_{H9}$ | 60 | 24 | 28 | 60 | 111.5 |
| K2 | 13.5 | 22.5 | 100 | 100 | 22.5 | $16_{H9}$ | 65 | 32 | 38 | 65 | 122.5 |
| K3 | 12 | 25 | 120 | 120 | 25 | $16_{H9}$ | 75 | 32 | 38 | 75 | 142.5 |
| K4 | 17 | 27.5 | 150 | 150 | 27.5 | $20_{H9}$ | 90 | 40 | 46 | 90 | 177.5 |
| K5 | 17 | 30 | 250 | 190 | 30 | $20_{H9}$ | 160 | 40 | 46 | 100 | 279 |
| K6 | 20.5 | 30 | 250 | 180 | 30 | $20_{H9}$ | 190 | 40 | 46 | 120 | 279 |
| K7 | 23 | 35 | 300 | 213 | 35 | $20_{H9}$ | 212 | 64 | 70 | 125 | 334 |
| K8 | 26 | 45 | 350 | 230 | 45 | $24_{H9}$ | 265 | 102 | 115 | 145 | 386 |
| K9 | 26 | 45 | 450 | 315 | 45 | $24_{H9}$ | 315 | 102 | 115 | 180 | 487.5 |
| K10 | 6 | 55 | 550 | 400 | 60 | $40_{H9}$ | 375 | 118 | 124 | 225 | 610 |

# Dimensional Data

## Optional "F" Round Flange Housing Options for K Series

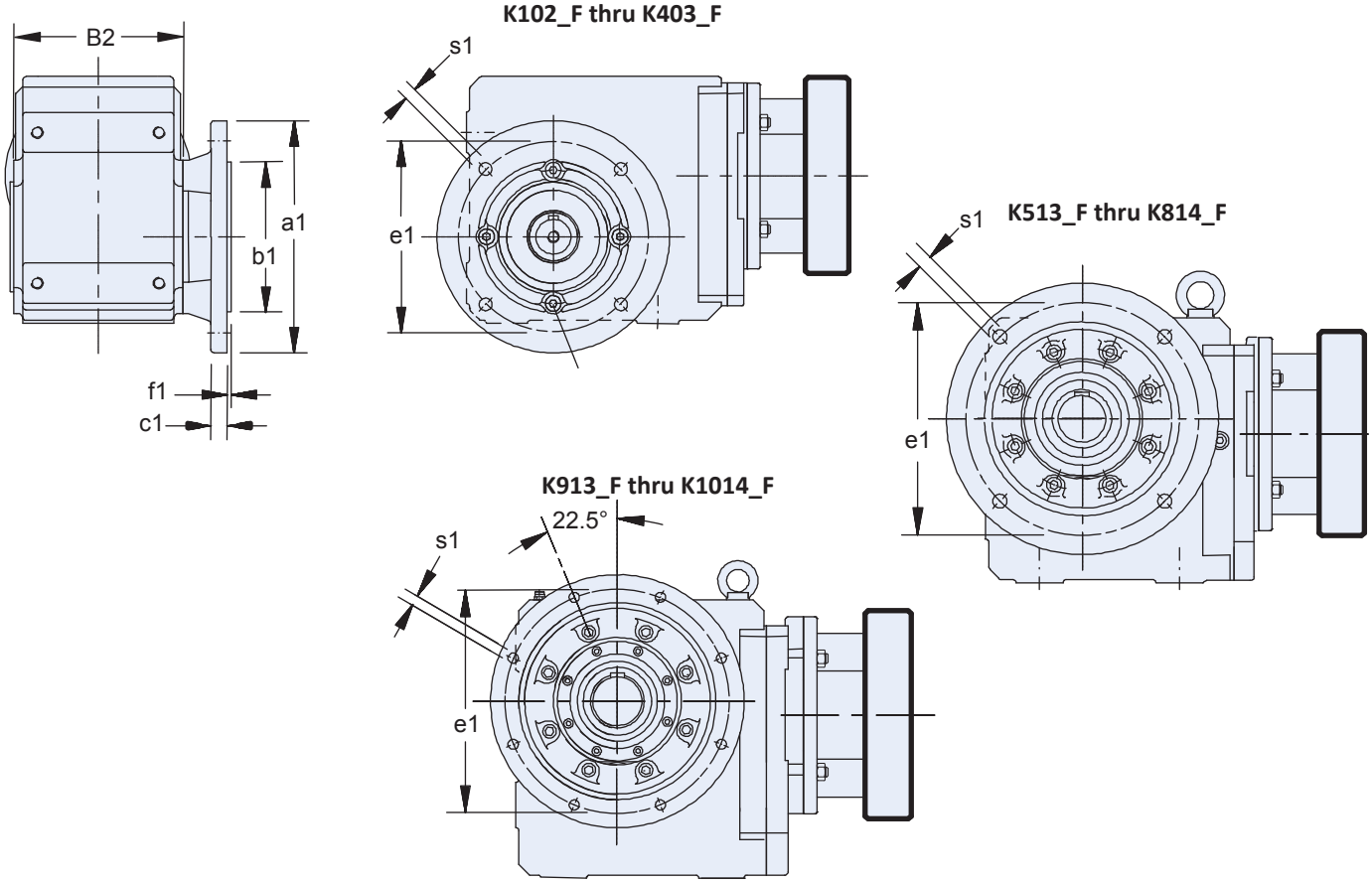



**Table 1** K Series – Optional Flange Dimensions (mm)

| Unit | Flange Size a1 | b1 | B2 | c1 | e1 | f1 | s1 |
|---|---|---|---|---|---|---|---|
| K1 | 140 | $95_{j6}$ | 106 | 10 | 115 | 3 | 9 |
| | 160 * | $110_{j6}$ | 106 | 10 | 130 | 3.5 | 9 |
| K2 | 160 | $110_{j6}$ | 134 | 12 | 130 | 3.5 | 9 |
| | 200 * | $130_{j6}$ | 134 | 12 | 165 | 3.5 | 11 |
| K3 | 160 | $110_{j6}$ | 146 | 14 | 130 | 3.5 | 9 |
| | 200 * | $130_{j6}$ | 146 | 14 | 165 | 3.5 | 11 |
| | 250 | $180_{j6}$ | 146 | 14 | 215 | 4 | 14 |
| K4 | 250 * | $180_{j6}$ | 173 | 15 | 215 | 4 | 14 |
| K5 | 250 * | $180_{j6}$ | 185 | 15 | 215 | 4 | 14 |
| K6 | 300 * | $230_{j6}$ | 200 | 17 | 265 | 4 | 14 |
| K7 | 350 * | $250_{h6}$ | 226 | 18 | 300 | 5 | 18 |
| K8 | 350 | $250_{h6}$ | 282 | 18 | 300 | 5 | 18 |
| | 400 * | $300_{h6}$ | 282 | 20 | 350 | 5 | 18 |
| | 450 | $350_{h6}$ | 282 | 20 | 400 | 5 | 18 |
| K9 | 450 * | $350_{h6}$ | 330 | 23 | 400 | 5 | 18 |
| K10 | 550 | $450_{h6}$ | 400 | 25 | 500 | 5 | 18 |

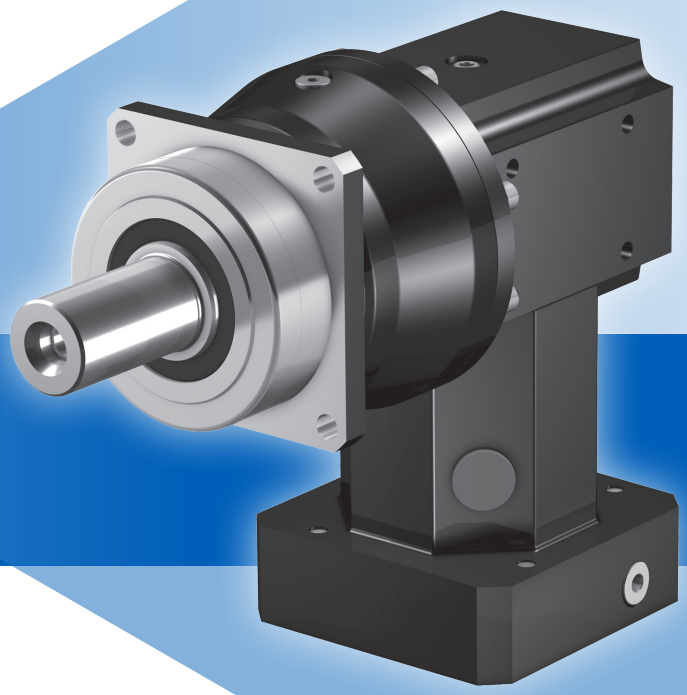
** Asterisk indicates standard flange diameter. For other diameters, specify at the time of ordering.*

# PKX Series: RIGHT ANGLE – Shaft Output

## PKX Features

- 3:1 to 300:1 ratios (higher ratios available. Contact STOBER.)
- Quiet running (<64dB(A))
- Bearing options to suit your application needs, extending gearbox life and avoiding oversizing, (see page 189).
- Error free motor mounting and quick changeover with toleranced pilot on motor plate
- Low no load running torque, giving you more torque for your application
- Magnetic oil filtration to remove contaminants to prevent breakdowns
- Build and ship in one day
- Assembled in the USA

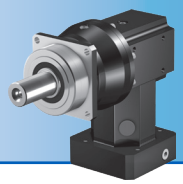
*STOBER PKX provides a right angle option with planetary gearing. Every gearbox is made to order. STOBER will custom whatever you need to fit your application. Contact us today to learn more.*



SHIPS in 1 DAY!
NO EXPEDITE FEE FOR 24 HOUR SERVICE

## General Specifications

| | |
|---|---|
| **Ambient Temperature** | 0°C to +40°C (104°F) [Unit temperature <90°C Max] |
| **Backlash** | PKX ≤4 arcmins (see performance overview chart, page 166) |
| **Coating** | Standard Black (RAL-9005), Food option |
| **Degree of Protection** | IP65 |
| **Direction of Rotation** | See page 168 |
| **Efficiency** | PKX 1 stage 96%, 2 stage 94%; PK 94% |
| **Input RPM** | Up to 6,000 RPM |
| **Installation** | Requires 12.9 fasteners. See page 288, for more information |
| **Lubrication** | Lubricated for life – standard Mobil SHC629; option food grade Mobil SHC CIBUS 150 |
| **Mounting Position** | Must be specified, see page 168 |
| **Warranty** | 5 Year Limited (2 Years on normal wear items: bearings, seals, etc.) |



# Overview

## Selection Options *At-a-Glance*

Using the **Selection Data** table later in this section, select the PKX Series Gearhead with the appropriate performance and design options tailored to your motor choice and exact application requirements. Use the part number guide below as a reference to build a part number for the complete gearhead assembly.

**Part Number Examples:**

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 0 | ! | @ | # | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PKX | P | 2 | 3 | 1 | S | P | S | S | 0040 | KX301VF | 0010 | MF | F | EL1 * |

| | Design Option | | Part Number Code | Description |
|---|---|---|---|---|
| 1 | **Series** | | P | Planetary |
| 2 | **Size** | | 2 3 4<br>5 7 8 9 | 7 sizes of gearhead |
| 3 | **Generation** | | 3 | Version of gearhead |
| 4 | **# of Stages** | | 1<br>2 | One stage for ratios of ≤ 10:1<br>Two stage for ratios >10:1 |
| 5 | **Housing** | | S | Standard mounting style |
| 6 | **Output Shaft** | | P<br>G | Shaft with key<br>Plain shaft (no key) |
| 7 | **Bearing Options** |  | S | Ball bearing |
| | |  | D | Double row angular contact bearing (except size P2) |
| | |  | Z | Cylindrical roller bearing (except size P2)("Z" cylindrical roller bearing not allowed with reduced backlash option.) |
| 8 | **Backlash** | | S<br>R | Standard Backlash<br>Reduced Backlash |
| 9 | **Ratio** | | 0040 | Ratios range from 4:1 to 100:1 f(0040=4:1; 0160=16:1; 1000=100:1, ect.) |
| 0 | **Secondary Unit** | | KX301VF | KX Series right angle unit: 5 sizes, 1 stage, with output shaft (V) & flange (F) |
| ! | **Secondary Unit Ratio** | | 0010 | KX Series: Ratios from 1:1 to 3:1 |
| @ | **Motor Adapter** | | MF | Motor Adapter with FlexiAdapt coupling |
| # | **Special Options** | | F | Food Duty (Size P3 thru P5) |
| * | **Mounting Position** | | EL1 EL2 EL3<br>EL4 EL5 EL6 | Required special instruction for all units, see page 168 |

## Options

### ME Adapter Option

- MSS1 Seal – special input seal for longer life (For sizes P5-9). Contact factory for this option.

### Coating Option

- **Standard:** For dry areas and normal conditions. All units standard coating, unless ordered with Food Duty.
- **Food Duty:** Able to withstand severe wet areas and washdown application (PKX size P3 thru P5).
- Available with multi-layer, industrial 316 stainless steel epoxy coating. Contact factory for this option.

### ATEX

- ATmosphere EXplosible – rated for explosive environments. Contact factory for this option and allow additional time for delivery.

## PKX Series Performance Overview

PKX Series performance is dependent on several factors including duty cycle, bearing design, gearhead size and stage configuration, among others. Use the chart below for preliminary evaluation, then use the following performance chart and selection information on the following pages for specific performance sizing and selection.

| Size/Generation/# of Stages | | P231 | P232 | P331 | P332 | P431 | P432 | P531 | P532 | P731 | P732 | P831 | P832 | P932 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Secondary Unit | | KX3 | | KX3 | | KX4 | KX3 | KX5 | KX4 | KX7 | KX5 | KX7 | | KX7 |
| **Acceleration Torque** $M_{2BMAX}$ | N | 25 | | 75 | | 135 | | 355 | | 805 | | 1840 | | 3300 |
| **Output Torque Nom.** [1] $M_{2N}$ | N | 18 | | 53 | | 102 | | 2270 | | 584 | | 1415 | | 2387 |
| **Torsional Stiffness** $C_2$ | Nm/arcmin | 1.8 | | 5 | | 12 | | 32 | | 62 | | 173 | | 393 |
| **Torsional Backlash** [2] | Δϕ | 7 | | 5 | | 5 | | 4 | | 4 | | 4 | | 4 |
| | Δϕ Reduced | – | | 3 | | 3 | | 2 | | 2 | | 2 | | – |
| **Input Speed Max.** $n_{1MAX}$ | Continuous | 3500 | | 3500 | | 3000 | 3500 | 3000 | 3000 | 2100 | 3000 | 2100 | | 2100 |
| | Cyclic | 6000 | | 6000 | | 5500 | 6000 | 5000 | 5500 | 4000 | 5000 | 4000 | | 4000 |
| **Efficiency (@ nom torque)** | % | 96 | 94 | 96 | 94 | 96 | 94 | 96 | 94 | 96 | 94 | 96 | 94 | 94 |
| **Weight** | kg | 3.0 | 3.5 | 3.8 | 4.1 | 7.4 | 6.1 | 13.1 | 11.5 | 26.6 | 22.2 | 42.1 | 46.8 | 71.9 |
| | lbs | 6.6 | 7.7 | 8.4 | 9.0 | 16.3 | 13.4 | 28.8 | 25.3 | 58.5 | 48.8 | 92.6 | 103 | 158.2 |
| **Noise** [3] | dB(A) | ≤64 | | ≤64 | | ≤66 | ≤64 | ≤68 | ≤66 | ≤70 | ≤68 | ≤70 | | ≤70 |

### Performance by Bearing Design Option [4]

**S = Ball bearing** **D = Double row angular contact bearing** **Z = Cylindrical roller bearing** [5]

| | | P2 | P3 | P4 | P5 | P7 | P8 | P9 |
|---|---|---|---|---|---|---|---|---|
| **Axial Load** $F_{2ax100}$ | S | 500 | 1000 | 1500 | 2300 | 2900 | 4700 | 6000 |
| | D | — | 2500 | 4000 | 6000 | 10,000 | 15,500 | 25,000 |
| | Z | — | 600 | 1000 | 1600 | 2000 | 3600 | 5000 |
| **Radial Load Max** $F_{2rad100}$ | S | 1200 | 2500 | 4000 | 6500 | 8500 | 13,000 | 18,000 |
| | D | — | 2750 | 4500 | 7000 | 9500 | 15,000 | 20,000 |
| | Z | — | 3000 | 5000 | 8000 | 10,000 | 18,000 | 27,000 |
| **Tilting Moment Max** $M_{2K100}$ | S | 34 | 79 | 146 | 315 | 544 | 852 | 1539 |
| | D | — | 94 | 182 | 382 | 665 | 1095 | 1930 |
| | Z | — | 95 | 183 | 388 | 640 | 1179 | 2309 |

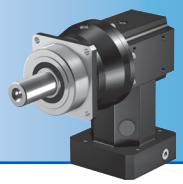
1) *Ratings based on input speed ($n_1$) of 1500 RPM.*
*For torque at higher input speeds ($M_{2NX}$) solve the formula:* $M_{2NX} = \frac{M_{2N}}{\sqrt[3]{\frac{n_1}{1500}}}$
*where $n_1$ = Actual Input Speed.*

2) *Tested at 1.5% of nominal torque and recorded on the output side of the gearhead.*

3) *Measurement at one (1) meter distance with input speed ($n_1$) of 1500 RPM.*

4) *Options S and Z are available with P Series only. See page 189 for output bearing options. Rating based on output speed ($n_2$) of 100 RPM. For values at other speeds see page 190.*

5) *"Z" cylindrical roller bearing not allowed with reduced backlash option.*



# Overview

## PKX Series Motor Mounting Plate Option (Motor information required with MF Motor Adapter Option)

STOBER Servo Gearheads fit the motor of your choice with the appropriate motor mounting plate assembled between the motor and the gearhead.

**NOTE: When ordering a gearhead:**

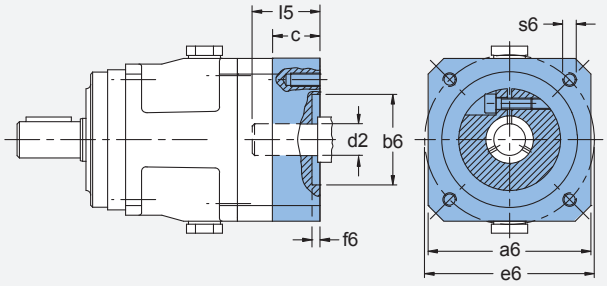
- Specify the motor manufacturer and part number
- Provide the motor drawing with dimensions, or specify the motor mounting dimensions (per the list shown at right)

For a precise dimension on a specific motor, or for general assistance, we recommend you contact STOBER Technical Support.

Maximum 10 working days for custom motor mounting plates.

### Customer Required Dimensions for Properly Sized Motor Mounting Plate

| | |
|---|---|
| d2 | Motor Shaft Diameter (If an adapter bushing is required it will be supplied with the motor plate.) |
| b6 | Pilot Diameter |
| e6 | Bolt Circle Diameter |
| s6 | Bolt Diameter |
| l5 | Motor Shaft Length |
| f6 | Pilot Length |
| a6 | Square Flange (Optional – motor plate will typically be made to match this dimension.) |

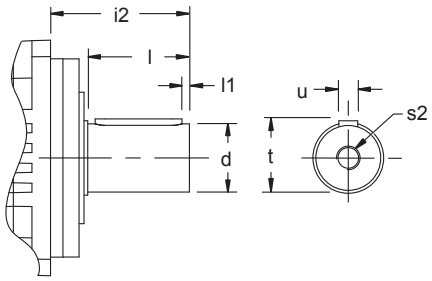



| Motor Mounting Plate Dimensions — mm (Gearhead Part Number Specific) | P231KX3 P232KX3 P331KX3 P332KX3 P432KX3 | P431KX4 P532KX4 | P531KX5 P732KX5 | P731KX7 P832KX7 P831KX7 P932KX7 |
|---|---|---|---|---|
| Maximum Allowed Motor Shaft Dia. d2 | 19 | 24 | 32 | 38 |
| Minimum Allowed Motor Plate Thickness c* | 18 | 21 | 24 | 25 |

** Note that c motor plate thickness is determined by the motor shaft length. The minimum motor plate thickness is the value listed.*

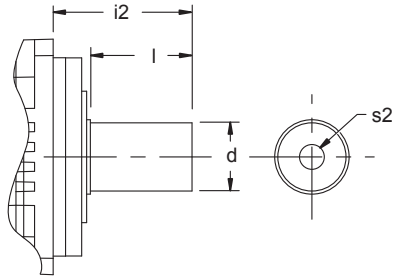
## PKX Series Output Shaft Options ("P" or "G" designated in part number, for example: P431P_0160 MF)

### P Shaft with Key




| Unit | d k6 | l1 | l | i2 | s2 (1) | t | u (2) |
|---|---|---|---|---|---|---|---|
| | mm | mm | mm | mm | | mm | W x H x L |
| P2 | 12 | 2 | 22 | 36 | M4 | 13.5 | A4X4X18 |
| P3 | 16 | 2 | 28 | 48 | M5 | 18 | A5X5X22 |
| P4 | 22 | 3 | 36 | 56 | M8 | 24.5 | A6X6X28 |
| P5 | 32 | 3 | 58 | 88 | M12 | 35 | A10X8X50 |
| P7 | 40 | 4 | 82 | 112 | M16 | 43 | A12X8X70 |
| P8 | 55 | 6 | 82 | 112 | M20 | 59 | A16X10X70 |
| P9 | 75 | 7 | 105 | 143 | M20 | 79.5 | A20X12X90 |

### G Shaft without Key



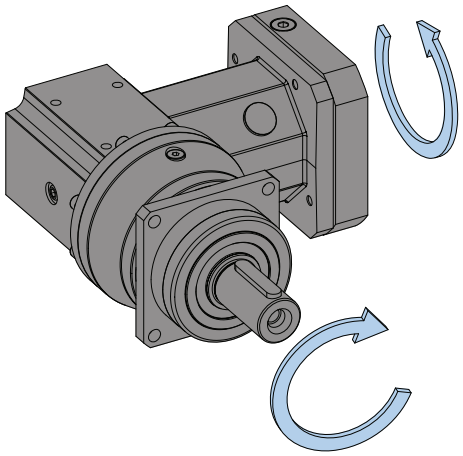

| Unit | d k6 | l | i2 | s2 (1) |
|---|---|---|---|---|
| | mm | mm | mm | |
| P2 | 12 | 22 | 36 | M4 |
| P3 | 16 | 28 | 48 | M5 |
| P4 | 22 | 36 | 56 | M8 |
| P5 | 32 | 58 | 88 | M12 |
| P7 | 40 | 82 | 112 | M16 |
| P8 | 55 | 82 | 112 | M20 |
| P9 | 75 | 105 | 143 | M20 |

(1) *The center hole in shafts with keys (Option "P") are machined to DIN 332 T2 shape DR.*

(2) *Feather keys are toleranced according to standard DIN 6885.*

## PKX Series Direction of Rotation

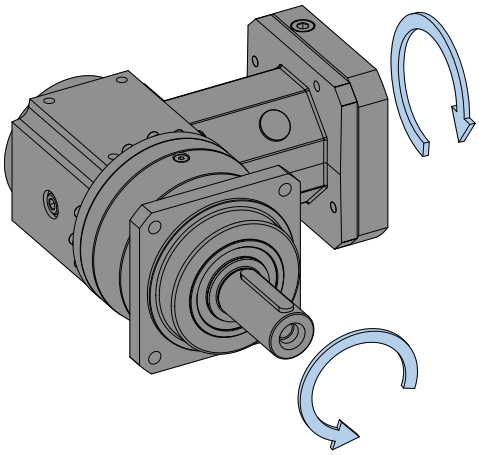
**CW**



**1 Stage Units (P2 - P5)**

**2 Stage Units (P2 - P7)**

**CCW**



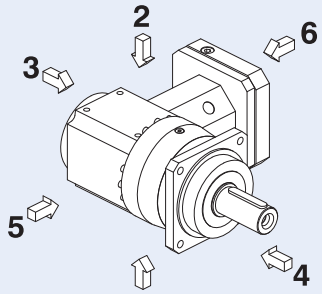
**1 Stage Units (P7 & P8)**

**2 Stage Units (P8 & P9)**

## PKX Mounting Position Options

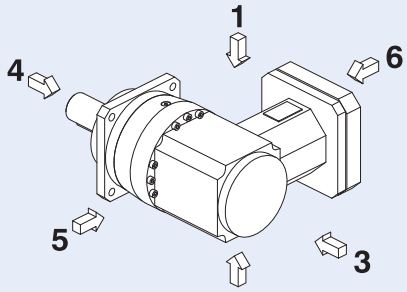
**Horizontal Positions (EL1, EL2, EL5, EL6) are interchange;**

**Vertical Positions (EL3 and EL4) MUST BE SPECIFIED**




**1**

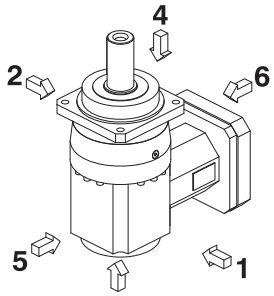
**EL1**




**2**

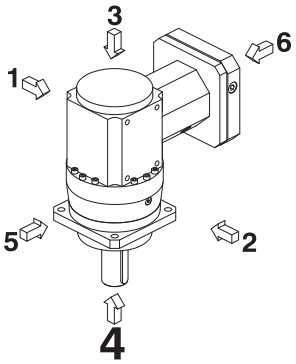
**EL2**

**IMPORTANT: Mounting PKX is either vertical mounting position (EL3 or EL4) must be specified when ordering.**




**3**

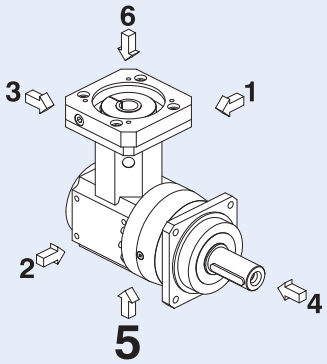
**EL3**




**4**

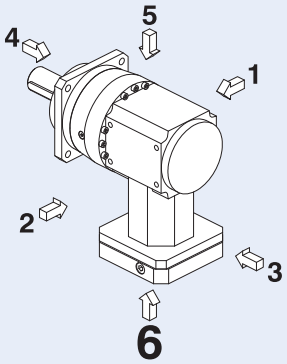
**EL4**

**IMPORTANT: Mounting PKX is either vertical mounting position (EL3 or EL4) must be specified when ordering.**



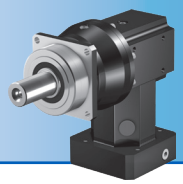

**5**

**EL5**



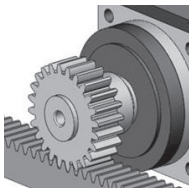
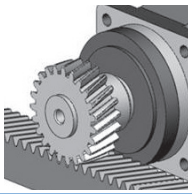
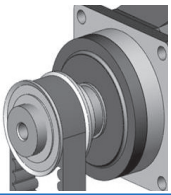

**6**

**EL6**



# Overview

## PKX Series Output Bearing Options

| | S Ball Bearing | D Double Row Angular Contact Bearing | Z Cylindrical Roller Bearing ("Z" cylindrical roller bearing not allowed with reduced backlash option.) |
|---|---|---|---|
| |  |  |  |
| **Characteristics:** | • Minimal frictional torque<br>• Good radial load capacity<br>• Axial load approx. 35% of radial load | • Low frictional torque<br>• Good radial bearing capacity<br>• Axial load approx. 50% of radial load | • Very good radial load capacity<br>• Axial load approx. 20% of radial load |
| **Applications:** | • Spur geared rack/pinion<br>• Couplings<br>• Belt with or without light tension | • Helical geared rack/pinion<br>• Couplings with high axial load<br>• Belt with or without light tension | • Prestressed belt drive<br>• Prestressed spur rack drive<br>• Applications with high radial loads and/or high service requirements |

## Permissible Output Shaft Load and Tilting Moments*

| | $z_2$ Distance of Shaft Shoulder to Center of Output Bearing | $F_{2ax100}$ Permitted Axial Force | $F_{2rad100}$ Permitted Radial Force ≤100RPM | $F_{2rad,acc}$ Radial Acceleration Force | $M_{2K100}$ Permitted Tilting Torque ≤100RPM | $M_{2k,acc}$ Permitted Acceleration Tilting Torque |
|---|---|---|---|---|---|---|
| **Unit** | mm | N | N | N | Nm | Nm |
| **S Ball Bearing** | | | | | | |
| P2 | 17 | 500 | 1200 | 1300 | 34 | 36 |
| P3 | 17.5 | 1000 | 2500 | 2500 | 79 | 79 |
| P4 | 18.5 | 1500 | 4000 | 4500 | 146 | 164 |
| P5 | 19.5 | 2300 | 6500 | 7000 | 315 | 340 |
| P7 | 23 | 2900 | 8000 | 9000 | 544 | 576 |
| P8 | 24.5 | 4700 | 13,000 | 18,000 | 852 | 1179 |
| P9 | 33 | 6000 | 18,000 | 27,000 | 1539 | 2309 |
| **D Double Row Angular Contact Bearing** | | | | | | |
| P3 | 20 | 2500 | 2750 | 2750 | 94 | 94 |
| P4 | 22.5 | 4000 | 4500 | 5000 | 182 | 203 |
| P5 | 25.5 | 6000 | 7000 | 8000 | 382 | 436 |
| P7 | 29 | 10,000 | 9000 | 10,000 | 665 | 700 |
| P8 | 32 | 15,500 | 15,000 | 18,000 | 1095 | 1314 |
| P9 | 44 | 25,000 | 20,000 | 30,000 | 1930 | 2895 |
| **Z Cylindrical Roller Bearing** | | | | | | |
| P3 | 17.5 | 600 | 3000 | 3000 | 95 | 95 |
| P4 | 18.5 | 1000 | 5000 | 5000 | 183 | 183 |
| P5 | 19.5 | 1600 | 8000 | 8000 | 388 | 388 |
| P7 | 23 | 2000 | 10,000 | 10,000 | 640 | 640 |
| P8 | 24.5 | 3600 | 18,000 | 18,000 | 1179 | 1179 |
| P9 | 33 | 5000 | 27,000 | 35,000 | 2309 | 2993 |

** Refer to illustration and load/life/speed definitions on page 170*

*During EMERGENCY OFF operation (maximum stops per gearhead = 1000) the permissible values in the table for $F_{2A}$, $F2_R$, and $M_{2K}$ can be multiplied by a factor of 2. The permissible load values given are valid with the load applied to the center of the output shaft ($x_2$).*

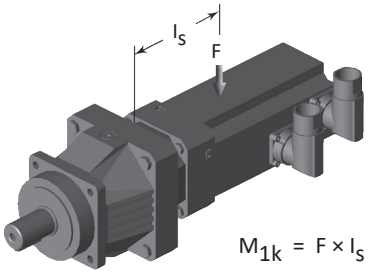
## PKX No Load Running Torque*

| | | Input Ratio $T_R$ | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | One Stage | | | | | | | Two Stage | | | | | | | | | | | |
| Unit | | 3 | 4 | 5 | 7 | 8 | 10 | 12 | 16 | 20 | 25 | 28 | 32 | 35 | 40 | 50 | 56 | 70 | 80 | 100 |
| P2 | Nm | – | 0.16 | 0.13 | 0.13 | 0.13 | 0.10 | – | 0.13 | 0.13 | 0.08 | 0.08 | 0.08 | 0.08 | 0.08 | 0.08 | 0.08 | 0.08 | 0.08 | 0.08 |
| P3 | Nm | 0.26 | 0.21 | .016 | 0.16 | 0.16 | .016 | 0.13 | 0.13 | 0.13 | 0.08 | 0.08 | 0.13 | 0.08 | 0.08 | 0.08 | 0.08 | 0.08 | 0.08 | 0.08 |
| P4 | Nm | 0.33 | 0.23 | 0.23 | 0.18 | 0.18 | 0.18 | 0.14 | 0.14 | 0.14 | 0.11 | 0.11 | 0.14 | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 | 0.11 |
| P5 | Nm | 0.60 | 0.45 | 0.40 | 0.30 | 0.20 | 0.20 | 0.23 | 0.23 | 0.23 | 0.18 | 0.18 | 0.23 | 0.18 | 0.18 | 0.18 | 0.18 | 0.18 | 0.18 | 0.18 |
| P7 | Nm | 0.83 | 0.53 | 0.43 | 0.33 | 0.23 | 0.23 | 0.30 | 0.30 | 0.30 | 0.20 | 0.20 | 0.30 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 |
| P8 | Nm | 1.05 | 0.75 | 0.65 | 0.45 | 0.35 | 0.35 | 0.48 | 0.43 | 0.43 | 0.33 | 0.33 | 0.43 | 0.23 | 0.23 | 0.23 | 0.23 | 0.23 | 0.23 | 0.23 |
| P9 | Nm | – | 0.92 | 0.72 | 0.52 | – | 0.42 | – | 0.55 | 0.55 | 0.45 | 0.45 | – | 0.35 | 0.35 | 0.35 | – | 0.35 | – | 0.35 |

** Torque is measured with the input at 2000 RPM and an ambient temperature of 20° C.*

## Permissible Motor Tilting Torque

The permissible tilting torque of the motor attached to the gear unit is a result of the static and dynamic load "F" from the motor weight, mass acceleration, and vibration multiplied by the distance from the center of gravity "$l_S$" of the motor.




$$M_{1k} = F \times l_S \leq M_{1K}$$

| M1K | KX301_MF | KX401_MF | KX501_MF | KX701_MF |
|---|---|---|---|---|
| Nm | 12 | 24 | 50 | 100 |

## PKX Series Load/Life/Speed Calculations

The permissible load and tilting moment values are based on an output speed of 100 RPM. For higher speeds the following applies, where $n_2$ is the desired speed:

$$F_{2AX} = \frac{F_{2ax100}}{\sqrt[3]{\frac{n_2}{100}}} \qquad F_{2RX} = \frac{F_{2rad100}}{\sqrt[3]{\frac{n_2}{100}}} \qquad M_{2KX} = \frac{M_{2K100}}{\sqrt[3]{\frac{n_2}{100}}}$$

The application output tilting moment should be determined by the following formula:

$$M_{2k,acc*} = \frac{2 \bullet F_{2ax100} \bullet y_2 + F_{2rad,acc} \bullet (x_2 + Z_2)}{1000} \leq M_{2k,acc}$$

$$M_{2k,eq*} = \sqrt[3]{\frac{n_{2b1} \bullet t_{b1} \bullet M_{2kb1}^{\ 3} + \ldots + n_{2bn} \bullet t_{bn} \bullet M_{2kbn}^{\ 3}}{n_{2b1} \bullet t_{b1} + \ldots + n_{2bn} \bullet t_{bn}}} \leq M_{2kN}$$

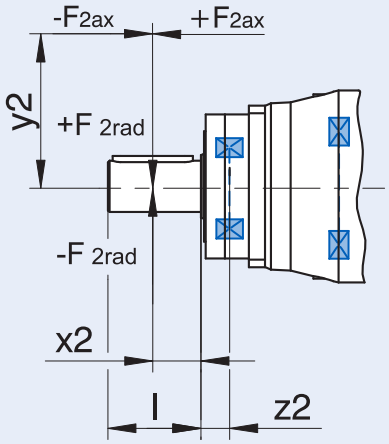
$$F_{2rad,eq*} = \sqrt[3]{\frac{n_{2b1} \bullet t_{b1} \bullet F_{2rb1}^{\ 3} + \ldots + n_{2bn} \bullet t_{bn} \bullet F_{2rbn}^{\ 3}}{n_{2b1} \bullet t_{b1} + \ldots + n_{2bn} \bullet t_{bn}}} \leq F_{2radN}$$

Where:

| | | | |
|---|---|---|---|
| $z_2$ | Distance of Shaft Shoulder to Center of Output Bearing | $F_{2rad,acc}$ | Radial Acceleration Force |
| $n_2$ | Actual Average Output Speed | $F_{2rad,acc*}$ | Radial Acceleration Force at Gear Unit Output |
| $x_2$ | Distance of the Shaft Shoulder to the Force Application Point | $M_{2K100}$ | Permitted Tilting Torque ≤100RPM |
| $y_2$ | Distance of the Shaft Axis to the Axial Force Application Point | $M_{2K,acc}$ | Permitted Acceleration Tilting Torque |
| $F_{2ax*}$ | Actual Axial Force at Gear Unit Output | $M_{2k,acc*}$ | Permitted Acceleration Tilting Torque at Gear Unit Output |
| $F_{2ax100}$ | Permitted Axial Force | $C_{2K}$ | Tilting Stiffness |
| $F_{2rad100}$ | Permitted Radial Force ≤100RPM | | |

**All formulas shown are based on METRIC values**

*Upper case letters are permissible values. Lower case letters are for existing values.*



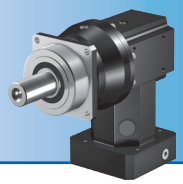

The hours of life ($L_h$) of the unit can be determined by the following formula:

**bearing life for duty cycle ≤ 40%**

$L_h$ > 10,000 hours if $M_{2K100}/M_{2A}$ < 1.25 and > 1
$L_h$ > 20,000 hours if $M_{2K100}/M_{2A}$ > 1.25 and > 1.5
$L_h$ > 30,000 hours if $M_{2K100}/M_{2A}$ < 1.5

**bearing life for duty cycle ≥ 40%**

$$L_{hA} = L_h \left( \frac{40\%}{\text{Duty Cycle}} \right)$$



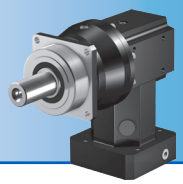
# Selection Data

| Exact Ratio (i) | Output Torque: Nom. $M_{2N}$ [1] Nm | Output Torque: Accel. $M_{2acc}$ Nm | Output Torque: Accel. Torque for Reduced Backlash $M_{2accHT}$ Nm | Output Torque: Peak $M_{2NOT}$ [2] Nm | Back-lash $\Delta\varphi_2$ arcmin | Red. Back-lash $\Delta\varphi_{2red}$ arcmin | Part Number* (Gearhead + Input) | Max. Input Speed RPM (n1): Continuous EL 1,2,5,6 | Max. Input Speed RPM (n1): Continuous EL 3,4 | Max. Input Speed RPM (n1): Cyclic All | Motor Shaft [3] Max Ø $d_{MW}$ mm | Input Inertia $J_1$ kgcm² | Tors. Stiffness $C_2$ Nm/arcmin | Oper. Noise $L_{pA}$ dB(A) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **P2KX** | | | | | | | | | | | | | | |
| 4.000 | 15 | 25 | – | 51 | 8.5 | – | P231_0040KX301_0010 MF | 3000 | 2500 | 4500 | ≤19 | 1.1 | 1.5 | 70 |
| 5.000 | 15 | 25 | – | 51 | 8.0 | – | P231_0050KX301_0010 MF | 3000 | 2500 | 4500 | ≤19 | 1.0 | 1.6 | 70 |
| 7.000 | 15 | 23 | – | 46 | 7.5 | – | P231_0070KX301_0010 MF | 3000 | 2500 | 4500 | ≤19 | 1.0 | 1.7 | 70 |
| 8.000 | 16 | 25 | – | 51 | 8.5 | – | P231_0040KX301_0020 MF | 3500 | 3000 | 5500 | ≤19 | 0.81 | 1.5 | 66 |
| 10.00 | 16 | 25 | – | 51 | 8.0 | – | P231_0050KX301_0020 MF | 3500 | 3000 | 5500 | ≤19 | 0.81 | 1.6 | 66 |
| 12.00 | 16 | 25 | – | 51 | 8.5 | – | P231_0040KX301_0030 MF | 3500 | 3500 | 6000 | ≤19 | 0.75 | 1.5 | 64 |
| 15.00 | 16 | 25 | – | 51 | 8.0 | – | P231_0050KX301_0030 MF | 3500 | 3500 | 6000 | ≤19 | 0.75 | 1.6 | 64 |
| 20.00 | 12 | 21 | – | 41 | 7.0 | – | P231_0100KX301_0020 MF | 3500 | 3000 | 5500 | ≤19 | 0.80 | 1.6 | 66 |
| 21.00 | 16 | 23 | – | 46 | 7.5 | – | P231_0070KX301_0030 MF | 3500 | 3500 | 6000 | ≤19 | 0.75 | 1.7 | 64 |
| 24.00 | 14 | 21 | – | 41 | 7.5 | – | P231_0080KX301_0030 MF | 3500 | 3500 | 6000 | ≤19 | 0.75 | 1.6 | 64 |
| 30.00 | 12 | 21 | – | 41 | 7.0 | – | P231_0100KX301_0030 MF | 3500 | 3500 | 6000 | ≤19 | 0.75 | 1.6 | 64 |
| 35.00 | 18 | 25 | – | 51 | 8.5 | – | P232_0350KX301_0010 MF | 3000 | 2500 | 4500 | ≤19 | 1.0 | 1.8 | 70 |
| 40.00 | 16 | 25 | – | 51 | 8.5 | – | P232_0200KX301_0020 MF | 3500 | 3000 | 5500 | ≤19 | 0.81 | 1.8 | 66 |
| 50.00 | 16 | 25 | – | 51 | 8.5 | – | P232_0250KX301_0020 MF | 3500 | 3000 | 5500 | ≤19 | 0.81 | 1.8 | 66 |
| 56.00 | 16 | 24 | – | 48 | 8.5 | – | P232_0280KX301_0020 MF | 3500 | 3000 | 5500 | ≤19 | 0.81 | 1.8 | 66 |
| 60.00 | 16 | 25 | – | 51 | 8.5 | – | P232_0200KX301_0030 MF | 3500 | 3500 | 6000 | ≤19 | 0.75 | 1.8 | 64 |
| 70.00 | 18 | 25 | – | 51 | 8.5 | – | P232_0350KX301_0020 MF | 3500 | 3000 | 5500 | ≤19 | 0.81 | 1.8 | 66 |
| 75.00 | 16 | 25 | – | 51 | 8.5 | – | P232_0250KX301_0030 MF | 3500 | 3500 | 6000 | ≤19 | 0.75 | 1.8 | 64 |
| 80.00 | 16 | 24 | – | 48 | 8.5 | – | P232_0400KX301_0020 MF | 3500 | 3000 | 5500 | ≤19 | 0.80 | 1.8 | 66 |
| 84.00 | 16 | 24 | – | 48 | 8.5 | – | P232_0280KX301_0030 MF | 3500 | 3500 | 6000 | ≤19 | 0.75 | 1.8 | 64 |
| 100.0 | 19 | 25 | – | 51 | 8.0 | – | P232_0500KX301_0020 MF | 3500 | 3000 | 5500 | ≤19 | 0.80 | 1.8 | 66 |
| 105.0 | 18 | 25 | – | 51 | 8.5 | – | P232_0350KX301_0030 MF | 3500 | 3500 | 6000 | ≤19 | 0.75 | 1.8 | 64 |
| 120.0 | 16 | 24 | – | 48 | 8.5 | – | P232_0400KX301_0030 MF | 3500 | 3500 | 6000 | ≤19 | 0.75 | 1.8 | 64 |
| 140.0 | 18 | 23 | – | 46 | 8.0 | – | P232_0700KX301_0020 MF | 3500 | 3000 | 5500 | ≤19 | 0.80 | 1.8 | 66 |
| 150.0 | 19 | 25 | – | 51 | 8.0 | – | P232_0500KX301_0030 MF | 3500 | 3500 | 6000 | ≤19 | 0.75 | 1.8 | 64 |
| 200.0 | 16 | 21 | – | 41 | 8.0 | – | P232_1000KX301_0020 MF | 3500 | 3000 | 5500 | ≤19 | 0.80 | 1.6 | 66 |
| 210.0 | 18 | 23 | – | 46 | 8.0 | – | P232_0700KX301_0030 MF | 3500 | 3500 | 6000 | ≤19 | 0.75 | 1.8 | 64 |
| 300.0 | 16 | 21 | – | 41 | 8.0 | – | P232_1000KX301_0030 MF | 3500 | 3500 | 6000 | ≤19 | 0.75 | 1.6 | 64 |

[1] *Based on input speed of 1500 RPM. See page 166 for details on torque calculations.*
[2] *Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
* *MF = Motor adapter with FlexiAdapt® coupling*

| Exact Ratio (i) | Output Torque: Nom. [1] $M_{2N}$ Nm | Output Torque: Accel. $M_{2acc}$ Nm | Output Torque: Accel. Torque for Reduced Backlash $M_{2accHT}$ Nm | Output Torque: Peak [2] $M_{2NOT}$ Nm | Back-lash $\Delta\phi_2$ arcmin | Red. Back-lash $\Delta\phi_{2red}$ arcmin | Part Number* (Gearhead + Input) | Max. Input Speed RPM (n1): Continuous EL 1,2,5,6 | Max. Input Speed RPM (n1): Continuous EL 3,4 | Max. Input Speed RPM (n1): Cyclic All | Motor Shaft [3] Max Ø $d_{MW}$ mm | Input Inertia $J_1$ kgcm² | Tors. Stiffness $C_2$ Nm/arcmin | Oper. Noise $L_{pA}$ dB(A) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **P3KX** | | | | | | | | | | | | | | |
| 3.000 | 29 | 38 | 38 | 68 | 7.5 | 5.5 | P331_0030KX301_0010 MF | 3000 | 2500 | 4500 | ≤19 | 1.3 | 2.4 | 70 |
| 4.000 | 39 | 50 | 50 | 91 | 6.5 | 4.5 | P331_0040KX301_0010 MF | 3000 | 2500 | 4500 | ≤19 | 1.1 | 3.3 | 70 |
| 5.000 | 45 | 63 | 63 | 113 | 6.0 | 4.0 | P331_0050KX301_0010 MF | 3000 | 2500 | 4500 | ≤19 | 1.1 | 3.8 | 70 |
| 6.000 | 29 | 38 | 38 | 77 | 7.5 | 5.5 | P331_0030KX301_0020 MF | 3500 | 3000 | 5500 | ≤19 | 0.87 | 2.4 | 66 |
| 7.000 | 45 | 69 | 75 | 138 | 5.5 | 3.5 | P331_0070KX301_0010 MF | 3000 | 2500 | 4500 | ≤19 | 1.0 | 4.2 | 70 |
| 8.000 | 39 | 50 | 50 | 103 | 6.5 | 4.5 | P331_0040KX301_0020 MF | 3500 | 3000 | 5500 | ≤19 | 0.83 | 3.3 | 66 |
| 10.00 | 45 | 63 | 63 | 129 | 6.0 | 4.0 | P331_0050KX301_0020 MF | 3500 | 3000 | 5500 | ≤19 | 0.82 | 3.8 | 66 |
| 12.00 | 39 | 50 | 50 | 103 | 6.5 | 4.5 | P331_0040KX301_0030 MF | 3500 | 3500 | 6000 | ≤19 | 0.76 | 3.3 | 64 |
| 14.00 | 45 | 69 | 75 | 138 | 5.5 | 3.5 | P331_0070KX301_0020 MF | 3500 | 3000 | 5500 | ≤19 | 0.81 | 4.2 | 66 |
| 15.00 | 45 | 63 | 63 | 129 | 6.0 | 4.0 | P331_0050KX301_0030 MF | 3500 | 3500 | 6000 | ≤19 | 0.75 | 3.8 | 64 |
| 16.00 | 40 | 63 | 65 | 126 | 5.5 | 3.5 | P331_0080KX301_0020 MF | 3500 | 3000 | 5500 | ≤19 | 0.81 | 4.1 | 66 |
| 20.00 | 36 | 60 | 60 | 120 | 5.0 | 3.0 | P331_0100KX301_0020 MF | 3500 | 3000 | 5500 | ≤19 | 0.81 | 4.0 | 66 |
| 21.00 | 45 | 69 | 75 | 138 | 5.5 | 3.5 | P331_0070KX301_0030 MF | 3500 | 3500 | 6000 | ≤19 | 0.75 | 4.2 | 64 |
| 24.00 | 40 | 63 | 65 | 126 | 5.5 | 3.5 | P331_0080KX301_0030 MF | 3500 | 3500 | 6000 | ≤19 | 0.75 | 4.1 | 64 |
| 30.00 | 36 | 60 | 60 | 120 | 5.0 | 3.0 | P331_0100KX301_0030 MF | 3500 | 3500 | 6000 | ≤19 | 0.75 | 4.0 | 64 |
| 32.00 | 45 | 65 | 65 | 130 | 5.5 | 3.5 | P332_0160KX301_0020 MF | 3500 | 3000 | 5500 | ≤19 | 0.81 | 5.0 | 66 |
| 35.00 | 50 | 75 | 75 | 150 | 5.5 | 3.5 | P332_0350KX301_0010 MF | 3000 | 2500 | 4500 | ≤19 | 1.0 | 5.2 | 70 |
| 40.00 | 50 | 75 | 75 | 150 | 5.5 | 3.5 | P332_0200KX301_0020 MF | 3500 | 3000 | 5500 | ≤19 | 0.81 | 5.1 | 66 |
| 50.00 | 50 | 75 | 75 | 150 | 5.5 | 3.5 | P332_0250KX301_0020 MF | 3500 | 3000 | 5500 | ≤19 | 0.81 | 5.1 | 66 |
| 56.00 | 45 | 65 | 70 | 130 | 5.5 | 3.5 | P332_0280KX301_0020 MF | 3500 | 3000 | 5500 | ≤19 | 0.81 | 5.1 | 66 |
| 60.00 | 50 | 75 | 75 | 150 | 5.5 | 3.5 | P332_0200KX301_0030 MF | 3500 | 3500 | 6000 | ≤19 | 0.75 | 5.1 | 64 |
| 64.00 | 48 | 63 | 65 | 126 | 5.5 | 3.5 | P332_0320KX301_0020 MF | 3500 | 3000 | 5500 | ≤19 | 0.81 | 4.5 | 66 |
| 70.00 | 50 | 75 | 75 | 150 | 5.5 | 3.5 | P332_0350KX301_0020 MF | 3500 | 3000 | 5500 | ≤19 | 0.81 | 5.2 | 66 |
| 75.00 | 50 | 75 | 75 | 150 | 5.5 | 3.5 | P332_0250KX301_0030 MF | 3500 | 3500 | 6000 | ≤19 | 0.75 | 5.1 | 64 |
| 80.00 | 45 | 65 | 65 | 130 | 5.5 | 3.5 | P332_0400KX301_0020 MF | 3500 | 3000 | 5500 | ≤19 | 0.80 | 4.8 | 66 |
| 84.00 | 45 | 65 | 70 | 130 | 5.5 | 3.5 | P332_0280KX301_0030 MF | 3500 | 3500 | 6000 | ≤19 | 0.75 | 5.1 | 64 |
| 100.0 | 50 | 75 | 75 | 150 | 5.0 | 3.0 | P332_0500KX301_0020 MF | 3500 | 3000 | 5500 | ≤19 | 0.80 | 5.0 | 66 |
| 105.0 | 50 | 75 | 75 | 150 | 5.5 | 3.5 | P332_0350KX301_0030 MF | 3500 | 3500 | 6000 | ≤19 | 0.75 | 5.2 | 64 |
| 120.0 | 45 | 65 | 65 | 130 | 5.5 | 3.5 | P332_0400KX301_0030 MF | 3500 | 3500 | 6000 | ≤19 | 0.75 | 4.8 | 64 |
| 140.0 | 53 | 69 | 69 | 138 | 5.0 | 3.0 | P332_0700KX301_0020 MF | 3500 | 3000 | 5500 | ≤19 | 0.80 | 4.9 | 66 |
| 150.0 | 50 | 75 | 75 | 150 | 5.0 | 3.0 | P332_0500KX301_0030 MF | 3500 | 3500 | 6000 | ≤19 | 0.75 | 5.0 | 64 |
| 200.0 | 46 | 60 | 60 | 120 | 5.0 | 3.0 | P332_1000KX301_0020 MF | 3500 | 3000 | 5500 | ≤19 | 0.80 | 4.3 | 66 |
| 210.0 | 53 | 69 | 69 | 138 | 5.0 | 3.0 | P332_0700KX301_0030 MF | 3500 | 3500 | 6000 | ≤19 | 0.75 | 4.9 | 64 |
| 300.0 | 46 | 60 | 60 | 120 | 5.0 | 3.0 | P332_1000KX301_0030 MF | 3500 | 3500 | 6000 | ≤19 | 0.75 | 4.3 | 64 |

[1] *Based on input speed of 1500 RPM. See page 166 for details on torque calculations.*
[2] *Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
* *MF = Motor adapter with FlexiAdapt® coupling*



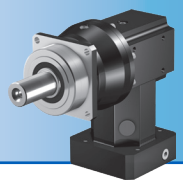
# Selection Data

| Exact Ratio (i) | Output Torque: Nom. $M_{2N}$ [1] | Output Torque: Accel. $M_{2acc}$ | Output Torque: Accel. Torque for Reduced Backlash $M_{2accHT}$ | Output Torque: Peak $M_{2NOT}$ [2] | Back-lash $\Delta\phi_2$ | Red. Back-lash $\Delta\phi_{2red}$ | Part Number* (Gearhead + Input) | Max. Input Speed RPM (n1): Continuous EL 1,2,5,6 | Max. Input Speed RPM (n1): Continuous EL 3,4 | Max. Input Speed RPM (n1): Cyclic | Motor Shaft [3] Max Ø $d_{MW}$ | Input Inertia $J_1$ | Tors. Stiffness $C_2$ | Oper. Noise $L_{pA}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Nm | Nm | Nm | Nm | arcmin | arcmin | | EL 1,2,5,6 | EL 3,4 | All | mm | kgcm² | Nm/ arcmin | dB(A) |
| **P4KX** | | | | | | | **(continued next page)** | | | | | | | |
| 3.000 | 50 | 73 | 73 | 155 | 7.5 | 5.5 | P431_0030KX401_0010 MF | 2500 | 2000 | 4000 | ≤24 | 3.1 | 5.3 | 72 |
| 4.000 | 78 | 97 | 97 | 206 | 6.5 | 4.5 | P431_0040KX401_0010 MF | 2500 | 2000 | 4000 | ≤24 | 2.7 | 7.3 | 72 |
| 5.000 | 85 | 121 | 121 | 258 | 6.0 | 4.0 | P431_0050KX401_0010 MF | 2500 | 2000 | 4000 | ≤24 | 2.6 | 8.6 | 72 |
| 6.000 | 50 | 73 | 73 | 155 | 7.5 | 5.5 | P431_0030KX401_0020 MF | 2500 | 2500 | 5000 | ≤24 | 1.8 | 5.3 | 68 |
| 7.000 | 85 | 135 | 143 | 271 | 5.5 | 3.5 | P431_0070KX401_0010 MF | 2500 | 2000 | 4000 | ≤24 | 2.4 | 9.2 | 72 |
| 8.000 | 78 | 97 | 97 | 206 | 6.5 | 4.5 | P431_0040KX401_0020 MF | 2500 | 2500 | 5000 | ≤24 | 1.7 | 7.3 | 68 |
| 10.00 | 90 | 121 | 121 | 258 | 6.0 | 4.0 | P431_0050KX401_0020 MF | 2500 | 2500 | 5000 | ≤24 | 1.7 | 8.6 | 68 |
| 12.00 | 78 | 97 | 97 | 206 | 6.5 | 4.5 | P431_0040KX401_0030 MF | 3000 | 3000 | 5500 | ≤24 | 1.5 | 7.3 | 66 |
| 14.00 | 90 | 135 | 143 | 271 | 5.5 | 3.5 | P431_0070KX401_0020 MF | 2500 | 2500 | 5000 | ≤24 | 1.6 | 9.2 | 68 |
| 15.00 | 90 | 121 | 121 | 258 | 6.0 | 4.0 | P431_0050KX401_0030 MF | 3000 | 3000 | 5500 | ≤24 | 1.5 | 8.6 | 66 |
| 16.00 | 80 | 120 | 125 | 239 | 5.5 | 3.5 | P431_0080KX401_0020 MF | 2500 | 2500 | 5000 | ≤24 | 1.6 | 8.5 | 68 |
| 20.00 | 75 | 115 | 115 | 230 | 5.0 | 3.0 | P431_0100KX401_0020 MF | 2500 | 2500 | 5000 | ≤24 | 1.6 | 8.4 | 68 |
| 21.00 | 90 | 135 | 143 | 271 | 5.5 | 3.5 | P431_0070KX401_0030 MF | 3000 | 3000 | 5500 | ≤24 | 1.4 | 9.2 | 66 |
| 24.00 | 80 | 120 | 125 | 239 | 5.5 | 3.5 | P431_0080KX401_0030 MF | 3000 | 3000 | 5500 | ≤24 | 1.4 | 8.5 | 66 |
| 30.00 | 75 | 115 | 115 | 230 | 5.0 | 3.0 | P431_0100KX401_0030 MF | 3000 | 3000 | 5500 | ≤24 | 1.4 | 8.4 | 66 |
| 32.00 | 89 | 130 | 130 | 260 | 5.5 | 3.5 | P432_0160KX301_0020 MF | 3500 | 3000 | 5500 | ≤19 | 0.83 | 11 | 66 |
| 35.00 | 102 | 133 | 138 | 266 | 5.5 | 3.5 | P432_0350KX301_0010 MF | 3000 | 2500 | 4500 | ≤19 | 1.0 | 12 | 70 |
| 40.00 | 95 | 134 | 139 | 268 | 5.5 | 3.5 | P432_0200KX301_0020 MF | 3500 | 3000 | 5500 | ≤19 | 0.82 | 12 | 66 |
| 50.00 | 100 | 134 | 139 | 268 | 5.5 | 3.5 | P432_0250KX301_0020 MF | 3500 | 3000 | 5500 | ≤19 | 0.82 | 12 | 66 |
| 56.00 | 95 | 130 | 130 | 260 | 5.5 | 3.5 | P432_0280KX301_0020 MF | 3500 | 3000 | 5500 | ≤19 | 0.81 | 12 | 66 |
| 60.00 | 95 | 134 | 139 | 268 | 5.5 | 3.5 | P432_0200KX301_0030 MF | 3500 | 3500 | 6000 | ≤19 | 0.76 | 12 | 64 |
| 64.00 | 90 | 126 | 131 | 253 | 5.5 | 3.5 | P432_0320KX301_0020 MF | 3500 | 3000 | 5500 | ≤19 | 0.83 | 9.4 | 66 |
| 70.00 | 102 | 133 | 138 | 266 | 5.5 | 3.5 | P432_0350KX301_0020 MF | 3500 | 3000 | 5500 | ≤19 | 0.81 | 12 | 66 |
| 75.00 | 100 | 134 | 139 | 268 | 5.5 | 3.5 | P432_0250KX301_0030 MF | 3500 | 3500 | 6000 | ≤19 | 0.75 | 12 | 64 |
| 80.00 | 87 | 130 | 130 | 260 | 5.5 | 3.5 | P432_0400KX301_0020 MF | 3500 | 3000 | 5500 | ≤19 | 0.81 | 12 | 66 |
| 84.00 | 95 | 130 | 130 | 260 | 5.5 | 3.5 | P432_0280KX301_0030 MF | 3500 | 3500 | 6000 | ≤19 | 0.75 | 12 | 64 |
| 100.0 | 102 | 132 | 138 | 264 | 5.0 | 3.0 | P432_0500KX301_0020 MF | 3500 | 3000 | 5500 | ≤19 | 0.81 | 12 | 66 |
| 105.0 | 102 | 133 | 138 | 266 | 5.5 | 3.5 | P432_0350KX301_0030 MF | 3500 | 3500 | 6000 | ≤19 | 0.75 | 12 | 64 |

[1] *Based on input speed of 1500 RPM. See page 166 for details on torque calculations.*
[2] *Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
* *MF = Motor adapter with FlexiAdapt® coupling*

| Exact Ratio (i) | Output Torque: Nom. $M_{2N}$ [1] | Output Torque: Accel. $M_{2acc}$ | Output Torque: Accel. Torque for Reduced Backlash $M_{2accHT}$ | Output Torque: Peak $M_{2NOT}$ [2] | Backlash $\Delta\phi_2$ | Red. Backlash $\Delta\phi_{2red}$ | Part Number* (Gearhead + Input) | Max. Input Speed RPM (n1): Continuous EL 1,2,5,6 | Max. Input Speed RPM (n1): Continuous EL 3,4 | Max. Input Speed RPM (n1): Cyclic | Motor Shaft [3] Max Ø $d_{MW}$ | Input Inertia $J_1$ | Tors. Stiffness $C_2$ | Oper. Noise $L_{pA}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Nm | Nm | Nm | Nm | arcmin | arcmin | | | | All | mm | kgcm² | Nm/ arcmin | dB(A) |
| **P4KX** | **(continued from previous page)** | | | | | | | | | | | | | |
| 120.0 | 87 | 130 | 130 | 260 | 5.5 | 3.5 | P432_0400KX301_0030 MF | 3500 | 3500 | 6000 | ≤19 | 0.75 | 12 | 64 |
| 140.0 | 97 | 127 | 127 | 253 | 5.0 | 3.0 | P432_0700KX301_0020 MF | 3500 | 3000 | 5500 | ≤19 | 0.81 | 11 | 66 |
| 150.0 | 102 | 132 | 138 | 264 | 5.0 | 3.0 | P432_0500KX301_0030 MF | 3500 | 3500 | 6000 | ≤19 | 0.75 | 12 | 64 |
| 200.0 | 85 | 110 | 110 | 220 | 5.0 | 3.0 | P432_1000KX301_0020 MF | 3500 | 3000 | 5500 | ≤19 | 0.81 | 9.0 | 66 |
| 210.0 | 97 | 127 | 127 | 253 | 5.0 | 3.0 | P432_0700KX301_0030 MF | 3500 | 3500 | 6000 | ≤19 | 0.75 | 11 | 64 |
| 300.0 | 85 | 110 | 110 | 220 | 5.0 | 3.0 | P432_1000KX301_0030 MF | 3500 | 3500 | 6000 | ≤19 | 0.75 | 9.0 | 64 |

[1] *Based on input speed of 1500 RPM. See page 166 for details on torque calculations.*
[2] *Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
* *MF = Motor adapter with FlexiAdapt® coupling*



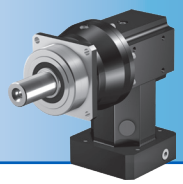


| Exact Ratio (i) | Output Torque: Nom. $M_{2N}$ | Output Torque: Accel. $M_{2acc}$ | Output Torque: Accel. Torque for Reduced Backlash $M_{2accHT}$ | Output Torque: Peak $M_{2NOT}$ | Back-lash $\Delta\phi_2$ | Red. Back-lash $\Delta\phi_{2red}$ | Part Number* (Gearhead + Input) | Max. Input Speed RPM (n1): Continuous EL 1,2,5,6 | Max. Input Speed RPM (n1): Continuous EL 3,4 | Max. Input Speed RPM (n1): Cyclic | Motor Shaft [3] Max Ø $d_{MW}$ | Input Inertia $J_1$ | Tors. Stiffness $C_2$ | Oper. Noise $L_{pA}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Nm | Nm | Nm | Nm | arcmin | arcmin | | EL 1,2,5,6 | EL 3,4 | All | mm | kgcm² | Nm/ arcmin | dB(A) |
| **P5KX** | | | | | | | **(continued next page)** | | | | | | | |
| 3.000 | 120 | 183 | 183 | 387 | 6.5 | 4.5 | P531_0030KX501_0010 MF | 2500 | 2000 | 3500 | ≤32 | 10 | 13 | 74 |
| 4.000 | 194 | 244 | 244 | 515 | 5.5 | 3.5 | P531_0040KX501_0010 MF | 2500 | 2000 | 3500 | ≤32 | 8.6 | 18 | 74 |
| 5.000 | 210 | 306 | 306 | 644 | 5.0 | 3.0 | P531_0050KX501_0010 MF | 2500 | 2000 | 3500 | ≤32 | 8.2 | 22 | 74 |
| 6.000 | 120 | 183 | 183 | 387 | 6.5 | 4.5 | P531_0030KX501_0020 MF | 2500 | 2500 | 4500 | ≤32 | 6.0 | 13 | 70 |
| 7.000 | 210 | 333 | 380 | 667 | 4.5 | 2.5 | P531_0070KX501_0010 MF | 2500 | 2000 | 3500 | ≤32 | 7.8 | 25 | 74 |
| 8.000 | 194 | 244 | 244 | 515 | 5.5 | 3.5 | P531_0040KX501_0020 MF | 2500 | 2500 | 4500 | ≤32 | 5.6 | 18 | 70 |
| 10.00 | 220 | 306 | 306 | 644 | 5.0 | 3.0 | P531_0050KX501_0020 MF | 2500 | 2500 | 4500 | ≤32 | 5.5 | 22 | 70 |
| 12.00 | 194 | 244 | 244 | 515 | 5.5 | 3.5 | P531_0040KX501_0030 MF | 3000 | 3000 | 5000 | ≤32 | 4.9 | 18 | 68 |
| 14.00 | 210 | 333 | 380 | 667 | 4.5 | 2.5 | P531_0070KX501_0020 MF | 2500 | 2500 | 4500 | ≤32 | 5.4 | 25 | 70 |
| 15.00 | 220 | 306 | 306 | 644 | 5.0 | 3.0 | P531_0050KX501_0030 MF | 3000 | 3000 | 5000 | ≤32 | 4.9 | 22 | 68 |
| 16.00 | 200 | 296 | 300 | 592 | 4.5 | 2.5 | P531_0080KX501_0020 MF | 2500 | 2500 | 4500 | ≤32 | 5.3 | 21 | 70 |
| 20.00 | 180 | 288 | 288 | 575 | 4.0 | 2.0 | P531_0100KX501_0020 MF | 2500 | 2500 | 4500 | ≤32 | 5.3 | 24 | 70 |
| 21.00 | 210 | 333 | 380 | 667 | 4.5 | 2.5 | P531_0070KX501_0030 MF | 3000 | 3000 | 5000 | ≤32 | 4.8 | 25 | 68 |
| 24.00 | 200 | 296 | 300 | 592 | 4.5 | 2.5 | P531_0080KX501_0030 MF | 3000 | 3000 | 5000 | ≤32 | 4.8 | 21 | 68 |
| 30.00 | 180 | 288 | 288 | 575 | 4.0 | 2.0 | P531_0100KX501_0030 MF | 3000 | 3000 | 5000 | ≤32 | 4.8 | 24 | 68 |
| 32.00 | 220 | 300 | 300 | 600 | 4.5 | 2.5 | P532_0160KX401_0020 MF | 2500 | 2500 | 5000 | ≤24 | 1.7 | 29 | 68 |
| 35.00 | 270 | 352 | 352 | 704 | 4.5 | 2.5 | P532_0350KX401_0010 MF | 2500 | 2000 | 4000 | ≤24 | 2.4 | 32 | 72 |
| 40.00 | 250 | 355 | 364 | 710 | 4.5 | 2.5 | P532_0200KX401_0020 MF | 2500 | 2500 | 5000 | ≤24 | 1.7 | 31 | 68 |
| 50.00 | 260 | 355 | 357 | 710 | 4.5 | 2.5 | P532_0250KX401_0020 MF | 2500 | 2500 | 5000 | ≤24 | 1.7 | 31 | 68 |
| 56.00 | 231 | 300 | 300 | 600 | 4.5 | 2.5 | P532_0280KX401_0020 MF | 2500 | 2500 | 5000 | ≤24 | 1.6 | 31 | 68 |
| 60.00 | 250 | 355 | 364 | 710 | 4.5 | 2.5 | P532_0200KX401_0030 MF | 3000 | 3000 | 5500 | ≤24 | 1.5 | 31 | 66 |
| 64.00 | 240 | 312 | 363 | 624 | 4.5 | 2.5 | P532_0320KX401_0020 MF | 2500 | 2500 | 5000 | ≤24 | 1.7 | 25 | 68 |
| 70.00 | 270 | 352 | 352 | 704 | 4.5 | 2.5 | P532_0350KX401_0020 MF | 2500 | 2500 | 5000 | ≤24 | 1.6 | 32 | 68 |
| 75.00 | 260 | 355 | 357 | 710 | 4.5 | 2.5 | P532_0250KX401_0030 MF | 3000 | 3000 | 5500 | ≤24 | 1.5 | 31 | 66 |
| 80.00 | 214 | 300 | 300 | 600 | 4.5 | 2.5 | P532_0400KX401_0020 MF | 2500 | 2500 | 5000 | ≤24 | 1.6 | 31 | 68 |
| 84.00 | 231 | 300 | 300 | 600 | 4.5 | 2.5 | P532_0280KX401_0030 MF | 3000 | 3000 | 5500 | ≤24 | 1.4 | 31 | 66 |
| 100.0 | 269 | 352 | 352 | 704 | 4.0 | 2.0 | P532_0500KX401_0020 MF | 2500 | 2500 | 5000 | ≤24 | 1.6 | 32 | 68 |
| 105.0 | 270 | 352 | 352 | 704 | 4.5 | 2.5 | P532_0350KX401_0030 MF | 3000 | 3000 | 5500 | ≤24 | 1.4 | 32 | 66 |

[1] *Based on input speed of 1500 RPM. See page 166 for details on torque calculations.*
[2] *Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
* *MF = Motor adapter with FlexiAdapt® coupling*

| Exact Ratio (i) | Output Torque: Nom. [1] $M_{2N}$ | Output Torque: Accel. $M_{2acc}$ | Output Torque: Accel. Torque for Reduced Backlash $M_{2accHT}$ | Output Torque: Peak [2] $M_{2NOT}$ | Back-lash $\Delta\phi_2$ | Red. Back-lash $\Delta\phi_{2red}$ | Part Number* (Gearhead + Input) | Max. Input Speed RPM (n1): Continuous EL 1,2,5,6 | Max. Input Speed RPM (n1): Continuous EL 3,4 | Max. Input Speed RPM (n1): Cyclic | Motor Shaft [3] Max Ø $d_{MW}$ | Input Inertia $J_1$ | Tors. Stiffness $C_2$ | Oper. Noise $L_{pA}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Nm | Nm | Nm | Nm | arcmin | arcmin | | | | All | mm | kgcm² | Nm/ arcmin | dB(A) |
| **P5KX** | **(continued from previous page)** | | | | | | | | | | | | | |
| 120.0 | 214 | 300 | 300 | 600 | 4.5 | 2.5 | **P532_0400KX401_0030 MF** | 3000 | 3000 | 5500 | ≤24 | 1.4 | 31 | 66 |
| 140.0 | 263 | 345 | 357 | 690 | 4.0 | 2.0 | **P532_0700KX401_0020 MF** | 2500 | 2500 | 5000 | ≤24 | 1.6 | 30 | 68 |
| 150.0 | 269 | 352 | 352 | 704 | 4.0 | 2.0 | **P532_0500KX401_0030 MF** | 3000 | 3000 | 5500 | ≤24 | 1.4 | 32 | 66 |
| 200.0 | 221 | 288 | 288 | 575 | 4.0 | 2.0 | **P532_1000KX401_0020 MF** | 2500 | 2500 | 5000 | ≤24 | 1.6 | 26 | 68 |
| 210.0 | 263 | 345 | 357 | 690 | 4.0 | 2.0 | **P532_0700KX401_0030 MF** | 3000 | 3000 | 5500 | ≤24 | 1.4 | 30 | 66 |
| 300.0 | 221 | 288 | 288 | 575 | 4.0 | 2.0 | **P532_1000KX401_0030 MF** | 3000 | 3000 | 5500 | ≤24 | 1.4 | 26 | 66 |

[1] *Based on input speed of 1500 RPM. See page 166 for details on torque calculations.*
[2] *Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
* *MF = Motor adapter with FlexiAdapt® coupling*



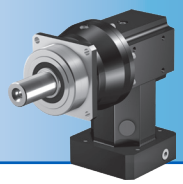


| Exact Ratio (i) | Output Torque: Nom. [1] $M_{2N}$ Nm | Output Torque: Accel. $M_{2acc}$ Nm | Output Torque: Accel. Torque for Reduced Backlash $M_{2accHT}$ Nm | Output Torque: Peak [2] $M_{2NOT}$ Nm | Back-lash $\Delta\phi_2$ arcmin | Red. Back-lash $\Delta\phi_{2red}$ arcmin | Part Number* (Gearhead + Input) | Max. Input Speed RPM (n1): Continuous EL 1,2,5,6 | Max. Input Speed RPM (n1): Continuous EL 3,4 | Max. Input Speed RPM (n1): Cyclic All | Motor Shaft [3] Max Ø $d_{MW}$ mm | Input Inertia $J_1$ kgcm² | Tors. Stiffness $C_2$ Nm/arcmin | Oper. Noise $L_{pA}$ dB(A) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **P7KX** | **(continued next page)** | | | | | | | | | | | | | |
| 3.000 | 280 | 364 | 364 | 680 | 6.5 | 4.5 | P731_0030KX701_0010 MF | 1800 | 1600 | 3000 | ≤38 | 34 | 38 | 76 |
| 4.000 | 388 | 485 | 485 | 907 | 5.5 | 3.5 | P731_0040KX701_0010 MF | 1800 | 1600 | 3000 | ≤38 | 29 | 47 | 76 |
| 5.000 | 440 | 606 | 606 | 1134 | 5.0 | 3.0 | P731_0050KX701_0010 MF | 1800 | 1600 | 3000 | ≤38 | 27 | 52 | 76 |
| 6.000 | 291 | 364 | 364 | 773 | 6.5 | 4.5 | P731_0030KX701_0020 MF | 1800 | 1800 | 3500 | ≤38 | 17 | 38 | 72 |
| 7.000 | 440 | 805 | 840 | 1588 | 4.5 | 2.5 | P731_0070KX701_0010 MF | 1800 | 1600 | 3000 | ≤38 | 26 | 54 | 76 |
| 8.000 | 388 | 485 | 485 | 1031 | 5.5 | 3.5 | P731_0040KX701_0020 MF | 1800 | 1800 | 3500 | ≤38 | 16 | 47 | 72 |
| 10.00 | 440 | 606 | 606 | 1289 | 5.0 | 3.0 | P731_0050KX701_0020 MF | 1800 | 1800 | 3500 | ≤38 | 15 | 52 | 72 |
| 12.00 | 388 | 485 | 485 | 1031 | 5.5 | 3.5 | P731_0040KX701_0030 MF | 2100 | 2100 | 4000 | ≤38 | 13 | 47 | 70 |
| 14.00 | 440 | 805 | 840 | 1610 | 4.5 | 2.5 | P731_0070KX701_0020 MF | 1800 | 1800 | 3500 | ≤38 | 15 | 54 | 72 |
| 15.00 | 440 | 606 | 606 | 1289 | 5.0 | 3.0 | P731_0050KX701_0030 MF | 2100 | 2100 | 4000 | ≤38 | 13 | 52 | 70 |
| 16.00 | 400 | 668 | 700 | 1336 | 4.5 | 2.5 | P731_0080KX701_0020 MF | 1800 | 1800 | 3500 | ≤38 | 15 | 53 | 72 |
| 20.00 | 350 | 575 | 575 | 1150 | 4.0 | 2.0 | P731_0100KX701_0020 MF | 1800 | 1800 | 3500 | ≤38 | 15 | 52 | 72 |
| 21.00 | 440 | 805 | 840 | 1610 | 4.5 | 2.5 | P731_0070KX701_0030 MF | 2100 | 2100 | 4000 | ≤38 | 13 | 54 | 70 |
| 24.00 | 400 | 668 | 700 | 1336 | 4.5 | 2.5 | P731_0080KX701_0030 MF | 2100 | 2100 | 4000 | ≤38 | 13 | 53 | 70 |
| 30.00 | 350 | 575 | 575 | 1150 | 4.0 | 2.0 | P731_0100KX701_0030 MF | 2100 | 2100 | 4000 | ≤38 | 12 | 52 | 70 |
| 32.00 | 450 | 700 | 700 | 1400 | 4.5 | 2.5 | P732_0160KX501_0020 MF | 2500 | 2500 | 4500 | ≤32 | 5.5 | 59 | 70 |
| 35.00 | 540 | 770 | 805 | 1540 | 4.5 | 2.5 | P732_0350KX501_0010 MF | 2500 | 2000 | 3500 | ≤32 | 7.9 | 62 | 74 |
| 40.00 | 460 | 805 | 805 | 1610 | 4.5 | 2.5 | P732_0200KX501_0020 MF | 2500 | 2500 | 4500 | ≤32 | 5.5 | 60 | 70 |
| 50.00 | 500 | 805 | 805 | 1610 | 4.5 | 2.5 | P732_0250KX501_0020 MF | 2500 | 2500 | 4500 | ≤32 | 5.4 | 62 | 70 |
| 56.00 | 538 | 700 | 700 | 1400 | 4.5 | 2.5 | P732_0280KX501_0020 MF | 2500 | 2500 | 4500 | ≤32 | 5.4 | 62 | 70 |
| 60.00 | 460 | 805 | 805 | 1610 | 4.5 | 2.5 | P732_0200KX501_0030 MF | 3000 | 3000 | 5000 | ≤32 | 4.9 | 60 | 68 |
| 64.00 | 470 | 730 | 730 | 1460 | 4.5 | 2.5 | P732_0320KX501_0020 MF | 2500 | 2500 | 4500 | ≤32 | 5.5 | 56 | 70 |
| 70.00 | 540 | 770 | 805 | 1540 | 4.5 | 2.5 | P732_0350KX501_0020 MF | 2500 | 2500 | 4500 | ≤32 | 5.3 | 62 | 70 |
| 75.00 | 500 | 805 | 805 | 1610 | 4.5 | 2.5 | P732_0250KX501_0030 MF | 3000 | 3000 | 5000 | ≤32 | 4.8 | 62 | 68 |
| 80.00 | 454 | 700 | 700 | 1400 | 4.5 | 2.5 | P732_0400KX501_0020 MF | 2500 | 2500 | 4500 | ≤32 | 5.3 | 62 | 70 |
| 84.00 | 538 | 700 | 700 | 1400 | 4.5 | 2.5 | P732_0280KX501_0030 MF | 3000 | 3000 | 5000 | ≤32 | 4.8 | 62 | 68 |
| 100.0 | 565 | 770 | 805 | 1540 | 4.0 | 2.0 | P732_0500KX501_0020 MF | 2500 | 2500 | 4500 | ≤32 | 5.3 | 62 | 70 |
| 105.0 | 540 | 770 | 805 | 1540 | 4.5 | 2.5 | P732_0350KX501_0030 MF | 3000 | 3000 | 5000 | ≤32 | 4.8 | 62 | 68 |

[1] *Based on input speed of 1500 RPM. See page 166 for details on torque calculations.*
[2] *Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
* *MF = Motor adapter with FlexiAdapt® coupling*

| Exact Ratio (i) | Output Torque: Nom. [1] $M_{2N}$ | Output Torque: Accel. $M_{2acc}$ | Output Torque: Accel. Torque for Reduced Backlash $M_{2accHT}$ | Output Torque: Peak [2] $M_{2NOT}$ | Back-lash $\Delta\phi_2$ | Red. Back-lash $\Delta\phi_{2red}$ | Part Number* (Gearhead + Input) | Max. Input Speed RPM (n1): Continuous EL 1,2,5,6 | Max. Input Speed RPM (n1): Continuous EL 3,4 | Max. Input Speed RPM (n1): Cyclic | Motor Shaft [3] Max Ø $d_{MW}$ | Input Inertia $J_1$ | Tors. Stiffness $C_2$ | Oper. Noise $L_{pA}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Nm | Nm | Nm | Nm | arcmin | arcmin | | | | All | mm | kgcm² | Nm/ arcmin | dB(A) |
| **P7KX** | **(continued from previous page)** | | | | | | | | | | | | | |
| 120.0 | 454 | 700 | 700 | 1400 | 4.5 | 2.5 | **P732_0400KX501_0030 MF** | 3000 | 3000 | 5000 | ≤32 | 4.8 | 62 | 68 |
| 140.0 | 584 | 762 | 799 | 1525 | 4.0 | 2.0 | **P732_0700KX501_0020 MF** | 2500 | 2500 | 4500 | ≤32 | 5.3 | 59 | 70 |
| 150.0 | 565 | 770 | 805 | 1540 | 4.0 | 2.0 | **P732_0500KX501_0030 MF** | 3000 | 3000 | 5000 | ≤32 | 4.8 | 62 | 68 |
| 200.0 | 423 | 550 | 550 | 1100 | 4.0 | 2.0 | **P732_1000KX501_0020 MF** | 2500 | 2500 | 4500 | ≤32 | 5.3 | 54 | 70 |
| 210.0 | 584 | 762 | 799 | 1525 | 4.0 | 2.0 | **P732_0700KX501_0030 MF** | 3000 | 3000 | 5000 | ≤32 | 4.8 | 59 | 68 |
| 300.0 | 423 | 550 | 550 | 1100 | 4.0 | 2.0 | **P732_1000KX501_0030 MF** | 3000 | 3000 | 5000 | ≤32 | 4.8 | 54 | 68 |

[1] *Based on input speed of 1500 RPM. See page 166 for details on torque calculations.*
[2] *Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
* *MF = Motor adapter with FlexiAdapt® coupling*



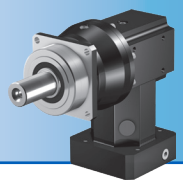


| Exact Ratio (i) | Output Torque: Nom. [1] $M_{2N}$ Nm | Output Torque: Accel. $M_{2acc}$ Nm | Output Torque: Accel. Torque for Reduced Backlash $M_{2accHT}$ Nm | Output Torque: Peak [2] $M_{2NOT}$ Nm | Back-lash $\Delta\phi_2$ arcmin | Red. Back-lash $\Delta\phi_{2red}$ arcmin | Part Number* (Gearhead + Input) | Max. Input Speed RPM (n1): Continuous EL 1,2,5,6 | Max. Input Speed RPM (n1): Continuous EL 3,4 | Max. Input Speed RPM (n1): Cyclic All | Motor Shaft [3] Max Ø $d_{MW}$ mm | Input Inertia $J_1$ kgcm² | Tors. Stiffness $C_2$ Nm/arcmin | Oper. Noise $L_{pA}$ dB(A) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **P8KX** | **(continued next page)** | | | | | | | | | | | | | |
| 3.000 | 291 | 364 | 364 | 680 | 6.5 | 4.5 | P831_0030KX701_0010 MF | 1800 | 1600 | 3000 | ≤38 | 67 | 59 | 76 |
| 4.000 | 388 | 485 | 485 | 907 | 5.5 | 3.5 | P831_0040KX701_0010 MF | 1800 | 1600 | 3000 | ≤38 | 43 | 84 | 76 |
| 5.000 | 485 | 606 | 606 | 1134 | 5.0 | 3.0 | P831_0050KX701_0010 MF | 1800 | 1600 | 3000 | ≤38 | 36 | 104 | 76 |
| 6.000 | 291 | 364 | 364 | 773 | 6.5 | 4.5 | P831_0030KX701_0020 MF | 1800 | 1800 | 3500 | ≤38 | 25 | 59 | 72 |
| 7.000 | 679 | 849 | 849 | 1588 | 4.5 | 2.5 | P831_0070KX701_0010 MF | 1800 | 1600 | 3000 | ≤38 | 31 | 125 | 76 |
| 8.000 | 388 | 485 | 485 | 1031 | 5.5 | 3.5 | P831_0040KX701_0020 MF | 1800 | 1800 | 3000 | ≤38 | 29 | 128 | 76 |
| 10.00 | 772 | 1213 | 1213 | 2268 | 4.0 | 2.0 | P831_0050KX701_0020 MF | 1800 | 1800 | 3000 | ≤38 | 28 | 130 | 76 |
| 12.00 | 776 | 970 | 970 | 1814 | 4.5 | 2.5 | P831_0040KX701_0030 MF | 2100 | 2100 | 4000 | ≤38 | 14 | 84 | 70 |
| 14.00 | 679 | 849 | 849 | 1804 | 4.5 | 2.5 | P831_0070KX701_0020 MF | 1800 | 1800 | 3500 | ≤38 | 16 | 125 | 72 |
| 15.00 | 485 | 606 | 606 | 1289 | 5.0 | 3.0 | P831_0050KX701_0030 MF | 2100 | 2100 | 4000 | ≤38 | 14 | 104 | 70 |
| 16.00 | 776 | 970 | 970 | 2062 | 4.5 | 2.5 | P831_0080KX701_0020 MF | 1800 | 1800 | 3500 | ≤38 | 16 | 128 | 72 |
| 20.00 | 850 | 1213 | 1213 | 2577 | 4.0 | 2.0 | P831_0100KX701_0020 MF | 1800 | 1800 | 3500 | ≤38 | 15 | 130 | 72 |
| 21.00 | 679 | 849 | 849 | 1804 | 4.5 | 2.5 | P831_0070KX701_0030 MF | 2100 | 2100 | 4000 | ≤38 | 13 | 125 | 70 |
| 24.00 | 776 | 970 | 970 | 2062 | 4.5 | 2.5 | P831_0080KX701_0030 MF | 2100 | 2100 | 4000 | ≤38 | 13 | 128 | 70 |
| 30.00 | 850 | 1213 | 1213 | 2577 | 4.0 | 2.0 | P831_0100KX701_0030 MF | 2100 | 2100 | 4000 | ≤38 | 13 | 130 | 70 |
| 32.00 | 1100 | 1600 | 1600 | 3200 | 4.5 | 2.5 | P832_0160KX701_0020 MF | 1800 | 1800 | 3500 | ≤38 | 16 | 163 | 72 |
| 35.00 | 1415 | 1840 | 2000 | 3230 | 4.5 | 2.5 | P832_0350KX701_0010 MF | 1800 | 1600 | 3000 | ≤38 | 26 | 173 | 76 |
| 40.00 | 1250 | 1840 | 2000 | 3230 | 4.5 | 2.5 | P832_0200KX701_0020 MF | 1800 | 1800 | 3500 | ≤38 | 16 | 169 | 72 |
| 50.00 | 1300 | 1840 | 2000 | 3230 | 4.5 | 2.5 | P832_0250KX701_0020 MF | 1800 | 1800 | 3500 | ≤38 | 15 | 172 | 72 |
| 56.00 | 1100 | 1600 | 1600 | 3200 | 4.5 | 2.5 | P832_0280KX701_0020 MF | 1800 | 1800 | 3500 | ≤38 | 15 | 168 | 72 |
| 60.00 | 1250 | 1840 | 2000 | 3230 | 4.5 | 2.5 | P832_0200KX701_0030 MF | 2100 | 2100 | 4000 | ≤38 | 13 | 169 | 70 |
| 64.00 | 1173 | 1525 | 1595 | 3049 | 4.5 | 2.5 | P832_0320KX701_0020 MF | 1800 | 1800 | 3500 | ≤38 | 16 | 157 | 72 |
| 70.00 | 1415 | 1840 | 2000 | 3230 | 4.5 | 2.5 | P832_0350KX701_0020 MF | 1800 | 1800 | 3500 | ≤38 | 15 | 173 | 72 |
| 75.00 | 1300 | 1840 | 2000 | 3230 | 4.5 | 2.5 | P832_0250KX701_0030 MF | 2100 | 2100 | 4000 | ≤38 | 13 | 172 | 70 |
| 80.00 | 1097 | 1600 | 1600 | 3200 | 4.5 | 2.5 | P832_0400KX701_0020 MF | 1800 | 1800 | 3500 | ≤38 | 15 | 166 | 72 |
| 84.00 | 1100 | 1600 | 1600 | 3200 | 4.5 | 2.5 | P832_0280KX701_0030 MF | 2100 | 2100 | 4000 | ≤38 | 13 | 168 | 70 |
| 100.0 | 1415 | 1840 | 2000 | 3230 | 4.0 | 2.0 | P832_0500KX701_0020 MF | 1800 | 1800 | 3500 | ≤38 | 15 | 172 | 72 |
| 105.0 | 1415 | 1840 | 2000 | 3230 | 4.5 | 2.5 | P832_0350KX701_0030 MF | 2100 | 2100 | 4000 | ≤38 | 13 | 173 | 70 |

[1] *Based on input speed of 1500 RPM. See page 166 for details on torque calculations.*
[2] *Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
* *MF = Motor adapter with FlexiAdapt® coupling*

| Exact Ratio (i) | Output Torque: Nom. [1] $M_{2N}$ Nm | Output Torque: Accel. $M_{2acc}$ Nm | Output Torque: Accel. Torque for Reduced Backlash $M_{2accHT}$ Nm | Output Torque: Peak [2] $M_{2NOT}$ Nm | Back-lash $\Delta\phi_2$ arcmin | Red. Back-lash $\Delta\phi_{2red}$ arcmin | Part Number* (Gearhead + Input) | Max. Input Speed RPM (n1): Continuous EL 1,2,5,6 | Max. Input Speed RPM (n1): Continuous EL 3,4 | Max. Input Speed RPM (n1): Cyclic All | Motor Shaft [3] Max Ø $d_{MW}$ mm | Input Inertia $J_1$ kgcm² | Tors. Stiffness $C_2$ Nm/ arcmin | Oper. Noise $L_{pA}$ dB(A) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **P8KX** | **(continued from previous page)** | | | | | | | | | | | | | |
| 120.0 | 1097 | 1600 | 1600 | 3200 | 4.5 | 2.5 | P832_0400KX701_0030 MF | 2100 | 2100 | 4000 | ≤38 | 13 | 166 | 70 |
| 140.0 | 1238 | 1610 | 1610 | 3220 | 4.0 | 2.0 | P832_0700KX701_0020 MF | 1800 | 1800 | 3500 | ≤38 | 15 | 163 | 72 |
| 150.0 | 1415 | 1840 | 2000 | 3230 | 4.0 | 2.0 | P832_0500KX701_0030 MF | 2100 | 2100 | 4000 | ≤38 | 12 | 172 | 70 |
| 200.0 | 1015 | 1320 | 1320 | 2640 | 4.0 | 2.0 | P832_1000KX701_0020 MF | 1800 | 1800 | 3500 | ≤38 | 15 | 148 | 72 |
| 210.0 | 1238 | 1610 | 1610 | 3220 | 4.0 | 2.0 | P832_0700KX701_0030 MF | 2100 | 2100 | 4000 | ≤38 | 12 | 163 | 70 |
| 300.0 | 1015 | 1320 | 1320 | 2640 | 4.0 | 2.0 | P832_1000KX701_0030 MF | 2100 | 2100 | 4000 | ≤38 | 12 | 148 | 70 |

[1] *Based on input speed of 1500 RPM. See page 166 for details on torque calculations.*
[2] *Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
* *MF = Motor adapter with FlexiAdapt® coupling*

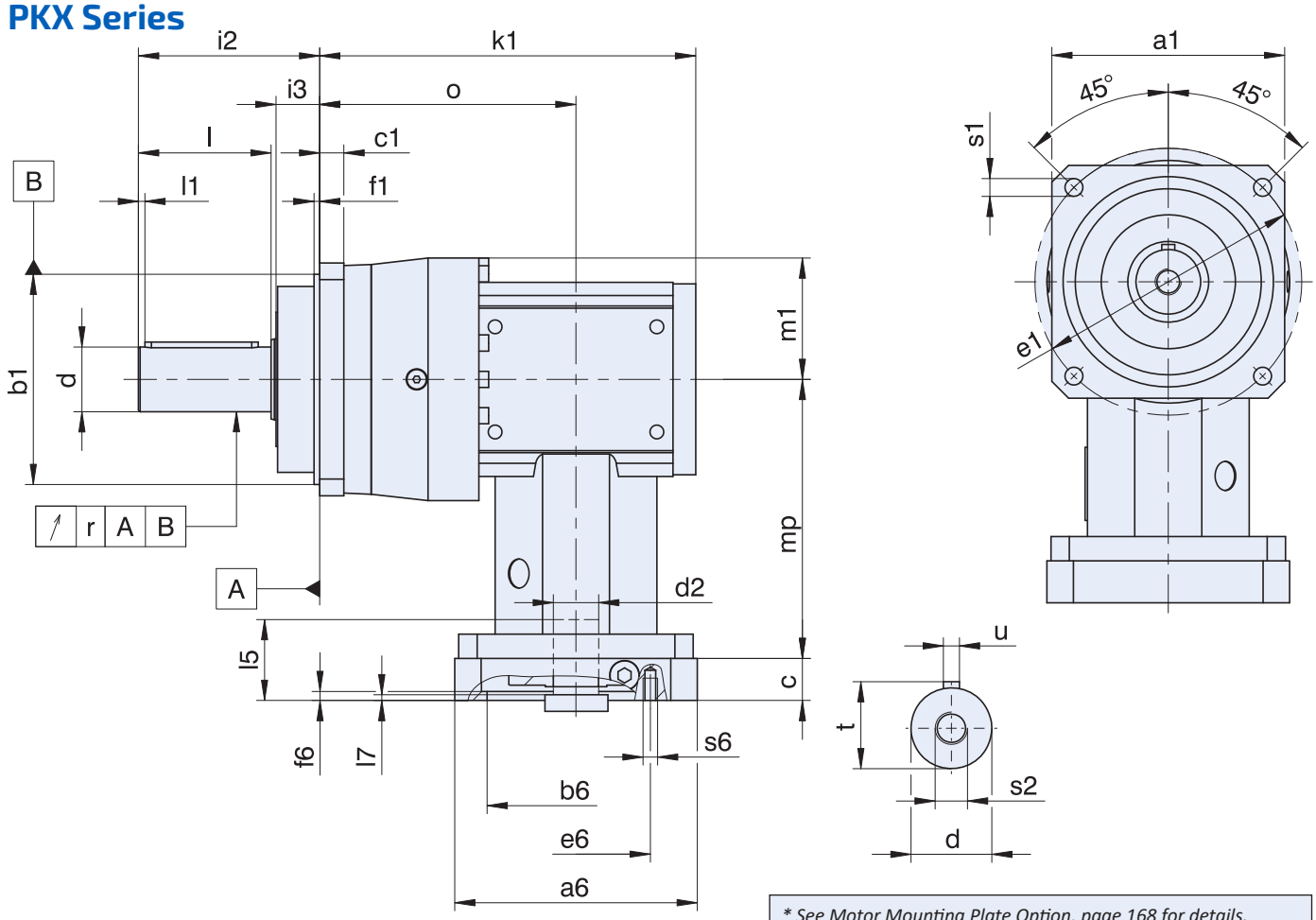




| Exact Ratio (i) | Output Torque: Nom. $M_{2N}$ [1] Nm | Output Torque: Accel. $M_{2acc}$ Nm | Output Torque: Accel. Torque for Reduced Backlash $M_{2accHT}$ Nm | Output Torque: Peak $M_{2NOT}$ [2] Nm | Back-lash $\Delta\phi_2$ arcmin | Red. Back-lash $\Delta\phi_{2red}$ arcmin | Part Number* (Gearhead + Input) | Max. Input Speed RPM (n1): Continuous EL 1,2,5,6 | Max. Input Speed RPM (n1): Continuous EL 3,4 | Max. Input Speed RPM (n1): Cyclic All | Motor Shaft [3] Max Ø $d_{MW}$ mm | Input Inertia $J_1$ kgcm² | Tors. Stiffness $C_2$ Nm/arcmin | Oper. Noise $L_{pA}$ dB(A) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **P9KX** | | | | | | | | | | | | | | |
| 16.00 | 1520 | 1900 | – | 3705 | 4.5 | – | P932_0160KX701_0010 MF | 1800 | 1600 | 3000 | ≤38 | 44 | 348 | 76 |
| 20.00 | 1900 | 2375 | – | 4632 | 4.5 | – | P932_0200KX701_0010 MF | 1800 | 1600 | 3000 | ≤38 | 43 | 368 | 76 |
| 25.00 | 2375 | 2969 | – | 5789 | 4.5 | – | P932_0250KX701_0010 MF | 1800 | 1600 | 3000 | ≤38 | 36 | 381 | 76 |
| 28.00 | 2280 | 3000 | – | 6000 | 4.5 | – | P932_0280KX701_0010 MF | 1800 | 1600 | 3000 | ≤38 | 31 | 381 | 76 |
| 32.00 | 1520 | 1900 | – | 4211 | 4.5 | – | P932_0160KX701_0020 MF | 1800 | 1800 | 3500 | ≤38 | 20 | 348 | 72 |
| 35.00 | 2376 | 3300 | – | 6600 | 4.5 | – | P932_0350KX701_0010 MF | 1800 | 1600 | 3000 | ≤38 | 30 | 391 | 76 |
| 40.00 | 1900 | 2375 | – | 5263 | 4.5 | – | P932_0200KX701_0020 MF | 1800 | 1800 | 3500 | ≤38 | 19 | 368 | 72 |
| 50.00 | 2375 | 2969 | – | 6579 | 4.5 | – | P932_0250KX701_0020 MF | 1800 | 1800 | 3500 | ≤38 | 17 | 381 | 72 |
| 56.00 | 2280 | 3000 | – | 6000 | 4.5 | – | P932_0280KX701_0020 MF | 1800 | 1800 | 3500 | ≤38 | 16 | 381 | 72 |
| 60.00 | 1900 | 2375 | – | 5263 | 4.5 | – | P932_0200KX701_0030 MF | 2100 | 2100 | 4000 | ≤38 | 14 | 368 | 70 |
| 70.00 | 2376 | 3300 | – | 6600 | 4.5 | – | P932_0350KX701_0020 MF | 1800 | 1800 | 3500 | ≤38 | 16 | 391 | 72 |
| 75.00 | 2375 | 2969 | – | 6579 | 4.5 | – | P932_0250KX701_0030 MF | 2100 | 2100 | 4000 | ≤38 | 14 | 381 | 70 |
| 80.00 | 2000 | 3000 | – | 6000 | 4.5 | – | P932_0400KX701_0020 MF | 1800 | 1800 | 3500 | ≤38 | 15 | 384 | 72 |
| 84.00 | 2280 | 3000 | – | 6000 | 4.5 | – | P932_0280KX701_0030 MF | 2100 | 2100 | 4000 | ≤38 | 13 | 381 | 70 |
| 100.0 | 2295 | 3200 | – | 6400 | 4.0 | – | P932_0500KX701_0020 MF | 1800 | 1800 | 3500 | ≤38 | 15 | 393 | 72 |
| 105.0 | 2376 | 3300 | – | 6600 | 4.5 | – | P932_0350KX701_0030 MF | 2100 | 2100 | 4000 | ≤38 | 13 | 391 | 70 |
| 120.0 | 2000 | 3000 | – | 6000 | 4.5 | – | P932_0400KX701_0030 MF | 2100 | 2100 | 4000 | ≤38 | 13 | 384 | 70 |
| 140.0 | 2387 | 3156 | – | 6312 | 4.0 | – | P932_0700KX701_0020 MF | 1800 | 1800 | 3500 | ≤38 | 15 | 369 | 72 |
| 150.0 | 2295 | 3200 | – | 6400 | 4.0 | – | P932_0500KX701_0030 MF | 2100 | 2100 | 4000 | ≤38 | 13 | 393 | 70 |
| 200.0 | 1692 | 2200 | – | 4400 | 4.0 | – | P932_1000KX701_0020 MF | 1800 | 1800 | 3500 | ≤38 | 15 | 320 | 72 |
| 210.0 | 2387 | 3156 | – | 6312 | 4.0 | – | P932_0700KX701_0030 MF | 2100 | 2100 | 4000 | ≤38 | 13 | 369 | 70 |
| 300.0 | 1692 | 2200 | – | 4400 | 4.0 | – | P932_1000KX701_0030 MF | 2100 | 2100 | 4000 | ≤38 | 13 | 320 | 70 |

[1] *Based on input speed of 1500 RPM. See page 166 for details on torque calculations.*
[2] *Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
* *MF = Motor adapter with FlexiAdapt® coupling*

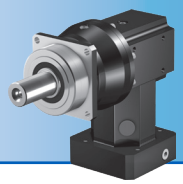
## PKX Series




** See Motor Mounting Plate Option, page 168 for details.*
*** See Output Shaft Options, page 189 for details.*

**Table 1 Dimensions (mm)**

| Unit | Øa1 | Øb1 | c1 | Ød | Øe1 | f1 | i2 | i3 | k1 | l | l1 | m1 | o | r | Øs1 | s2 | t | u |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| P231_KX301 | 55 | $50^{h6}$ | 6 | $12^{k6}$ | 63 | 7.0 | 36 | 12 | 124.0 | 22 | 2 | 31 | 84.0 | – | 5.5 | M4 | 13.5 | A4×4×18 |
| P232_KX301 | 55 | $50^{h6}$ | 6 | $12^{k6}$ | 63 | 7.0 | 36 | 12 | 156.0 | 22 | 2 | 31 | 116.0 | – | 5.5 | M4 | 13.5 | A4×4×18 |
| P331_KX301 | 72 | $60^{h6}$ | 7 | $16^{k6}$ | 75 | 7.5 | 48 | 18 | 131.0 | 28 | 2 | 36 | 91.0 | 0.025 | 5.5 | M5 | 18.0 | A5×5×22 |
| P332_KX301 | 72 | $60^{h6}$ | 7 | $16^{k6}$ | 75 | 7.5 | 48 | 18 | 165.5 | 28 | 2 | 38 | 125.5 | 0.025 | 5.5 | M5 | 18.0 | A5×5×22 |
| P431_KX401 | 76 | $70^{h6}$ | 9 | $22^{k6}$ | 85 | 7.5 | 56 | 18 | 165.0 | 36 | 3 | 49 | 115.0 | 0.025 | 6.6 | M8 | 24.5 | A6×6×28 |
| P432_KX301 | 76 | $70^{h6}$ | 9 | $22^{k6}$ | 85 | 7.5 | 56 | 18 | 180.0 | 36 | 3 | 50 | 140.0 | 0.025 | 6.6 | M8 | 24.5 | A6×6×28 |
| P531_KX501 | 101 | $90^{h6}$ | 10 | $32^{k6}$ | 120 | 15.0 | 88 | 28 | 187.5 | 58 | 3 | 58 | 128.5 | 0.030 | 9.0 | M12 | 35.0 | A10×8×50 |
| P532_KX401 | 101 | $90^{h6}$ | 10 | $32^{k6}$ | 120 | 15.0 | 88 | 28 | 207.0 | 58 | 3 | 60 | 157.0 | 0.030 | 9.0 | M12 | 35.0 | A10×8×50 |
| P731_KX701 | 144 | $130^{h6}$ | 15 | $40^{k6}$ | 165 | 3.5 | 112 | 27 | 232.5 | 82 | 4 | 75 | 158.5 | 0.035 | 11.0 | M16 | 43.0 | A12×8×70 |
| P732_KX501 | 144 | $130^{h6}$ | 15 | $40^{k6}$ | 165 | 3.5 | 112 | 27 | 255.5 | 82 | 4 | 75 | 196.5 | 0.035 | 11.0 | M16 | 43.0 | A12×8×70 |
| P831_KX701 | 190 | $160^{h6}$ | 15 | $55^{k6}$ | 215 | 10.0 | 112 | 27 | 267.0 | 82 | 6 | 102 | 193.0 | 0.035 | 13.5 | M20 | 59.0 | A16×10×70 |
| P832_KX701 | 190 | $160^{h6}$ | 15 | $55^{k6}$ | 215 | 10.0 | 112 | 27 | 324.5 | 82 | 6 | 102 | 250.5 | 0.035 | 13.5 | M20 | 59.0 | A16×10×70 |
| P932_KX701 | 212 | $180^{h6}$ | 17 | $75^{k6}$ | 250 | 10.0 | 143 | 34 | 388.0 | 105 | 7 | 115 | 314.0 | 0.040 | 17.5 | M20 | 79.5 | A20×12×90 |



# Dimensional Data

## Motor Mounting Plate

**Example dimensions for the motor connection**

| Type | Øb6 | Øe6 | Ød2max | l5 | □a6 | c | f6 | l7 | s6 |
|---|---|---|---|---|---|---|---|---|---|
| P_KX301_MF | $60^{H7}$ | 75 | 19 | 40 | 75 | 18 | 3.5 | 5.5 | M5 |
| P_KX401_MF | $95^{H7}$ | 115 | 24 | 42 | 100 | 21 | 4.0 | 4.5 | M8 |
| P_KX501_MF | $110^{H7}$ | 130 | 32 | 53 | 120 | 24 | 4.0 | 5.0 | M8 |
| P_KX701_MF | $130^{H7}$ | 165 | 38 | 64 | 150 | 26 | 5.5 | 8.0 | M10 |

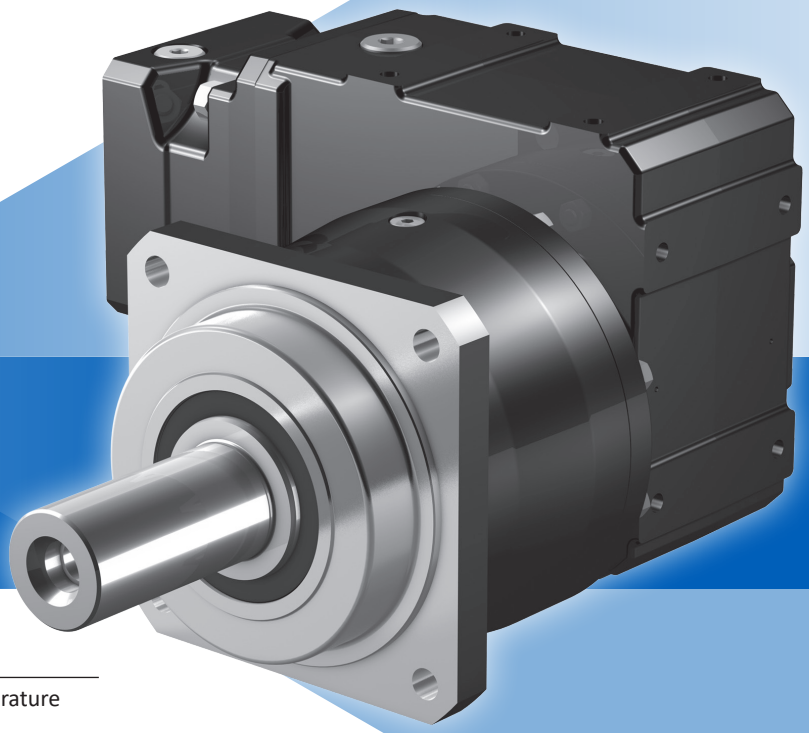
In the table above, you will find example dimensions for the motor connection for the MF motor adapter. **Note that when dimension c is lengthened (depending on the motor used), dimensions c6, l5 and lg are also lengthened accordingly.**

# PK Series: RIGHT ANGLE – Shaft Output

## PK Features

- 4:1 to 561:1 ratios (higher ratios available. Contact STOBER.)
- Quiet running (<63dB(A))
- Bearing options to suit your application needs, extending gearbox life and avoiding oversizing, (see page 209).
- Error free motor mounting and quick changeover with toleranced pilot on motor plate
- Low no load running torque, giving you more torque for your application
- Magnetic oil filtration to remove contaminants to prevent breakdowns
- Build and ship in one day
- Assembled in the USA

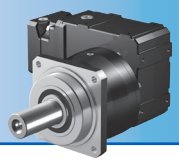
*STOBER PK provides a right angle option with planetary gearing. It is a more compact, precise solution and can handle higher input speeds. Every gearbox is made to order. STOBER will custom whatever you need to fit your application. Contact us today to learn more.*



SHIPS in 1 DAY!
NO EXPEDITE FEE FOR 24 HOUR SERVICE

## General Specifications

| | |
|---|---|
| **Ambient Temperature** | 0°C to +40°C (104°F) [Unit temperature <90°C Max] |
| **Backlash** | PK ≤3.5 (see performance overview chart, page 186) |
| **Coating** | Standard Black (RAL-9005), Corrosion Resistant option, Food option |
| **Degree of Protection** | IP65 |
| **Direction of Rotation** | PK: Input and output rotate the SAME direction |
| **Efficiency** | PK 94% |
| **Input RPM** | Up to 6,000 RPM |
| **Installation** | Requires 12.9 fasteners. See page 288, for more information |
| **Lubrication** | Lubricated for life – standard Mobil SHC629; option food grade Mobil SHC CIBUS 150 |
| **Mounting Position** | Must be specified, see page 188 |
| **Warranty** | 5 Year Limited (2 Years on normal wear items: bearings, seals, etc.) |



# Overview

## Selection Options *At-a-Glance*

Using the **Selection Data** table later in this section, select the PK Series Gearhead with the appropriate performance and design options tailored to your motor choice and exact application requirements. Use the part number guide below as a reference to build a part number for the complete gearhead assembly.

**Part Number Examples:**

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 0 | ! | @ | # | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PK | P | 5 | 3 | 1 | S | P | S | S | 0030 | K102VF | 0040 | ME10 | F | EL1 * |

| | Design Option | | Part Number Code | Description |
|---|---|---|---|---|
| 1 | **Series** | | P | Planetary |
| 2 | **Size** | | 5 7 8 9 | 4 sizes of gearhead |
| 3 | **Generation** | | 3 | Version of gearhead |
| 4 | **# of Stages** | | 1 | One stage for ratios of ≤ 10:1 |
| 5 | **Housing** | | S | Standard mounting style |
| 6 | **Output Shaft** | | P<br>G | Shaft with key<br>Plain shaft (no key) |
| 7 | **Bearing Options** |  | S | Ball bearing |
| | |  | D | Double row angular contact bearing |
| | |  | Z | Cylindrical roller bearing ("Z" cylindrical roller bearing not allowed with reduced backlash option.) |
| 8 | **Backlash** | | S<br>R | Standard Backlash<br>Reduced Backlash |
| 9 | **Ratio** | | 0030 | Ratios range from 3:1 to 100:1 for PK Series (0030=3:1; 0160=16:1; 1000=100:1, ect.) |
| 0 | **Secondary Unit** | | K102VF | K Series helical/bevel unit: 4 sizes, 2 stages, with output shaft (V) & flange (F) – please specify side 3 or side 4 (see page 188 for more information) |
| ! | **Secondary Unit Ratio** | | 0040 | Ratios from 4:1 to 69:1 (0010=1:1; 0020=2:1; 0030=3:1) |
| @ | **Motor Adapter** | | ME10 - ME40 | Motor Adapter with EasyAdapt coupling |
| # | **Special Options** | | F | Food Duty (Size P5 only) |
| * | **Mounting Position** | | EL1 EL2 EL3<br>EL4 EL5 EL6 | Required special instruction for all units, see page 188 |

## Options

### ME Adapter Option

- MSS1 Seal – special input seal for longer life (For sizes P5-9). Contact factory for this option.
- Peak Torque Booster – pinion securing element for shock loads, increasing peak torque up to 80%.

### Integrated Safety Brake

- ServoStop – provides dynamic braking during power failures or emergency stops in hazardous situations. Contact factory for this option.

### Coating Option

- **Standard:** For dry areas and normal conditions. All units standard coating, unless ordered with Food Duty.
- **Food Duty:** Able to withstand severe wet areas and washdown application (Size P5 only).
- Available with multi-layer, industrial 316 stainless steel epoxy coating. Contact factory for this option.

## PK Series Performance Overview

PK Series performance is dependent on several factors including duty cycle, bearing design, gearhead size and stage configuration, among others. Use the chart below for preliminary evaluation, then use the following performance chart and selection information on the following pages for specific performance sizing and selection.

| Size/Generation/# of Stages | | P531 | P731 | | P831 | | P931 |
|---|---|---|---|---|---|---|---|
| Secondary Unit | | K1 | K1 | K2 | K2 | K3 | K4 |
| **Acceleration Torque** $M_{2BMAX}$ | N | 350 | 805 | | 1494 | 1840 | 3105 |
| **Output Torque Nom.** [1] $M_{2N}$ | N | 220 | 440 | | 1000 | 1100 | 2100 |
| **Torsional Stiffness** $C_2$ | Nm/arcmin | 29 | 53 | | 131 | 128 | 305 |
| **Torsional Backlash** [2] $\Delta\phi$ | standard | ≤4 | ≤3.5 | ≤4 | ≤3.5 | ≤4 | ≤3.5 |
| **Reduced Backlash** | | ≤2.0 | ≤1.5 | ≤2.0 | ≤1.5 | ≤2.0 | ≤3.5 |
| **Input Speed Max.** $n_{1MAX}$ | Continuous | 4000 | 4000 | 4000 | 4000 | 3900 | 3600 |
| | Cyclic | 7000 | 7000 | 6500 | 6500 | 6000 | 5500 |
| **Efficiency (@ nom torque)** | % | 94 | 94 | | 94 | | 94 |
| **Weight** | kg | 17.5 | 24.2 | 31.7 | 49.1 | 54.1 | 84.4 |
| | lbs | 38.5 | 53.2 | 69.7 | 108 | 119 | 185.7 |
| **Noise** [3] | dB(A) | ≤63 | ≤63 | ≤64 | ≤64 | ≤65 | ≤66 |

### Performance by Bearing Design Option [4]

**S = Ball bearing** **D = Double row angular contact bearing** **Z = Cylindrical roller bearing** [5]

| | | P5 | P7 | P8 | P9 |
|---|---|---|---|---|---|
| **Axial Load** $F_{2ax100}$ | S | 2300 | 2900 | 4700 | 6000 |
| | D | 6000 | 10,000 | 15,500 | 25,000 |
| | Z | 1600 | 2000 | 3600 | 5000 |
| **Radial Load Max** $F_{2rad100}$ | S | 6500 | 8500 | 13,000 | 18,000 |
| | D | 7000 | 9500 | 15,000 | 20,000 |
| | Z | 8000 | 10,000 | 18,000 | 27,000 |
| **Tilting Moment Max** $M_{2K100}$ | S | 315 | 544 | 852 | 1539 |
| | D | 382 | 665 | 1095 | 1930 |
| | Z | 388 | 640 | 1179 | 2309 |

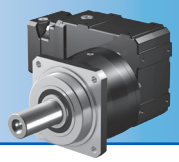
[1] *Ratings based on input speed ($n_1$) of 1500 RPM. To calculate torque at higher input speeds, contact the factory.*

[2] *Tested at 1.5% of nominal torque and recorded on the output side of the gearhead.*

[3] *Measurement at one (1) meter distance with input speed ($n_1$) of 1500 RPM.*

[4] *See page 209 for output bearing options. Rating based on output speed ($n_2$) of 100 RPM. For values at other speeds see page 190.*

[5] *"Z" cylindrical roller bearing not allowed with reduced backlash option.*



# Overview

## PK Series Motor Mounting Plate Option (Motor information required with ME or MF Motor Adapter Option)

STOBER Servo Gearheads fit the motor of your choice with the appropriate motor mounting plate assembled between the motor and the gearhead.

**NOTE: When ordering a gearhead:**

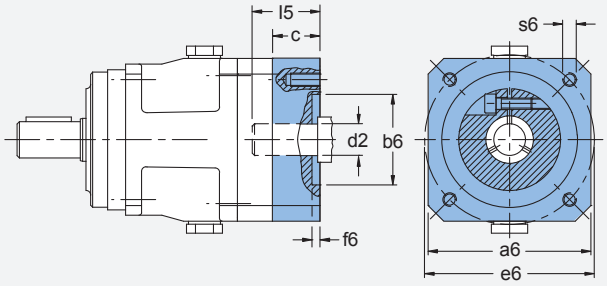
- Specify the motor manufacturer and part number
- Provide the motor drawing with dimensions, or specify the motor mounting dimensions (per the list shown at right)

For a precise dimension on a specific motor, or for general assistance, we recommend you contact STOBER Technical Support.

Maximum 10 working days for custom motor mounting plates.

### Customer Required Dimensions for Properly Sized Motor Mounting Plate

| | |
|---|---|
| d2 | Motor Shaft Diameter (If an adapter bushing is required it will be supplied with the motor plate.) |
| b6 | Pilot Diameter |
| e6 | Bolt Circle Diameter |
| s6 | Bolt Diameter |
| l5 | Motor Shaft Length |
| f6 | Pilot Length |
| a6 | Square Flange (Optional – motor plate will typically be made to match this dimension.) |

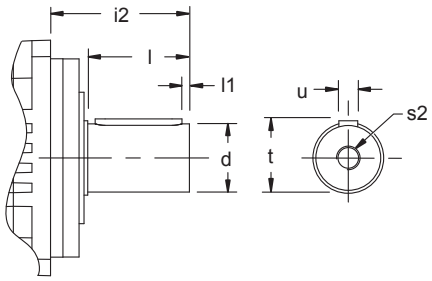



| Motor Mounting Plate Dimensions — mm(Gearhead Part Number Specific) | P532 | P431...L P531 P532...L P732 | P531...L P731 P732...L P832 | P731...L P831 P832...L P932 | P831...L P931 P932...L |
|---|---|---|---|---|---|
| Maximum Allowed Motor Shaft Dia. d2 | 24 | 32 | 38 | 48 | 60 |
| Minimum Allowed Motor Plate Thickness c* | 21 | 24 | 26 | 35 | 43 |

** Note that c motor plate thickness is determined by the motor shaft length. The minimum motor plate thickness is the value listed.*

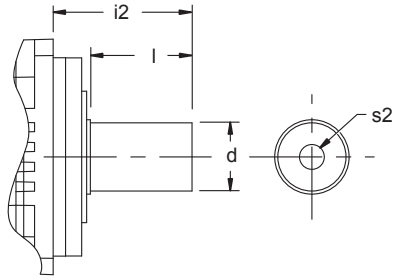
## PK Series Output Shaft Options ("P" or "G" designated in part number, for example: P431P_0160 MEL)

### P Shaft with Key




| Unit | d k6 | l1 | l | i2 | s2 (1) | t | u (2) |
|---|---|---|---|---|---|---|---|
| | mm | mm | mm | mm | | mm | W x H x L |
| P5 | 32 | 3 | 58 | 88 | M12 | 35 | A10X8X50 |
| P7 | 40 | 4 | 82 | 112 | M16 | 43 | A12X8X70 |
| P8 | 55 | 6 | 82 | 112 | M20 | 59 | A16X10X70 |
| P9 | 75 | 7 | 105 | 143 | M20 | 79.5 | A20X12X90 |

### G Shaft without Key




| Unit | d k6 | l | i2 | s2 (1) |
|---|---|---|---|---|
| | mm | mm | mm | |
| P5 | 32 | 58 | 88 | M12 |
| P7 | 40 | 82 | 112 | M16 |
| P8 | 55 | 82 | 112 | M20 |
| P9 | 75 | 105 | 143 | M20 |

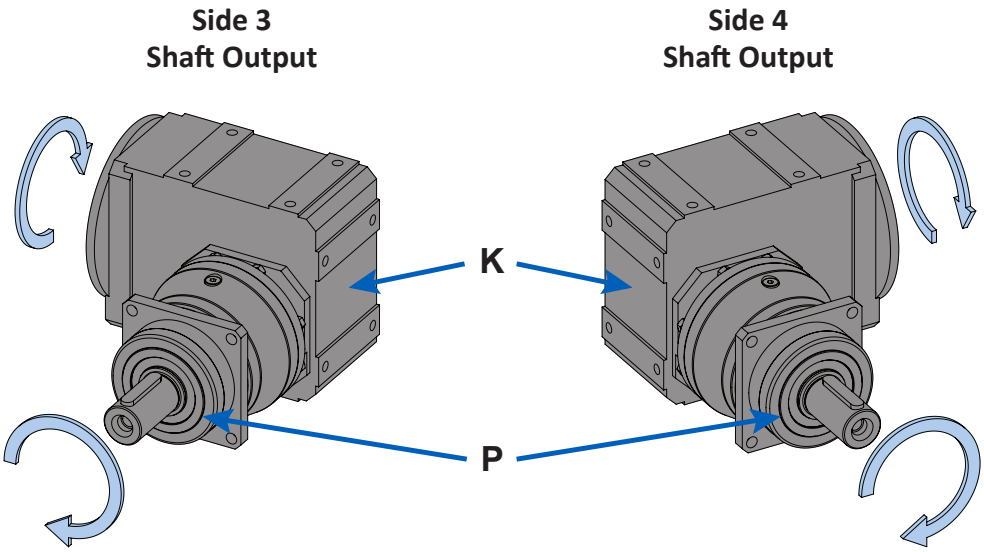
(1) *The center hole in shafts with keys (Option "P") are machined to DIN 332 T2 shape DR.*

(2) *Feather keys are toleranced according to standard DIN 6885.*

## PK Series Direction of Rotation

For PK units, the "P" Series planetary output unit can be mounted on either the right (Side 3) or the left (Side 4) of the "K" Series right angle secondary unit. Note CCW input direction of rotation and CW output shaft direction with both mounting configurations.

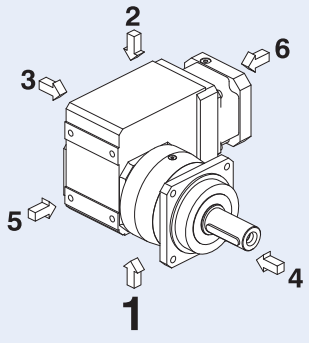
**IMPORTANT: When ordering, Mounting Side 3 or Side 4 MUST BE SPECIFIED.**



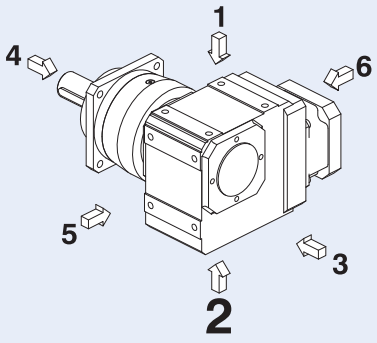

## PK Mounting Position Options

**When ordering any PK unit, the Mounting Position MUST BE SPECIFIED using one of the Mounting Position order codes below.**

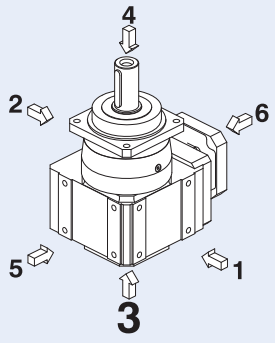
*Note: the code relates to the orientation side that faces down.*
*For example, EL1 has side 1 facing down, EL2 has side 2 facing down, etc.*



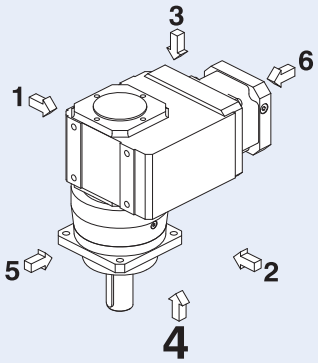

**EL1**



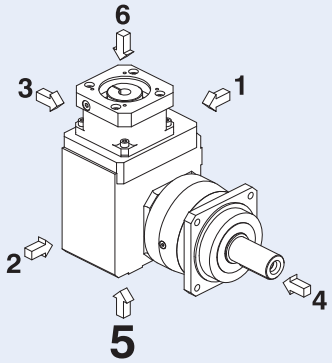

**EL2**



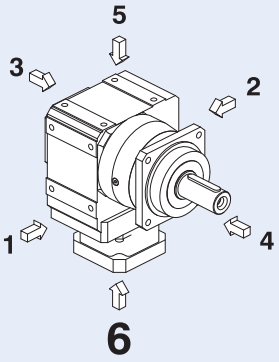

**EL3**



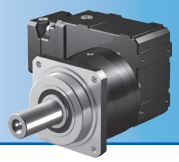

**EL4**




**EL5**

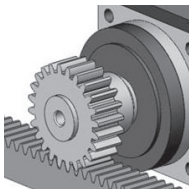
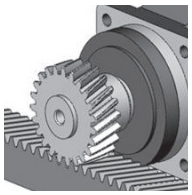
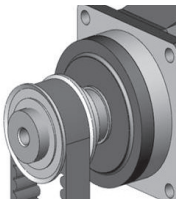



**EL6**



# Overview

## PK Series Output Bearing Options

| | S Ball Bearing | D Double Row Angular Contact Bearing | Z Cylindrical Roller Bearing ("Z" cylindrical roller bearing not allowed with reduced backlash option.) |
|---|---|---|---|
| |  |  |  |
| **Characteristics:** | • Minimal frictional torque<br>• Good radial load capacity<br>• Axial load approx. 35% of radial load | • Low frictional torque<br>• Good radial bearing capacity<br>• Axial load approx. 50% of radial load | • Very good radial load capacity<br>• Axial load approx. 20% of radial load |
| **Applications:** | • Spur geared rack/pinion<br>• Couplings<br>• Belt with or without light tension | • Helical geared rack/pinion<br>• Couplings with high axial load<br>• Belt with or without light tension | • Prestressed belt drive<br>• Prestressed spur rack drive<br>• Applications with high radial loads and/or high service requirements |

## Permissible Output Shaft Load and Tilting Moments*

| | $Z_2$ Distance of Shaft Shoulder to Center of Output Bearing | $F_{2ax100}$ Permitted Axial Force | $F_{2rad100}$ Permitted Radial Force ≤100RPM | $F_{2rad,acc}$ Radial Acceleration Force | $M_{2K100}$ Permitted Tilting Torque ≤100RPM | $M_{2k,acc}$ Permitted Acceleration Tilting Torque |
|---|---|---|---|---|---|---|
| **Unit** | mm | N | N | N | Nm | Nm |
| **S Ball Bearing** | | | | | | |
| P5 | 19.5 | 2300 | 6500 | 7000 | 315 | 340 |
| P7 | 23 | 2900 | 8000 | 9000 | 544 | 576 |
| P8 | 24.5 | 4700 | 13,000 | 18,000 | 852 | 1179 |
| P9 | 33 | 6000 | 18,000 | 27,000 | 1539 | 2309 |
| **D Double Row Angular Contact Bearing** | | | | | | |
| P5 | 25.5 | 6000 | 7000 | 8000 | 382 | 436 |
| P7 | 29 | 10,000 | 9000 | 10,000 | 665 | 700 |
| P8 | 32 | 15,500 | 15,000 | 18,000 | 1095 | 1314 |
| P9 | 44 | 25,000 | 20,000 | 30,000 | 1930 | 2895 |
| **Z Cylindrical Roller Bearing** | | | | | | |
| P5 | 19.5 | 1600 | 8000 | 8000 | 388 | 388 |
| P7 | 23 | 2000 | 10,000 | 10,000 | 640 | 640 |
| P8 | 24.5 | 3600 | 18,000 | 18,000 | 1179 | 1179 |
| P9 | 33 | 5000 | 27,000 | 35,000 | 2309 | 2993 |

** Refer to illustration and load/life/speed definitions on page 190*

*During EMERGENCY OFF operation (maximum stops per gearhead = 1000) the permissible values in the table for $F_{2A}$, $F2_R$, and $M_{2K}$ can be multiplied by a factor of 2. The permissible load values given are valid with the load applied to the center of the output shaft ($x_2$).*

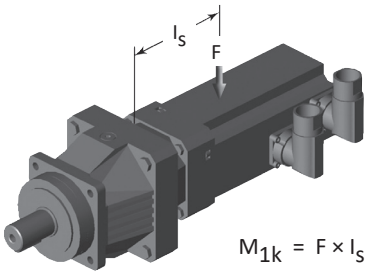
## PK No Load Running Torque*

| | | Input Ratio $T_R$ | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | One Stage | | | | | | | Two Stage | | | | | | | | | | | |
| Unit | | 3 | 4 | 5 | 7 | 8 | 10 | 12 | 16 | 20 | 25 | 28 | 32 | 35 | 40 | 50 | 56 | 70 | 80 | 100 |
| P5 | Nm | 0.60 | 0.45 | 0.40 | 0.30 | 0.20 | 0.20 | 0.23 | 0.23 | 0.23 | 0.18 | 0.18 | 0.23 | 0.18 | 0.18 | 0.18 | 0.18 | 0.18 | 0.18 | 0.18 |
| P7 | Nm | 0.83 | 0.53 | 0.43 | 0.33 | 0.23 | 0.23 | 0.30 | 0.30 | 0.30 | 0.20 | 0.20 | 0.30 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 | 0.20 |
| P8 | Nm | 1.05 | 0.75 | 0.65 | 0.45 | 0.35 | 0.35 | 0.48 | 0.43 | 0.43 | 0.33 | 0.33 | 0.43 | 0.23 | 0.23 | 0.23 | 0.23 | 0.23 | 0.23 | 0.23 |
| P9 | Nm | – | 0.92 | 0.72 | 0.52 | – | 0.42 | – | 0.55 | 0.55 | 0.45 | 0.45 | – | 0.35 | 0.35 | 0.35 | – | 0.35 | – | 0.35 |

** Torque is measured with the input at 2000 RPM and an ambient temperature of 20° C.*

## Permissible Motor Tilting Torque

The permissible tilting torque of the motor attached to the gear unit is a result of the static and dynamic load "F" from the motor weight, mass acceleration, and vibration multiplied by the distance from the center of gravity "$l_S$" of the motor.




$$M_{1k} = F \times l_S \leq M_{1K}$$

| M1K | ME10 | ME20 | ME30 | ME40 | ME50 |
|---|---|---|---|---|---|
| Nm | 25 | 60 | 125 | 250 | 600 |

## PK Series Load/Life/Speed Calculations

**All formulas shown are based on METRIC values**

*Upper case letters are permissible values. Lower case letters are for existing values.*

The permissible load and tilting moment values are based on an output speed of 100 RPM. For higher speeds the following applies, where $n_2$ is the desired speed:

$$F_{2AX} = \frac{F_{2ax100}}{\sqrt[3]{\frac{n_2}{100}}} \qquad F_{2RX} = \frac{F_{2rad100}}{\sqrt[3]{\frac{n_2}{100}}} \qquad M_{2KX} = \frac{M_{2K100}}{\sqrt[3]{\frac{n_2}{100}}}$$

The application output tilting moment should be determined by the following formula:

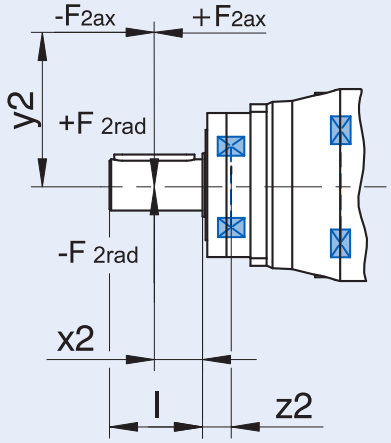
$$M_{2k,acc*} = \frac{2 \bullet F_{2ax100} \bullet y_2 + F_{2rad,acc} \bullet (x_2 + Z_2)}{1000} \leq M_{2k,acc}$$

$$M_{2k,eq*} = \sqrt[3]{\frac{n_{2b1} \bullet t_{b1} \bullet M_{2kb1}{}^3 + \ldots + n_{2bn} \bullet t_{bn} \bullet M_{2kbn}{}^3}{n_{2b1} \bullet t_{b1} + \ldots + n_{2bn} \bullet t_{bn}}} \leq M_{2kN}$$

$$F_{2rad,eq*} = \sqrt[3]{\frac{n_{2b1} \bullet t_{b1} \bullet F_{2rb1}{}^3 + \ldots + n_{2bn} \bullet t_{bn} \bullet F_{2rbn}{}^3}{n_{2b1} \bullet t_{b1} + \ldots + n_{2bn} \bullet t_{bn}}} \leq F_{2radN}$$

Where:

| | | | |
|---|---|---|---|
| $z_2$ | Distance of Shaft Shoulder to Center of Output Bearing | $F_{2rad,acc}$ | Radial Acceleration Force |
| $n_2$ | Actual Average Output Speed | $F_{2rad,acc*}$ | Radial Acceleration Force at Gear Unit Output |
| $x_2$ | Distance of the Shaft Shoulder to the Force Application Point | $M_{2K100}$ | Permitted Tilting Torque ≤100RPM |
| $y_2$ | Distance of the Shaft Axis to the Axial Force Application Point | $M_{2K,acc}$ | Permitted Acceleration Tilting Torque |
| $F_{2ax*}$ | Actual Axial Force at Gear Unit Output | $M_{2k,acc*}$ | Permitted Acceleration Tilting Torque at Gear Unit Output |
| $F_{2ax100}$ | Permitted Axial Force | $C_{2K}$ | Tilting Stiffness |
| $F_{2rad100}$ | Permitted Radial Force ≤100RPM | | |




The hours of life ($L_h$) of the unit can be determined by the following formula:

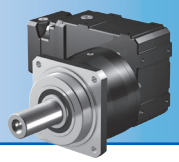
**bearing life for duty cycle ≤ 40%**

$L_h$ > 10,000 hours if $M_{2K100}/M_{2A}$ < 1.25 and > 1
$L_h$ > 20,000 hours if $M_{2K100}/M_{2A}$ > 1.25 and > 1.5
$L_h$ > 30,000 hours if $M_{2K100}/M_{2A}$ < 1.5

**bearing life for duty cycle ≥ 40%**

$$L_{hA} = L_h \left( \frac{40\%}{\text{Duty Cycle}} \right)$$

# Selection Data



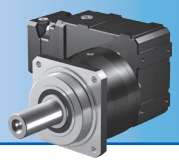
| Reducer Ratio (i) | | Output Torque | | | | Back-lash/ Red | Part Number* (Gearhead + Input) | Max. Input Speed RPM (n1) | | | Motor Shaft [3] Max Ø | Input Inertia | Tors. Stiffness |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Nom. [1] | Accel. | Accel. Torque for Reduced Backlash | Peak [2] | | | Continuous | | Cyclic | | | |
| Nom. | Exact | $M_{2N}$ | $M_{2acc}$ | $M_{2accHT}$ | $M_{2NOT}$ | $\Delta\phi_2$ | | EL 1,2 | EL 3,4,5,6 | All | $d_{MW}$ | $J_1$ | $C_2$ |
| | | Nm | Nm | Nm | Nm | arcmin | | | | | mm | kgcm² | Nm/ arcmin |
| **P5K** | | | | | | | | | | | | | |
| 12.00 | 12/1 | 120 | 200 | 200 | 360 | 5.0/3.0 | P531_0030K102_0040 ME10 | 3300 | 2800 | 5000 | ≤19 | 1.7 | 22 |
| | | | | | | | P531_0030K102_0040 ME20 | | | | ≤24 | 3.6 | |
| 16.00 | 16/1 | 210 | 300 | 320 | 480 | 4.5/2.5 | P531_0040K102_0040 ME10 | 3300 | 2800 | 5000 | ≤19 | 1.6 | 26 |
| | | | | | | | P531_0040K102_0040 ME20 | | | | ≤24 | 3.5 | |
| 20.00 | 20/1 | 220 | 350 | 385 | 600 | 4.0/.20 | P531_0050K102_0040 ME10 | 3300 | 2800 | 5000 | ≤19 | 1.5 | 29 |
| | | | | | | | P531_0050K102_0040 ME20 | | | | ≤24 | 3.4 | |
| 27.84 | 7600/273 | 220 | 350 | 385 | 700 | 4.0/.20 | P531_0050K102_0056 ME10 | 3300 | 2800 | 5000 | ≤19 | 1.3 | 29 |
| | | | | | | | P531_0050K102_0056 ME20 | | | | ≤24 | 3.2 | |
| 30.00 | 30/1 | 220 | 350 | 385 | 700 | 4.0/.20 | P531_0050K102_0060 ME10 | 3300 | 2800 | 5000 | ≤19 | 1.1 | 29 |
| | | | | | | | P531_0050K102_0060 ME20 | | | | ≤24 | 3.0 | |
| 33.22 | 299/9 | 220 | 350 | 385 | 700 | 4.0/.20 | P531_0050K102_0066 ME10 | 3600 | 3300 | 5500 | ≤19 | 1.0 | 29 |
| | | | | | | | P531_0050K102_0066 ME20 | | | | ≤24 | 2.9 | |
| 41.55 | 1911/46 | 220 | 350 | 385 | 700 | 4.0/.20 | P531_0050K102_0083 ME10 | 3600 | 3300 | 5500 | ≤19 | 0.93 | 29 |
| | | | | | | | P531_0050K102_0083 ME20 | | | | ≤24 | 2.8 | |
| 46.25 | 8740/189 | 220 | 350 | 385 | 700 | 4.0/.20 | P531_0050K102_0092 ME10 | 3600 | 3300 | 5500 | ≤19 | 0.97 | 29 |
| | | | | | | | P531_0050K102_0092 ME20 | | | | ≤24 | 2.9 | |
| 57.83 | 1330/23 | 220 | 350 | 385 | 700 | 4.0/.20 | P531_0050K102_0115 ME10 | 3600 | 3300 | 5500 | ≤19 | 0.87 | 29 |
| | | | | | | | P531_0050K102_0115 ME20 | | | | ≤24 | 2.8 | |
| 70.57 | 494/7 | 220 | 350 | 385 | 700 | 4.0/.20 | P531_0050K102_0140 ME10 | 4000 | 3800 | 6000 | ≤19 | 0.82 | 29 |
| | | | | | | | P531_0050K102_0140 ME20 | 3700 | 3700 | | ≤24 | 2.7 | |
| 87.82 | 10,450/119 | 220 | 350 | 385 | 700 | 4.0/.20 | P531_0050K102_0175 ME10 | 4000 | 3800 | 6000 | ≤19 | 0.77 | 29 |
| | | | | | | | P531_0050K102_0175 ME20 | 3700 | 3700 | | ≤24 | 2.7 | |
| 116.3 | 5700/49 | 220 | 350 | 385 | 700 | 4.0/.20 | P531_0050K102_0230 ME10 | 4000 | 4000 | 7000 | ≤19 | 0.72 | 29 |
| | | | | | | | P531_0050K102_0230 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.6 | |
| 140.2 | 2945/21 | 220 | 350 | 385 | 700 | 4.0/.20 | P531_0050K102_0280 ME10 | 4000 | 4000 | 7000 | ≤19 | 0.70 | 29 |
| | | | | | | | P531_0050K102_0280 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.6 | |
| 175.5 | 3686/21 | 220 | 350 | 385 | 700 | 4.0/.20 | P531_0050K102_0350 ME10 | 4000 | 4000 | 7000 | ≤19 | 0.68 | 29 |
| | | | | | | | P531_0050K102_0350 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.6 | |
| 234.6 | 11,495/49 | 220 | 350 | 385 | 700 | 4.0/.20 | P531_0050K102_0470 ME10 | 4000 | 4000 | 7000 | ≤19 | 0.63 | 29 |
| 280.5 | 5890/21 | 220 | 350 | 385 | 700 | 4.0/.20 | P531_0050K102_0560 ME10 | 4000 | 4000 | 7000 | ≤19 | 0.62 | 29 |

[1] *Based on input speed of 1500 RPM. See page 186 for details on torque calculations.*
[2] *Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
* *MF = Motor adapter with FlexiAdapt® coupling*

| Reducer Ratio (i) | | Output Torque | | | | Back-lash/ Red $\Delta\phi_2$ | Part Number* (Gearhead + Input) | Max. Input Speed RPM (n1) | | | Motor Shaft [3] Max Ø $d_{MW}$ | Input Inertia $J_1$ | Tors. Stiffness $C_2$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Nom. [1] $M_{2N}$ | Accel. $M_{2acc}$ | Accel. Torque for Reduced Backlash $M_{2accHT}$ | Peak [2] $M_{2NOT}$ | | | Continuous | | Cyclic | | | |
| Nom. | Exact | Nm | Nm | Nm | Nm | arcmin | | EL 1,2 | EL 3,4,5,6 | All | mm | kgcm² | Nm/ arcmin |
| **P7K** | | **(continued next page)** | | | | | | | | | | | |
| 12.00 | 12/1 | 300 | 500 | 500 | 900 | 4.5/2.5 | P731_0030K202_0040 ME20 | 3000 | 2600 | 4500 | ≤32 | 7.0 | 39 |
| | | | | | | | P731_0030K202_0040 ME30 | | | | ≤38 | 12 | |
| 16.00 | 16/1 | 440 | 677 | 677 | 1200 | 4.5/2.5 | P731_0040K202_0040 ME20 | 3000 | 2600 | 4500 | ≤32 | 6.7 | 49 |
| | | | | | | | P731_0040K202_0040 ME30 | | | | ≤38 | 12 | |
| 20.00 | 20/1 | 440 | 805 | 840 | 1500 | 4.0/2.0 | P731_0050K202_0040 ME20 | 3000 | 2600 | 4500 | ≤32 | 6.6 | 53 |
| | | | | | | | P731_0050K202_0040 ME30 | | | | ≤38 | 12 | |
| 25.89 | 10,535/407 | 440 | 805 | 840 | 1610 | 4.0/2.0 | P731_0050K202_0052 ME20 | 3000 | 2600 | 4500 | ≤32 | 5.7 | 53 |
| | | | | | | | P731_0050K202_0052 ME30 | | | | ≤38 | 11 | |
| 28.00 | 28/1 | 440 | 633 | 633 | 841 | 4.0/2.0 | P731_0070K102_0040 ME10 | 3300 | 2800 | 5000 | ≤19 | 1.6 | 51 |
| | | | | | | | P731_0070K102_0040 ME20 | | | | ≤24 | 3.5 | 52 |
| 30.00 | 30/1 | 440 | 677 | 677 | 900 | 4.0/2.0 | P731_0050K202_0060 ME10 | 3000 | 2600 | 4500 | ≤19 | 2.4 | 53 |
| | | | 805 | 840 | 1610 | | P731_0050K202_0060 ME20 | | | | ≤32 | 5.8 | |
| | | | | | | | P731_0050K202_0060 ME30 | | | | ≤38 | 11 | |
| 33.42 | 11,395/341 | 440 | 755 | 755 | 1003 | 4.0/2.0 | P731_0050K202_0067 ME10 | 3500 | 3100 | 5000 | ≤19 | 1.8 | 53 |
| | | | 805 | 840 | 1610 | | P731_0050K202_0067 ME20 | | | | ≤32 | 5.2 | |
| | | | | | | | P731_0050K202_0067 ME30 | | | | ≤38 | 10 | |
| 38.98 | 1520/39 | 440 | 741 | 741 | 1170 | 4.0/2.0 | P731_0070K102_0056 ME10 | 3300 | 2800 | 5000 | ≤19 | 1.3 | 52 |
| | | | | | | | P731_0070K102_0056 ME20 | | | | ≤24 | 3.2 | |
| 40.00 | 40/1 | 350 | 575 | 575 | 1150 | 3.5/1.5 | P731_0100K102_0040 ME10 | 3300 | 2800 | 5000 | ≤19 | 1.5 | 50 |
| | | | | | | | P731_0100K102_0040 ME20 | | | | ≤24 | 3.4 | |
| 41.99 | 12,470/297 | 440 | 805 | 840 | 1260 | 4.0/2.0 | P731_0050K202_0084 ME10 | 3500 | 3100 | 5000 | ≤19 | 1.4 | 53 |
| | | | | | 1610 | | P731_0050K202_0084 ME20 | | | | ≤32 | 4.8 | |
| | | | | | | | P731_0050K202_0084 ME30 | | | | ≤38 | 10 | |
| 42.00 | 42/1 | 440 | 760 | 760 | 1260 | 4.0/2.0 | P731_0070K102_0060 ME10 | 3300 | 2800 | 5000 | ≤19 | 1.1 | 52 |
| | | | | | | | P731_0070K102_0060 ME20 | | | | ≤24 | 3.0 | |
| 45.95 | 11,395/248 | 440 | 805 | 840 | 1379 | 4.0/2.0 | P731_0050K202_0092 ME10 | 3500 | 3100 | 5000 | ≤19 | 1.6 | 53 |
| | | | | | 1610 | | P731_0050K202_0092 ME20 | | | | ≤32 | 5.0 | |
| | | | | | | | P731_0050K202_0092 ME30 | | | | ≤38 | 10 | |
| 46.51 | 2093/45 | 440 | 786 | 786 | 1396 | 4.0/2.0 | P731_0070K102_0066 ME10 | 3600 | 3300 | 5500 | ≤19 | 1.1 | 52 |
| | | | | | | | P731_0070K102_0066 ME20 | | | | ≤24 | 3.0 | |
| 55.68 | 15,200/273 | 350 | 575 | 575 | 1150 | 3.5/1.5 | P731_0100K102_0056 ME10 | 3300 | 2800 | 5000 | ≤19 | 1.3 | 50 |
| | | | | | | | P731_0100K102_0056 ME20 | | | | ≤24 | 3.2 | |

[1] *Based on input speed of 1500 RPM. See page 186 for details on torque calculations.*
[2] *Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
* *MF = Motor adapter with FlexiAdapt® coupling*

# Selection Data



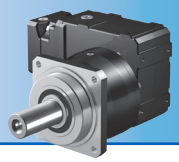
| Reducer Ratio (i) | | Output Torque | | | | Back-lash/ Red $\Delta\phi_2$ | Part Number* (Gearhead + Input) | Max. Input Speed RPM (n1) | | | Motor Shaft [3] Max Ø $d_{MW}$ | Input Inertia $J_1$ | Tors. Stiffness $C_2$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Nom. [1] $M_{2N}$ | Accel. $M_{2acc}$ | Accel. Torque for Reduced Backlash $M_{2accHT}$ | Peak [2] $M_{2NOT}$ | | | Continuous | | Cyclic | | | |
| Nom. | Exact | Nm | Nm | Nm | Nm | arcmin | | EL 1,2 | EL 3,4,5,6 | All | mm | kgcm² | Nm/ arcmin |
| **P7K** | | **(continued next page)** | | | | | | | | | | | |
| 57.73 | 6235/108 | 440 | 805 | 840 | 1610 | 4.0/2.0 | P731_0050K202_0115 ME10 | 3500 | 3100 | 5000 | ≤19 | 1.3 | 53 |
| | | | | | | | P731_0050K202_0115 ME20 | | | | ≤32 | 4.7 | |
| | | | | | | | P731_0050K202_0115 ME30 | | | | ≤38 | 10 | |
| 58.16 | 13,377/230 | 440 | 805 | 840 | 1561 | 4.0/2.0 | P731_0070K102_0083 ME10 | 3600 | 3300 | 5500 | ≤19 | 0.94 | 52 |
| | | | | | | | P731_0070K102_0083 ME20 | | | | ≤24 | 2.8 | |
| 60.00 | 60/1 | 350 | 575 | 575 | 1150 | 3.5/1.5 | P731_0100K102_0060 ME10 | 3300 | 2800 | 5000 | ≤19 | 1.1 | 50 |
| | | | | | | | P731_0100K102_0060 ME20 | | | | ≤24 | 3.0 | |
| 64.74 | 1748/27 | 440 | 805 | 840 | 1561 | 4.0/2.0 | P731_0070K102_0092 ME10 | 3600 | 3300 | 5500 | ≤19 | 0.97 | 52 |
| | | | | | | | P731_0070K102_0092 ME20 | | | | ≤24 | 2.9 | |
| 66.44 | 598/9 | 350 | 575 | 575 | 1150 | 3.5/1.5 | P731_0100K102_0066 ME10 | 3600 | 3300 | 5500 | ≤19 | 1.0 | 50 |
| | | | | | | | P731_0100K102_0066 ME20 | | | | ≤24 | 2.9 | |
| 69.26 | 14,405/208 | 440 | 805 | 840 | 1610 | 4.0/2.0 | P731_0050K202_0140 ME10 | 3900 | 3500 | 5500 | ≤19 | 1.1 | 53 |
| | | | | | | | P731_0050K202_0140 ME20 | 3700 | | | ≤32 | 4.5 | |
| | | | | | | | P731_0050K202_0140 ME30 | 3500 | | 5000 | ≤38 | 9.9 | |
| 70.98 | 3549/50 | 440 | 805 | 840 | 1561 | 4.0/2.0 | P731_0070K102_0100 ME10 | 4000 | 3800 | 6000 | ≤19 | 0.86 | 52 |
| | | | | | | | P731_0070K102_0100 ME20 | 3700 | 3700 | | ≤24 | 2.8 | |
| 80.96 | 1862/23 | 440 | 805 | 840 | 1561 | 4.0/2.0 | P731_0070K102_0115 ME10 | 3600 | 3300 | 5500 | ≤19 | 0.88 | 52 |
| | | | | | | | P731_0070K102_0115 ME20 | | | | ≤24 | 2.8 | |
| 83.09 | 1911/23 | 350 | 575 | 575 | 1150 | 3.5/1.5 | P731_0100K102_0083 ME10 | 3600 | 3300 | 5500 | ≤19 | 0.93 | 50 |
| | | | | | | | P731_0100K102_0083 ME20 | | | | ≤24 | 2.8 | |
| 87.35 | 2795/32 | 440 | 805 | 840 | 1610 | 4.0/2.0 | P731_0050K202_0175 ME10 | 3900 | 3500 | 5500 | ≤19 | 1.0 | 53 |
| | | | | | | | P731_0050K202_0175 ME20 | 3700 | | | ≤32 | 4.4 | |
| | | | | | | | P731_0050K202_0175 ME30 | 3500 | | 5000 | ≤38 | 9.7 | |
| 88.33 | 3003/34 | 440 | 805 | 840 | 1561 | 4.0/2.0 | P731_0070K102_0125 ME10 | 4000 | 3800 | 6000 | ≤19 | 0.79 | 52 |
| | | | | | | | P731_0070K102_0125 ME20 | 3700 | 3700 | | ≤24 | 2.7 | |
| 92.49 | 17,480/189 | 350 | 575 | 575 | 1150 | 3.5/1.5 | P731_0100K102_0092 ME10 | 3600 | 3300 | 5500 | ≤19 | 0.96 | 50 |
| | | | | | | | P731_0100K102_0092 ME20 | | | | ≤24 | 2.9 | |
| 98.80 | 494/5 | 440 | 805 | 840 | 1561 | 4.0/2.0 | P731_0070K102_0140 ME10 | 4000 | 3800 | 6000 | ≤19 | 0.82 | 52 |
| | | | | | | | P731_0070K102_0140 ME20 | 3700 | 3700 | | ≤24 | 2.7 | |
| 115.7 | 2660/23 | 350 | 575 | 575 | 1150 | 3.5/1.5 | P731_0100K102_0115 ME10 | 3600 | 3300 | 5500 | ≤19 | 0.87 | 50 |
| | | | | | | | P731_0100K102_0115 ME20 | | | | ≤24 | 2.8 | |
| 115.9 | 14,835/128 | 440 | 805 | 840 | 1610 | 4.0/2.0 | P731_0050K202_0230 ME10 | 4000 | 3900 | 6500 | ≤19 | 0.87 | 53 |
| | | | | | | | P731_0050K202_0230 ME20 | 3700 | 3700 | 6000 | ≤32 | 4.3 | |
| | | | | | | | P731_0050K202_0230 ME30 | 3500 | 3500 | 5000 | ≤38 | 9.6 | |

*[1] Based on input speed of 1500 RPM. See page 186 for details on torque calculations.*
*[2] Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
** MF = Motor adapter with FlexiAdapt® coupling*

| Reducer Ratio (i) | | Output Torque | | | | Back-lash/ Red $\Delta\phi_2$ | Part Number* (Gearhead + Input) | Max. Input Speed RPM (n1) | | | Motor Shaft [3] Max Ø $d_{MW}$ | Input Inertia $J_1$ | Tors. Stiffness $C_2$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Nom. [1] $M_{2N}$ | Accel. $M_{2acc}$ | Accel. Torque for Reduced Backlash $M_{2accHT}$ | Peak [2] $M_{2NOT}$ | | | Continuous | | Cyclic | | | |
| Nom. | Exact | Nm | Nm | Nm | Nm | arcmin | | EL 1,2 | EL 3,4,5,6 | All | mm | kgcm² | Nm/ arcmin |
| **P7K** | | **(continued from previous page)** | | | | | | | | | | | |
| 117.0 | 117/1 | 440 | 805 | 840 | 1561 | 4.0/2.0 | P731_0070K102_0165 ME10 | 4000 | 4000 | 7000 | ≤19 | 0.73 | 52 |
| | | | | | | | P731_0070K102_0165 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.6 | |
| 122.9 | 2090/17 | 440 | 805 | 840 | 1561 | 4.0/2.0 | P731_0070K102_0175 ME10 | 4000 | 3800 | 6000 | ≤19 | 0.77 | 52 |
| | | | | | | | P731_0070K102_0175 ME20 | 3700 | 3700 | | ≤24 | 2.7 | |
| 139.8 | 559/4 | 440 | 805 | 840 | 1610 | 4.0/2.0 | P731_0050K202_0280 ME10 | 4000 | 3900 | 6500 | ≤19 | 0.81 | 53 |
| | | | | | | | P731_0050K202_0280 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.7 | |
| 141.1 | 2821/20 | 440 | 805 | 840 | 1561 | 4.0/2.0 | P731_0070K102_0200 ME10 | 4000 | 4000 | 7000 | ≤19 | 0.71 | 52 |
| | | | | | | | P731_0070K102_0200 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.6 | |
| 162.9 | 1140/7 | 440 | 805 | 840 | 1561 | 4.0/2.0 | P731_0070K102_0230 ME10 | 4000 | 4000 | 7000 | ≤19 | 0.72 | 52 |
| | | | | | | | P731_0070K102_0230 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.6 | |
| 172.8 | 9675/56 | 440 | 805 | 840 | 1610 | 4.0/2.0 | P731_0050K202_0350 ME10 | 4000 | 3900 | 6500 | ≤19 | 0.76 | 53 |
| | | | | | | | P731_0050K202_0350 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.7 | |
| 176.5 | 8827/50 | 440 | 783 | 783 | 1386 | 4.0/2.0 | P731_0070K102_0250 ME10 | 4000 | 4000 | 7000 | ≤19 | 0.68 | 52 |
| | | | | | | | P731_0070K102_0250 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.6 | |
| 196.3 | 589/3 | 440 | 805 | 840 | 1561 | 4.0/2.0 | P731_0070K102_0280 ME10 | 4000 | 4000 | 7000 | ≤19 | 0.70 | 52 |
| | | | | | | | P731_0070K102_0280 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.6 | |
| 231.1 | 1849/8 | 440 | 805 | 840 | 1610 | 4.0/2.0 | P731_0050K202_0460 ME10 | 4000 | 3900 | 6500 | ≤19 | 0.71 | 53 |
| | | | | | | | P731_0050K202_0460 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.6 | |
| 232.7 | 11,400/49 | 350 | 575 | 575 | 1150 | 3.5/1.5 | P731_0100K102_0230 ME10 | 4000 | 4000 | 7000 | ≤19 | 0.72 | 50 |
| | | | | | | | P731_0100K102_0230 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.6 | |
| 235.9 | 4719/20 | 440 | 595 | 595 | 1053 | 4.0/2.0 | P731_0070K102_0340 ME10 | 4000 | 4000 | 7000 | ≤19 | 0.63 | 52 |
| 245.7 | 3686/15 | 440 | 805 | 840 | 1561 | 4.0/2.0 | P731_0070K102_0350 ME10 | 4000 | 4000 | 7000 | ≤19 | 0.68 | 52 |
| | | | | | | | P731_0070K102_0350 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.6 | |
| 277.7 | 6665/24 | 440 | 805 | 840 | 1392 | 4.0/2.0 | P731_0050K202_0560 ME10 | 4000 | 3900 | 6500 | ≤19 | 0.66 | 53 |
| 280.5 | 5890/21 | 350 | 575 | 575 | 1150 | 3.5/1.5 | P731_0100K102_0280 ME10 | 4000 | 4000 | 7000 | ≤19 | 0.70 | 50 |
| | | | | | | | P731_0100K102_0280 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.6 | |
| 282.1 | 2821/10 | 417 | 501 | 501 | 887 | 4.0/2.0 | P731_0070K102_0400 ME10 | 4000 | 4000 | 7000 | ≤19 | 0.62 | 52 |
| 328.4 | 2299/7 | 440 | 805 | 828 | 1466 | 4.0/2.0 | P731_0070K102_0470 ME10 | 4000 | 4000 | 7000 | ≤19 | 0.63 | 52 |
| 351.1 | 7372/21 | 350 | 575 | 575 | 1150 | 3.5/1.5 | P731_0100K102_0350 ME10 | 4000 | 4000 | 7000 | ≤19 | 0.68 | 50 |
| | | | | | | | P731_0100K102_0350 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.6 | |
| 352.2 | 35,217/100 | 339 | 407 | 407 | 721 | 4.0/2.0 | P731_0070K102_0500 ME10 | 4000 | 4000 | 7000 | ≤19 | 0.62 | 52 |
| 392.7 | 1178/3 | 440 | 697 | 697 | 1235 | 4.0/2.0 | P731_0070K102_0560 ME10 | 4000 | 4000 | 7000 | ≤19 | 0.62 | 52 |
| 469.2 | 22,990/49 | 350 | 575 | 575 | 1150 | 3.5/1.5 | P731_0100K102_0470 ME10 | 4000 | 4000 | 7000 | ≤19 | 0.63 | 50 |
| 490.2 | 2451/5 | 440 | 566 | 566 | 1003 | 4.0/2.0 | P731_0070K102_0700 ME10 | 4000 | 4000 | 7000 | ≤19 | 0.62 | 52 |
| 561.0 | 11,780/21 | 350 | 575 | 575 | 1150 | 3.5/1.5 | P731_0100K102_0560 ME10 | 4000 | 4000 | 7000 | ≤19 | 0.62 | 50 |

[1] *Based on input speed of 1500 RPM. See page 186 for details on torque calculations.*
[2] *Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
* *MF = Motor adapter with FlexiAdapt® coupling*

# Selection Data



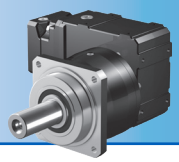
| Reducer Ratio (i) | | Output Torque | | | | Back-lash/ Red $\Delta\phi_2$ | Part Number* (Gearhead + Input) | Max. Input Speed RPM (n1) | | | Motor Shaft [3] Max Ø $d_{MW}$ | Input Inertia $J_1$ | Tors. Stiffness $C_2$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Nom. [1] $M_{2N}$ | Accel. $M_{2acc}$ | Accel. Torque for Reduced Backlash $M_{2accHT}$ | Peak [2] $M_{2NOT}$ | | | Continuous | | Cyclic | | | |
| Nom. | Exact | Nm | Nm | Nm | Nm | arcmin | | EL 1,2 | EL 3,4,5,6 | All | mm | kgcm² | Nm/ arcmin |
| **P8K** | | **(continued next page)** | | | | | | | | | | | |
| 12.00 | 12/1 | 593 | 677 | 677 | 900 | 4.5/2.5 | P831_0030K302_0040 ME20 | 2700 | 2300 | 4000 | ≤32 | 12 | 81 |
| | | | 889 | 889 | 2165 | | P831_0030K302_0040 ME30 | | | | ≤38 | 17 | 83 |
| 16.00 | 16/1 | 790 | 903 | 903 | 1200 | 4.0/2.0 | P831_0040K302_0040 ME20 | 2700 | 2300 | 4000 | ≤32 | 10 | 108 |
| | | | 1186 | 1186 | 2887 | | P831_0040K302_0040 ME30 | | | | ≤38 | 16 | 109 |
| 20.00 | 20/1 | 988 | 1129 | 1129 | 1500 | 4.0/2.0 | P831_0050K302_0040 ME20 | 2700 | 2300 | 4000 | ≤32 | 9.7 | 126 |
| | | | 1482 | 1482 | 3230 | | P831_0050K302_0040 ME30 | | | | ≤38 | 15 | 127 |
| 26.88 | 215/8 | 1090 | 1518 | 1518 | 2016 | 4.0/2.0 | P831_0050K302_0054 ME20 | 2700 | 2300 | 4000 | ≤32 | 7.6 | 127 |
| | | | | | | | P831_0050K302_0054 ME30 | | | | ≤38 | 13 | |
| 28.00 | 28/1 | 790 | 1185 | 1185 | 2100 | 3.5/1.5 | P831_0070K202_0040 ME20 | 3000 | 2600 | 4500 | ≤32 | 6.8 | 128 |
| | | | | | | | P831_0070K202_0040 ME30 | | | | ≤38 | 12 | |
| 30.00 | 30/1 | 1100 | 1694 | 1694 | 2250 | 4.0/2.0 | P831_0050K302_0060 ME20 | 2700 | 2300 | 4000 | ≤32 | 7.8 | 127 |
| | | | 1697 | 1697 | 3230 | | P831_0050K302_0060 ME30 | | | | ≤38 | 13 | 128 |
| 30.55 | 336/11 | 690 | 690 | 690 | 916 | 3.5/1.5 | P831_0070K202_0044 ME10 | 3000 | 2600 | 4500 | ≤19 | 3.0 | 125 |
| | | 813 | 1220 | 1220 | 2291 | | P831_0070K202_0044 ME20 | | | | ≤32 | 6.4 | 128 |
| | | | | | | | P831_0070K202_0044 ME30 | | | | ≤38 | 12 | |
| 36.24 | 14,749/407 | 861 | 1291 | 1291 | 2718 | 3.5/1.5 | P831_0070K202_0052 ME20 | 3000 | 2600 | 4500 | ≤32 | 5.9 | 128 |
| | | | | | | | P831_0070K202_0052 ME30 | | | | ≤38 | 11 | |
| 36.96 | 2365/64 | 1100 | 1819 | 1819 | 2772 | 4.0/2.0 | P831_0050K302_0074 ME20 | 2700 | 2300 | 4000 | ≤32 | 6.9 | 127 |
| | | | | | | | P831_0050K302_0074 ME30 | | | | ≤38 | 12 | 128 |
| 40.00 | 40/1 | 850 | 1380 | 1380 | 2760 | 3.5/1.5 | P831_0100K202_0040 ME20 | 3000 | 2600 | 4500 | ≤32 | 6.6 | 131 |
| | | | | | | | P831_0100K202_0040 ME30 | | | | ≤38 | 12 | |
| 42.00 | 42/1 | 904 | 948 | 948 | 1260 | 3.5/1.5 | P831_0070K202_0060 ME10 | 3000 | 2600 | 4500 | ≤19 | 2.5 | 127 |
| | | | 1356 | 1356 | 2887 | | P831_0070K202_0060 ME20 | | | | ≤32 | 5.9 | 128 |
| | | | | | | | P831_0070K202_0060 ME30 | | | | ≤38 | 11 | |
| 46.34 | 5375/116 | 1100 | 1840 | 1867 | 3230 | 4.0/2.0 | P831_0050K302_0093 ME20 | 3200 | 2800 | 4500 | ≤32 | 6.1 | 128 |
| | | | | | | | P831_0050K302_0093 ME30 | | | | ≤38 | 11 | |
| 46.78 | 15,953/341 | 937 | 1057 | 1057 | 1404 | 3.5/1.5 | P831_0070K202_0067 ME10 | 3500 | 3100 | 5000 | ≤19 | 1.8 | 127 |
| | | | 1406 | 1406 | 2887 | | P831_0070K202_0067 ME20 | | | | ≤32 | 5.2 | 128 |
| | | | | | | | P831_0070K202_0067 ME30 | | | | ≤38 | 11 | |

[1] *Based on input speed of 1500 RPM. See page 186 for details on torque calculations.*
[2] *Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
* *MF = Motor adapter with FlexiAdapt® coupling*

| Reducer Ratio (i) | | Output Torque | | | | Back-lash/ Red $\Delta\phi_2$ | Part Number* (Gearhead + Input) | Max. Input Speed RPM (n1) | | | Motor Shaft [3] Max Ø $d_{MW}$ | Input Inertia $J_1$ | Tors. Stiffness $C_2$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Nom. [1] $M_{2N}$ | Accel. $M_{2acc}$ | Accel. Torque for Reduced Backlash $M_{2accHT}$ | Peak [2] $M_{2NOT}$ | | | Continuous | | Cyclic | | | |
| Nom. | Exact | Nm | Nm | Nm | Nm | arcmin | | EL 1,2 | EL 3,4,5,6 | All | mm | kgcm² | Nm/ arcmin |
| **P8K** | | **(continued next page)** | | | | | | | | | | | |
| 49.83 | 14,749/296 | 957 | 1436 | 1436 | 2887 | 3.5/1.5 | P831_0070K202_0071 ME20 | 3000 | 2600 | 4500 | ≤32 | 5.5 | 128 |
| | | | | | | | P831_0070K202_0071 ME30 | | | | ≤38 | 11 | |
| 51.77 | 21,070/407 | 850 | 1380 | 1380 | 2760 | 3.5/1.5 | P831_0100K202_0052 ME20 | 3000 | 2600 | 4500 | ≤32 | 5.8 | 131 |
| | | | | | | | P831_0100K202_0052 ME30 | | | | ≤38 | 11 | |
| 58.05 | 1161/20 | 1100 | 1311 | 1311 | 1742 | 4.0/2.0 | P831_0050K302_0115 ME10 | 3200 | 2800 | 4500 | ≤19 | 2.1 | 127 |
| | | | 1840 | 1867 | 3230 | | P831_0050K302_0115 ME20 | | | | ≤32 | 5.5 | 128 |
| | | | | | | | P831_0050K302_0115 ME30 | | | | ≤38 | 11 | |
| 58.78 | 17,458/297 | 1000 | 1328 | 1328 | 1763 | 3.5/1.5 | P831_0070K202_0084 ME10 | 3500 | 3100 | 5000 | ≤19 | 1.5 | 128 |
| | | | 1494 | 1494 | 2887 | | P831_0070K202_0084 ME20 | | | | ≤32 | 4.9 | |
| | | | | | | | P831_0070K202_0084 ME30 | | | | ≤38 | 10 | |
| 60.00 | 60/1 | 850 | 1355 | 1355 | 1800 | 3.5/1.5 | P831_0100K202_0060 ME10 | 3000 | 2600 | 4500 | ≤19 | 2.4 | 131 |
| | | | 1380 | 1380 | 2760 | | P831_0100K202_0060 ME20 | | | | ≤32 | 5.8 | |
| | | | | | | | P831_0100K202_0060 ME30 | | | | ≤38 | 11 | |
| 64.33 | 15,953/248 | 1000 | 1453 | 1453 | 1931 | 3.5/1.5 | P831_0070K202_0092 ME10 | 3500 | 3100 | 5000 | ≤19 | 1.6 | 128 |
| | | | 1494 | 1494 | 2887 | | P831_0070K202_0092 ME20 | | | | ≤32 | 5.0 | |
| | | | | | | | P831_0070K202_0092 ME30 | | | | ≤38 | 10 | |
| 66.83 | 22,790/341 | 850 | 1380 | 1380 | 2006 | 3.5/1.5 | P831_0100K202_0067 ME10 | 3500 | 3100 | 5000 | ≤19 | 1.8 | 131 |
| | | | | | 2760 | | P831_0100K202_0067 ME20 | | | | ≤32 | 5.2 | |
| | | | | | | | P831_0100K202_0067 ME30 | | | | ≤38 | 11 | |
| 69.68 | 7525/108 | 1100 | 1574 | 1574 | 2091 | 4.0/2.0 | P831_0050K302_0140 ME10 | 3500 | 3100 | 5000 | ≤19 | 1.7 | 127 |
| | | | 1840 | 1867 | 3230 | | P831_0050K302_0140 ME20 | | | | ≤32 | 5.1 | 128 |
| | | | | | | | P831_0050K302_0140 ME30 | | | | ≤38 | 10 | |
| 70.51 | 20,167/286 | 1000 | 1494 | 1494 | 2116 | 3.5/1.5 | P831_0070K202_0100 ME10 | 3900 | 3500 | 5500 | ≤19 | 1.3 | 128 |
| | | | | | 2887 | | P831_0070K202_0100 ME20 | 3700 | | | ≤32 | 4.7 | |
| | | | | | | | P831_0070K202_0100 ME30 | 3500 | | 5000 | ≤38 | 10 | |
| 80.82 | 8729/108 | 1000 | 1494 | 1494 | 2425 | 3.5/1.5 | P831_0070K202_0115 ME10 | 3500 | 3100 | 5000 | ≤19 | 1.3 | 128 |
| | | | | | 2887 | | P831_0070K202_0115 ME20 | | | | ≤32 | 4.7 | |
| | | | | | | | P831_0070K202_0115 ME30 | | | | ≤38 | 10 | |

[1] *Based on input speed of 1500 RPM. See page 186 for details on torque calculations.*
[2] *Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
* *MF = Motor adapter with FlexiAdapt® coupling*

# Selection Data



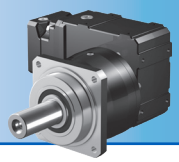
| Reducer Ratio (i) | | Output Torque | | | | Back-lash/ Red $\Delta\phi_2$ | Part Number* (Gearhead + Input) | Max. Input Speed RPM (n1) | | | Motor Shaft [3] Max Ø $d_{MW}$ | Input Inertia $J_1$ | Tors. Stiffness $C_2$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Nom. [1] $M_{2N}$ | Accel. $M_{2acc}$ | Accel. Torque for Reduced Backlash $M_{2accHT}$ | Peak [2] $M_{2NOT}$ | | | Continuous | | Cyclic | | | |
| Nom. | Exact | Nm | Nm | Nm | Nm | arcmin | | EL 1,2 | EL 3,4,5,6 | All | mm | kgcm² | Nm/ arcmin |
| **P8K** | | **(continued next page)** | | | | | | | | | | | |
| 83.97 | 24,940/297 | 850 | 1380 | 1380 | 2520 | 3.5/1.5 | P831_0100K202_0084 ME10 | 3500 | 3100 | 5000 | ≤19 | 1.4 | 131 |
| | | | | | 2760 | | P831_0100K202_0084 ME20 | | | | ≤32 | 4.8 | |
| | | | | | | | P831_0100K202_0084 ME30 | | | | ≤38 | 10 | |
| 86.47 | 7955/92 | 1100 | 1840 | 1867 | 2594 | 4.0/2.0 | P831_0050K302_0175 ME10 | 3500 | 3100 | 5000 | ≤19 | 1.4 | 128 |
| | | | | | 3230 | | P831_0050K302_0175 ME20 | | | | ≤32 | 4.8 | |
| | | | | | | | P831_0050K302_0175 ME30 | | | | ≤38 | 10 | |
| 88.94 | 3913/44 | 1000 | 1494 | 1494 | 2669 | 3.5/1.5 | P831_0070K202_0125 ME10 | 3900 | 3500 | 5500 | ≤19 | 1.1 | 128 |
| | | | | | 2887 | | P831_0070K202_0125 ME20 | 3700 | | | ≤32 | 4.5 | |
| | | | | | | | P831_0070K202_0125 ME30 | 3500 | | 5000 | ≤38 | 9.8 | |
| 91.90 | 11,395/124 | 850 | 1380 | 1380 | 2758 | 3.5/1.5 | P831_0100K202_0092 ME10 | 3500 | 3100 | 5000 | ≤19 | 1.6 | 131 |
| | | | | | 2760 | | P831_0100K202_0092 ME20 | | | | ≤32 | 5.0 | |
| | | | | | | | P831_0100K202_0092 ME30 | | | | ≤38 | 10 | |
| 96.96 | 20,167/208 | 1000 | 1494 | 1494 | 2887 | 3.5/1.5 | P831_0070K202_0140 ME10 | 3900 | 3500 | 5500 | ≤19 | 1.2 | 128 |
| | | | | | | | P831_0070K202_0140 ME20 | 3700 | | | ≤32 | 4.6 | |
| | | | | | | | P831_0070K202_0140 ME30 | 3500 | | 5000 | ≤38 | 9.9 | |
| 115.5 | 6235/54 | 850 | 1380 | 1380 | 2760 | 3.5/1.5 | P831_0100K202_0115 ME10 | 3500 | 3100 | 5000 | ≤19 | 1.3 | 131 |
| | | | | | | | P831_0100K202_0115 ME20 | | | | ≤32 | 4.7 | |
| | | | | | | | P831_0100K202_0115 ME30 | | | | ≤38 | 10 | |
| 116.5 | 2795/24 | 1100 | 1840 | 1867 | 3230 | 4.0/2.0 | P831_0050K302_0230 ME10 | 3800 | 3500 | 6000 | ≤19 | 1.1 | 128 |
| | | | | | | | P831_0050K302_0230 ME20 | 3700 | | | ≤32 | 4.5 | |
| | | | | | | | P831_0050K302_0230 ME30 | 3500 | | 5000 | ≤38 | 9.9 | |
| 118.0 | 20,769/176 | 1000 | 1494 | 1494 | 2887 | 3.5/1.5 | P831_0070K202_0170 ME10 | 4000 | 3900 | 6500 | ≤19 | 0.91 | 128 |
| | | | | | | | P831_0070K202_0170 ME20 | 3700 | 3700 | 6000 | ≤32 | 4.3 | |
| | | | | | | | P831_0070K202_0170 ME30 | 3500 | 3500 | 5000 | ≤38 | 9.6 | |
| 122.3 | 3913/32 | 1000 | 1494 | 1494 | 2887 | 3.5/1.5 | P831_0070K202_0175 ME10 | 3900 | 3500 | 5500 | ≤19 | 1.0 | 128 |
| | | | | | | | P831_0070K202_0175 ME20 | 3700 | | | ≤32 | 4.4 | |
| | | | | | | | P831_0070K202_0175 ME30 | 3500 | | 5000 | ≤38 | 9.7 | |

[1] *Based on input speed of 1500 RPM. See page 186 for details on torque calculations.*
[2] *Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
* *MF = Motor adapter with FlexiAdapt® coupling*

| Reducer Ratio (i) | | Output Torque | | | | Back-lash/ Red $\Delta\phi_2$ | Part Number* (Gearhead + Input) | Max. Input Speed RPM (n1) | | | Motor Shaft [3] Max Ø $d_{MW}$ | Input Inertia $J_1$ | Tors. Stiffness $C_2$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Nom. [1] $M_{2N}$ | Accel. $M_{2acc}$ | Accel. Torque for Reduced Backlash $M_{2accHT}$ | Peak [2] $M_{2NOT}$ | | | Continuous | | Cyclic | | | |
| Nom. | Exact | Nm | Nm | Nm | Nm | arcmin | | EL 1,2 | EL 3,4,5,6 | All | mm | kgcm² | Nm/ arcmin |
| **P8K** | | **(continued next page)** | | | | | | | | | | | |
| 138.5 | 14,405/104 | 850 | 1380 | 1380 | 2760 | 3.5/1.5 | P831_0100K202_0140 ME10 | 3900 | 3500 | 5500 | ≤19 | 1.1 | 131 |
| | | | | | | | P831_0100K202_0140 ME20 | 3700 | | | ≤32 | 4.6 | |
| | | | | | | | P831_0100K202_0140 ME30 | 3500 | | 5000 | ≤38 | 9.9 | |
| 139.4 | 17,845/128 | 1100 | 1840 | 1867 | 3230 | 4.0/2.0 | P831_0050K302_0280 ME10 | 3800 | 3500 | 6000 | ≤19 | 1.0 | 128 |
| | | | | | | | P831_0050K302_0280 ME20 | 3700 | | | ≤32 | 4.4 | |
| | | | | | | | P831_0050K302_0280 ME30 | 3500 | | 5000 | ≤38 | 9.7 | |
| 142.3 | 7826/55 | 1000 | 1494 | 1494 | 2887 | 3.5/1.5 | P831_0070K202_0200 ME10 | 4000 | 3900 | 6500 | ≤19 | 0.84 | 128 |
| | | | | | | | P831_0070K202_0200 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.7 | |
| 162.3 | 20,769/128 | 1000 | 1494 | 1494 | 2887 | 3.5/1.5 | P831_0070K202_0230 ME10 | 4000 | 3900 | 6500 | ≤19 | 0.88 | 128 |
| | | | | | | | P831_0070K202_0230 ME20 | 3700 | 3700 | 6000 | ≤32 | 4.3 | |
| | | | | | | | P831_0070K202_0230 ME30 | 3500 | 3500 | 5000 | ≤38 | 9.6 | |
| 173.7 | 4515/26 | 1100 | 1840 | 1867 | 3230 | 4.0/2.0 | P831_0050K302_0350 ME10 | 3800 | 3500 | 6000 | ≤19 | 0.90 | 128 |
| | | | | | | | P831_0050K302_0350 ME20 | 3700 | | | ≤24 | 2.8 | |
| 174.7 | 2795/16 | 850 | 1380 | 1380 | 2760 | 3.5/1.5 | P831_0100K202_0175 ME10 | 3900 | 3500 | 5500 | ≤19 | 1.0 | 131 |
| | | | | | | | P831_0100K202_0175 ME20 | 3700 | | | ≤32 | 4.4 | |
| | | | | | | | P831_0100K202_0175 ME30 | 3500 | | 5000 | ≤38 | 9.7 | |
| 175.9 | 1935/11 | 1000 | 1494 | 1494 | 2887 | 3.5/1.5 | P831_0070K202_0250 ME10 | 4000 | 3900 | 6500 | ≤19 | 0.77 | 128 |
| | | | | | | | P831_0070K202_0250 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.7 | |
| 195.7 | 3913/20 | 1000 | 1494 | 1494 | 2887 | 3.5/1.5 | P831_0070K202_0280 ME10 | 4000 | 3900 | 6500 | ≤19 | 0.81 | 128 |
| | | | | | | | P831_0070K202_0280 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.7 | |
| 231.1 | 1849/8 | 1100 | 1840 | 1867 | 3230 | 4.0/2.0 | P831_0050K302_0460 ME10 | 3800 | 3500 | 6000 | ≤19 | 0.79 | 128 |
| | | | | | | | P831_0050K302_0460 ME20 | 3700 | | | ≤24 | 2.7 | |
| 231.8 | 14,835/64 | 850 | 1380 | 1380 | 2760 | 3.5/1.5 | P831_0100K202_0230 ME10 | 4000 | 3900 | 6500 | ≤19 | 0.87 | 131 |
| | | | | | | | P831_0100K202_0230 ME20 | 3700 | 3700 | 6000 | ≤32 | 4.3 | |
| | | | | | | | P831_0100K202_0230 ME30 | 3500 | 3500 | 5000 | ≤38 | 9.6 | |
| 235.3 | 12,943/55 | 1000 | 1255 | 1255 | 2223 | 3.5/1.5 | P831_0070K202_0340 ME10 | 4000 | 3900 | 6500 | ≤19 | 0.72 | 128 |
| | | | | | | | P831_0070K202_0340 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.6 | |

[1] *Based on input speed of 1500 RPM. See page 186 for details on torque calculations.*
[2] *Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
* *MF = Motor adapter with FlexiAdapt® coupling*

# Selection Data



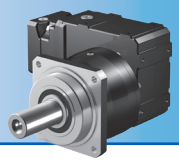
| Reducer Ratio (i) | | Output Torque | | | | Back-lash/ Red $\Delta\phi_2$ | Part Number* (Gearhead + Input) | Max. Input Speed RPM (n1) | | | Motor Shaft [3] Max Ø $d_{MW}$ | Input Inertia $J_1$ | Tors. Stiffness $C_2$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Nom. [1] $M_{2N}$ | Accel. $M_{2acc}$ | Accel. Torque for Reduced Backlash $M_{2accHT}$ | Peak [2] $M_{2NOT}$ | | | Continuous | | Cyclic | | | |
| Nom. | Exact | Nm | Nm | Nm | Nm | arcmin | | EL 1,2 | EL 3,4,5,6 | All | mm | kgcm² | Nm/ arcmin |
| **P8K** | | **(continued from previous page)** | | | | | | | | | | | |
| 241.9 | 1935/8 | 1000 | 1494 | 1494 | 2887 | 3.5 | P831_0070K202_0350 ME10 | 4000 | 3900 | 6500 | ≤19 | 0.76 | 128 |
| | | | | | | | P831_0070K202_0350 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.7 | |
| 278.5 | 12,255/44 | 1100 | 1541 | 1541 | 2729 | 4.0 | P831_0050K302_0560 ME10 | 3800 | 3500 | 6000 | ≤19 | 0.75 | 128 |
| | | | | | | | P831_0050K302_0560 ME20 | 3700 | | | ≤24 | 2.6 | |
| 279.5 | 559/2 | 850 | 1380 | 1380 | 2760 | 3.5 | P831_0100K202_0280 ME10 | 4000 | 3900 | 6500 | ≤19 | 0.81 | 131 |
| | | | | | | | P831_0100K202_0280 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.7 | |
| 282.8 | 9331/33 | 784 | 941 | 941 | 1418 | 3.5 | P831_0070K202_0400 ME10 | 4000 | 3900 | 6500 | ≤19 | 0.66 | 128 |
| 323.6 | 12,943/40 | 1000 | 1494 | 1494 | 2887 | 3.5 | P831_0070K202_0460 ME10 | 4000 | 3900 | 6500 | ≤19 | 0.71 | 128 |
| | | | | | | | P831_0070K202_0460 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.6 | |
| 345.5 | 9675/28 | 850 | 1380 | 1380 | 2760 | 3.5 | P831_0100K202_0350 ME10 | 4000 | 3900 | 6500 | ≤19 | 0.76 | 131 |
| | | | | | | | P831_0100K202_0350 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.7 | |
| 353.4 | 46,655/132 | 654 | 784 | 784 | 1329 | 3.5 | P831_0070K202_0500 ME10 | 4000 | 3900 | 6500 | ≤19 | 0.64 | 128 |
| 388.8 | 9331/24 | 1000 | 1294 | 1294 | 1949 | 3.5 | P831_0070K202_0560 ME10 | 4000 | 3900 | 6500 | ≤19 | 0.66 | 128 |
| 462.3 | 1849/4 | 850 | 1380 | 1380 | 2760 | 3.5 | P831_0100K202_0460 ME10 | 4000 | 3900 | 6500 | ≤19 | 0.71 | 131 |
| | | | | | | | P831_0100K202_0460 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.6 | 132 |
| 486.0 | 46,655/96 | 899 | 1078 | 1078 | 1828 | 3.5 | P831_0070K202_0690 ME10 | 4000 | 3900 | 6500 | ≤19 | 0.64 | 128 |
| 555.4 | 6665/12 | 850 | 1380 | 1380 | 2760 | 3.5 | P831_0100K202_0560 ME10 | 4000 | 3900 | 6500 | ≤19 | 0.66 | 131 |

[1] *Based on input speed of 1500 RPM. See page 186 for details on torque calculations.*
[2] *Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
* *MF = Motor adapter with FlexiAdapt® coupling*

| Reducer Ratio (i) | | Output Torque | | | | Back-lash/ Red $\Delta\phi_2$ | Part Number* (Gearhead + Input) | Max. Input Speed RPM (n1) | | | Motor Shaft [3] Max Ø $d_{MW}$ | Input Inertia $J_1$ | Tors. Stiffness $C_2$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Nom. [1] $M_{2N}$ | Accel. $M_{2acc}$ | Accel. Torque for Reduced Backlash $M_{2accHT}$ | Peak [2] $M_{2NOT}$ | | | Continuous | | Cyclic | | | |
| Nom. | Exact | Nm | Nm | Nm | Nm | arcmin | | EL 1,2 | EL 3,4,5,6 | All | mm | kgcm² | Nm/ arcmin |
| **P9K** | | **(continued next page)** | | | | | | | | | | | |
| 28.00 | 28/1 | 2076 | 3105 | - | 5600 | 3.5 | P931_0070K402_0040 ME30 | 2600 | 2200 | 3800 | ≤38 | 20 | 303 |
| | | | | | | | P931_0070K402_0040 ME40 | | | | ≤48 | 42 | |
| 30.55 | 336/11 | 2100 | 3105 | - | 6109 | 3.5 | P931_0070K402_0044 ME30 | 2600 | 2200 | 3800 | ≤38 | 19 | 304 |
| | | | | | | | P931_0070K402_0044 ME40 | | | | ≤48 | 41 | 303 |
| 37.95 | 12,943/341 | 2100 | 3105 | - | 6210 | 3.5 | P931_0070K402_0054 ME30 | 2600 | 2200 | 3800 | ≤38 | 16 | 304 |
| | | | | | | | P931_0070K402_0054 ME40 | | | | ≤48 | 38 | |
| 42.00 | 42/1 | 2100 | 3105 | - | 6210 | 3.5 | P931_0070K402_0060 ME30 | 2600 | 2200 | 3800 | ≤38 | 17 | 304 |
| | | | | | | | P931_0070K402_0060 ME40 | | | | ≤48 | 39 | |
| 47.03 | 1505/32 | 2100 | 2656 | - | 3529 | 3.5 | P931_0070K402_0067 ME20 | 3000 | 2600 | 4500 | ≤32 | 8.6 | 303 |
| | | | 3105 | | 6210 | | P931_0070K402_0067 ME30 | | | | ≤38 | 14 | 304 |
| | | | | | | | P931_0070K402_0067 ME40 | | | | ≤48 | 36 | |
| 52.19 | 12,943/248 | 2100 | 3105 | - | 6210 | 3.5 | P931_0070K402_0075 ME30 | 2600 | 2200 | 3800 | ≤38 | 15 | 305 |
| | | | | | | | P931_0070K402_0075 ME40 | | | | ≤48 | 37 | |
| 58.64 | 645/11 | 2100 | 3105 | - | 4399 | 3.5 | P931_0070K402_0084 ME20 | 3000 | 2600 | 4500 | ≤32 | 7.2 | 304 |
| | | | | | 6210 | | P931_0070K402_0084 ME30 | | | | ≤38 | 13 | 305 |
| | | | | | | | P931_0070K402_0084 ME40 | | | | ≤48 | 35 | |
| 64.67 | 16,555/256 | 2100 | 3105 | - | 4852 | 3.5 | P931_0070K402_0092 ME20 | 3000 | 2600 | 4500 | ≤32 | 7.8 | 304 |
| | | | | | 6210 | | P931_0070K402_0092 ME30 | | | | ≤38 | 13 | 305 |
| | | | | | | | P931_0070K402_0092 ME40 | | | | ≤48 | 35 | |
| 70.69 | 9331/132 | 2100 | 3105 | - | 5302 | 3.5 | P931_0070K402_0100 ME20 | 3400 | 3000 | 5000 | ≤32 | 6.4 | 304 |
| | | | | | 6210 | | P931_0070K402_0100 ME30 | 3400 | 3000 | 5000 | ≤38 | 12 | 305 |
| | | | | | | | P931_0070K402_0100 ME40 | 3000 | | 4500 | ≤48 | 34 | |
| 80.63 | 645/8 | 2100 | 3105 | - | 6049 | 3.5 | P931_0070K402_0115 ME20 | 3000 | 2600 | 4500 | ≤32 | 6.7 | 305 |
| | | | | | 6210 | | P931_0070K402_0115 ME30 | | | | ≤38 | 12 | |
| | | | | | | | P931_0070K402_0115 ME40 | | | | ≤48 | 34 | |
| 88.61 | 2924/33 | 2100 | 3105 | - | 6210 | 3.5 | P931_0070K402_0125 ME20 | 3400 | 3000 | 5000 | ≤32 | 5.7 | 305 |
| | | | | | | | P931_0070K402_0125 ME30 | | | | ≤38 | 11 | |
| | | | | | | | P931_0070K402_0125 ME40 | 3000 | | 4500 | ≤48 | 33 | |

[1] *Based on input speed of 1500 RPM. See page 186 for details on torque calculations.*
[2] *Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
* *MF = Motor adapter with FlexiAdapt® coupling*

# Selection Data

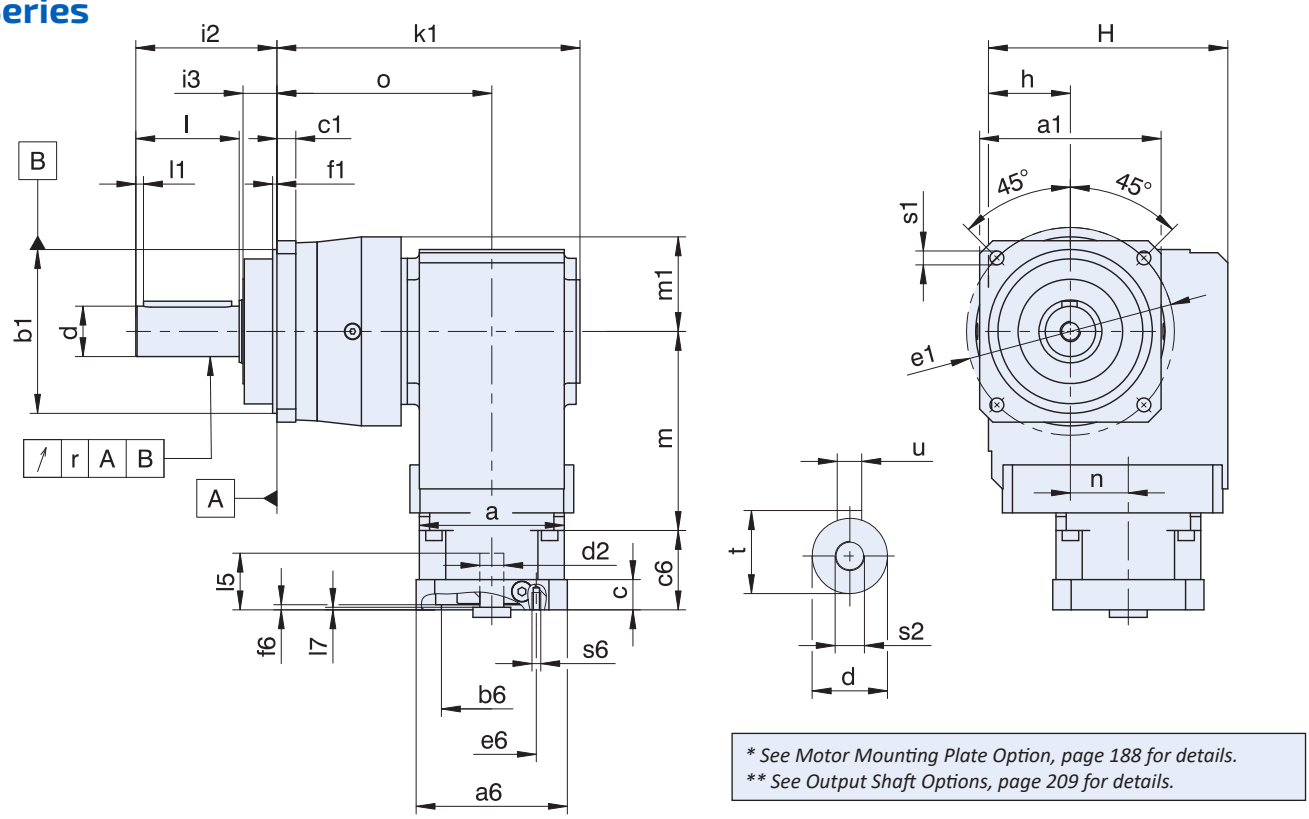


| Reducer Ratio (i) | | Output Torque | | | | Back-lash/ Red $\Delta\phi_2$ | Part Number* (Gearhead + Input) | Max. Input Speed RPM (n1) | | | Motor Shaft [3] Max Ø $d_{MW}$ | Input Inertia $J_1$ | Tors. Stiffness $C_2$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Nom. [1] $M_{2N}$ | Accel. $M_{2acc}$ | Accel. Torque for Reduced Backlash $M_{2accHT}$ | Peak [2] $M_{2NOT}$ | | | Continuous | | Cyclic | | | |
| Nom. | Exact | Nm | Nm | Nm | Nm | arcmin | | EL 1,2 | EL 3,4,5,6 | All | mm | kgcm² | Nm/ arcmin |
| **P9K** | | **(continued from previous page)** | | | | | | | | | | | |
| 97.20 | 9331/96 | 2100 | 3105 | - | 6210 | 3.5 | P931_0070K402_0140 ME20 | 3400 | 3000 | 5000 | ≤32 | 6.1 | 305 |
| | | | | | | | P931_0070K402_0140 ME30 | | | | ≤38 | 12 | |
| | | | | | | | P931_0070K402_0140 ME40 | 3000 | | 4500 | ≤48 | 33 | |
| 118.6 | 3913/33 | 2100 | 3105 | - | 6210 | 3.5 | P931_0070K402_0170 ME20 | 3600 | 3300 | 5500 | ≤32 | 5.1 | 305 |
| | | | | | | | P931_0070K402_0170 ME30 | 3500 | | 5000 | ≤38 | 11 | |
| | | | | | | | P931_0070K402_0170 ME40 | 3000 | 3000 | 4500 | ≤48 | 32 | |
| 121.8 | 731/6 | 2100 | 3105 | - | 6210 | 3.5 | P931_0070K402_0175 ME20 | 3400 | 3000 | 5000 | ≤32 | 5.5 | 305 |
| | | | | | | | P931_0070K402_0175 ME30 | | | | ≤38 | 11 | |
| | | | | | | | P931_0070K402_0175 ME40 | 3000 | | 4500 | ≤48 | 33 | |
| 141.4 | 9331/66 | 2100 | 3105 | - | 6210 | 3.5 | P931_0070K402_0200 ME20 | 3600 | 3300 | 5500 | ≤32 | 4.8 | 305 |
| | | | | | | | P931_0070K402_0200 ME30 | 3500 | | 5000 | ≤38 | 10 | |
| 163.0 | 3913/24 | 2100 | 3105 | - | 6210 | 3.5 | P931_0070K402_0230 ME20 | 3600 | 3300 | 5500 | ≤32 | 4.9 | 305 |
| | | | | | | | P931_0070K402_0230 ME30 | 3500 | | 5000 | ≤38 | 10 | |
| | | | | | | | P931_0070K402_0230 ME40 | 3000 | 3000 | 4500 | ≤48 | 32 | |
| 177.0 | 29,197/165 | 2100 | 3105 | - | 6210 | 3.5 | P931_0070K402_0250 ME20 | 3600 | 3300 | 5500 | ≤32 | 4.6 | 305 |
| | | | | | | | P931_0070K402_0250 ME30 | 3500 | | 5000 | ≤38 | 9.9 | |
| 194.4 | 9331/48 | 2100 | 3105 | - | 6210 | 3.5 | P931_0070K402_0280 ME20 | 3600 | 3300 | 5500 | ≤32 | 4.7 | 305 |
| | | | | | | | P931_0070K402_0280 ME30 | 3500 | | 5000 | ≤38 | 10 | |
| 235.7 | 33,712/143 | 2100 | 3105 | - | 5125 | 3.5 | P931_0070K402_0340 ME20 | 3600 | 3300 | 5500 | ≤24 | 2.8 | 305 |
| 243.3 | 29,197/120 | 2100 | 3105 | - | 6210 | 3.5 | P931_0070K402_0350 ME20 | 3600 | 3300 | 5500 | ≤32 | 4.5 | 305 |
| | | | | | | | P931_0070K402_0350 ME30 | 3500 | | 5000 | ≤38 | 9.8 | |
| 283.6 | 34,314/121 | 2092 | 2510 | - | 4446 | 3.5 | P931_0070K402_0410 ME20 | 3600 | 3300 | 5500 | ≤24 | 2.8 | 305 |
| 324.2 | 4214/13 | 2100 | 3105 | - | 6210 | 3.5 | P931_0070K402_0460 ME20 | 3600 | 3300 | 5500 | ≤24 | 2.8 | 305 |
| 353.0 | 38,829/110 | 1830 | 2196 | - | 3890 | 3.5 | P931_0070K402_0500 ME20 | 3600 | 3300 | 5500 | ≤24 | 2.7 | 305 |
| 389.9 | 17157/44 | 2100 | 3105 | - | 6113 | 3.5 | P931_0070K402_0560 ME20 | 3600 | 3300 | 5500 | ≤24 | 2.7 | 305 |
| 485.4 | 38,829/80 | 2100 | 3020 | - | 5349 | 3.5 | P931_0070K402_0690 ME20 | 3600 | 3300 | 5500 | ≤24 | 2.7 | 305 |



[1] *Based on input speed of 1500 RPM. See page 186 for details on torque calculations.*
[2] *Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
* *MF = Motor adapter with FlexiAdapt® coupling*

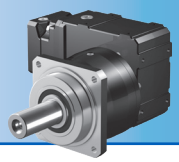
## PK Series




** See Motor Mounting Plate Option, page 188 for details.*
*** See Output Shaft Options, page 209 for details.*

**Table 1 Dimensions (mm)**

| Unit | Øa1 | Øb1 | c1 | Ød | Øe1 | f1 | h | H | i2 | i3 | k1 | l | l1 | m1 | o | r | Øs1 | s2 | t | u |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| P531_K102 | 101 | $90^{h6}$ | 10 | $32^{k6}$ | 120 | 15.0 | 60 | 160 | 88 | 28 | 199.5 | 58 | 3 | 60.0 | 143.5 | 0.030 | 9.0 | M12 | 35.0 | A10×8×50 |
| P731_K102 | 144 | $130^{h6}$ | 15 | $40^{k6}$ | 165 | 3.5 | 60 | 160 | 112 | 27 | 212.5 | 82 | 4 | 75.0 | 156.5 | 0.035 | 11.0 | M16 | 43.0 | A12×8×70 |
| P731_K202 | 144 | $130^{h6}$ | 15 | $40^{k6}$ | 165 | 3.5 | 65 | 190 | 112 | 27 | 240.5 | 82 | 4 | 75.0 | 170.5 | 0.035 | 11.0 | M16 | 43.0 | A12×8×70 |
| P831_K202 | 190 | $160^{h6}$ | 15 | $55^{k6}$ | 215 | 10.0 | 65 | 190 | 112 | 27 | 277.5 | 82 | 6 | 102.0 | 207.5 | 0.035 | 13.5 | M20 | 59.0 | A16×10×70 |
| P831_K302 | 190 | $160^{h6}$ | 15 | $55^{k6}$ | 215 | 10.0 | 75 | 213 | 112 | 27 | 291.0 | 82 | 6 | 102.0 | 215.0 | 0.035 | 13.5 | M20 | 59.0 | A16×10×70 |
| P931_K402 | 212 | $180^{h6}$ | 17 | $75^{k6}$ | 250 | 10.0 | 90 | 240 | 143 | 34 | 350.5 | 105 | 7 | 115.0 | 260.5 | 0.040 | 17.5 | M20 | 79.5 | A20×12×90 |



# Dimensional Data

## Motor Mounting Plate

**Table 2** Dimensions (mm)

| Base Right Angle Module | Motor Adapter Code | | | | | | | | | | | | Wt. lbs. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ME10 | | | ME20 | | | ME30 | | | ME40 | | | |
| | C | m | n | C | m | n | C | m | n | C | m | n | |
| P531_K102 | Ø98 | 124 | 36 | Ø115 | 128 | 36 | — | — | — | — | — | — | 31 |
| P731_K102 | Ø98 | 124 | 36 | Ø115 | 128 | 36 | — | — | — | — | — | — | 31 |
| P731_K202 | Ø98 | 143 | 46 | Ø115 | 147 | 46 | Ø145 | 149 | 46 | — | — | — | 40 |
| P831_K202 | Ø98 | 143 | 46 | Ø115 | 147 | 46 | Ø145 | 149 | 46 | — | — | — | 40 |
| P831_K302 | Ø140 | 163 | 53 | Ø115 | 167 | 53 | Ø145 | 169 | 53 | — | — | — | 67 |
| P931_K402 | – | – | – | Ø160 | 187 | 60 | Ø145 | 189 | 60 | Ø190 | 192 | 60 | 93 |

**Table 3** Dimensions (mm)

| Motor Adapter Code | Thickness [2] c Min. | Motor Shaft d2 Max. [1] | X | Wt. lbs. |
|---|---|---|---|---|
| ME10 | 21 | 19 | 40 | 5 |
| ME20 | 24 | 32 | 50 | 8 |
| ME30 | 25 | 38 | 60 | 12 |
| ME40 | 33 | 48 | 88 | 18 |

*1) If an adapter bushing is required it will be supplied as a component of the motor mounting plate.*

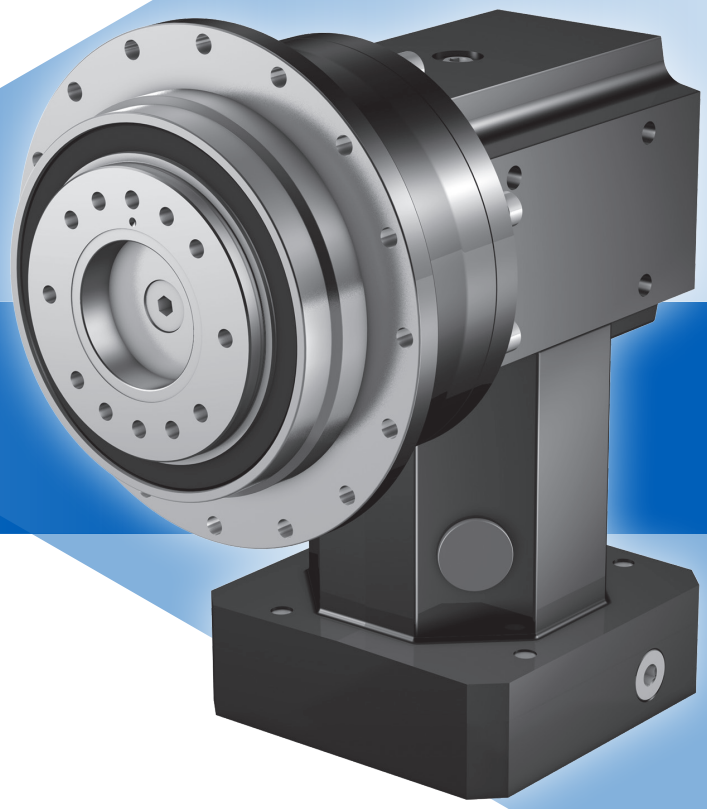
*2) Motor plate maximum thickness (L9) will vary with motor shaft length but will not be less than shown.*

# PHKX Series: RIGHT ANGLE – Flange Output

## PHKX Features

- 4:1 to 300:1 ratios (higher ratios available. Contact STOBER.)
- Quiet running (<64dB(A))
- High load capacity and tilting rigidity through symmetrical bearing arrangement
- FKM seals for extended gearbox life
- Large motor input option to accept bigger diameter motor shafts so you don't use an oversized gearbox
- Error free motor mounting and quick changeover with toleranced pilot on motor plate
- Low no load running torque, giving you more torque for your application
- Magnetic oil filtration to remove contaminants to prevent breakdowns
- Build and ship in one day
- Assembled in the USA

*STOBER PHKX provides a right angle option with planetary gearing. Every gearbox is made to order. STOBER will custom whatever you need to fit your application. Contact us today to learn more.*



SHIPS in 1 DAY!
NO EXPEDITE FEE FOR 24 HOUR SERVICE

## General Specifications

| | |
|---|---|
| **Ambient Temperature** | 0°C to +40°C (104°F) [Unit temperature <90°C Max] |
| **Backlash** | ≤3.5 (see performance overview chart on page 206 |
| **Coating** | Standard Black (RAL-9005) |
| **Degree of Protection** | IP65 |
| **Direction of Rotation** | See page 207 |
| **Efficiency** | PHKX: 1 stage 96%, 2 stage 94% |
| **Input RPM** | Up to 6,000 RPM |
| **Installation** | Requires 12.9 fasteners. See page 288, for more information |
| **Lubrication** | Lubricated for life – standard Mobil SHC629; option food grade Mobil SHC CIBUS 150 |
| **Mounting Position** | Must be specified, see page 207 |
| **Warranty** | 5 Year Limited (2 Years on normal wear items: bearings, seals, etc.) |



# Overview

## Selection Options *At-a-Glance*

Using the **Selection Data** table later in this section, select the PHKX Series Gearhead with the appropriate performance and design options tailored to your motor choice and exact application requirements. Use the part number guide below as a reference to build a part number for the complete gearhead assembly.

**Part Number Examples:**

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 0 | ! | @ | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PHKX | PH | 3 | 3 | 1 | S | F | S | S | 0040 | KX301VF | 0010 | MF | EL1 * |

| | Design Option | Part Number Code | Description |
|---|---|---|---|
| 1 | **Series** | PH | Rotating flange output planetary |
| 2 | **Size** | 3 4 5 7 8 9 10 | 7 sizes of gearhead |
| 3 | **Generation** | 3<br>4 | sizes 3-8<br>sizes 9 and 10 |
| 4 | **# of Stages** | 1<br>2 | One stage for ratios of ≤ 10:1<br>Two stage for ratios >30:1 |
| 5 | **Housing** | S | Standard mounting style |
| 6 | **Output Shaft** | F | Flange output |
| 7 | **Bearing** | S<br>V | Standard<br>Reinforced Bearing (Sizes 3-5) |
| 8 | **Backlash** | S<br>R | Standard Backlash<br>Reduced Backlash (PH3-9) |
| 9 | **Ratio** | 0040 | Ratios range from 4:1 to 100:1<br>(0040=4:1; 0055=5.5:1; 1000=100:1, ect.) |
| 0 | **Secondary Unit** | KX301VF | KX Series right angle unit: 5 sizes, 1 stage, without output shaft (V) and with flange (F) |
| ! | **Secondary Unit Ratio** | 0010 | Ratios from 1:1 to 3:1 (0010=1:1; 0020=2:1; 0030=3:1) |
| @ | **Motor Adapter** | MF | Motor Adapter with FlexiAdapt coupling |
| * | **Mounting Position** | EL1 EL2 EL3<br>EL4 EL5 EL6 | Required special instruction for all units, see page 207 |

## Options

### Coating Options

- Available with multi-layer, industrial 316 stainless steel epoxy coating. Contact factory for this option.

### ATEX

- ATmosphere EXplosible – rated for explosive environments. Contact factory for this option and allow additional time for delivery.

## PHKX Performance Overview

PH Series performance is dependent on several factors including duty cycle, bearing design, gearhead size and stage configuration, among others. Use the chart below for preliminary evaluation, then use the following performance chart and selection information on the following pages for specific performance sizing and selection.

| Size/Generation/# of Stages | | PH331 | PH332 | PH431 | PH432 | PH531 | PH532 | PH731 | PH732 | PH831 | PH832 | PH942 | PH1042 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Secondary Unit | | KX3 | KX3 | KX4 | KX3 | KX5 | KX4 | KX7 | KX5 | KX7 | KX7 | KX7 | KX7 |
| **Acceleration Torque** $M_{2BMAX}$ | Nm | 75 | 80 | 160 | | 370 | 385 | 840 | 866 | 1200 | 2100 | 4883 | 4883 |
| **Output Torque Nom.** [1] $M_{2N}$ | Nm | 53 | | 110 | | 296 | | 600 | | 1557 | | 3500 | |
| **Torsional Stiffness** $C_2$ | Nm/arcmin | 8.4 | 13 | 19 | 30 | 46 | 78 | 122 | 176 | 253 | 489 | 1035 | 1545 |
| **Torsional Backlash** [2] | Δϕ | ≤5 | ≤4 | ≤4 | ≤3 | ≤4 | ≤3 | ≤4 | ≤3 | ≤4 | ≤3 | ≤3 | ≤3 |
| | Δϕ Reduced | ≤3 | ≤2 | ≤2 | ≤1 | ≤2 | ≤1 | ≤2 | ≤1 | ≤2 | ≤1 | ≤1 | - |
| | arcmin | | | | | | | | | | | | |
| **Input Speed Max.** $n_{1MAX}$ | Continuous | 3500 | | 3000 | 3500 | 3000 | | 2100 | 3000 | 2100 | 2100 | 2100 | 2100 |
| | Cyclic | 6000 | | 5500 | 6000 | 5000 | | 4000 | 5000 | 4000 | 4500 | 4000 | 4000 |
| **Efficiency (@nom torque)** | % | 95 | 92 | 95 | 92 | 95 | 92 | 95 | 92 | 95 | 92 | 92 | 92 |
| **Weight** | kg | 3.5 | 4.0 | 7.9 | 6.5 | 13.5 | 11.8 | 25.5 | 21.8 | 43.9 | 49.4 | 77 | 93 |
| | lbs | 7.7 | 8.8 | 17.4 | 14.3 | 29.7 | 26 | 56.1 | 48 | 96.6 | 108.7 | 170 | 250 |
| **Noise** [3] | dB(A) | ≤64 | | ≤66 | ≤64 | ≤68 | ≤66 | ≤70 | ≤68 | ≤70 | | ≤70 | ≤70 |
| **Performance by Bearing Design Option** [4] | | | | | | | | | | | | | |
| **Permitted Axial Force** $F_{2ax100}$ | N | 1650 | | 2150 | | 4150 | | 6150 | | 10,050 | | 33,000 | 50,000 |
| **Permitted Tilting Torque** $M_{2K100}$ | Nm | 101 | | 257 | | 440 | | 1466 | | 3486 | | 7500 | 8800 |
| **Performance by Reinforced Bearing Design Option** | | | | | | | | | | | | | |
| **Permitted Axial Force** $F_{2ax100}$ | N | 2200 | | 2900 | | 5000 | | — | | — | | — | — |
| **Permitted Tilting Torque ≤100RPM** $M_{2K100}$ | Nm | 150 | | 354 | | 572 | | — | | — | | — | — |

[1] *Ratings based on input speed ($n_1$) of 1500 RPM.*

*For torque at higher input speeds ($M_{2NX}$) solve the formula:*
*where $n_1$ = Actual Input Speed.*

$$M_{2NX} = \frac{M_{2N}}{\sqrt[3]{\frac{n_1}{1500}}}$$

[2] *Tested at 1.5% of nominal torque and recorded on the output side of the gearhead. For lower backlash, contact STOBER technical support.*

[3] *Measurement at one (1) meter distance with input speed ($n_1$) of 1500 RPM.*

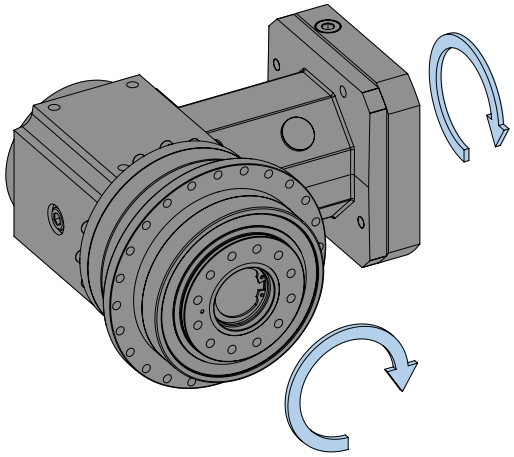
[4] *Rating based on output speed ($n_2$) of 100 RPM. For values at other speeds see page 209.*



# Overview

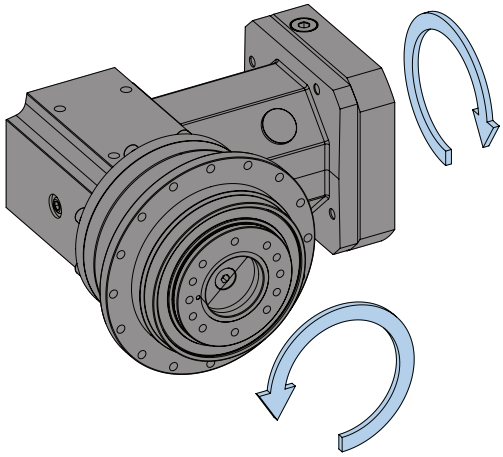
## PHKX Series Direction of Rotation

**CW**



1 Stage Units (PH7 thru PH10)
2 Stage Units (PH7 thru PH10)

**CCW**

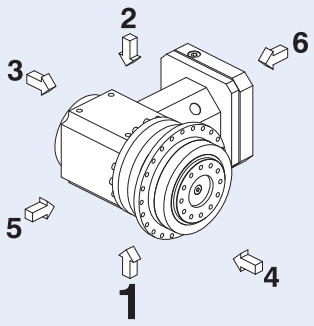


1 Stage Units (PH3 thru PH5)
2 Stage Units (PH3 thru PH5)

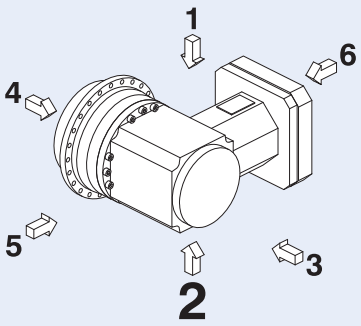
## PHKX Mounting Position Options

Horizontal Positions (EL1, EL2, EL5, EL6) are interchangeable;

Vertical Positions (EL3 and EL4) MUST BE SPECIFIED

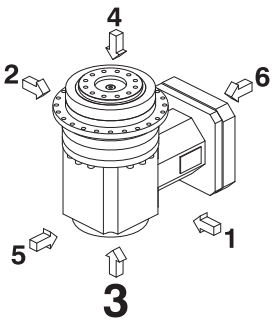



EL1

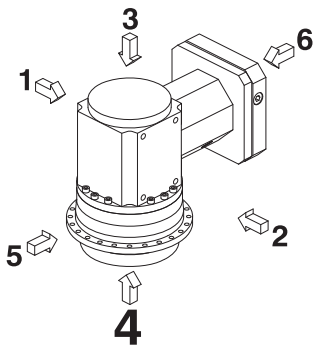



EL2

**IMPORTANT:** Mounting PHKX in either vertical mounting position (EL3 or EL4) must be specified when ordering.

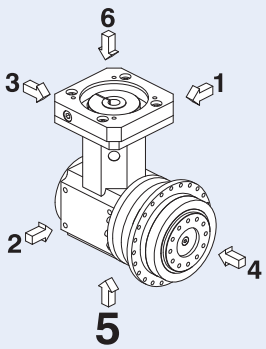



EL3

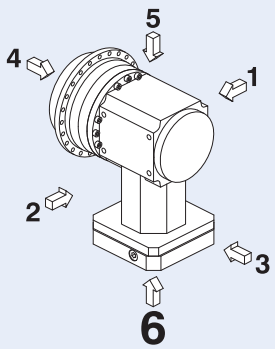



EL4

**IMPORTANT:** Mounting PHKX in either vertical mounting position (EL3 or EL4) must be specified when ordering.




EL5




EL6

## PHKX Series Motor Mounting Plate Option

STOBER Servo Gearheads fit the motor of your choice with the appropriate motor mounting plate assembled between the motor and the gearhead.

**NOTE: When ordering a gearhead:**

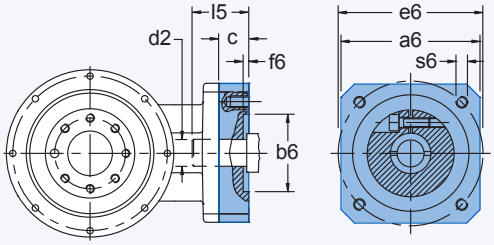
- Specify the motor manufacturer and part number
- Provide the motor drawing with dimensions, or specify the motor mounting dimensions (per the list shown at right)

For a precise dimension on a specific motor, or for general assistance, we recommend you contact STOBER Technical Support.

**Customer Required Dimensions for Properly Sized Motor Mounting Plate**

Motor information required with Motor Adapter (MF option for PHKX)

| | |
|---|---|
| d2 | Motor Shaft Diameter (If an adapter bushing is required it will be supplied with the motor plate.) |
| b6 | Pilot Diameter |
| e6 | Bolt Circle Diameter |
| s6 | Bolt Diameter |
| l5 | Motor Shaft Length |
| f6 | Pilot Length |
| a6 | Square Flange (Optional – motor plate will typically be made to match this dimension.) |

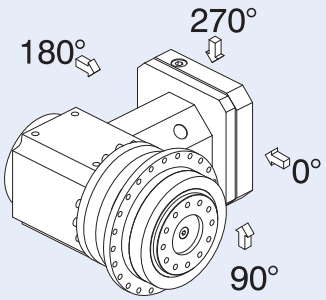


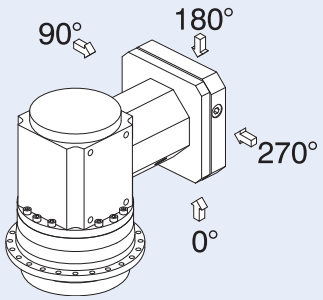

| PHKX Motor Mounting Plate Dimensions — mm (Gearhead Part Number Specific) | PH331KX3<br>PH332KX3<br>PH432KX3 | PH431KX4<br>PH532KX4 | PH531KX5<br>PH732KX5 | PH731KX7<br>PH831KX7<br>PH832KX7<br>PH942KX7<br>PH1042KX7 |
|---|---|---|---|---|
| Maximum Allowed Motor Shaft Dia. d2 | 19 | 24 | 32 | 38 |
| Minimum Allowed Motor Plate Thickness c* | 18 | 21 | 24 | 25 |

** Note that the c motor plate thickness is determined by the motor shaft length. The minimum motor plate thickness is the value listed.*

## PHKX Series Motor Mounting Plate Access Hole

Access to the clamping screw for the motor coupling is located on the 270° side of the motor mounting plate at the location shown. If necessary, the motor mounting plate can be rotated in the field, if a 0°, 90° or 180° orientation for the access hole is desirable.

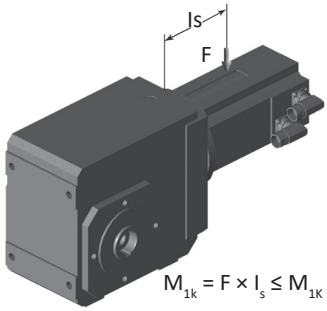



## PHKX Series Permissible Motor Tilting Torque

The permissible tilting torque of the motor attached to the gear unit is a result of the static and dynamic load "F" from the motor weight, mass acceleration, and vibration multiplied by the distance from the center of gravity "$l_s$" of the motor.

| $M_{1K}$ | PHKX (MF Motor Adapters) | | | |
|---|---|---|---|---|
| | PHKX3 | PHKX4 | PHKX5 | PHKX7 |
| Nm | 12 | 24 | 50 | 100 |





# Overview

## PHKX Series Permissible Output Shaft Load and Tilting Moments – Standard Bearings

| Size | $Z_2$ Distance of Shaft Shoulder to Center of Output Bearing mm | $F_{2ax100}$ Permitted Axial Force N | $F_{2rad100}$ Permitted Radial Force ≤100RPM N | $F_{2rad,acc}$ Radial Acceleration Force N | $M_{2K100}$ Permitted Tilting Torque ≤100RPM Nm | $M_{2K,acc}$ Permitted Acceleration Tilting Torque Nm | $C_{2K}$ Tilting Stiffness Nm/arcmin |
|---|---|---|---|---|---|---|---|
| 3 | 62.5 | 1650 | 1613 | 1613 | 101 | 101 | 75 |
| 4 | 83.0 | 2150 | 3095 | 3571 | 257 | 296 | 192 |
| 5 | 97.0 | 4150 | 4536 | 4897 | 440 | 475 | 429 |
| 7 | 86.0 | 6150 | 17,045 | 17,045 | 1466 | 1466 | 500 |
| 8 | 125.5 | 10,050 | 27,778 | 27,778 | 3486 | 3486 | 1550 |
| 9 | 155.0 | 33,000 | 48,387 | 70,968 | 7500 | 11,000 | 7500 |
| 10 | 171.0 | 50,000 | 51,462 | 73,099 | 8800 | 12,500 | 9500 |

## PHKX Series Permissible Output Shaft Load and Tilting Moments – Reinforced Bearings

| Size | $Z_2$ Distance of Shaft Shoulder to Center of Output Bearing mm | $F_{2ax100}$ Permitted Axial Force N | $F_{2rad100}$ Permitted Radial Force ≤100RPM N | $F_{2rad,acc}$ Radial Acceleration Force N | $M_{2K100}$ Permitted Tilting Torque ≤100RPM Nm | $M_{2K,acc}$ Permitted Acceleration Tilting Torque Nm | $C_{2K}$ Tilting Stiffness Nm/arcmin |
|---|---|---|---|---|---|---|---|
| 3 | 66.5 | 2200 | 2250 | 2250 | 150 | 150 | 80 |
| 4 | 88.5 | 2900 | 4000 | 4000 | 354 | 354 | 217 |
| 5 | 104.0 | 5000 | 5500 | 5500 | 572 | 572 | 478 |

## PHKX Series Load/Life/Speed Calculations

The permissible load and tilting moment values are based on an output speed of 100 RPM. For higher speeds the following applies, where $n_2$ is the desired speed:

$$F_{2radN} = \frac{F_{2rad100}}{\sqrt[3]{\frac{n_{2m*}}{100rpm}}} \qquad F_{2AX} = \frac{F_{2ax100}}{\sqrt[3]{\frac{n_2}{100}}} \qquad M_{2KX} = \frac{M_{2K100}}{\sqrt[3]{\frac{n_2}{100}}}$$

The application output tilting moment should be determined by the following formula:

$$M_{2k,acc*} = \frac{2 \bullet F_{2ax100*} \bullet y_2 + F_{2rad,acc*} \bullet (x_2 + Z_2)}{1000} \leq M_{2k,acc}$$

$$M_{2k,eq*} = \sqrt[3]{\frac{n_{2b1} \bullet t_{b1} \bullet M_{2kb1}{}^3 + \ldots + n_{2bn} \bullet t_{bn} \bullet M_{2kbn}{}^3}{n_{2b1} \bullet t_{b1} + \ldots + n_{2bn} \bullet t_{bn}}} \leq M_{2kN}$$

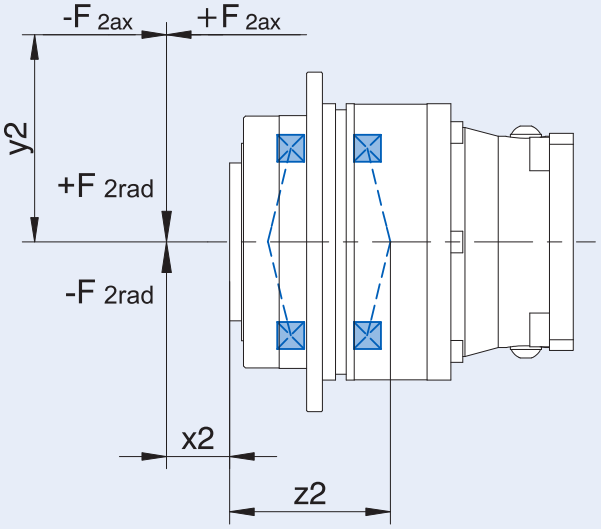
$$F_{2rad,eq*} = \sqrt[3]{\frac{n_{2b1} \bullet t_{b1} \bullet F_{2rb1}{}^3 + \ldots + n_{2bn} \bullet t_{bn} \bullet F_{2rbn}{}^3}{n_{2b1} \bullet t_{b1} + \ldots + n_{2bn} \bullet t_{bn}}} \leq F_{2radN}$$

Where:

| | |
|---|---|
| $Z_2$ | Distance of Shaft Shoulder to Center of Output Bearing |
| $n_2$ | Actual Average Output Speed |
| $X_2$ | Distance of the Shaft Shoulder to the Force Application Point |
| $Y_2$ | Distance of the Shaft Axis to the Axial Force Application Point |
| $F_{2ax*}$ | Actual Axial Force at Gear Unit Output |
| $F_{2ax100}$ | Permitted Axial Force |
| $F_{2rad100}$ | Permitted Radial Force ≤100RPM |
| $F_{2rad,acc}$ | Radial Acceleration Force |
| $F_{2rad,acc*}$ | Radial Acceleration Force at Gear Unit Output |
| $M_{2K100}$ | Permitted Tilting Torque ≤100RPM |
| $M_{2K,acc}$ | Permitted Acceleration Tilting Torque |
| $M_{2k,acc*}$ | Permitted Acceleration Tilting Torque at Gear Unit Output |
| $C_{2K}$ | Tilting Stiffness |

**All formulas shown are based on METRIC values**

*Upper case letters are permissible values. Lower case letters are for existing values.*




The hours of life ($L_h$) of the unit can be determined by the following formula:

**bearing life for duty cycle ≤ 40%**

$L_h$ > 10,000 hours if $M_{2K100}/M_{2A*}$ < 1.25 and > 1
$L_h$ > 20,000 hours if $M_{2K100}/M_{2A*}$ > 1.25 and > 1.5
$L_h$ > 30,000 hours if $M_{2K100}/M_{2A*}$ < 1.5

**bearing life for duty cycle ≥ 40%**

$$L_{hA} = L_h \left(\frac{40\%}{\text{Duty Cycle}}\right)$$

| Exact Ratio (i) | Output Torque: Nom. $M_{2N}$ [1] | Output Torque: Accel. $M_{2acc}$ | Output Torque: Accel. Torque for Reduced Backlash $M_{2accHT}$ | Output Torque: Peak $M_{2NOT}$ [2] | Back-lash $\Delta\phi_2$ | Red. Back-lash $\Delta\phi_{2red}$ | Part Number* (Gearhead + Input) | Max. Input Speed RPM (n1): Continuous EL 1,2,5,6 | Max. Input Speed RPM (n1): Continuous EL 3,4 | Max. Input Speed RPM (n1): Cyclic | Motor Shaft [3] Max Ø $d_{MW}$ | Input Inertia $J_1$ | Tors. Stiffness $C_2$ | Oper. Noise $L_{pA}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Nm | Nm | Nm | Nm | arcmin | arcmin | | | | All | mm | kgcm² | Nm/ arcmin | dB(A) |
| **PH3KX** | | | | | | | | | | | | | | |
| 5.000 | 45 | 62 | 62 | 115 | 6.0 | 4.0 | PH331_0050KX301_0010 MF | 3000 | 2500 | 4500 | ≤19 | 1.1 | 6.9 | 70 |
| 7.000 | 45 | 75 | 77 | 150 | 5.5 | 3.5 | PH331_0070KX301_0010 MF | 3000 | 2500 | 4500 | ≤19 | 1.0 | 8.4 | 70 |
| 10.00 | 45 | 62 | 62 | 130 | 6.0 | 4.0 | PH331_0050KX301_0020 MF | 3500 | 3000 | 5500 | ≤19 | 0.82 | 6.9 | 66 |
| 14.00 | 45 | 75 | 77 | 150 | 5.5 | 3.5 | PH331_0070KX301_0020 MF | 3500 | 3000 | 5500 | ≤19 | 0.81 | 8.4 | 66 |
| 15.00 | 45 | 62 | 62 | 130 | 6.0 | 4.0 | PH331_0050KX301_0030 MF | 3500 | 3500 | 6000 | ≤19 | 0.75 | 6.9 | 64 |
| 20.00 | 36 | 60 | 60 | 120 | 5.0 | 3.0 | PH331_0100KX301_0020 MF | 3500 | 3000 | 5500 | ≤19 | 0.81 | 7.8 | 66 |
| 21.00 | 45 | 75 | 77 | 150 | 5.5 | 3.5 | PH331_0070KX301_0030 MF | 3500 | 3500 | 6000 | ≤19 | 0.75 | 8.4 | 64 |
| 30.00 | 36 | 60 | 60 | 120 | 5.0 | 3.0 | PH331_0100KX301_0030 MF | 3500 | 3500 | 6000 | ≤19 | 0.75 | 7.8 | 64 |
| 35.00 | 50 | 80 | 85 | 160 | 4.5 | 2.5 | PH332_0350KX301_0010 MF | 3000 | 2500 | 4500 | ≤19 | 1.0 | 13 | 70 |
| 40.00 | 45 | 80 | 85 | 160 | 4.5 | 2.5 | PH332_0200KX301_0020 MF | 3500 | 3000 | 5500 | ≤19 | 0.81 | 13 | 66 |
| 50.00 | 50 | 80 | 85 | 160 | 4.5 | 2.5 | PH332_0250KX301_0020 MF | 3500 | 3000 | 5500 | ≤19 | 0.81 | 13 | 66 |
| 56.00 | 50 | 75 | 75 | 150 | 4.5 | 2.5 | PH332_0280KX301_0020 MF | 3500 | 3000 | 5500 | ≤19 | 0.81 | 12 | 66 |
| 60.00 | 45 | 80 | 85 | 160 | 4.5 | 2.5 | PH332_0200KX301_0030 MF | 3500 | 3500 | 6000 | ≤19 | 0.75 | 13 | 64 |
| 70.00 | 50 | 80 | 85 | 160 | 4.5 | 2.5 | PH332_0350KX301_0020 MF | 3500 | 3000 | 5500 | ≤19 | 0.81 | 13 | 66 |
| 75.00 | 50 | 80 | 85 | 160 | 4.5 | 2.5 | PH332_0250KX301_0030 MF | 3500 | 3500 | 6000 | ≤19 | 0.75 | 13 | 64 |
| 80.00 | 50 | 67 | 67 | 134 | 4.5 | 2.5 | PH332_0400KX301_0020 MF | 3500 | 3000 | 5500 | ≤19 | 0.81 | 8.9 | 66 |
| 84.00 | 50 | 75 | 75 | 150 | 4.5 | 2.5 | PH332_0280KX301_0030 MF | 3500 | 3500 | 6000 | ≤19 | 0.75 | 12 | 64 |
| 100.0 | 50 | 75 | 75 | 150 | 4.0 | 2.0 | PH332_0500KX301_0020 MF | 3500 | 3000 | 5500 | ≤19 | 0.81 | 12 | 66 |
| 105.0 | 50 | 80 | 85 | 160 | 4.5 | 2.5 | PH332_0350KX301_0030 MF | 3500 | 3500 | 6000 | ≤19 | 0.75 | 13 | 64 |
| 120.0 | 50 | 67 | 67 | 134 | 4.5 | 2.5 | PH332_0400KX301_0030 MF | 3500 | 3500 | 6000 | ≤19 | 0.75 | 8.9 | 64 |
| 140.0 | 53 | 69 | 69 | 138 | 4.0 | 2.0 | PH332_0700KX301_0020 MF | 3500 | 3000 | 5500 | ≤19 | 0.80 | 11 | 66 |
| 150.0 | 50 | 75 | 75 | 150 | 4.0 | 2.0 | PH332_0500KX301_0030 MF | 3500 | 3500 | 6000 | ≤19 | 0.75 | 12 | 64 |
| 200.0 | 46 | 60 | 60 | 120 | 4.0 | 2.0 | PH332_1000KX301_0020 MF | 3500 | 3000 | 5500 | ≤19 | 0.80 | 8.8 | 66 |
| 210.0 | 53 | 69 | 69 | 138 | 4.0 | 2.0 | PH332_0700KX301_0030 MF | 3500 | 3500 | 6000 | ≤19 | 0.75 | 11 | 64 |
| 300.0 | 46 | 60 | 60 | 120 | 4.0 | 2.0 | PH332_1000KX301_0030 MF | 3500 | 3500 | 6000 | ≤19 | 0.75 | 8.8 | 64 |

[1] *Based on input speed of 1500 RPM. See page 206.for details on torque calculations.*
[2] *Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
[3] *Inertia based on maximum input. For lower inertia, using smaller diameter input, contact STOBER.*
* *MF = Motor Adapter with FlexiAdapt® coupling*

# Selection Data



| Exact Ratio (i) | Output Torque: Nom. $M_{2N}$ [1] Nm | Output Torque: Accel. $M_{2acc}$ Nm | Output Torque: Accel. Torque for Reduced Backlash $M_{2accHT}$ Nm | Output Torque: Peak $M_{2NOT}$ [2] Nm | Back-lash $\Delta\phi_2$ arcmin | Red. Back-lash $\Delta\phi_{2red}$ arcmin | Part Number* (Gearhead + Input) | Max. Input Speed RPM (n1): Continuous EL 1,2,5,6 | Max. Input Speed RPM (n1): Continuous EL 3,4 | Max. Input Speed RPM (n1): Cyclic All | Motor Shaft [3] Max Ø $d_{MW}$ mm | Input Inertia $J_1$ kgcm² | Tors. Stiffness $C_2$ Nm/ arcmin | Oper. Noise $L_{pA}$ dB(A) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **PH4KX** | | | | | | | | | | | | | | |
| 4.000 | 77 | 96 | 96 | 208 | 5.5 | 3.5 | PH431_0040KX401_0010 MF | 2500 | 2000 | 4000 | ≤24 | 2.9 | 11 | 72 |
| 5.000 | 85 | 120 | 120 | 260 | 5.0 | 3.0 | PH431_0050KX401_0010 MF | 2500 | 2000 | 4000 | ≤24 | 2.7 | 15 | 72 |
| 7.000 | 85 | 160 | 168 | 320 | 4.5 | 2.5 | PH431_0070KX401_0010 MF | 2500 | 2000 | 4000 | ≤24 | 2.5 | 19 | 72 |
| 8.000 | 77 | 96 | 96 | 208 | 5.5 | 3.5 | PH431_0040KX401_0020 MF | 2500 | 2500 | 5000 | ≤24 | 1.7 | 11 | 68 |
| 10.00 | 90 | 120 | 120 | 260 | 5.0 | 3.0 | PH431_0050KX401_0020 MF | 2500 | 2500 | 5000 | ≤24 | 1.7 | 15 | 68 |
| 12.00 | 77 | 96 | 96 | 208 | 5.5 | 3.5 | PH431_0040KX401_0030 MF | 3000 | 3000 | 5500 | ≤24 | 1.5 | 11 | 66 |
| 14.00 | 90 | 160 | 168 | 320 | 4.5 | 2.5 | PH431_0070KX401_0020 MF | 2500 | 2500 | 5000 | ≤24 | 1.7 | 19 | 68 |
| 15.00 | 90 | 120 | 120 | 260 | 5.0 | 3.0 | PH431_0050KX401_0030 MF | 3000 | 3000 | 5500 | ≤24 | 1.5 | 15 | 66 |
| 20.00 | 75 | 115 | 115 | 230 | 4.0 | 2.0 | PH431_0100KX401_0020 MF | 2500 | 2500 | 5000 | ≤24 | 1.6 | 18 | 68 |
| 21.00 | 90 | 160 | 168 | 320 | 4.5 | 2.5 | PH431_0070KX401_0030 MF | 3000 | 3000 | 5500 | ≤24 | 1.5 | 19 | 66 |
| 30.00 | 75 | 115 | 115 | 230 | 4.0 | 2.0 | PH431_0100KX401_0030 MF | 3000 | 3000 | 5500 | ≤24 | 1.4 | 18 | 66 |
| 32.00 | 90 | 160 | 173 | 312 | 3.5 | 1.5 | PH432_0160KX301_0020 MF | 3500 | 3000 | 5500 | ≤19 | 0.83 | 25 | 66 |
| 35.00 | 110 | 160 | 174 | 320 | 3.5 | 1.5 | PH432_0350KX301_0010 MF | 3000 | 2500 | 4500 | ≤19 | 1.1 | 30 | 70 |
| 40.00 | 95 | 150 | 150 | 299 | 3.5 | 1.5 | PH432_0200KX301_0020 MF | 3500 | 3000 | 5500 | ≤19 | 0.82 | 27 | 66 |
| 48.00 | 90 | 160 | 173 | 312 | 3.5 | 1.5 | PH432_0160KX301_0030 MF | 3500 | 3500 | 6000 | ≤19 | 0.76 | 25 | 64 |
| 50.00 | 100 | 161 | 174 | 322 | 3.5 | 1.5 | PH432_0250KX301_0020 MF | 3500 | 3000 | 5500 | ≤19 | 0.82 | 29 | 66 |
| 56.00 | 95 | 160 | 173 | 312 | 3.5 | 1.5 | PH432_0280KX301_0020 MF | 3500 | 3000 | 5500 | ≤19 | 0.83 | 29 | 66 |
| 60.00 | 95 | 150 | 150 | 299 | 3.5 | 1.5 | PH432_0200KX301_0030 MF | 3500 | 3500 | 6000 | ≤19 | 0.75 | 27 | 64 |
| 70.00 | 110 | 160 | 174 | 320 | 3.5 | 1.5 | PH432_0350KX301_0020 MF | 3500 | 3000 | 5500 | ≤19 | 0.82 | 30 | 66 |
| 75.00 | 100 | 161 | 174 | 322 | 3.5 | 1.5 | PH432_0250KX301_0030 MF | 3500 | 3500 | 6000 | ≤19 | 0.75 | 29 | 64 |
| 80.00 | 110 | 155 | 169 | 310 | 3.5 | 1.5 | PH432_0400KX301_0020 MF | 3500 | 3000 | 5500 | ≤19 | 0.83 | 29 | 66 |
| 84.00 | 95 | 160 | 173 | 312 | 3.5 | 1.5 | PH432_0280KX301_0030 MF | 3500 | 3500 | 6000 | ≤19 | 0.76 | 29 | 64 |
| 100.0 | 120 | 159 | 174 | 318 | 3.0 | 1.0 | PH432_0500KX301_0020 MF | 3500 | 3000 | 5500 | ≤19 | 0.82 | 30 | 66 |
| 105.0 | 110 | 160 | 174 | 320 | 3.5 | 1.5 | PH432_0350KX301_0030 MF | 3500 | 3500 | 6000 | ≤19 | 0.75 | 30 | 64 |
| 120.0 | 110 | 155 | 169 | 310 | 3.5 | 1.5 | PH432_0400KX301_0030 MF | 3500 | 3500 | 6000 | ≤19 | 0.76 | 29 | 64 |
| 140.0 | 120 | 158 | 164 | 316 | 3.0 | 1.0 | PH432_0700KX301_0020 MF | 3500 | 3000 | 5500 | ≤19 | 0.81 | 27 | 66 |
| 150.0 | 120 | 159 | 174 | 318 | 3.0 | 1.0 | PH432_0500KX301_0030 MF | 3500 | 3500 | 6000 | ≤19 | 0.75 | 30 | 64 |
| 200.0 | 85 | 110 | 110 | 220 | 3.0 | 1.0 | PH432_1000KX301_0020 MF | 3500 | 3000 | 5500 | ≤19 | 0.81 | 20 | 66 |
| 210.0 | 120 | 158 | 164 | 316 | 3.0 | 1.0 | PH432_0700KX301_0030 MF | 3500 | 3500 | 6000 | ≤19 | 0.75 | 27 | 64 |
| 300.0 | 85 | 110 | 110 | 220 | 3.0 | 1.0 | PH432_1000KX301_0030 MF | 3500 | 3500 | 6000 | ≤19 | 0.75 | 20 | 64 |

[1] *Based on input speed of 1500 RPM. See page 206.for details on torque calculations.*
[2] *Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
[3] *Inertia based on maximum input. For lower inertia, using smaller diameter input, contact STOBER.*
* *MF = Motor Adapter with FlexiAdapt® coupling*

# PHKX Series: RIGHT ANGLE – Flange Output

| Exact Ratio (i) | Output Torque: Nom. [1] $M_{2N}$ Nm | Output Torque: Accel. $M_{2acc}$ Nm | Output Torque: Accel. Torque for Reduced Backlash $M_{2accHT}$ Nm | Output Torque: Peak [2] $M_{2NOT}$ Nm | Back-lash $\Delta\phi_2$ arcmin | Red. Back-lash $\Delta\phi_{2red}$ arcmin | Part Number* (Gearhead + Input) | Max. Input Speed RPM (n1): Continuous EL 1,2,5,6 | Max. Input Speed RPM (n1): Continuous EL 3,4 | Max. Input Speed RPM (n1): Cyclic All | Motor Shaft [3] Max Ø $d_{MW}$ mm | Input Inertia $J_1$ kgcm² | Tors. Stiffness $C_2$ Nm/ arcmin | Oper. Noise $L_{pA}$ dB(A) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **PH5KX** | | | | | | | | | | | | | | |
| 4.000 | 192 | 242 | 242 | 521 | 5.5 | 3.5 | PH531_0040KX501_0010 MF | 2500 | 2000 | 3500 | ≤32 | 9.1 | 28 | 74 |
| 5.000 | 210 | 302 | 302 | 651 | 5.0 | 3.0 | PH531_0050KX501_0010 MF | 2500 | 2000 | 3500 | ≤32 | 8.5 | 37 | 74 |
| 7.000 | 210 | 370 | 387 | 705 | 4.5 | 2.5 | PH531_0070KX501_0010 MF | 2500 | 2000 | 3500 | ≤32 | 8.0 | 46 | 74 |
| 8.000 | 192 | 242 | 242 | 521 | 5.5 | 3.5 | PH531_0040KX501_0020 MF | 2500 | 2500 | 4500 | ≤32 | 5.7 | 28 | 70 |
| 10.00 | 220 | 302 | 302 | 651 | 5.0 | 3.0 | PH531_0050KX501_0020 MF | 2500 | 2500 | 4500 | ≤32 | 5.5 | 37 | 70 |
| 12.00 | 192 | 242 | 242 | 521 | 5.5 | 3.5 | PH531_0040KX501_0030 MF | 3000 | 3000 | 5000 | ≤32 | 5.0 | 28 | 68 |
| 14.00 | 210 | 370 | 387 | 705 | 4.5 | 2.5 | PH531_0070KX501_0020 MF | 2500 | 2500 | 4500 | ≤32 | 5.4 | 46 | 70 |
| 15.00 | 220 | 302 | 302 | 651 | 5.0 | 3.0 | PH531_0050KX501_0030 MF | 3000 | 3000 | 5000 | ≤32 | 4.9 | 37 | 68 |
| 20.00 | 180 | 288 | 288 | 575 | 4.0 | 2.0 | PH531_0100KX501_0020 MF | 2500 | 2500 | 4500 | ≤32 | 5.3 | 44 | 70 |
| 21.00 | 210 | 370 | 387 | 705 | 4.5 | 2.5 | PH531_0070KX501_0030 MF | 3000 | 3000 | 5000 | ≤32 | 4.8 | 46 | 68 |
| 30.00 | 180 | 288 | 288 | 575 | 4.0 | 2.0 | PH531_0100KX501_0030 MF | 3000 | 3000 | 5000 | ≤32 | 4.8 | 44 | 68 |
| 32.00 | 230 | 355 | 355 | 696 | 3.5 | 1.5 | PH532_0160KX401_0020 MF | 2500 | 2500 | 5000 | ≤24 | 1.7 | 63 | 68 |
| 35.00 | 290 | 385 | 400 | 705 | 3.5 | 1.5 | PH532_0350KX401_0010 MF | 2500 | 2000 | 4000 | ≤24 | 2.5 | 78 | 72 |
| 40.00 | 250 | 370 | 387 | 705 | 3.5 | 1.5 | PH532_0200KX401_0020 MF | 2500 | 2500 | 5000 | ≤24 | 1.7 | 71 | 68 |
| 48.00 | 230 | 355 | 355 | 696 | 3.5 | 1.5 | PH532_0160KX401_0030 MF | 3000 | 3000 | 5500 | ≤24 | 1.5 | 63 | 66 |
| 50.00 | 260 | 385 | 400 | 705 | 3.5 | 1.5 | PH532_0250KX401_0020 MF | 2500 | 2500 | 5000 | ≤24 | 1.7 | 75 | 68 |
| 56.00 | 240 | 355 | 387 | 696 | 3.5 | 1.5 | PH532_0280KX401_0020 MF | 2500 | 2500 | 5000 | ≤24 | 1.7 | 72 | 68 |
| 60.00 | 250 | 370 | 387 | 705 | 3.5 | 1.5 | PH532_0200KX401_0030 MF | 3000 | 3000 | 5500 | ≤24 | 1.5 | 71 | 66 |
| 70.00 | 290 | 385 | 400 | 705 | 3.5 | 1.5 | PH532_0350KX401_0020 MF | 2500 | 2500 | 5000 | ≤24 | 1.7 | 78 | 68 |
| 75.00 | 260 | 385 | 400 | 705 | 3.5 | 1.5 | PH532_0250KX401_0030 MF | 3000 | 3000 | 5500 | ≤24 | 1.4 | 75 | 66 |
| 80.00 | 260 | 355 | 356 | 696 | 3.5 | 1.5 | PH532_0400KX401_0020 MF | 2500 | 2500 | 5000 | ≤24 | 1.7 | 71 | 68 |
| 84.00 | 240 | 355 | 387 | 696 | 3.5 | 1.5 | PH532_0280KX401_0030 MF | 3000 | 3000 | 5500 | ≤24 | 1.5 | 72 | 66 |
| 100.0 | 296 | 385 | 400 | 705 | 3.0 | 1.0 | PH532_0500KX401_0020 MF | 2500 | 2500 | 5000 | ≤24 | 1.7 | 77 | 68 |
| 105.0 | 290 | 385 | 400 | 705 | 3.5 | 1.5 | PH532_0350KX401_0030 MF | 3000 | 3000 | 5500 | ≤24 | 1.5 | 78 | 66 |
| 120.0 | 260 | 355 | 356 | 696 | 3.5 | 1.5 | PH532_0400KX401_0030 MF | 3000 | 3000 | 5500 | ≤24 | 1.5 | 71 | 66 |
| 140.0 | 284 | 370 | 387 | 705 | 3.0 | 1.0 | PH532_0700KX401_0020 MF | 2500 | 2500 | 5000 | ≤24 | 1.6 | 69 | 68 |
| 150.0 | 296 | 385 | 400 | 705 | 3.0 | 1.0 | PH532_0500KX401_0030 MF | 3000 | 3000 | 5500 | ≤24 | 1.4 | 77 | 66 |
| 200.0 | 221 | 288 | 288 | 575 | 3.0 | 1.0 | PH532_1000KX401_0020 MF | 2500 | 2500 | 5000 | ≤24 | 1.6 | 52 | 68 |
| 210.0 | 284 | 370 | 387 | 705 | 3.0 | 1.0 | PH532_0700KX401_0030 MF | 3000 | 3000 | 5500 | ≤24 | 1.4 | 69 | 66 |
| 300.0 | 221 | 288 | 288 | 575 | 3.0 | 1.0 | PH532_1000KX401_0030 MF | 3000 | 3000 | 5500 | ≤24 | 1.4 | 52 | 66 |

[1] *Based on input speed of 1500 RPM. See page 206.for details on torque calculations.*
[2] *Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
[3] *Inertia based on maximum input. For lower inertia, using smaller diameter input, contact STOBER.*
* *MF = Motor Adapter with FlexiAdapt® coupling*

# Selection Data



| Exact Ratio (i) | Output Torque: Nom. [1] $M_{2N}$ Nm | Output Torque: Accel. $M_{2acc}$ Nm | Output Torque: Accel. Torque for Reduced Backlash $M_{2accHT}$ Nm | Output Torque: Peak [2] $M_{2NOT}$ Nm | Back-lash $\Delta\phi_2$ arcmin | Red. Back-lash $\Delta\phi_{2red}$ arcmin | Part Number* (Gearhead + Input) | Max. Input Speed RPM (n1): Continuous EL 1,2,5,6 | Max. Input Speed RPM (n1): Continuous EL 3,4 | Max. Input Speed RPM (n1): Cyclic All | Motor Shaft [3] Max Ø $d_{MW}$ mm | Input Inertia $J_1$ kgcm² | Tors. Stiffness $C_2$ Nm/ arcmin | Oper. Noise $L_{pA}$ dB(A) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **PH7KX** | | | | | | | | | | | | | | |
| 4.000 | 384 | 480 | 480 | 917 | 5.5 | 3.5 | PH731_0040KX701_0010 MF | 1800 | 1600 | 3000 | ≤38 | 30 | 94 | 76 |
| 5.000 | 440 | 600 | 600 | 1146 | 5.0 | 3.0 | PH731_0050KX701_0010 MF | 1800 | 1600 | 3000 | ≤38 | 28 | 111 | 76 |
| 7.000 | 440 | 840 | 840 | 1604 | 4.5 | 2.5 | PH731_0070KX701_0010 MF | 1800 | 1600 | 3000 | ≤38 | 26 | 122 | 76 |
| 8.000 | 384 | 480 | 480 | 1042 | 5.5 | 3.5 | PH731_0040KX701_0020 MF | 1800 | 1800 | 3500 | ≤38 | 16 | 94 | 72 |
| 10.00 | 440 | 600 | 600 | 1302 | 5.0 | 3.0 | PH731_0050KX701_0020 MF | 1800 | 1800 | 3500 | ≤38 | 15 | 111 | 72 |
| 12.00 | 384 | 480 | 480 | 1042 | 5.5 | 3.5 | PH731_0040KX701_0030 MF | 2100 | 2100 | 4000 | ≤38 | 13 | 94 | 70 |
| 14.00 | 440 | 840 | 840 | 1720 | 4.5 | 2.5 | PH731_0070KX701_0020 MF | 1800 | 1800 | 3500 | ≤38 | 15 | 122 | 72 |
| 15.00 | 440 | 600 | 600 | 1302 | 5.0 | 3.0 | PH731_0050KX701_0030 MF | 2100 | 2100 | 4000 | ≤38 | 13 | 111 | 70 |
| 20.00 | 350 | 575 | 575 | 1150 | 4.0 | 2.0 | PH731_0100KX701_0020 MF | 1800 | 1800 | 3500 | ≤38 | 15 | 110 | 72 |
| 21.00 | 440 | 840 | 840 | 1720 | 4.5 | 2.5 | PH731_0070KX701_0030 MF | 2100 | 2100 | 4000 | ≤38 | 13 | 122 | 70 |
| 30.00 | 350 | 575 | 575 | 1150 | 4.0 | 2.0 | PH731_0100KX701_0030 MF | 2100 | 2100 | 4000 | ≤38 | 13 | 110 | 70 |
| 32.00 | 450 | 740 | 740 | 1480 | 3.5 | 1.5 | PH732_0160KX501_0020 MF | 2500 | 2500 | 4500 | ≤32 | 5.6 | 152 | 70 |
| 35.00 | 540 | 866 | 908 | 1720 | 3.5 | 1.5 | PH732_0350KX501_0010 MF | 2500 | 2000 | 3500 | ≤32 | 8.0 | 172 | 74 |
| 40.00 | 460 | 805 | 845 | 1610 | 3.5 | 1.5 | PH732_0200KX501_0020 MF | 2500 | 2500 | 4500 | ≤32 | 4.9 | 157 | 70 |
| 48.00 | 450 | 740 | 740 | 1480 | 3.5 | 1.5 | PH732_0160KX501_0030 MF | 3000 | 3000 | 5000 | ≤32 | 4.9 | 152 | 68 |
| 50.00 | 500 | 866 | 908 | 1720 | 3.5 | 1.5 | PH732_0250KX501_0020 MF | 2500 | 2500 | 4500 | ≤32 | 5.4 | 166 | 70 |
| 56.00 | 540 | 770 | 880 | 1540 | 3.5 | 1.5 | PH732_0280KX501_0020 MF | 2500 | 2500 | 4500 | ≤32 | 5.5 | 176 | 70 |
| 60.00 | 460 | 805 | 845 | 1610 | 3.5 | 1.5 | PH732_0200KX501_0030 MF | 3000 | 3000 | 5000 | ≤32 | 4.9 | 157 | 68 |
| 70.00 | 540 | 866 | 908 | 1720 | 3.5 | 1.5 | PH732_0350KX501_0020 MF | 2500 | 2500 | 4500 | ≤32 | 5.4 | 172 | 70 |
| 75.00 | 500 | 866 | 908 | 1720 | 3.5 | 1.5 | PH732_0250KX501_0030 MF | 3000 | 3000 | 5000 | ≤32 | 4.8 | 166 | 68 |
| 80.00 | 540 | 770 | 770 | 1540 | 3.5 | 1.5 | PH732_0400KX501_0020 MF | 2500 | 2500 | 4500 | ≤32 | 5.5 | 174 | 70 |
| 84.00 | 540 | 770 | 880 | 1540 | 3.5 | 1.5 | PH732_0280KX501_0030 MF | 3000 | 3000 | 5000 | ≤32 | 4.9 | 176 | 68 |
| 100.0 | 600 | 830 | 834 | 1660 | 3.0 | 1.0 | PH732_0500KX501_0020 MF | 2500 | 2500 | 4500 | ≤32 | 5.4 | 171 | 70 |
| 105.0 | 540 | 866 | 908 | 1720 | 3.5 | 1.5 | PH732_0350KX501_0030 MF | 3000 | 3000 | 5000 | ≤32 | 4.8 | 172 | 68 |
| 120.0 | 540 | 770 | 770 | 1540 | 3.5 | 1.5 | PH732_0400KX501_0030 MF | 3000 | 3000 | 5000 | ≤32 | 4.9 | 174 | 68 |
| 140.0 | 600 | 809 | 847 | 1617 | 3.0 | 1.0 | PH732_0700KX501_0020 MF | 2500 | 2500 | 4500 | ≤32 | 5.3 | 152 | 70 |
| 150.0 | 600 | 830 | 834 | 1660 | 3.0 | 1.0 | PH732_0500KX501_0030 MF | 3000 | 3000 | 5000 | ≤32 | 4.8 | 171 | 68 |
| 200.0 | 423 | 550 | 550 | 1100 | 3.0 | 1.0 | PH732_1000KX501_0020 MF | 2500 | 2500 | 4500 | ≤32 | 5.3 | 121 | 70 |
| 210.0 | 600 | 809 | 847 | 1617 | 3.0 | 1.0 | PH732_0700KX501_0030 MF | 3000 | 3000 | 5000 | ≤32 | 4.8 | 152 | 68 |
| 300.0 | 423 | 550 | 550 | 1100 | 3.0 | 1.0 | PH732_1000KX501_0030 MF | 3000 | 3000 | 5000 | ≤32 | 4.8 | 121 | 68 |

[1] *Based on input speed of 1500 RPM. See page 206.for details on torque calculations.*
[2] *Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
[3] *Inertia based on maximum input. For lower inertia, using smaller diameter input, contact STOBER.*
* *MF = Motor Adapter with FlexiAdapt® coupling*

# PHKX Series: RIGHT ANGLE – Flange Output

| Exact Ratio (i) | Output Torque: Nom. [1] $M_{2N}$ Nm | Output Torque: Accel. $M_{2acc}$ Nm | Output Torque: Accel. Torque for Reduced Backlash $M_{2accHT}$ Nm | Output Torque: Peak [2] $M_{2NOT}$ Nm | Back-lash $\Delta\phi_2$ arcmin | Red. Back-lash $\Delta\phi_{2red}$ arcmin | Part Number* (Gearhead + Input) | Max. Input Speed RPM (n1): Continuous EL 1,2,5,6 | Max. Input Speed RPM (n1): Continuous EL 3,4 | Max. Input Speed RPM (n1): Cyclic All | Motor Shaft [3] Max Ø $d_{MW}$ mm | Input Inertia $J_1$ kgcm² | Tors. Stiffness $C_2$ Nm/arcmin | Oper. Noise $L_{pA}$ dB(A) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **PH8KX** | | | | | | | | | | | | | | |
| 4.000 | 384 | 480 | 480 | 917 | 5.5 | 3.5 | PH831_0040KX701_0010 MF | 1800 | 1600 | 3000 | ≤38 | 52 | 122 | 76 |
| 5.000 | 480 | 600 | 600 | 1146 | 5.0 | 3.0 | PH831_0050KX701_0010 MF | 1800 | 1600 | 3000 | ≤38 | 41 | 170 | 76 |
| 7.000 | 672 | 840 | 840 | 1604 | 4.5 | 2.5 | PH831_0070KX701_0010 MF | 1800 | 1600 | 3000 | ≤38 | 34 | 232 | 76 |
| 8.000 | 384 | 480 | 480 | 1042 | 5.5 | 3.5 | PH831_0040KX701_0020 MF | 1800 | 1800 | 3500 | ≤38 | 21 | 122 | 72 |
| 10.00 | 772 | 1200 | 1200 | 2292 | 4.0 | 2.0 | PH831_0050KX701_0020 MF | 1800 | 1600 | 3500 | ≤38 | 29 | 253 | 76 |
| 12.00 | 384 | 480 | 480 | 1042 | 5.5 | 3.5 | PH831_0040KX701_0030 MF | 2100 | 2100 | 4000 | ≤38 | 15 | 122 | 70 |
| 14.00 | 672 | 840 | 840 | 1823 | 4.5 | 2.5 | PH831_0070KX701_0020 MF | 1800 | 1800 | 3500 | ≤38 | 17 | 232 | 72 |
| 15.00 | 480 | 600 | 600 | 1302 | 5.0 | 3.0 | PH831_0050KX701_0030 MF | 2100 | 2100 | 4000 | ≤38 | 14 | 170 | 70 |
| 20.00 | 850 | 1200 | 1200 | 2604 | 4.0 | 2.0 | PH831_0100KX701_0020 MF | 1800 | 1800 | 3500 | ≤38 | 16 | 253 | 72 |
| 21.00 | 672 | 840 | 840 | 1823 | 4.5 | 2.5 | PH831_0070KX701_0030 MF | 2100 | 2100 | 4000 | ≤38 | 13 | 232 | 70 |
| 30.00 | 850 | 1200 | 1200 | 2604 | 4.0 | 2.0 | PH831_0100KX701_0030 MF | 2100 | 2100 | 4000 | ≤38 | 13 | 253 | 70 |
| 32.00 | 1100 | 1860 | 1860 | 3929 | 3.5 | 1.5 | PH832_0160KX701_0020 MF | 1800 | 1800 | 3500 | ≤38 | 16 | 415 | 72 |
| 40.00 | 1250 | 2100 | 2300 | 4200 | 3.5 | 1.5 | PH832_0200KX701_0020 MF | 1800 | 1800 | 3500 | ≤38 | 15 | 462 | 72 |
| 48.00 | 1100 | 1860 | 1860 | 3929 | 3.5 | 1.5 | PH832_0160KX701_0030 MF | 2100 | 2100 | 4000 | ≤38 | 13 | 415 | 70 |
| 50.00 | 1300 | 2100 | 2300 | 4200 | 3.5 | 1.5 | PH832_0250KX701_0020 MF | 1800 | 1800 | 3500 | ≤38 | 15 | 479 | 72 |
| 56.00 | 1100 | 2000 | 2000 | 3929 | 3.5 | 1.5 | PH832_0280KX701_0020 MF | 1800 | 1800 | 3500 | ≤38 | 16 | 451 | 72 |
| 60.00 | 1250 | 2100 | 2300 | 4200 | 3.5 | 1.5 | PH832_0200KX701_0030 MF | 2100 | 2100 | 4000 | ≤38 | 13 | 462 | 70 |
| 70.00 | 1450 | 2100 | 2300 | 4200 | 3.5 | 1.5 | PH832_0350KX701_0020 MF | 1800 | 1800 | 3500 | ≤38 | 15 | 489 | 72 |
| 75.00 | 1300 | 2100 | 2300 | 4200 | 3.5 | 1.5 | PH832_0250KX701_0030 MF | 2100 | 2100 | 4000 | ≤38 | 13 | 479 | 70 |
| 80.00 | 1100 | 1920 | 1936 | 3840 | 3.5 | 1.5 | PH832_0400KX701_0020 MF | 1800 | 1800 | 3500 | ≤38 | 16 | 440 | 72 |
| 84.00 | 1100 | 2000 | 2000 | 3929 | 3.5 | 1.5 | PH832_0280KX701_0030 MF | 2100 | 2100 | 4000 | ≤38 | 13 | 451 | 70 |
| 100.0 | 1557 | 2100 | 2300 | 4200 | 3.0 | 1.0 | PH832_0500KX701_0020 MF | 1800 | 1800 | 3500 | ≤38 | 15 | 481 | 72 |
| 105.0 | 1450 | 2100 | 2300 | 4200 | 3.5 | 1.5 | PH832_0350KX701_0030 MF | 2100 | 2100 | 4000 | ≤38 | 13 | 489 | 70 |
| 120.0 | 1100 | 1920 | 1936 | 3840 | 3.5 | 1.5 | PH832_0400KX701_0030 MF | 2100 | 2100 | 4000 | ≤38 | 13 | 440 | 70 |
| 140.0 | 1422 | 1848 | 1936 | 3696 | 3.0 | 1.0 | PH832_0700KX701_0020 MF | 1800 | 1800 | 3500 | ≤38 | 15 | 421 | 72 |
| 150.0 | 1557 | 2100 | 2300 | 4200 | 3.0 | 1.0 | PH832_0500KX701_0030 MF | 2100 | 2100 | 4000 | ≤38 | 13 | 481 | 70 |
| 200.0 | 1062 | 1380 | 1380 | 2760 | 3.0 | 1.0 | PH832_1000KX701_0020 MF | 1800 | 1800 | 3500 | ≤38 | 15 | 332 | 72 |
| 210.0 | 1422 | 1848 | 1936 | 3696 | 3.0 | 1.0 | PH832_0700KX701_0030 MF | 2100 | 2100 | 4000 | ≤38 | 13 | 421 | 70 |
| 300.0 | 1062 | 1380 | 1380 | 2760 | 3.0 | 1.0 | PH832_1000KX701_0030 MF | 2100 | 2100 | 4000 | ≤38 | 12 | 332 | 70 |

[1] *Based on input speed of 1500 RPM. See page 206.for details on torque calculations.*
[2] *Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
[3] *Inertia based on maximum input. For lower inertia, using smaller diameter input, contact STOBER.*
* *MF = Motor Adapter with FlexiAdapt® coupling*

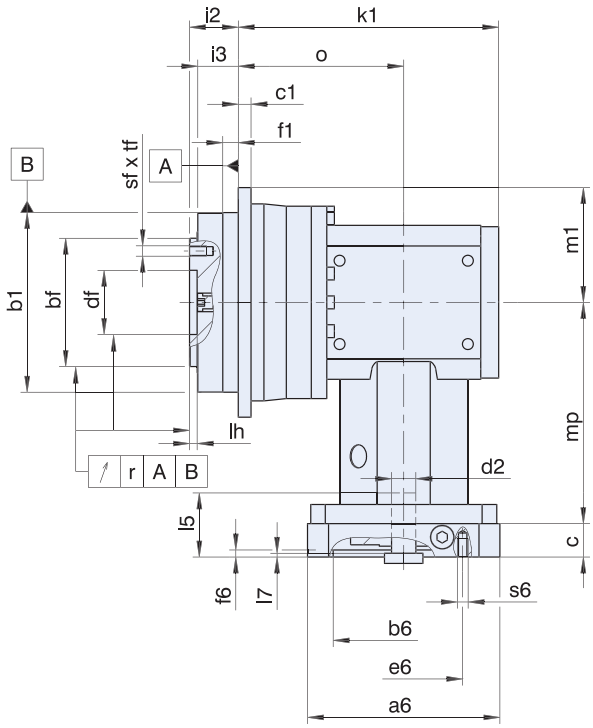


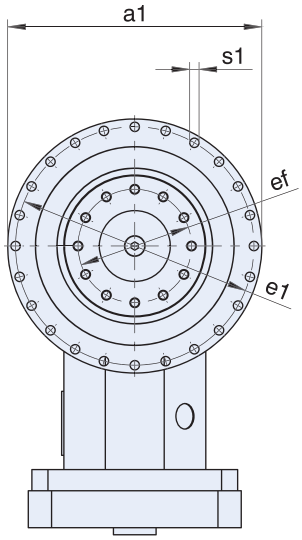
| Exact Ratio (i) | Output Torque: Nom. $M_{2N}$ [1] Nm | Output Torque: Accel. $M_{2acc}$ Nm | Output Torque: Accel. Torque for Reduced Backlash $M_{2accHT}$ Nm | Output Torque: Peak $M_{2NOT}$ [2] Nm | Back-lash $\Delta\phi_2$ arcmin | Red. Back-lash $\Delta\phi_{2red}$ arcmin | Part Number* (Gearhead + Input) | Max. Input Speed RPM (n1): Continuous EL 1,2,5,6 | Max. Input Speed RPM (n1): Continuous EL 3,4 | Max. Input Speed RPM (n1): Cyclic All | Motor Shaft [3] Max Ø $d_{MW}$ mm | Input Inertia $J_1$ kgcm² | Tors. Stiffness $C_2$ Nm/ arcmin | Oper. Noise $L_{pA}$ dB(A) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **PH9KX** | | | | | | | | | | | | | | |
| 12.00 | 1116 | 1395 | 1395 | 2839 | 4.0 | 2.0 | PH942_0120KX701_0010 MF | 1800 | 1600 | 3000 | ≤38 | 76 | 655 | 76 |
| 16.00 | 1488 | 1860 | 1860 | 3785 | 3.5 | 1.5 | PH942_0160KX701_0010 MF | 1800 | 1600 | 3000 | ≤38 | 48 | 808 | 76 |
| 18.00 | 1674 | 2093 | 2093 | 4258 | 3.5 | 1.5 | PH942_0180KX701_0010 MF | 1800 | 1600 | 3000 | ≤38 | 70 | 832 | 76 |
| 20.00 | 1860 | 2325 | 2325 | 4731 | 3.5 | 1.5 | PH942_0200KX701_0010 MF | 1800 | 1600 | 3000 | ≤38 | 39 | 908 | 76 |
| 24.00 | 1116 | 1395 | 1395 | 3226 | 4.0 | 2.0 | PH942_0120KX701_0020 MF | 1800 | 1800 | 3500 | ≤38 | 27 | 655 | 72 |
| 30.00 | 2790 | 3488 | 3488 | 7097 | 3.5 | 1.5 | PH942_0300KX701_0010 MF | 1800 | 1600 | 3000 | ≤38 | 37 | 988 | 76 |
| 32.00 | 1488 | 1860 | 1860 | 4301 | 3.5 | 1.5 | PH942_0160KX701_0020 MF | 1800 | 1800 | 3500 | ≤38 | 20 | 808 | 72 |
| 36.00 | 1674 | 2093 | 2093 | 4839 | 3.5 | 1.5 | PH942_0180KX701_0020 MF | 1800 | 1800 | 3500 | ≤38 | 26 | 832 | 72 |
| 40.00 | 1860 | 2325 | 2325 | 5376 | 3.5 | 1.5 | PH942_0200KX701_0020 MF | 1800 | 1800 | 3500 | ≤38 | 18 | 908 | 72 |
| 42.00 | 3500 | 4883 | 4883 | 9935 | 3.0 | 1.0 | PH942_0420KX701_0010 MF | 1800 | 1600 | 3000 | ≤38 | 31 | 1035 | 76 |
| 48.00 | 2232 | 2790 | 2790 | 6452 | 3.5 | 1.5 | PH942_0240KX701_0020 MF | 1800 | 1800 | 3500 | ≤38 | 20 | 932 | 72 |
| 54.00 | 1674 | 2093 | 2093 | 4839 | 3.5 | 1.5 | PH942_0180KX701_0030 MF | 2100 | 2100 | 4000 | ≤38 | 17 | 832 | 70 |
| 60.00 | 2790 | 3488 | 3488 | 8065 | 3.5 | 1.5 | PH942_0300KX701_0020 MF | 1800 | 1800 | 3500 | ≤38 | 18 | 988 | 72 |
| 72.00 | 2232 | 2790 | 2790 | 6452 | 3.5 | 1.5 | PH942_0240KX701_0030 MF | 2100 | 2100 | 4000 | ≤38 | 15 | 932 | 70 |
| 80.00 | 3200 | 4600 | 4600 | 9200 | 3.5 | 1.5 | PH942_0400KX701_0020 MF | 1800 | 1800 | 3500 | ≤38 | 16 | 998 | 72 |
| 84.00 | 3500 | 4883 | 4883 | 10000 | 3.0 | 1.0 | PH942_0420KX701_0020 MF | 1800 | 1800 | 3500 | ≤38 | 16 | 1035 | 72 |
| 90.00 | 2790 | 3488 | 3488 | 8065 | 3.5 | 1.5 | PH942_0300KX701_0030 MF | 2100 | 2100 | 4000 | ≤38 | 14 | 988 | 70 |
| 96.00 | 3500 | 5000 | 5000 | 10000 | 3.0 | 1.0 | PH942_0480KX701_0020 MF | 1800 | 1800 | 3500 | ≤38 | 16 | 1033 | 72 |
| 120.0 | 3500 | 5000 | 5000 | 10000 | 3.0 | 1.0 | PH942_0600KX701_0020 MF | 1800 | 1800 | 3500 | ≤38 | 16 | 1033 | 72 |
| 126.0 | 3500 | 4883 | 4883 | 10000 | 3.0 | 1.0 | PH942_0420KX701_0030 MF | 2100 | 2100 | 4000 | ≤38 | 13 | 1035 | 70 |
| 144.0 | 3500 | 5000 | 5000 | 10000 | 3.0 | 1.0 | PH942_0480KX701_0030 MF | 2100 | 2100 | 4000 | ≤38 | 13 | 1033 | 70 |
| 180.0 | 3500 | 5000 | 5000 | 10000 | 3.0 | 1.0 | PH942_0600KX701_0030 MF | 2100 | 2100 | 4000 | ≤38 | 13 | 1033 | 70 |

| Exact Ratio (i) | Output Torque: Nom. [1] $M_{2N}$ | Output Torque: Accel. $M_{2acc}$ | Output Torque: Accel. Torque for Reduced Backlash $M_{2accHT}$ | Output Torque: Peak [2] $M_{2NOT}$ | Backlash $\Delta\phi_2$ | Red. Backlash $\Delta\phi_{2red}$ | Part Number* (Gearhead + Input) | Max. Input Speed RPM (n1): Continuous EL 1,2,5,6 | Max. Input Speed RPM (n1): Continuous EL 3,4 | Max. Input Speed RPM (n1): Cyclic | Motor Shaft [3] Max Ø $d_{MW}$ | Input Inertia $J_1$ | Tors. Stiffness $C_2$ | Oper. Noise $L_{pA}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Nm | Nm | Nm | Nm | arcmin | arc-min | | EL 1,2,5,6 | EL 3,4 | All | mm | kgcm² | Nm/ arcmin | dB(A) |
| **PH10KX** | | | | | | | | | | | | | | |
| 18.00 | 1674 | 2093 | – | 4258 | 3.5 | – | PH1042_0180KX701_0010 MF | 1800 | 1600 | 3000 | ≤38 | 72 | 1127 | 76 |
| 24.00 | 2232 | 2790 | – | 5677 | 3.5 | – | PH1042_0240KX701_0010 MF | 1800 | 1600 | 3000 | ≤38 | 45 | 1328 | 76 |
| 30.00 | 2790 | 3488 | – | 7097 | 3.5 | – | PH1042_0300KX701_0010 MF | 1800 | 1600 | 3000 | ≤38 | 38 | 1444 | 76 |
| 36.00 | 1674 | 2093 | – | 4839 | 3.5 | – | PH1042_0180KX701_0020 MF | 1800 | 1800 | 3500 | ≤38 | 26 | 1127 | 72 |
| 42.00 | 3906 | 4883 | – | 9935 | 3.0 | – | PH1042_0420KX701_0010 MF | 1800 | 1600 | 3000 | ≤38 | 31 | 1545 | 76 |
| 48.00 | 2232 | 2790 | – | 6452 | 3.5 | – | PH1042_0240KX701_0020 MF | 1800 | 1800 | 2500 | ≤38 | 20 | 1328 | 72 |
| 54.00 | 1674 | 2093 | – | 4839 | 3.5 | – | PH1042_0180KX701_0030 MF | 2100 | 2100 | 4000 | ≤38 | 18 | 1127 | 70 |
| 60.00 | 2790 | 3488 | – | 8065 | 3.5 | – | PH1042_0300KX701_0020 MF | 1800 | 1800 | 3500 | ≤38 | 18 | 1444 | 72 |
| 72.00 | 2232 | 2790 | – | 6452 | 3.5 | – | PH1042_0240KX701_0030 MF | 2100 | 2100 | 4000 | ≤38 | 15 | 1328 | 70 |
| 84.00 | 3906 | 4883 | – | 11290 | 3.0 | – | PH1042_0420KX701_0020 MF | 1800 | 1800 | 3500 | ≤38 | 16 | 1545 | 72 |
| 90.00 | 2790 | 3488 | – | 8065 | 3.5 | – | PH1042_0300KX701_0030 MF | 2100 | 2100 | 4000 | ≤38 | 14 | 1444 | 70 |
| 120.0 | 4900 | 6975 | – | 14000 | 3.0 | – | PH1042_0600KX701_0020 MF | 1800 | 1800 | 3500 | ≤38 | 16 | 1542 | 72 |
| 126.0 | 3906 | 4883 | – | 11290 | 3.0 | – | PH1042_0420KX701_0030 MF | 2100 | 2100 | 4000 | ≤38 | 13 | 1545 | 70 |
| 180.0 | 4900 | 6975 | – | 14000 | 3.0 | – | PH1042_0600KX701_0030 MF | 2100 | 2100 | 4000 | ≤38 | 13 | 1542 | 70 |



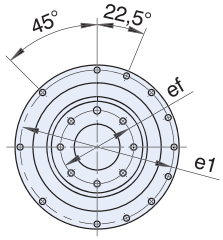
## PHKX Series Dimensions — All Units



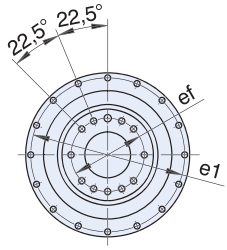




** See Motor Mounting Plate Option, page <?> for details.*

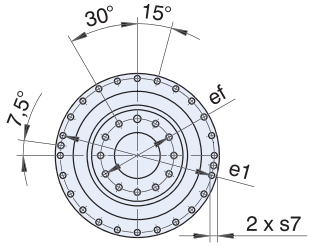
**PH3 | PH4**




**PH5**




**PH7 | PH8**




**PH9 | PH10**

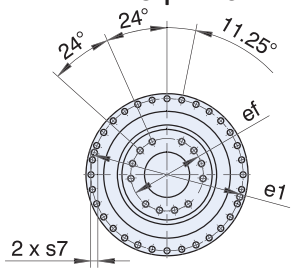



**Table 1 Dimensions (mm)**

| Unit | Øa1 | Øb1 | Øbf | c1 | Ødf | Øe1 | Øef | f1 | i2 | i3 | k1 | lh | m1 | mp | o | r | Øs1 | s7 | sf | tf |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PH331_KX301 | 86$^{h7}$ | 64$^{h7}$ | 40$^{h7}$ | 4 | 20.0$^{H6}$ | 79 | 31.5 | 7 | 19.5 | 16.5 | 113.5 | 4 | 43.0 | 95.5 | 73.5 | 0.020 | 4.5 | – | M5 | 7 |
| PH332_KX301 | 86$^{h7}$ | 64$^{h7}$ | 40$^{h7}$ | 4 | 20.0$^{H6}$ | 79 | 31.5 | 7 | 19.5 | 16.5 | 147.0 | 4 | 43.0 | 95.5 | 107.0 | 0.020 | 4.5 | – | M5 | 7 |
| PH431_KX401 | 118$^{h7}$ | 90$^{h7}$ | 63$^{h7}$ | 7 | 31.5$^{H6}$ | 109 | 50 | 10 | 30.0 | 24.0 | 139.0 | 6 | 59.0 | 104.0 | 89.0 | 0.020 | 5.5 | – | M6 | 11 |
| PH432_KX301 | 118$^{h7}$ | 90$^{h7}$ | 63$^{h7}$ | 7 | 31.5$^{H6}$ | 109 | 50 | 10 | 30.0 | 24.0 | 161.5 | 6 | 59.0 | 95.5 | 121.5 | 0.020 | 5.5 | – | M6 | 11 |
| PH531_KX501 | 145$^{h7}$ | 110$^{h7}$ | 80$^{h7}$ | 8 | 40.0$^{H6}$ | 135 | 63 | 12 | 29.0 | 23.0 | 168.0 | 6 | 72.5 | 132.0 | 109.0 | 0.020 | 5.5 | – | M6 | 11 |
| PH532_KX401 | 145$^{h7}$ | 110$^{h7}$ | 80$^{h7}$ | 8 | 40.0$^{H6}$ | 135 | 63 | 12 | 29.0 | 23.0 | 187.5 | 6 | 72.5 | 104.0 | 137.5 | 0.020 | 5.5 | – | M6 | 11 |
| PH731_KX701 | 179$^{h7}$ | 140$^{h7}$ | 100$^{h7}$ | 10 | 50.0$^{H6}$ | 168 | 80 | 12 | 38.0 | 32.0 | 203.0 | 6 | 89.5 | 172.5 | 129.0 | 0.025 | 6.6 | – | M8 | 14 |
| PH732_KX501 | 179$^{h7}$ | 140$^{h7}$ | 100$^{h7}$ | 10 | 50.0$^{H6}$ | 168 | 80 | 12 | 38.0 | 32.0 | 226.0 | 6 | 89.5 | 132.0 | 167.0 | 0.025 | 6.6 | – | M8 | 14 |
| PH831_KX701 | 247$^{h7}$ | 200$^{h7}$ | 160$^{h7}$ | 12 | 80.0$^{H6}$ | 233 | 125 | 15 | 50.0 | 42.0 | 235.5 | 8 | 123.5 | 172.5 | 161.5 | 0.030 | 9.0 | M10 | M10 | 18 |
| PH832_KX701 | 247$^{h7}$ | 200$^{h7}$ | 160$^{h7}$ | 12 | 80.0$^{H6}$ | 233 | 125 | 15 | 50.0 | 42.0 | 293.0 | 8 | 123.5 | 172.5 | 219.0 | 0.030 | 9.0 | M10 | M10 | 18 |
| PH942_KX701 | - | 255$^{h7}$ | 180$^{h7}$ | 18 | 90.0$^{H6}$ | 280 | 140 | 20 | 66.0 | 55.0 | 336.0 | 12 | 150.0 | 172.5 | 262.0 | 0.030 | 13.5 | M8 | M16 | 24 |
| PH1042_KX701 | - | 285$^{h7}$ | 200$^{h7}$ | 20 | 95.0$^{H6}$ | 310 | 160 | 20 | 75.0 | 60.0 | 343.0 | 10 | 165.0 | 172.5 | 269.0 | 0.040 | 13.5 | M10 | M20 | 28 |

**Example dimensions for the motor connection**

| Unit | Øb6 | Øe6 | Ød2max | l5 | □a6 | c | f6 | l7 | s6 |
|---|---|---|---|---|---|---|---|---|---|
| PH_KX301_MF | 60$^{H7}$ | 75 | 19 | 40 | 75 | 18 | 3.5 | 5.5 | M5 |
| PH_KX401_MF | 95$^{H7}$ | 115 | 24 | 42 | 100 | 21 | 4.0 | 4.5 | M8 |
| PH_KX501_MF | 110$^{H7}$ | 130 | 32 | 53 | 120 | 24 | 4.0 | 5.0 | M8 |
| PH_KX701_MF | 130$^{H7}$ | 165 | 38 | 64 | 150 | 26 | 5.5 | 8.0 | M10 |

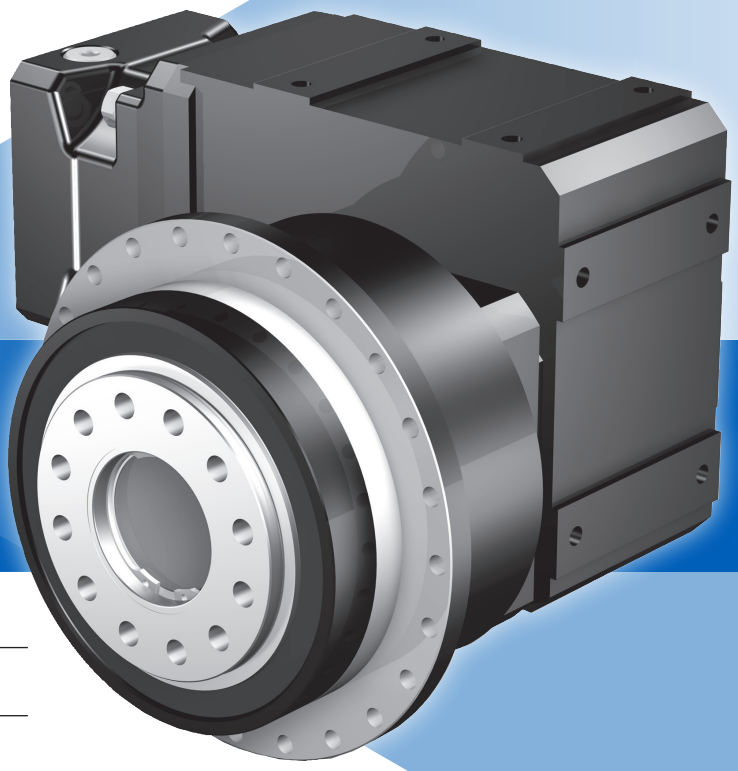
In the table above, you will find example dimensions for the motor connection for the MF motor adapter. **Note that when dimension c is lengthened (depending on the motor used), dimensions c6, l5 and lg are also lengthened accordingly.**

# PHK Series: RIGHT ANGLE – Flange Output

## PHK Features

- 16:1 to 591:1 ratios (higher ratios available. Contact STOBER.)
- Quiet running (<63dB(A))
- High load capacity and tilting rigidity through symmetrical bearing arrangement
- FKM seals for extended gearbox life
- Large motor input option to accept bigger diameter motor shafts so you don't use an oversized gearbox
- Error free motor mounting and quick changeover with toleranced pilot on motor plate
- Low no load running torque, giving you more torque for your application
- Magnetic oil filtration to remove contaminants to prevent breakdowns
- Build and ship in one day
- Assembled in the USA

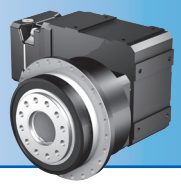
*STOBER PHK provides a right angle option with planetary gearing. The PHK provides a more compact, precise solution, and can handle higher input speeds. Every gearbox is made to order. STOBER will custom whatever you need to fit your application. Contact us today to learn more.*



SHIPS in 1 DAY!
NO EXPEDITE FEE FOR 24 HOUR SERVICE

## General Specifications

| | |
|---|---|
| **Ambient Temperature** | 0°C to +40°C (104°F) [Unit temperature <90°C Max] |
| **Backlash** | ≤3.5 (see performance overview chart, page 220 ) |
| **Coating** | Standard Black (RAL-9005) |
| **Degree of Protection** | IP65 |
| **Direction of Rotation** | See page 221 |
| **Efficiency** | 94% |
| **Input RPM** | Up to 6,000 RPM |
| **Installation** | Requires 12.9 fasteners. See page 288, for more information |
| **Lubrication** | Lubricated for life – standard Mobil SHC629; option food grade Mobil SHC CIBUS 150 |
| **Mounting Position** | Must be specified, see page 221 |
| **Warranty** | 5 Year Limited (2 Years on normal wear items: bearings, seals, etc.) |



# Overview

## Selection Options *At-a-Glance*

Using the **Selection Data** table later in this section, select the PHK Series Gearhead with the appropriate performance and design options tailored to your motor choice and exact application requirements. Use the part number guide below as a reference to build a part number for the complete gearhead assembly.

**Part Number Examples:**

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 0 | ! | @ | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PHK | PH | 5 | 3 | 1 | S | F | S | S | 0040 | K102VF | 0040 | ME10 | EL1 * |

| | Design Option | Part Number Code | Description |
|---|---|---|---|
| 1 | **Series** | PH | Rotating flange output planetary |
| 2 | **Size** | 5 7 8 9 10 | 5 sizes of gearhead |
| 3 | **Generation** | 3<br>4 | Generation 3 (Sizes 5-8)<br>Generation 4 (Sizes 9 & 10) |
| 4 | **# of Stages** | 1 | One stage for ratios of ≤ 10:1 |
| 5 | **Housing** | S | Standard mounting style |
| 6 | **Output Shaft** | F | Flange output |
| 7 | **Bearing** | S<br>V | Standard<br>Reinforced Bearing (Size 5) |
| 8 | **Backlash** | S | Standard Backlash (Size 5-9 only) |
| 9 | **Ratio** | 0040 | Ratios range from 4:1 to 100:1<br>(0040=4:1; 0055=5.5:1; 1000=100:1, ect.) |
| 0 | **Secondary Unit** | K102VF | K Series helical/bevel unit: 5 sizes, 2 or 3 stages, with output shaft (V) and flange (F) |
| ! | **Secondary Unit Ratio** | 0040 | Ratios from 4:1 to 78:1 (0010=1:1; 0020=2:1; 0030=3:1) |
| @ | **Motor Adapter** | ME10 - ME50<br>MB | Motor Adapter with EasyAdapt coupling<br>ServoStop with motor adapter with brake (Contact factory) |
| * | **Mounting Position** | EL1 EL2 EL3<br>EL4 EL5 EL6 | Required special instruction for all units, see page 221 |

## Options

### ME Adapter Option

- MSS1 Seal – special input seal for longer life (For sizes P5-9). Contact factory for this option.
- Peak Torque Booster – pinion securing element for shock loads, increasing peak torque up to 80%.

### Integrated Safety Brake

- ServoStop – provides dynamic braking during power failures or emergency stops in hazardous situations. Contact factory for this option.

### Coating Option

- Available with multi-layer, industrial 316 stainless steel epoxy coating. Contact factory for this option.

### ATEX

- ATmosphere EXplosible – rated for explosive environments. Contact factory for this option and allow additional time for delivery.

## PHK Performance Overview

PHK Series performance is dependent on several factors including duty cycle, bearing design, gearhead size and stage configuration, among others. Use the chart below for preliminary evaluation, then use the following performance chart and selection information on the following pages for specific performance sizing and selection.

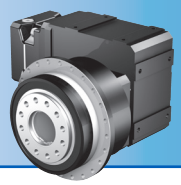
| Size/Generation/# of Stages | | PH521 | PH721 | | PH821 | | PH931 | PH1031 |
|---|---|---|---|---|---|---|---|---|
| Secondary Unit | | K102 | K102 | K202 | K202 | K302 | K513 | K613 |
| **Acceleration Torque** $M_{2BMAX}$ | Nm | 385 | 869 | 882 | 1478 | 1848 | 5000 | 7500 |
| **Output Torque Nom.** [1] $M_{2N}$ | Nm | 220 | 440 | | 1000 | 1100 | 3000 | 5000 |
| **Torsional Stiffness** $C_2$ | Nm/arcmin | 62 | 11 | 117.0 | 260 | 245 | 730 | 1210 |
| **Torsional Backlash** [2] arcmin | Δϕstandard | ≤4 | ≤4 | | ≤3.5 | ≤4 | ≤4 | ≤4 |
| | Δϕ Reduced | ≤2.0 | ≤1.5 | | ≤1.5 | ≤1.5 | ≤2.0 | - |
| **Input Speed Max.** $n_{1MAX}$ | Continuous | 4000 | 4000 | 4000 | 4000 | 3800 | 3400 | 3100 |
| | Cyclic | 7000 | 7000 | 6500 | 6500 | 6000 | 5000 | 4500 |
| **Efficiency (@nom torque)** | % | 93 | 93 | | 93 | | 92 | 92 |
| **Weight** | kg | 18 | 22.2 | 32.6 | 51 | 56 | 96 | 148 |
| | lbs | 39.6 | 48.8 | 71.7 | 112.2 | 123.2 | 211.6 | 326 |
| **Noise** [3] | dB(A) | ≤63 | ≤63 | ≤64 | ≤64 | ≤65 | ≤65 | ≤65 |
| **Performance by Bearing Design Option** [4] | | | | | | | | |
| **Permitted Axial Force** $F_{2ax100}$ | N | 4150 | 6150 | | 10,050 | | 33,000 | 50,000 |
| **Permitted Tilting Torque** $M_{2K100}$ | Nm | 440 | 1,466 | | 3,486 | | 7,500 | 8,800 |
| **Performance by Reinforced Bearing Design Option – Choose V Option** [4] | | | | | | | | |
| **Permitted Axial Force** $F_{2ax100}$ | N | 5000 | — | | — | | — | — |
| **Permitted Tilting Torque ≤100RPM** $M_{2K100}$ | Nm | 572 | — | | — | | — | — |

[1] *Ratings based on input speed ($n_1$) of 1500 RPM. To calculate torque at higher input speeds, contact the factory.*

[2] *Tested at 1.5% of nominal torque and recorded on the output side of the gearhead. For lower backlash, contact STOBER technical support.*

[3] *Measurement at one (1) meter distance with input speed ($n_1$) of 1500 RPM.*

[4] *Rating based on output speed ($n_2$) of 100 RPM. For values at other speeds see page 223.*

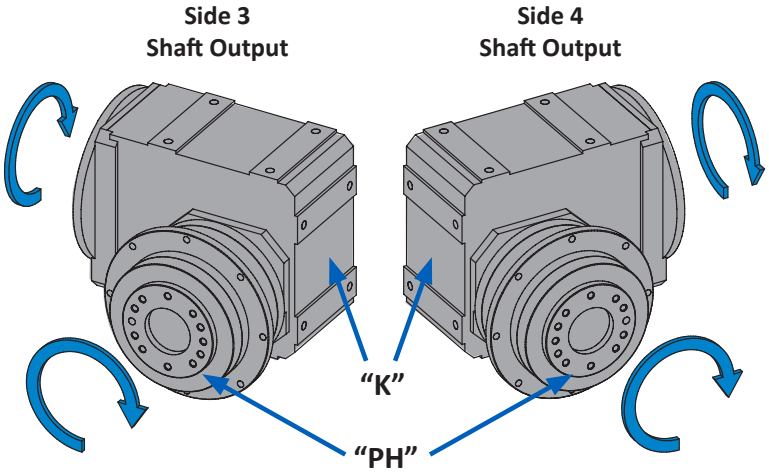


# Overview

## PHK Series Direction of Rotation

For PHK units, the “PH” Series planetary output unit can be mounted on either the right (Side 3) or the left (Side 4) of the “K” Series right angle secondary unit. Note CCW input direction of rotation and CW output shaft direction with both mounting configurations.

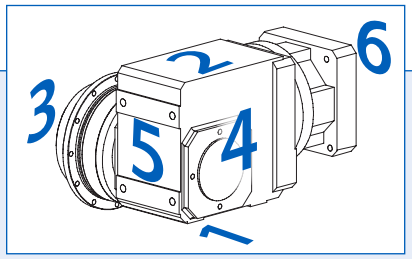
**IMPORTANT: When ordering, Mounting Side 3 or Side 4 MUST BE SPECIFIED.**

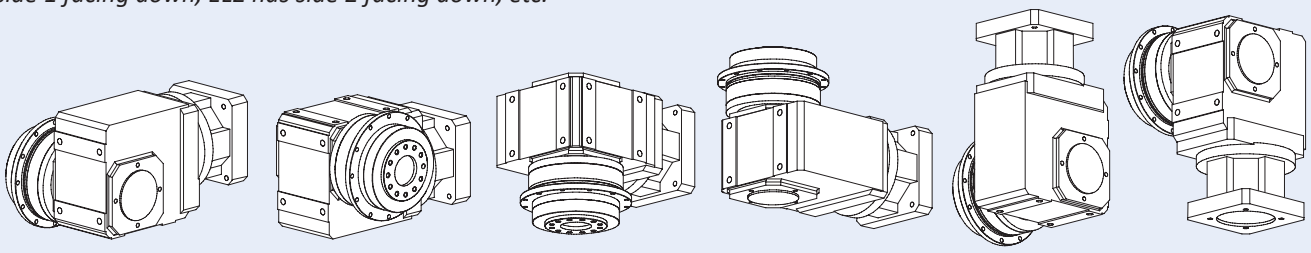



## PHK Mounting Position Options

**When ordering, the Mounting Position MUST BE SPECIFIED using one of the Mounting Position order codes below.**

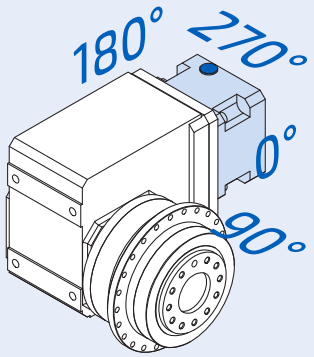
*Note: the code relates to the orientation side that faces down. For example, EL1 has side 1 facing down, EL2 has side 2 facing down, etc.*




## PHK Series Motor Mounting Plate Access Hole

Access to the clamping screw for the motor coupling is located on the 270° side of the motor mounting plate at the location shown. If necessary, the motor mounting plate can be rotated in the field, if a 0°, 90° or 180° orientation for the access hole is desirable.



## PHK Series Motor Mounting Plate Option

STOBER Servo Gearheads fit the motor of your choice with the appropriate motor mounting plate assembled between the motor and the gearhead.

**NOTE: When ordering a gearhead:**

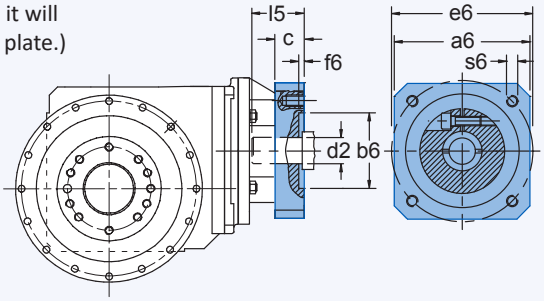
- Specify the motor manufacturer and part number
- Provide the motor drawing with dimensions, or specify the motor mounting dimensions (per the list shown at right)

For a precise dimension on a specific motor, or for general assistance, we recommend you contact STOBER Technical Support.

### Customer Required Dimensions for Properly Sized Motor Mounting Plate

Motor information required with Motor Adapter
(MF option for PHKX; ME option for PHK adn PHQK)

| | |
|---|---|
| d2 | Motor Shaft Diameter (If an adapter bushing is required it will be supplied with the motor plate.) |
| b6 | Pilot Diameter |
| e6 | Bolt Circle Diameter |
| s6 | Bolt Diameter |
| l5 | Motor Shaft Length |
| f6 | Pilot Length |
| a6 | Square Flange (Optional – motor plate will typically be made to match this dimension.) |



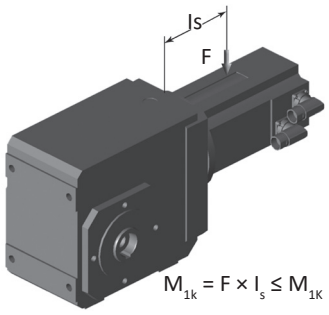

| PHK Motor Mounting Plate Dimensions — mm (Gearhead Part Number Specific) | ME10 | ME20 | ME30 | ME40 | ME50 |
|---|---|---|---|---|---|
| Maximum Allowed Motor Shaft Dia.d2 | 19 | 32 | 38 | 48 | 60 |
| Minimum Allowed Motor Plate Thickness c* | 21 | 24 | 25 | 33 | 43 |

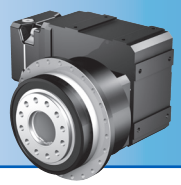
** Note that the c motor plate thickness is determined by the motor shaft length. The minimum motor plate thickness is the value listed.*

## PHK Series Permissible Motor Tilting Torque

The permissible tilting torque of the motor attached to the gear unit is a result of the static and dynamic load "F" from the motor weight, mass acceleration, and vibration multiplied by the distance from the center of gravity "$l_s$" of the motor.

| $M_{1K}$ | PHK (ME Motor Adapters) | | | | |
|---|---|---|---|---|---|
| | ME10 | ME20 | ME30 | ME40 | ME50 |
| Nm | 25 | 60 | 125 | 250 | 600 |





## PHK Series Permissible Output Shaft Load and Tilting Moments – Standard Bearings

| | $z_2$ | $F_{2ax100}$ | $F_{2rad100}$ | $F_{2rad,acc}$ | $M_{2K100}$ | $M_{2K,acc}$ | $c_{2K}$ |
|---|---|---|---|---|---|---|---|
| | Distance of Shaft Shoulder to Center of Output Bearing | Permitted Axial Force | Permitted Radial Force ≤100RPM | Radial Acceleration Force | Permitted Tilting Torque ≤100RPM | Permitted Acceleration Tilting Torque | Tilting Stiffness |
| **Size** | mm | N | N | N | Nm | Nm | Nm/arcmin |
| **5** | 97.0 | 4,150 | 4,536 | 4,897 | 440 | 475 | 429 |
| **7** | 86.0 | 6,150 | 17,045 | 17,045 | 1,466 | 1,466 | 500 |
| **8** | 125.5 | 10,050 | 27,778 | 27,778 | 3,486 | 3,486 | 1,550 |
| **9** | 155.0 | 33,000 | 48,387 | 70,968 | 7,500 | 11,000 | 7,500 |
| **10** | 171.0 | 50,000 | 51,462 | 73,099 | 8,800 | 12,500 | 9,500 |

## PHK Series Permissible Output Shaft Load and Tilting Moments – Reinforced Bearings

| | $z_2$ | $F_{2ax100}$ | $F_{2rad100}$ | $F_{2rad,acc}$ | $M_{2K100}$ | $M_{2K,acc}$ | $c_{2K}$ |
|---|---|---|---|---|---|---|---|
| | Distance of Shaft Shoulder to Center of Output Bearing | Permitted Axial Force | Permitted Radial Force ≤100RPM | Radial Acceleration Force | Permitted Tilting Torque ≤100RPM | Permitted Acceleration Tilting Torque | Tilting Stiffness |
| **Size** | mm | N | N | N | Nm | Nm | Nm/arcmin |
| **5** | 104.0 | 5000 | 5500 | 5500 | 572 | 572 | 478 |

## PHK Series Load/Life/Speed Calculations

The permissible load and tilting moment values are based on an output speed of 100 RPM. For higher speeds the following applies, where $n_2$ is the desired speed:

$$F_{2radN} = \frac{F_{2rad100}}{\sqrt[3]{\frac{n_{2m*}}{100rpm}}} \qquad F_{2AX} = \frac{F_{2ax100}}{\sqrt[3]{\frac{n_2}{100}}} \qquad M_{2KX} = \frac{M_{2K100}}{\sqrt[3]{\frac{n_2}{100}}}$$

The application output tilting moment should be determined by the following formula:

$$M_{2k,acc*} = \frac{2 \bullet F_{2ax100*} \bullet y_2 + F_{2rad,acc*} \bullet (x_2 + Z_2)}{1000} \leq M_{2k,acc}$$

$$M_{2k,eq*} = \sqrt[3]{\frac{n_{2b1} \bullet t_{b1} \bullet M_{2kb1}{}^3 + \ldots + n_{2bn} \bullet t_{bn} \bullet M_{2kbn}{}^3}{n_{2b1} \bullet t_{b1} + \ldots + n_{2bn} \bullet t_{bn}}} \leq M_{2kN}$$

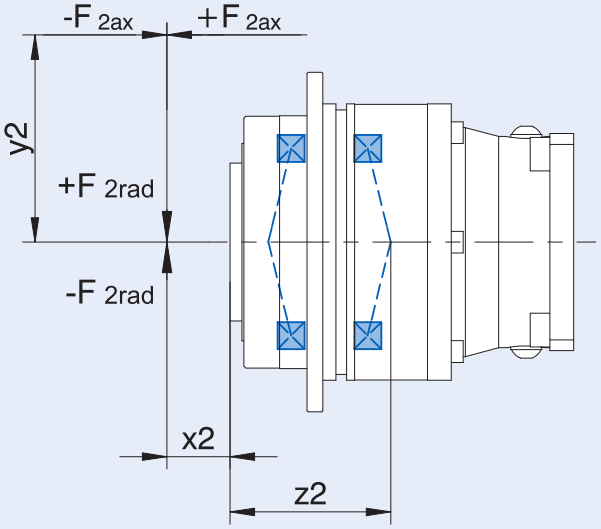
$$F_{2rad,eq*} = \sqrt[3]{\frac{n_{2b1} \bullet t_{b1} \bullet F_{2rb1}{}^3 + \ldots + n_{2bn} \bullet t_{bn} \bullet F_{2rbn}{}^3}{n_{2b1} \bullet t_{b1} + \ldots + n_{2bn} \bullet t_{bn}}} \leq F_{2radN}$$

Where:

| | |
|---|---|
| $z_2$ | Distance of Shaft Shoulder to Center of Output Bearing |
| $n_2$ | Actual Average Output Speed |
| $x_2$ | Distance of the Shaft Shoulder to the Force Application Point |
| $y_2$ | Distance of the Shaft Axis to the Axial Force Application Point |
| $F_{2ax*}$ | Actual Axial Force at Gear Unit Output |
| $F_{2ax100}$ | Permitted Axial Force |
| $F_{2rad100}$ | Permitted Radial Force ≤100RPM |
| $F_{2rad,acc}$ | Radial Acceleration Force |
| $F_{2rad,acc*}$ | Radial Acceleration Force at Gear Unit Output |
| $M_{2K100}$ | Permitted Tilting Torque ≤100RPM |
| $M_{2K,acc}$ | Permitted Acceleration Tilting Torque |
| $M_{2k,acc*}$ | Permitted Acceleration Tilting Torque at Gear Unit Output |
| $c_{2K}$ | Tilting Stiffness |

**All formulas shown are based on METRIC values**

*Upper case letters are permissible values. Lower case letters are for existing values.*




The hours of life ($L_h$) of the unit can be determined by the following formula:

**bearing life for duty cycle ≤ 40%**

$L_h$ > 10,000 hours if $M_{2K100}/M_{2A*}$ < 1.25 and > 1
$L_h$ > 20,000 hours if $M_{2K100}/M_{2A*}$ > 1.25 and > 1.5
$L_h$ > 30,000 hours if $M_{2K100}/M_{2A*}$ < 1.5

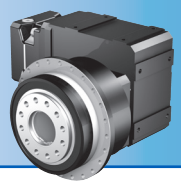
**bearing life for duty cycle ≥ 40%**

$$L_{hA} = L_h \left(\frac{40\%}{\text{Duty Cycle}}\right)$$

| Reducer Ratio (i) | | Output Torque | | | | Back-lash/ Red $\Delta\phi_2$ | Part Number* (Gearhead + Input) | Max. Input Speed RPM (n1) | | | Motor Shaft [3] Max Ø $d_{MW}$ | Input Inertia $J_1$ | Tors. Stiffness $C_2$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Nom. [1] $M_{2N}$ | Accel. $M_{2acc}$ | M2 accHT | Peak [2] $M_{2NOT}$ | | | Continuous | | Cyclic | | | |
| Nom. | Exact | Nm | Nm | Nm | Nm | arcmin | | EL 1,2 | EL 3,4,5,6 | All | mm | kgcm² | Nm/ arcmin |
| **PH5K** | | | | | | | | | | | | | |
| 16.00 | 16/1 | 210 | 355 | 358 | 485 | 4.5/2.5 | PH531_0040K102_0040 ME10 | 3300 | 2800 | 5000 | ≤19 | 1.6 | 50 |
| | | | | | | | PH531_0040K102_0040 ME20 | | | | ≤24 | 3.5 | 51 |
| 20.00 | 20/1 | 220 | 385 | 400 | 607 | 4.0/2.0 | PH531_0050K102_0040 ME10 | 3300 | 2800 | 5000 | ≤19 | 1.6 | 60 |
| | | | | | | | PH531_0050K102_0040 ME20 | | | | ≤24 | 3.5 | 61 |
| 27.84 | 7600/273 | 220 | 385 | 400 | 705 | 4.0/2.0 | PH531_0050K102_0056 ME10 | 3300 | 2800 | 5000 | ≤19 | 1.3 | 61 |
| | | | | | | | PH531_0050K102_0056 ME20 | | | | ≤24 | 3.2 | |
| 30.00 | 30/1 | 220 | 385 | 400 | 705 | 4.0/2.0 | PH531_0050K102_0060 ME10 | 3300 | 2800 | 5000 | ≤19 | 1.1 | 61 |
| | | | | | | | PH531_0050K102_0060 ME20 | | | | ≤24 | 3.0 | |
| 33.22 | 299/9 | 220 | 385 | 400 | 705 | 4.0/2.0 | PH531_0050K102_0066 ME10 | 3600 | 3300 | 5500 | ≤19 | 1.1 | 61 |
| | | | | | | | PH531_0050K102_0066 ME20 | | | | ≤24 | 3.0 | |
| 41.55 | 1911/46 | 220 | 385 | 400 | 705 | 4.0/2.0 | PH531_0050K102_0083 ME10 | 3600 | 3300 | 5500 | ≤19 | 0.93 | 61 |
| | | | | | | | PH531_0050K102_0083 ME20 | | | | ≤24 | 2.8 | 62 |
| 46.25 | 8740/189 | 220 | 385 | 400 | 705 | 4.0/2.0 | PH531_0050K102_0092 ME10 | 3600 | 3300 | 5500 | ≤19 | 0.97 | 61 |
| | | | | | | | PH531_0050K102_0092 ME20 | | | | ≤24 | 2.9 | 62 |
| 57.83 | 1330/23 | 220 | 385 | 400 | 705 | 4.0/2.0 | PH531_0050K102_0115 ME10 | 3600 | 3300 | 5500 | ≤19 | 0.88 | 62 |
| | | | | | | | PH531_0050K102_0115 ME20 | | | | ≤24 | 2.8 | |
| 70.57 | 494/7 | 220 | 385 | 400 | 705 | 4.0/2.0 | PH531_0050K102_0140 ME10 | 4000 | 3800 | 6000 | ≤19 | 0.82 | 62 |
| | | | | | | | PH531_0050K102_0140 ME20 | 3700 | 3700 | | ≤24 | 2.7 | |
| 87.82 | 10450/119 | 220 | 385 | 400 | 705 | 4.0/2.0 | PH531_0050K102_0175 ME10 | 4000 | 3800 | 6000 | ≤19 | 0.77 | 62 |
| | | | | | | | PH531_0050K102_0175 ME20 | 3700 | 3700 | | ≤24 | 2.7 | |
| 116.3 | 5700/49 | 220 | 385 | 400 | 705 | 4.0/2.0 | PH531_0050K102_0230 ME10 | 4000 | 4000 | 7000 | ≤19 | 0.72 | 62 |
| | | | | | | | PH531_0050K102_0230 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.6 | |
| 140.2 | 2945/21 | 220 | 385 | 400 | 705 | 4.0/2.0 | PH531_0050K102_0280 ME10 | 4000 | 4000 | 7000 | ≤19 | 0.70 | 62 |
| | | | | | | | PH531_0050K102_0280 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.6 | |
| 175.5 | 3686/21 | 220 | 385 | 400 | 705 | 4.0/2.0 | PH531_0050K102_0350 ME10 | 4000 | 4000 | 7000 | ≤19 | 0.68 | 62 |
| | | | | | | | PH531_0050K102_0350 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.6 | |
| 234.6 | 11,495/49 | 220 | 385 | 400 | 705 | 4.0/2.0 | PH531_0050K102_0470 ME10 | 4000 | 4000 | 7000 | ≤19 | 0.63 | 62 |
| 280.5 | 5890/21 | 220 | 385 | 400 | 705 | 4.0/2.0 | PH531_0050K102_0560 ME10 | 4000 | 4000 | 7000 | ≤19 | 0.62 | 62 |

[1] *Based on input speed of 1500 RPM. See page <?>.for details on torque calculations.*
[2] *Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
* *Motor shaft adapter code (shaft diameter max - mm): ME10 (19), ME20 (32), ME30 (38), ME40 (48), ME50 (60)*

# Selection Data



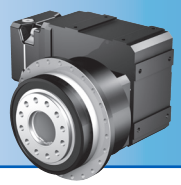
| Reducer Ratio (i) | | Output Torque | | | | Back-lash/ Red $\Delta\phi_2$ | Part Number* (Gearhead + Input) | Max. Input Speed RPM (n1) | | | Motor Shaft [3] Max Ø $d_{MW}$ | Input Inertia $J_1$ | Tors. Stiffness $C_2$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Nom. [1] $M_{2N}$ | Accel. $M_{2acc}$ | M2 accHT | Peak [2] $M_{2NOT}$ | | | Continuous | | Cyclic | | | |
| Nom. | Exact | Nm | Nm | Nm | Nm | arcmin | | EL 1,2 | EL 3,4,5,6 | All | mm | kgcm² | Nm/ arcmin |
| **PH7K** | | **(continued next page)** | | | | | | | | | | | |
| 16.00 | 16/1 | 440 | 670 | 670 | 1212 | 4.5/2.5 | PH731_0040K202_0040 ME20 | 3000 | 2600 | 4500 | ≤32 | 6.8 | 99 |
| | | | | | | | PH731_0040K202_0040 ME30 | | | | ≤38 | 12 | |
| 20.00 | 20/1 | 440 | 838 | 838 | 1516 | 4.0/2.0 | PH731_0050K202_0040 ME20 | 3000 | 2600 | 4500 | ≤32 | 6.6 | 116 |
| | | | | | | | PH731_0050K202_0040 ME30 | | | | ≤38 | 12 | |
| 25.89 | 10,535/407 | 440 | 882 | 913 | 1720 | 4.0/2.0 | PH731_0050K202_0052 ME20 | 3000 | 2600 | 4500 | ≤32 | 5.8 | 116 |
| | | | | | | | PH731_0050K202_0052 ME30 | | | | ≤38 | 11 | |
| 28.00 | 28/1 | 438 | 626 | 626 | 849 | 4.0/2.0 | PH731_0070K102_0040 ME10 | 3300 | 2800 | 5000 | ≤19 | 1.6 | 108 |
| | | | | | | | PH731_0070K102_0040 ME20 | | | | ≤24 | 3.5 | 109 |
| 30.00 | 30/1 | 440 | 670 | 670 | 909 | 4.0/2.0 | PH731_0050K202_0060 ME10 | 3000 | 2600 | 4500 | ≤19 | 2.4 | 114 |
| | | | 882 | 924 | 1720 | | PH731_0050K202_0060 ME20 | | | | ≤32 | 5.8 | 116 |
| | | | | | | | PH731_0050K202_0060 ME30 | | | | ≤38 | 11 | |
| 33.42 | 11,395/341 | 440 | 747 | 747 | 1013 | 4.0/2.0 | PH731_0050K202_0067 ME10 | 3500 | 3100 | 5000 | ≤19 | 1.8 | 115 |
| | | | 882 | 924 | 1720 | | PH731_0050K202_0067 ME20 | | | | ≤32 | 5.2 | 116 |
| | | | | | | | PH731_0050K202_0067 ME30 | | | | ≤38 | 11 | 117 |
| 38.98 | 1520/39 | 440 | 733 | 733 | 1182 | 4.0/2.0 | PH731_0070K102_0056 ME10 | 3300 | 2800 | 5000 | ≤19 | 1.3 | 109 |
| | | | | | | | PH731_0070K102_0056 ME20 | | | | ≤24 | 3.2 | 110 |
| 40.00 | 40/1 | 350 | 575 | 575 | 1150 | 3.5/1.5 | PH731_0100K102_0040 ME10 | 3300 | 2800 | 5000 | ≤19 | 1.5 | 104 |
| | | | | | | | PH731_0100K102_0040 ME20 | | | | ≤24 | 3.4 | 105 |
| 41.99 | 12,470/297 | 440 | 882 | 924 | 1273 | 4.0/2.0 | PH731_0050K202_0084 ME10 | 3500 | 3100 | 5000 | ≤19 | 1.4 | 116 |
| | | | | | 1720 | | PH731_0050K202_0084 ME20 | | | | ≤32 | 4.8 | 117 |
| | | | | | | | PH731_0050K202_0084 ME30 | | | | ≤38 | 10 | |
| 42.00 | 42/1 | 440 | 752 | 752 | 1273 | 4.0/2.0 | PH731_0070K102_0060 ME10 | 3300 | 2800 | 5000 | ≤19 | 1.1 | 110 |
| | | | | | | | PH731_0070K102_0060 ME20 | | | | ≤24 | 3.0 | |
| 45.95 | 11,395/248 | 440 | 882 | 924 | 1393 | 4.0/2.0 | PH731_0050K202_0092 ME10 | 3500 | 3100 | 5000 | ≤19 | 1.6 | 116 |
| | | | | | 1720 | | PH731_0050K202_0092 ME20 | | | | ≤32 | 5.0 | 117 |
| | | | | | | | PH731_0050K202_0092 ME30 | | | | ≤38 | 10 | |
| 46.51 | 2093/45 | 440 | 778 | 778 | 1410 | 4.0/2.0 | PH731_0070K102_0066 ME10 | 3600 | 3300 | 5500 | ≤19 | 1.1 | 110 |
| | | | | | | | PH731_0070K102_0066 ME20 | | | | ≤24 | 3.0 | |
| 55.68 | 15,200/273 | 350 | 575 | 575 | 1150 | 3.5/1.5 | PH731_0100K102_0056 ME10 | 3300 | 2800 | 5000 | ≤19 | 1.3 | 105 |
| | | | | | | | PH731_0100K102_0056 ME20 | | | | ≤24 | 3.2 | |
| 57.73 | 6235/108 | 440 | 882 | 924 | 1720 | 4.0/2.0 | PH731_0050K202_0115 ME10 | 3500 | 3100 | 5000 | ≤19 | 1.3 | 116 |
| | | | | | | | PH731_0050K202_0115 ME20 | | | | ≤32 | 4.7 | 117 |
| | | | | | | | PH731_0050K202_0115 ME30 | | | | ≤38 | 10 | |

*[1] Based on input speed of 1500 RPM. See page <?>.for details on torque calculations.*
*[2] Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
** Motor shaft adapter code (shaft diameter max - mm): ME10 (19), ME20 (32), ME30 (38), ME40 (48), ME50 (60)*

| Reducer Ratio (i) | | Output Torque | | | | Back-lash/ Red | Part Number* (Gearhead + Input) | Max. Input Speed RPM (n1) | | | Motor Shaft [3] Max Ø | Input Inertia | Tors. Stiffness |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Nom. [1] | Accel. | M2 accHT | Peak [2] | | | Continuous | | Cyclic | | | |
| Nom. | Exact | $M_{2N}$ | $M_{2acc}$ | | $M_{2NOT}$ | $\Delta\phi_2$ | | EL 1,2 | EL 3,4,5,6 | All | $d_{MW}$ | $J_1$ | $C_2$ |
| | | Nm | Nm | Nm | Nm | arcmin | | | | | mm | kgcm² | Nm/ arcmin |
| **PH7K** | | **(continued next page)** | | | | | | | | | | | |
| 58.16 | 13,377/230 | 440 | 838 | 838 | 1545 | 4.0/2.0 | PH731_0070K102_0083 ME10 | 3600 | 3300 | 5500 | ≤19 | 0.94 | 110 |
| | | | | | | | PH731_0070K102_0083 ME20 | | | | ≤24 | 2.8 | |
| 60.00 | 60/1 | 350 | 575 | 575 | 1150 | 3.5/1.5 | PH731_0100K102_0060 ME10 | 3300 | 2800 | 5000 | ≤19 | 1.1 | 105 |
| | | | | | | | PH731_0100K102_0060 ME20 | | | | ≤24 | 3.0 | |
| 64.74 | 1748/27 | 440 | 868 | 868 | 1545 | 4.0/2.0 | PH731_0070K102_0092 ME10 | 3600 | 3300 | 5500 | ≤19 | 0.98 | 110 |
| | | | | | | | PH731_0070K102_0092 ME20 | | | | ≤24 | 2.9 | |
| 66.44 | 598/9 | 350 | 575 | 575 | 1150 | 3.5/1.5 | PH731_0100K102_0066 ME10 | 3600 | 3300 | 5500 | ≤19 | 1.1 | 105 |
| | | | | | | | PH731_0100K102_0066 ME20 | | | | ≤24 | 2.9 | |
| 69.26 | 14,405/208 | 440 | 882 | 924 | 1720 | 4.0/2.0 | PH731_0050K202_0140 ME10 | 3900 | 3500 | 5500 | ≤19 | 1.1 | 116 |
| | | | | | | | PH731_0050K202_0140 ME20 | 3700 | | | ≤32 | 4.6 | 117 |
| | | | | | | | PH731_0050K202_0140 ME30 | 3500 | | 5000 | ≤38 | 9.9 | |
| 70.98 | 3549/50 | 440 | 840 | 840 | 1545 | 4.0/2.0 | PH731_0070K102_0100 ME10 | 4000 | 3800 | 6000 | ≤19 | 0.86 | 110 |
| | | | | | | | PH731_0070K102_0100 ME20 | 3700 | 3700 | | ≤24 | 2.8 | |
| 80.96 | 1862/23 | 440 | 869 | 869 | 1545 | 4.0/2.0 | PH731_0070K102_0115 ME10 | 3600 | 3300 | 5500 | ≤19 | 0.88 | 110 |
| | | | | | | | PH731_0070K102_0115 ME20 | | | | ≤24 | 2.8 | 111 |
| 83.09 | 1911/23 | 350 | 575 | 575 | 1150 | 3.5/1.5 | PH731_0100K102_0083 ME10 | 3600 | 3300 | 5500 | ≤19 | 0.93 | 105 |
| | | | | | | | PH731_0100K102_0083 ME20 | | | | ≤24 | 2.8 | |
| 87.35 | 2795/32 | 440 | 882 | 924 | 1720 | 4.0/2.0 | PH731_0050K202_0175 ME10 | 3900 | 3500 | 5500 | ≤19 | 1.0 | 117 |
| | | | | | | | PH731_0050K202_0175 ME20 | 3700 | | | ≤32 | 4.4 | |
| | | | | | | | PH731_0050K202_0175 ME30 | 3500 | | 5000 | ≤38 | 9.7 | |
| 88.33 | 3003/34 | 440 | 840 | 840 | 1545 | 4.0/2.0 | PH731_0070K102_0125 ME10 | 4000 | 3800 | 6000 | ≤19 | 0.79 | 110 |
| | | | | | | | PH731_0070K102_0125 ME20 | 3700 | 3700 | | ≤24 | 2.7 | 111 |
| 92.49 | 17,480/189 | 350 | 575 | 575 | 1150 | 3.5/1.5 | PH731_0100K102_0092 ME10 | 3600 | 3300 | 5500 | ≤19 | 0.97 | 105 |
| | | | | | | | PH731_0100K102_0092 ME20 | | | | ≤24 | 2.9 | |
| 98.80 | 494/5 | 440 | 869 | 869 | 1545 | 4.0/2.0 | PH731_0070K102_0140 ME10 | 4000 | 3800 | 6000 | ≤19 | 0.82 | 110 |
| | | | | | | | PH731_0070K102_0140 ME20 | 3700 | 3700 | | ≤24 | 2.7 | 111 |
| 115.7 | 2660/23 | 350 | 575 | 575 | 1150 | 3.5/1.5 | PH731_0100K102_0115 ME10 | 3600 | 3300 | 5500 | ≤19 | 0.88 | 105 |
| | | | | | | | PH731_0100K102_0115 ME20 | | | | ≤24 | 2.8 | |
| 115.9 | 14,835/128 | 440 | 882 | 924 | 1720 | 4.0/2.0 | PH731_0050K202_0230 ME10 | 4000 | 3900 | 6500 | ≤19 | 0.87 | 117 |
| | | | | | | | PH731_0050K202_0230 ME20 | 3700 | 3700 | 6000 | ≤32 | 4.3 | |
| | | | | | | | PH731_0050K202_0230 ME30 | 3500 | 3500 | 5000 | ≤38 | 9.6 | |
| 117.0 | 117/1 | 440 | 840 | 840 | 1545 | 4.0/2.0 | PH731_0070K102_0165 ME10 | 4000 | 4000 | 7000 | ≤19 | 0.74 | 110 |
| | | | | | | | PH731_0070K102_0165 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.6 | 111 |

[1] *Based on input speed of 1500 RPM. See page <?>.for details on torque calculations.*
[2] *Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
* *Motor shaft adapter code (shaft diameter max - mm): ME10 (19), ME20 (32), ME30 (38), ME40 (48), ME50 (60)*

# Selection Data



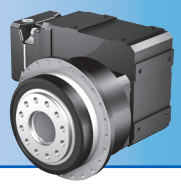
| Reducer Ratio (i) | | Output Torque | | | | Back-lash/ Red $\Delta\phi_2$ | Part Number* (Gearhead + Input) | Max. Input Speed RPM (n1) | | | Motor Shaft [3] Max Ø $d_{MW}$ | Input Inertia $J_1$ | Tors. Stiffness $C_2$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Nom. [1] $M_{2N}$ | Accel. $M_{2acc}$ | M2 accHT | Peak [2] $M_{2NOT}$ | | | Continuous | | Cyclic | | | |
| Nom. | Exact | Nm | Nm | Nm | Nm | arcmin | | EL 1,2 | EL 3,4,5,6 | All | mm | kgcm² | Nm/ arcmin |
| **PH7K** | | **(continued from previous page)** | | | | | | | | | | | |
| 122.9 | 2090/17 | 440 | 869 | 869 | 1545 | 4.0/2.0 | PH731_0070K102_0175 ME10 | 4000 | 3800 | 6000 | ≤19 | 0.77 | 111 |
| | | | | | | | PH731_0070K102_0175 ME20 | 3700 | 3700 | | ≤24 | 2.7 | |
| 139.8 | 559/4 | 440 | 882 | 924 | 1720 | 4.0/2.0 | PH731_0050K202_0280 ME10 | 4000 | 3900 | 6500 | ≤19 | 0.81 | 117 |
| | | | | | | | PH731_0050K202_0280 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.7 | |
| 141.1 | 2821/20 | 440 | 840 | 840 | 1545 | 4.0/2.0 | PH731_0070K102_0200 ME10 | 4000 | 4000 | 7000 | ≤19 | 0.71 | 111 |
| | | | | | | | PH731_0070K102_0200 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.6 | |
| 162.9 | 1140/7 | 440 | 869 | 869 | 1545 | 4.0/2.0 | PH731_0070K102_0230 ME10 | 4000 | 4000 | 7000 | ≤19 | 0.72 | 111 |
| | | | | | | | PH731_0070K102_0230 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.6 | |
| 172.8 | 9675/56 | 440 | 882 | 924 | 1720 | 4.0/2.0 | PH731_0050K202_0350 ME10 | 4000 | 3900 | 6500 | ≤19 | 0.76 | 117 |
| | | | | | | | PH731_0050K202_0350 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.7 | |
| 176.5 | 8827/50 | 440 | 774 | 774 | 1401 | 4.0/2.0 | PH731_0070K102_0250 ME10 | 4000 | 4000 | 7000 | ≤19 | 0.68 | 111 |
| | | | | | | | PH731_0070K102_0250 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.6 | |
| 196.3 | 589/3 | 440 | 869 | 869 | 1545 | 4.0/2.0 | PH731_0070K102_0280 ME10 | 4000 | 4000 | 7000 | ≤19 | 0.70 | 111 |
| | | | | | | | PH731_0070K102_0280 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.6 | |
| 231.1 | 1849/8 | 440 | 882 | 924 | 1720 | 4.0/2.0 | PH731_0050K202_0460 ME10 | 4000 | 3900 | 6500 | ≤19 | 0.71 | 117 |
| | | | | | | | PH731_0050K202_0460 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.6 | |
| 232.7 | 11,400/49 | 350 | 575 | 575 | 1150 | 3.5/1.5 | PH731_0100K102_0230 ME10 | 4000 | 4000 | 7000 | ≤19 | 0.72 | 105 |
| | | | | | | | PH731_0100K102_0230 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.6 | |
| 235.9 | 4719/20 | 440 | 589 | 589 | 1064 | 4.0/2.0 | PH731_0070K102_0340 ME10 | 4000 | 4000 | 7000 | ≤19 | 0.63 | 111 |
| 245.7 | 3686/15 | 440 | 869 | 869 | 1545 | 4.0/2.0 | PH731_0070K102_0350 ME10 | 4000 | 4000 | 7000 | ≤19 | 0.68 | 111 |
| | | | | | | | PH731_0070K102_0350 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.6 | |
| 277.7 | 6665/24 | 440 | 882 | 915 | 1407 | 4.0/2.0 | PH731_0050K202_0560 ME10 | 4000 | 3900 | 6500 | ≤19 | 0.66 | 117 |
| 280.5 | 5890/21 | 350 | 575 | 575 | 1150 | 3.5/1.5 | PH731_0100K102_0280 ME10 | 4000 | 4000 | 7000 | ≤19 | 0.70 | 105 |
| | | | | | | | PH731_0100K102_0280 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.6 | |
| 282.1 | 2821/10 | 413 | 496 | 496 | 896 | 4.0/2.0 | PH731_0070K102_0400 ME10 | 4000 | 4000 | 7000 | ≤19 | 0.62 | 111 |
| 328.4 | 2299/7 | 440 | 819 | 819 | 1482 | 4.0/2.0 | PH731_0070K102_0470 ME10 | 4000 | 4000 | 7000 | ≤19 | 0.63 | 111 |
| 351.1 | 7372/21 | 350 | 575 | 575 | 1150 | 3.5/1.5 | PH731_0100K102_0350 ME10 | 4000 | 4000 | 7000 | ≤19 | 0.68 | 105 |
| | | | | | | | PH731_0100K102_0350 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.6 | |
| 352.2 | 35,217/100 | 336 | 403 | 403 | 728 | 4.0/2.0 | PH731_0070K102_0500 ME10 | 4000 | 4000 | 7000 | ≤19 | 0.62 | 111 |
| 392.7 | 1178/3 | 440 | 690 | 690 | 1248 | 4.0/2.0 | PH731_0070K102_0560 ME10 | 4000 | 4000 | 7000 | ≤19 | 0.62 | 111 |
| 469.2 | 22,990/49 | 350 | 575 | 575 | 1150 | 3.5/1.5 | PH731_0100K102_0470 ME10 | 4000 | 4000 | 7000 | ≤19 | 0.63 | 105 |
| 490.2 | 2451/5 | 440 | 561 | 561 | 1014 | 4.0/2.0 | PH731_0070K102_0700 ME10 | 4000 | 4000 | 7000 | ≤19 | 0.62 | 111 |
| 561.0 | 11,780/21 | 350 | 575 | 575 | 1150 | 3.5/1.5 | PH731_0100K102_0560 ME10 | 4000 | 4000 | 7000 | ≤19 | 0.62 | 105 |

[1] *Based on input speed of 1500 RPM. See page <?>.for details on torque calculations.*
[2] *Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
* *Motor shaft adapter code (shaft diameter max - mm): ME10 (19), ME20 (32), ME30 (38), ME40 (48), ME50 (60)*

| Reducer Ratio (i) | | Output Torque | | | | Back-lash/ Red | Part Number* (Gearhead + Input) | Max. Input Speed RPM (n1) | | | Motor Shaft [3] Max Ø | Input Inertia | Tors. Stiffness |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Nom. [1] | Accel. | M2 accHT | Peak [2] | | | Continuous | | Cyclic | | | |
| | | $M_{2N}$ | $M_{2acc}$ | | $M_{2NOT}$ | $\Delta\phi_2$ | | EL 1,2 | EL 3,4,5,6 | All | $d_{MW}$ | $J_1$ | $C_2$ |
| Nom. | Exact | Nm | Nm | Nm | Nm | arcmin | | | | | mm | kgcm² | Nm/ arcmin |
| **PH8K** | | **(continued next page)** | | | | | | | | | | | |
| 16.00 | 16/1 | 782 | 894 | 894 | 1212 | 4.0/2.0 | PH831_0040K302_0040 ME20 | 2700 | 2300 | 4000 | ≤32 | 11 | 180 |
| | | | 1174 | 1174 | 2917 | | PH831_0040K302_0040 ME30 | | | | ≤38 | 16 | 183 |
| 20.00 | 20/1 | 978 | 1117 | 1117 | 1516 | 4.0/2.0 | PH831_0050K302_0040 ME20 | 2700 | 2300 | 4000 | ≤32 | 10 | 239 |
| | | | 1467 | 1467 | 3646 | | PH831_0050K302_0040 ME30 | | | | ≤38 | 15 | 243 |
| 26.88 | 215/8 | 1079 | 1502 | 1502 | 2037 | 4.0/2.0 | PH831_0050K302_0054 ME20 | 2700 | 2300 | 4000 | ≤32 | 7.8 | 242 |
| | | | | | | | PH831_0050K302_0054 ME30 | | | | ≤38 | 13 | 243 |
| 28.00 | 28/1 | 782 | 1173 | 1173 | 2122 | 3.5/1.5 | PH831_0070K202_0040 ME20 | 3000 | 2600 | 4500 | ≤32 | 7.0 | 242 |
| | | | | | | | PH831_0070K202_0040 ME30 | | | | ≤38 | 12 | 243 |
| 30.00 | 30/1 | 1100 | 1676 | 1676 | 2273 | 4.0/2.0 | PH831_0050K302_0060 ME20 | 2700 | 2300 | 4000 | ≤32 | 8.0 | 242 |
| | | | 1679 | 1679 | 3646 | | PH831_0050K302_0060 ME30 | | | | ≤38 | 13 | 244 |
| 30.55 | 336/11 | 683 | 683 | 683 | 926 | 3.5/1.5 | PH831_0070K202_0044 ME10 | 3000 | 2600 | 4500 | ≤19 | 3.2 | 235 |
| | | 805 | 1207 | 1207 | 2315 | | PH831_0070K202_0044 ME20 | | | | ≤32 | 6.6 | 243 |
| | | | | | | | PH831_0070K202_0044 ME30 | | | | ≤38 | 12 | 244 |
| 36.24 | 14,749/407 | 852 | 1278 | 1278 | 2746 | 3.5/1.5 | PH831_0070K202_0052 ME20 | 3000 | 2600 | 4500 | ≤32 | 6.0 | 243 |
| | | | | | | | PH831_0070K202_0052 ME30 | | | | ≤38 | 11 | 244 |
| 36.96 | 2365/64 | 1100 | 1800 | 1800 | 2801 | 4.0/2.0 | PH831_0050K302_0074 ME20 | 2700 | 2300 | 4000 | ≤32 | 7.0 | 243 |
| | | | | | | | PH831_0050K302_0074 ME30 | | | | ≤38 | 12 | 244 |
| 40.00 | 40/1 | 850 | 1392 | 1392 | 2784 | 3.5/1.5 | PH831_0100K202_0040 ME20 | 3000 | 2600 | 4500 | ≤32 | 6.7 | 259 |
| | | | | | | | PH831_0100K202_0040 ME30 | | | | ≤38 | 12 | |
| 42.00 | 42/1 | 895 | 939 | 939 | 1273 | 3.5/1.5 | PH831_0070K202_0060 ME10 | 3000 | 2600 | 4500 | ≤19 | 2.6 | 240 |
| | | | 1342 | 1342 | 2917 | | PH831_0070K202_0060 ME20 | | | | ≤32 | 6.0 | 244 |
| | | | | | | | PH831_0070K202_0060 ME30 | | | | ≤38 | 11 | |
| 46.34 | 5375/116 | 1100 | 1848 | 1848 | 3512 | 4.0/2.0 | PH831_0050K302_0093 ME20 | 3200 | 2800 | 4500 | ≤32 | 6.1 | 244 |
| | | | | | | | PH831_0050K302_0093 ME30 | | | | ≤38 | 11 | |
| 46.78 | 15,953/341 | 910 | 1046 | 1046 | 1419 | 3.5/1.5 | PH831_0070K202_0067 ME10 | 3500 | 3100 | 5000 | ≤19 | 1.9 | 241 |
| | | 928 | 1391 | 1391 | 2917 | | PH831_0070K202_0067 ME20 | | | | ≤32 | 5.3 | 244 |
| | | | | | | | PH831_0070K202_0067 ME30 | | | | ≤38 | 11 | 245 |
| 49.83 | 14,749/296 | 947 | 1421 | 1421 | 2917 | 3.5/1.5 | PH831_0070K202_0071 ME20 | 3000 | 2600 | 4500 | ≤32 | 5.6 | 244 |
| | | | | | | | PH831_0070K202_0071 ME30 | | | | ≤38 | 11 | 245 |
| 51.77 | 21,070/407 | 850 | 1392 | 1392 | 2784 | 3.5/1.5 | PH831_0100K202_0052 ME20 | 3000 | 2600 | 4500 | ≤32 | 5.8 | 259 |
| | | | | | | | PH831_0100K202_0052 ME30 | | | | ≤38 | 11 | 260 |

[1] *Based on input speed of 1500 RPM. See page <?>.for details on torque calculations.*
[2] *Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
* *Motor shaft adapter code (shaft diameter max - mm): ME10 (19), ME20 (32), ME30 (38), ME40 (48), ME50 (60)*

# Selection Data



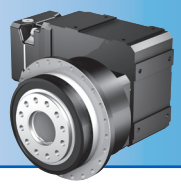
| Reducer Ratio (i) | | Output Torque | | | | Back-lash/ Red $\Delta\phi_2$ | Part Number* (Gearhead + Input) | Max. Input Speed RPM (n1) | | | Motor Shaft [3] Max Ø $d_{MW}$ | Input Inertia $J_1$ | Tors. Stiffness $C_2$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Nom. [1] $M_{2N}$ | Accel. $M_{2acc}$ | M2 accHT | Peak [2] $M_{2NOT}$ | | | Continuous | | Cyclic | | | |
| Nom. | Exact | Nm | Nm | Nm | Nm | arcmin | | EL 1,2 | EL 3,4,5,6 | All | mm | kgcm² | Nm/ arcmin |
| **PH8K** | **(continued next page)** | | | | | | | | | | | | |
| 58.05 | 1161/20 | 1100 | 1298 | 1298 | 1760 | 4.0/2.0 | PH831_0050K302_0115 ME10 | 3200 | 2800 | 4500 | ≤19 | 2.1 | 242 |
| | | | 1848 | 1848 | 3646 | | PH831_0050K302_0115 ME20 | | | | ≤32 | 5.5 | 244 |
| | | | | | | | PH831_0050K302_0115 ME30 | | | | ≤38 | 11 | 245 |
| 58.78 | 17,458/297 | 1000 | 1314 | 1314 | 1782 | 3.5/1.5 | PH831_0070K202_0084 ME10 | 3500 | 3100 | 5000 | ≤19 | 1.5 | 242 |
| | | | 1478 | 1478 | 2917 | | PH831_0070K202_0084 ME20 | | | | ≤32 | 4.9 | 245 |
| | | | | | | | PH831_0070K202_0084 ME30 | | | | ≤38 | 10 | |
| 60.00 | 60/1 | 850 | 1341 | 1341 | 1819 | 3.5/1.5 | PH831_0100K202_0060 ME10 | 3000 | 2600 | 4500 | ≤19 | 2.4 | 257 |
| | | | 1392 | 1392 | 2784 | | PH831_0100K202_0060 ME20 | | | | ≤32 | 5.8 | 259 |
| | | | | | | | PH831_0100K202_0060 ME30 | | | | ≤38 | 11 | 260 |
| 64.33 | 15,953/248 | 1000 | 1438 | 1438 | 1951 | 3.5/1.5 | PH831_0070K202_0092 ME10 | 3500 | 3100 | 5000 | ≤19 | 1.7 | 243 |
| | | | 1478 | 1478 | 2917 | | PH831_0070K202_0092 ME20 | | | | ≤32 | 5.1 | 245 |
| | | | | | | | PH831_0070K202_0092 ME30 | | | | ≤38 | 10 | |
| 66.83 | 22,790/341 | 850 | 1392 | 1392 | 2027 | 3.5/1.5 | PH831_0100K202_0067 ME10 | 3500 | 3100 | 5000 | ≤19 | 1.8 | 258 |
| | | | | | 2784 | | PH831_0100K202_0067 ME20 | | | | ≤32 | 5.2 | 260 |
| | | | | | | | PH831_0100K202_0067 ME30 | | | | ≤38 | 11 | |
| 69.68 | 7525/108 | 1100 | 1558 | 1558 | 2113 | 4.0/2.0 | PH831_0050K302_0140 ME10 | 3500 | 3100 | 5000 | ≤19 | 1.7 | 243 |
| | | | 1848 | 1848 | 3646 | | PH831_0050K302_0140 ME20 | | | | ≤32 | 5.1 | 244 |
| | | | | | | | PH831_0050K302_0140 ME30 | | | | ≤38 | 10 | 245 |
| 70.51 | 20,167/286 | 1000 | 1478 | 1478 | 2137 | 3.5/1.5 | PH831_0070K202_0100 ME10 | 3900 | 3500 | 5500 | ≤19 | 1.3 | 243 |
| | | | | | 2917 | | PH831_0070K202_0100 ME20 | 3700 | | | ≤32 | 4.7 | 245 |
| | | | | | | | PH831_0070K202_0100 ME30 | 3500 | | 5000 | ≤38 | 10 | |
| 80.82 | 8729/108 | 1000 | 1478 | 1478 | 2450 | 3.5/1.5 | PH831_0070K202_0115 ME10 | 3500 | 3100 | 5000 | ≤19 | 1.4 | 244 |
| | | | | | 2917 | | PH831_0070K202_0115 ME20 | | | | ≤32 | 4.8 | 245 |
| | | | | | | | PH831_0070K202_0115 ME30 | | | | ≤38 | 10 | |
| 83.97 | 24,940/297 | 850 | 1392 | 1392 | 2546 | 3.5/1.5 | PH831_0100K202_0084 ME10 | 3500 | 3100 | 5000 | ≤19 | 1.5 | 259 |
| | | | | | 2784 | | PH831_0100K202_0084 ME20 | | | | ≤32 | 4.9 | 260 |
| | | | | | | | PH831_0100K202_0084 ME30 | | | | ≤38 | 10 | |
| 86.47 | 7955/92 | 1100 | 1848 | 1848 | 2621 | 4.0/2.0 | PH831_0050K302_0175 ME10 | 3500 | 3100 | 5000 | ≤19 | 1.4 | 244 |
| | | | | | 3646 | | PH831_0050K302_0175 ME20 | | | | ≤32 | 4.8 | 245 |
| | | | | | | | PH831_0050K302_0175 ME30 | | | | ≤38 | 10 | |
| 88.94 | 3913/44 | 1000 | 1478 | 1478 | 2696 | 3.5/1.5 | PH831_0070K202_0125 ME10 | 3900 | 3500 | 5500 | ≤19 | 1.1 | 244 |
| | | | | | 2917 | | PH831_0070K202_0125 ME20 | 3700 | | | ≤32 | 4.5 | 245 |
| | | | | | | | PH831_0070K202_0125 ME30 | 3500 | | 5000 | ≤38 | 9.8 | |

[1] *Based on input speed of 1500 RPM. See page <?>.for details on torque calculations.*
[2] *Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
* *Motor shaft adapter code (shaft diameter max - mm): ME10 (19), ME20 (32), ME30 (38), ME40 (48), ME50 (60)*

| Reducer Ratio (i) | | Output Torque | | | | Back-lash/ Red | Part Number* (Gearhead + Input) | Max. Input Speed RPM (n1) | | | Motor Shaft [3] Max Ø | Input Inertia | Tors. Stiffness |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Nom. [1] | Accel. | M2 accHT | Peak [2] | | | Continuous | | Cyclic | | | |
| Nom. | Exact | $M_{2N}$ | $M_{2acc}$ | | $M_{2NOT}$ | $\Delta\phi_2$ | | EL 1,2 | EL 3,4,5,6 | All | $d_{MW}$ | $J_1$ | $C_2$ |
| | | Nm | Nm | Nm | Nm | arcmin | | | | | mm | kgcm² | Nm/ arcmin |
| **PH8K** | | **(continued next page)** | | | | | | | | | | | |
| 91.90 | 11395/124 | 850 | 1392 | 1392 | 2784 | 3.5/1.5 | PH831_0100K202_0092 ME10 | 3500 | 3100 | 5000 | ≤19 | 1.6 | 259 |
| | | | | | | | PH831_0100K202_0092 ME20 | | | | ≤32 | 5.0 | 260 |
| | | | | | | | PH831_0100K202_0092 ME30 | | | | ≤38 | 10 | |
| 96.96 | 20,167/208 | 1000 | 1478 | 1478 | 2917 | 3.5/1.5 | PH831_0070K202_0140 ME10 | 3900 | 3500 | 5500 | ≤19 | 1.2 | 244 |
| | | | | | | | PH831_0070K202_0140 ME20 | 3700 | | | ≤32 | 4.6 | 245 |
| | | | | | | | PH831_0070K202_0140 ME30 | 3500 | | 5000 | ≤38 | 9.9 | |
| 115.5 | 6235/54 | 850 | 1392 | 1392 | 2784 | 3.5/1.5 | PH831_0100K202_0115 ME10 | 3500 | 3100 | 5000 | ≤19 | 1.3 | 259 |
| | | | | | | | PH831_0100K202_0115 ME20 | | | | ≤32 | 4.7 | 260 |
| | | | | | | | PH831_0100K202_0115 ME30 | | | | ≤38 | 10 | |
| 116.5 | 2795/24 | 1100 | 1848 | 1848 | 3358 | 4.0/2.0 | PH831_0050K302_0230 ME10 | 3800 | 3500 | 6000 | ≤19 | 1.1 | 244 |
| | | | | | 3646 | | PH831_0050K302_0230 ME20 | 3700 | | | ≤32 | 4.5 | 245 |
| | | | | | | | PH831_0050K302_0230 ME30 | 3500 | | 5000 | ≤38 | 9.9 | |
| 118.0 | 20,769/176 | 1000 | 1478 | 1478 | 2917 | 3.5/1.5 | PH831_0070K202_0170 ME10 | 4000 | 3900 | 6500 | ≤19 | 0.92 | 245 |
| | | | | | | | PH831_0070K202_0170 ME20 | 3700 | 3700 | 6000 | ≤32 | 4.3 | |
| | | | | | | | PH831_0070K202_0170 ME30 | 3500 | 3500 | 5000 | ≤38 | 9.6 | |
| 122.3 | 3913/32 | 1000 | 1478 | 1478 | 2917 | 3.5/1.5 | PH831_0070K202_0175 ME10 | 3900 | 3500 | 5500 | ≤19 | 1.0 | 245 |
| | | | | | | | PH831_0070K202_0175 ME20 | 3700 | | | ≤32 | 4.4 | |
| | | | | | | | PH831_0070K202_0175 ME30 | 3500 | | 5000 | ≤38 | 9.7 | |
| 138.5 | 14,405/104 | 850 | 1392 | 1392 | 2784 | 3.5/1.5 | PH831_0100K202_0140 ME10 | 3900 | 3500 | 5500 | ≤19 | 1.2 | 260 |
| | | | | | | | PH831_0100K202_0140 ME20 | 3700 | | | ≤32 | 4.6 | |
| | | | | | | | PH831_0100K202_0140 ME30 | 3500 | | 5000 | ≤38 | 9.9 | |
| 139.4 | 17,845/128 | 1100 | 1848 | 1848 | 3646 | 4.0/2.0 | PH831_0050K302_0280 ME10 | 3800 | 3500 | 6000 | ≤19 | 1.0 | 244 |
| | | | | | | | PH831_0050K302_0280 ME20 | 3700 | | | ≤32 | 4.4 | 245 |
| | | | | | | | PH831_0050K302_0280 ME30 | 3500 | | 5000 | ≤38 | 9.7 | |
| 142.3 | 7826/55 | 1000 | 1478 | 1478 | 2917 | 3.5/1.5 | PH831_0070K202_0200 ME10 | 4000 | 3900 | 6500 | ≤19 | 0.85 | 245 |
| | | | | | | | PH831_0070K202_0200 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.7 | |
| 162.3 | 20,769/128 | 1000 | 1478 | 1478 | 2917 | 3.5/1.5 | PH831_0070K202_0230 ME10 | 4000 | 3900 | 6500 | ≤19 | 0.88 | 245 |
| | | | | | | | PH831_0070K202_0230 ME20 | 3700 | 3700 | 6000 | ≤32 | 4.3 | |
| | | | | | | | PH831_0070K202_0230 ME30 | 3500 | 3500 | 5000 | ≤38 | 9.6 | |
| 173.7 | 4515/26 | 1100 | 1848 | 1848 | 3646 | 4.0/2.0 | PH831_0050K302_0350 ME10 | 3800 | 3500 | 6000 | ≤19 | 0.90 | 245 |
| | | | | | | | PH831_0050K302_0350 ME20 | 3700 | | | ≤24 | 2.8 | |

[1] *Based on input speed of 1500 RPM. See page <?>.for details on torque calculations.*
[2] *Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
* *Motor shaft adapter code (shaft diameter max - mm): ME10 (19), ME20 (32), ME30 (38), ME40 (48), ME50 (60)*

# Selection Data



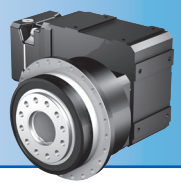
| Reducer Ratio (i) | | Output Torque | | | | Back-lash/ Red | Part Number* (Gearhead + Input) | Max. Input Speed RPM (n1) | | | Motor Shaft [3] Max Ø | Input Inertia | Tors. Stiffness |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Nom. [1] | Accel. | M2 | Peak [2] | | | Continuous | | Cyclic | | | |
| Nom. | Exact | $M_{2N}$ | $M_{2acc}$ | accHT | $M_{2NOT}$ | $\Delta\phi_2$ | | EL 1,2 | EL 3,4,5,6 | All | $d_{MW}$ | $J_1$ | $C_2$ |
| | | Nm | Nm | Nm | Nm | arcmin | | | | | mm | kgcm² | Nm/ arcmin |
| **PH8K** | | **(continued from previous page)** | | | | | | | | | | | |
| 174.7 | 2795/16 | 850 | 1392 | 1392 | 2784 | 3.5/1.5 | PH831_0100K202_0175 ME10 | 3900 | 3500 | 5500 | ≤19 | 1.0 | 260 |
| | | | | | | | PH831_0100K202_0175 ME20 | 3700 | | | ≤32 | 4.4 | |
| | | | | | | | PH831_0100K202_0175 ME30 | 3500 | | 5000 | ≤38 | 9.7 | |
| 175.9 | 1935/11 | 1000 | 1478 | 1478 | 2917 | 3.5/1.5 | PH831_0070K202_0250 ME10 | 4000 | 3900 | 6500 | ≤19 | 0.78 | 245 |
| | | | | | | | PH831_0070K202_0250 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.7 | |
| 195.7 | 3913/20 | 1000 | 1478 | 1478 | 2917 | 3.5/1.5 | PH831_0070K202_0280 ME10 | 4000 | 3900 | 6500 | ≤19 | 0.82 | 245 |
| | | | | | | | PH831_0070K202_0280 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.7 | |
| 231.1 | 1849/8 | 1100 | 1848 | 1848 | 3585 | 4.0/2.0 | PH831_0050K302_0460 ME10 | 3800 | 3500 | 6000 | ≤19 | 0.80 | 245 |
| | | | | | | | PH831_0050K302_0460 ME20 | 3700 | | | ≤24 | 2.7 | |
| 231.8 | 14,835/64 | 850 | 1392 | 1392 | 2784 | 3.5/1.5 | PH831_0100K202_0230 ME10 | 4000 | 3900 | 6500 | ≤19 | 0.87 | 260 |
| | | | | | | | PH831_0100K202_0230 ME20 | 3700 | 3700 | 6000 | ≤32 | 4.3 | |
| | | | | | | | PH831_0100K202_0230 ME30 | 3500 | 3500 | 5000 | ≤38 | 9.6 | |
| 235.3 | 12,943/55 | 1000 | 1242 | 1242 | 2246 | 3.5/1.5 | PH831_0070K202_0340 ME10 | 4000 | 3900 | 6500 | ≤19 | 0.72 | 245 |
| | | | | | | | PH831_0070K202_0340 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.6 | |
| 241.9 | 1935/8 | 1000 | 1478 | 1478 | 2917 | 3.5/1.5 | PH831_0070K202_0350 ME10 | 4000 | 3900 | 6500 | ≤19 | 0.76 | 245 |
| | | | | | | | PH831_0070K202_0350 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.7 | |
| 278.5 | 12,255/44 | 1100 | 1525 | 1525 | 2757 | 4.0/2.0 | PH831_0050K302_0560 ME10 | 3800 | 3500 | 6000 | ≤19 | 0.75 | 245 |
| | | | | | | | PH831_0050K302_0560 ME20 | 3700 | | | ≤24 | 2.6 | |
| 279.5 | 559/2 | 850 | 1392 | 1392 | 2784 | 3.5/1.5 | PH831_0100K202_0280 ME10 | 4000 | 3900 | 6500 | ≤19 | 0.81 | 260 |
| | | | | | | | PH831_0100K202_0280 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.7 | |
| 282.8 | 9331/33 | 776 | 931 | 931 | 1432 | 3.5/1.5 | PH831_0070K202_0400 ME10 | 4000 | 3900 | 6500 | ≤19 | 0.67 | 245 |
| 323.6 | 12,943/40 | 1000 | 1478 | 1478 | 2917 | 3.5/1.5 | PH831_0070K202_0460 ME10 | 4000 | 3900 | 6500 | ≤19 | 0.71 | 245 |
| | | | | | | | PH831_0070K202_0460 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.6 | |
| 345.5 | 9675/28 | 850 | 1392 | 1392 | 2784 | 3.5/1.5 | PH831_0100K202_0350 ME10 | 4000 | 3900 | 6500 | ≤19 | 0.76 | 260 |
| | | | | | | | PH831_0100K202_0350 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.7 | |
| 353.4 | 46,655/132 | 647 | 776 | 776 | 1404 | 3.5/1.5 | PH831_0070K202_0500 ME10 | 4000 | 3900 | 6500 | ≤19 | 0.65 | 245 |
| 388.8 | 9331/24 | 1000 | 1281 | 1281 | 1970 | 3.5/1.5 | PH831_0070K202_0560 ME10 | 4000 | 3900 | 6500 | ≤19 | 0.66 | 245 |
| 462.3 | 1849/4 | 850 | 1392 | 1392 | 2784 | 3.5/1.5 | PH831_0100K202_0460 ME10 | 4000 | 3900 | 6500 | ≤19 | 0.71 | 260 |
| | | | | | | | PH831_0100K202_0460 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.6 | |
| 486.0 | 46,655/96 | 889 | 1067 | 1067 | 1847 | 3.5/1.5 | PH831_0070K202_0690 ME10 | 4000 | 3900 | 6500 | ≤19 | 0.64 | 245 |
| 555.4 | 6665/12 | 850 | 1392 | 1392 | 2784 | 3.5/1.5 | PH831_0100K202_0560 ME10 | 4000 | 3900 | 6500 | ≤19 | 0.66 | 260 |

[1] *Based on input speed of 1500 RPM. See page <?>.for details on torque calculations.*
[2] *Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
* *Motor shaft adapter code (shaft diameter max - mm): ME10 (19), ME20 (32), ME30 (38), ME40 (48), ME50 (60)*

| Reducer Ratio (i) | | Output Torque | | | | Back-lash/ Red | Part Number* (Gearhead + Input) | Max. Input Speed RPM (n1) | | | Motor Shaft [3] Max Ø | Input Inertia | Tors. Stiffness |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Nom. [1] | Accel. | M2 accHT | Peak [2] | | | Continuous | | Cyclic | | | |
| Nom. | Exact | $M_{2N}$ | $M_{2acc}$ | | $M_{2NOT}$ | $\Delta\phi_2$ | | EL 1,2 | EL 3,4,5,6 | All | $d_{MW}$ | $J_1$ | $C_2$ |
| | | Nm | Nm | Nm | Nm | arcmin | | | | | mm | kgcm² | Nm/ arcmin |
| **PH9K** | | | | | | | | | | | | | |
| 32.54 | 17081/525 | 2758 | 3840 | 3840 | 6480 | 4.5/2.5 | PH941_0040K513_0081 ME30 | 1900 | 1800 | 3200 | ≤38 | 25 | 521 |
| | | | | | | | PH941_0040K513_0081 ME40 | | | | ≤48 | 47 | 520 |
| 40.60 | 203/5 | 2884 | 3840 | 3840 | 7500 | 4.5/2.5 | PH941_0040K513_0100 ME30 | 1900 | 1800 | 3200 | ≤38 | 21 | 522 |
| | | | | | | | PH941_0040K513_0100 ME40 | | | | ≤48 | 43 | |
| 48.80 | 17081/350 | 3000 | 5000 | 5000 | 9720 | 4.0/2.0 | PH941_0060K513_0081 ME30 | 1900 | 1800 | 3200 | ≤38 | 24 | 727 |
| | | | | | | | PH941_0060K513_0081 ME40 | | | | ≤48 | 46 | 726 |
| 60.90 | 609/10 | 3000 | 5000 | 5000 | 10000 | 4.0/2.0 | PH941_0060K513_0100 ME30 | 1900 | 1800 | 3200 | ≤38 | 20 | 728 |
| | | | | | | | PH941_0060K513_0100 ME40 | | | | ≤48 | 42 | |
| | | | | | | | PH941_0060K513_0130 ME30 | 2300 | 2200 | 3600 | ≤38 | 17 | 729 |
| | | | | | | | PH941_0060K513_0130 ME40 | | | | ≤48 | 39 | 728 |
| 76.85 | 1537/20 | 3000 | 5000 | 5000 | 10000 | 4.0/2.0 | PH941_0060K513_0130ME30 | 2300 | 2200 | 3600 | ≤38 | 17 | 729 |
| | | | | | | | PH941_0060K513_0130ME40 | | | | ≤48 | 39 | 728 |
| 96.56 | 26071/270 | 3000 | 5000 | 5000 | 7209 | 4.0/2.0 | PH941_0060K513_0160 ME20 | 2300 | 2200 | 3600 | ≤32 | 9.4 | 728 |
| | | | | | 10000 | | PH941_0060K513_0160 ME30 | | | | ≤38 | 15 | 729 |
| | | | | | | | PH941_0060K513_0160 ME40 | | | | ≤48 | 37 | |
| 116.1 | 27869/240 | 3000 | 5000 | 5000 | 8669 | 4.0/2.0 | PH941_0060K513_0195 ME20 | 2800 | 2500 | 4200 | ≤32 | 8.2 | 728 |
| | | | | | 10000 | | PH941_0060K513_0195 ME30 | | | | ≤38 | 14 | 729 |
| | | | | | | | PH941_0060K513_0195 ME40 | | | | ≤48 | 36 | |
| 146.1 | 11687/80 | 3000 | 5000 | 5000 | 10000 | 4.0/2.0 | PH941_0060K513_0240 ME20 | 2800 | 2500 | 4200 | ≤32 | 7.0 | 729 |
| | | | | | | | PH941_0060K513_0240 ME30 | | | | ≤38 | 12 | 730 |
| | | | | | | | PH941_0060K513_0240 ME40 | | | | ≤48 | 34 | |
| 193.8 | 62031/320 | 3000 | 5000 | 5000 | 10000 | 4.0/2.0 | PH941_0060K513_0320 ME20 | 3400 | 3000 | 5000 | ≤32 | 6.0 | 729 |
| | | | | | | | PH941_0060K513_0320 ME30 | | | | ≤38 | 11 | 730 |
| | | | | | | | PH941_0060K513_0320 ME40 | | | 4500 | ≤48 | 33 | |
| 231.2 | 8091/35 | 3000 | 5000 | 5000 | 10000 | 4.0/2.0 | PH941_0060K513_0390 ME20 | 3400 | 3000 | 5000 | ≤32 | 5.5 | 730 |
| | | | | | | | PH941_0060K513_0390 ME30 | | | | ≤38 | 11 | |
| 289.0 | 8091/28 | 3000 | 5000 | 5000 | 10000 | 4.0/2.0 | PH941_0060K513_0480 ME20 | 3400 | 3000 | 5000 | ≤32 | 5.0 | 730 |
| | | | | | | | PH941_0060K513_0480 ME30 | | | | ≤38 | 10 | |
| 387.3 | 25172/65 | 3000 | 5000 | 5000 | 10000 | 4.0/2.0 | PH941_0060K513_0650 ME20 | 3400 | 3000 | 5000 | ≤32 | 4.7 | 730 |
| | | | | | | | PH941_0060K513_0650 ME30 | | | | ≤38 | 10 | |
| 465.6 | 26071/56 | 3000 | 5000 | 5000 | 8724 | 4.0/2.0 | PH941_0060K513_0780 ME20 | 3400 | 3000 | 5000 | ≤24 | 3.0 | 730 |

[1] *Based on input speed of 1500 RPM. See page <?>.for details on torque calculations.*
[2] *Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
* *Motor shaft adapter code (shaft diameter max - mm): ME10 (19), ME20 (32), ME30 (38), ME40 (48), ME50 (60)*

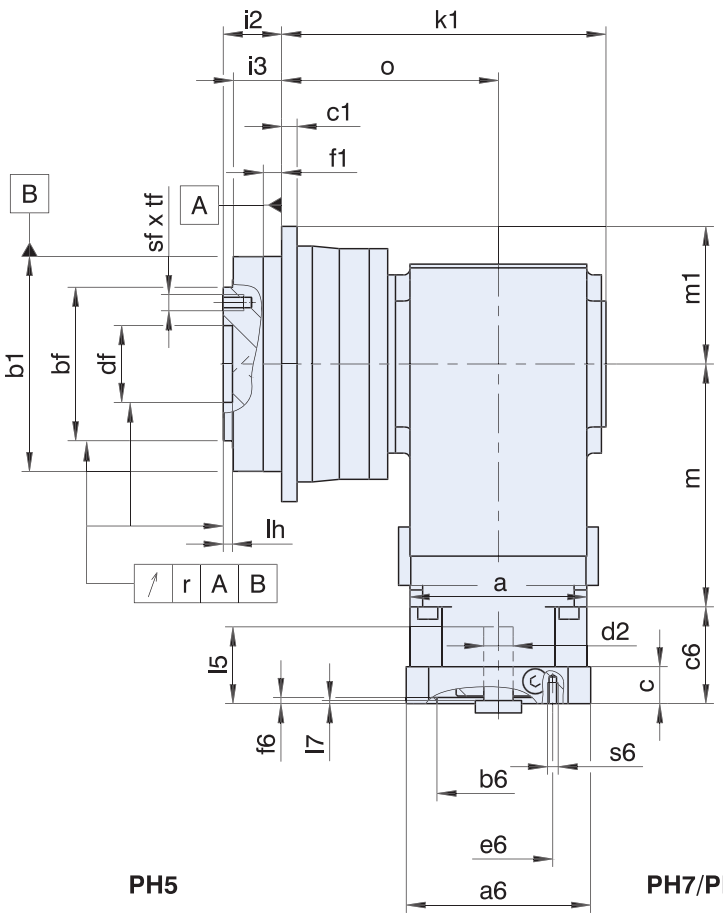
# Selection Data

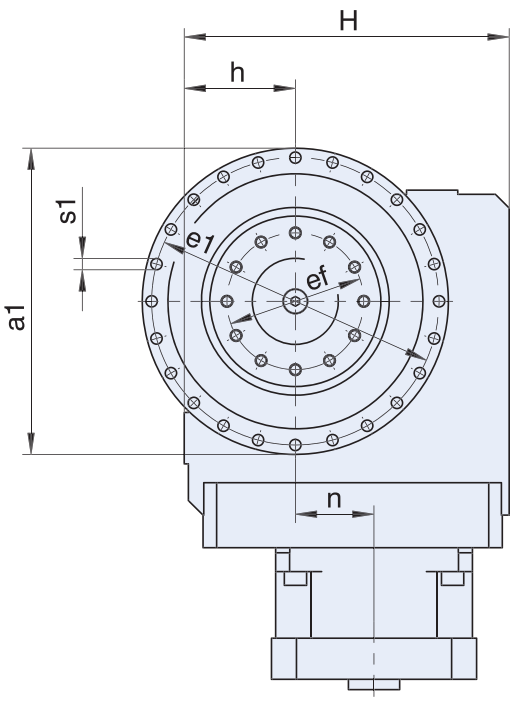


| Reducer Ratio (i) | | Output Torque | | | | Back-lash/ Red $\Delta\phi_2$ | Part Number* (Gearhead + Input) | Max. Input Speed RPM (n1) | | | Motor Shaft [3] Max Ø $d_{MW}$ | Input Inertia $J_1$ | Tors. Stiffness $C_2$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Nom. [1] $M_{2N}$ | Accel. $M_{2acc}$ | M2 accHT | Peak [2] $M_{2NOT}$ | | | Continuous | | Cyclic | | | |
| Nom. | Exact | Nm | Nm | Nm | Nm | arcmin | | EL 1,2 | EL 3,4,5,6 | All | mm | kgcm² | Nm/ arcmin |
| **PH10K** | | | | | | | | | | | | | |
| 48.64 | 255285/5248 | 5000 | 7144 | – | 9689 | 4.0 | PH1041_0060K613_0081 ME30 | 1800 | 1700 | 3000 | ≤38 | 37 | 1201 |
| | | | 7500 | | 15000 | | PH1041_0060K613_0081 ME40 | | | | ≤48 | 60 | 1202 |
| | | | | | | | PH1041_0060K613_0081 ME50 | | | | ≤60 | 88 | 1205 |
| 75.77 | 9699/128 | 5000 | 7500 | – | 15000 | 4.0 | PH1041_0060K613_0125 ME30 | 2200 | 2000 | 3500 | ≤38 | 24 | 1206 |
| | | | | | | | PH1041_0060K613_0125 ME40 | | | | ≤48 | 46 | |
| | | | | | | | PH1041_0060K613_0125 ME50 | | | | ≤60 | 75 | 1207 |
| 95.21 | 54839/576 | 5000 | 7500 | – | 15000 | 4.0 | PH1041_0060K613_0160 ME30 | 2200 | 2000 | 3500 | ≤38 | 20 | 1207 |
| | | | | | | | PH1041_0060K613_0160 ME40 | | | | ≤48 | 42 | |
| | | | | | | | PH1041_0060K613_0160 ME50 | | | | ≤60 | 71 | 1208 |
| 114.0 | 51057/448 | 5000 | 6273 | – | 8508 | 4.0 | PH1041_0060K613_0190 ME20 | 2600 | 2300 | 4000 | ≤32 | 12 | 1205 |
| | | | 7500 | | 15000 | | PH1041_0060K613_0190 ME30 | | | | ≤38 | 17 | 1208 |
| | | | | | | | PH1041_0060K613_0190 ME40 | | | | ≤48 | 39 | |
| | | | | | | | PH1041_0060K613_0190 ME50 | 2500 | | | ≤60 | 68 | 1209 |
| 144.0 | 73749/512 | 5000 | 7500 | – | 15000 | 4.0 | PH1041_0060K613_0240 ME30 | 2600 | 2300 | 4000 | ≤38 | 15 | 1209 |
| | | | | | | | PH1041_0060K613_0240 ME40 | | | | ≤48 | 37 | |
| | | | | | | | PH1041_0060K613_0240 ME50 | 2500 | | | ≤60 | 66 | |
| 191.1 | 391437/2048 | 5000 | 7500 | – | 12521 | 4.0 | PH1041_0060K613_0320 ME20 | 3100 | 2800 | 4500 | ≤32 | 7.7 | 1208 |
| | | | | | 15000 | | PH1041_0060K613_0320 ME30 | | | | ≤38 | 13 | 1209 |
| | | | | | | | PH1041_0060K613_0320 ME40 | 3000 | | | ≤48 | 35 | |
| | | | | | | | PH1041_0060K613_0320 ME50 | 2500 | 2500 | 4000 | ≤60 | 64 | |
| 229.9 | 470859/2048 | 5000 | 7500 | – | 13589 | 4.0 | PH1041_0060K613_0380 ME20 | 3100 | 2800 | 4500 | ≤32 | 6.7 | 1209 |
| | | | | | 15000 | | PH1041_0060K613_0380 ME30 | | | | ≤38 | 12 | |
| | | | | | | | PH1041_0060K613_0380 ME40 | 3000 | | | ≤48 | 34 | |
| | | | | | | | PH1041_0060K613_0380 ME50 | 2500 | 2500 | 4000 | ≤60 | 63 | |
| 286.4 | 119133/416 | 5000 | 7500 | – | 14337 | 4.0 | PH1041_0060K613_0480 ME20 | 3100 | 2800 | 4500 | ≤32 | 5.9 | 1209 |
| | | | | | | | PH1041_0060K613_0480 ME30 | | | | ≤38 | 11 | |
| 382.3 | 391437/1024 | 5000 | 7500 | – | 15000 | 4.0 | PH1041_0060K613_0640 ME20 | 3100 | 2800 | 4500 | ≤32 | 5.2 | 1209 |
| | | | | | | | PH1041_0060K613_0640 ME30 | | | | ≤38 | 10 | 1210 |
| 456.8 | 380091/832 | 5000 | 7500 | – | 15000 | 4.0 | PH1041_0060K613_0760 ME20 | 3100 | 2800 | 4500 | ≤32 | 4.9 | 1210 |
| | | | | | | | PH1041_0060K613_0760 ME30 | | | | ≤38 | 10 | |

[1] *Based on input speed of 1500 RPM. See page <?>.for details on torque calculations.*
[2] *Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
* *Motor shaft adapter code (shaft diameter max - mm): ME10 (19), ME20 (32), ME30 (38), ME40 (48), ME50 (60)*

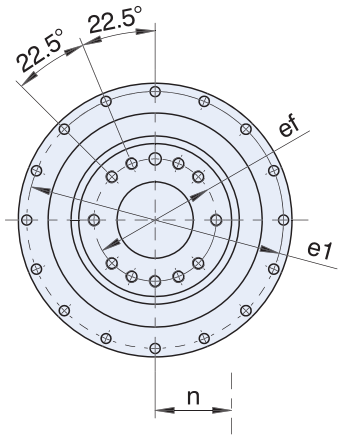
## PHK Series Dimensions — All Units



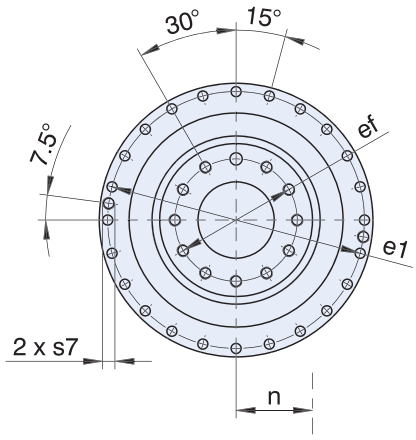




** See Motor Mounting Plate Option, page 221 for details.*

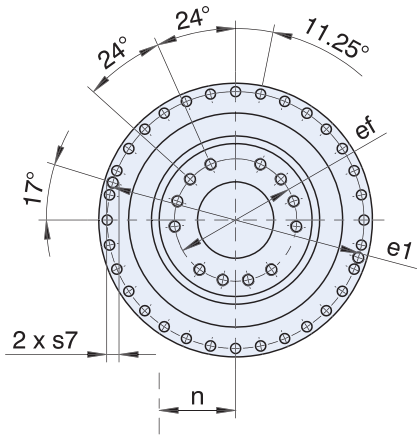
**PH5**




**PH7/PH8**




**PH9/PH10**



# Dimensional Data

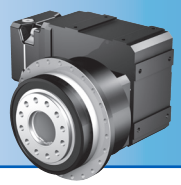


**Table 1** Dimensions (mm)

| Unit | Øa1 | Øb1 | Øbf | c1 | Ødf | Øe1 | Øef | f1 | h | H | i2 | i3 | k1 | lh | m1 | o | r | Øs1 | s7 | sf | tf |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PH531_K102 | $145^{h7}$ | $110^{h7}$ | $80^{h7}$ | 8 | $40^{H6}$ | 135 | 63 | 12 | 60 | 160 | 29 | 23 | 180.0 | 6 | 72.5 | 124.0 | 0.020 | 5.5 | – | M6 | 11 |
| PH731_K102 | $179^{h7}$ | $140^{h7}$ | $100^{h7}$ | 10 | $50^{H6}$ | 168 | 80 | 12 | 60 | 160 | 38 | 32 | 183.0 | 6 | 89.5 | 127.0 | 0.025 | 6.6 | – | M8 | 14 |
| PH731_K202 | $179^{h7}$ | $140^{h7}$ | $100^{h7}$ | 10 | $50^{H6}$ | 168 | 80 | 12 | 65 | 190 | 38 | 32 | 211.0 | 6 | 89.5 | 141.0 | 0.025 | 6.6 | – | M8 | 14 |
| PH831_K202 | $247^{h7}$ | $200^{h7}$ | $160^{h7}$ | 12 | $80^{H6}$ | 233 | 125 | 15 | 65 | 190 | 50 | 42 | 246.0 | 8 | 123.5 | 176.0 | 0.030 | 9.0 | M10 | M10 | 18 |
| PH831_K302 | $247^{h7}$ | $200^{h7}$ | $160^{h7}$ | 12 | $80^{H6}$ | 233 | 125 | 15 | 75 | 213 | 50 | 42 | 259.5 | 8 | 123.5 | 183.5 | 0.030 | 9.0 | M10 | M10 | 18 |
| PH941_K513 | - | $255^{h7}$ | $180^{h7}$ | 18 | $90^{H6}$ | 280 | 140 | 20 | 160 | 260 | 66 | 55 | 292.5 | 12 | 150.0 | 196.5 | 0.030 | 13.5 | M8 | M16 | 24 |
| PH1041_K613 | - | $285^{h7}$ | $200^{h7}$ | 20 | $95^{H6}$ | 310 | 160 | 20 | 190 | 310 | 75 | 60 | 318.5 | 10 | 165.0 | 215.0 | 0.040 | 13.5 | M10 | M20 | 28 |

## Motor Mounting Plate

**Table 2** Dimensions (mm)

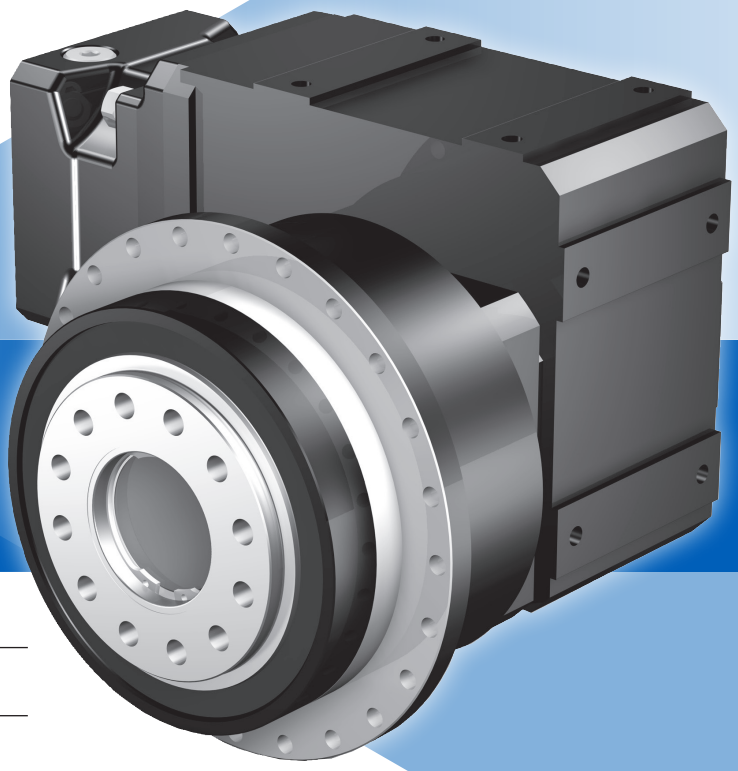
| Base Module | Motor Adapter Code | | | | | | | | | | | | | | | Wt. lbs. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ME10 | | | ME20 | | | ME30 | | | ME40 | | | ME50 | | | |
| | a | m | n | a | m | n | a | m | n | a | m | n | a | m | n | |
| PH531_K102 | 98 | 124 | 36 | 115 | 128 | 36 | – | – | – | – | – | – | – | – | – | 43 |
| PH731_K102 | 98 | 124 | 36 | 115 | 128 | 36 | – | – | – | – | – | – | – | – | – | 53 |
| PH731_K202 | 98 | 143 | 46 | 115 | 147 | 46 | 145 | 149 | 46 | – | – | – | – | – | – | 69 |
| PH831_K202 | 98 | 143 | 46 | 115 | 147 | 46 | 145 | 149 | 46 | – | – | – | – | – | – | 116 |
| PH831_K302 | 140 | 163 | 53 | 115 | 167 | 53 | 145 | 169 | 53 | – | – | – | – | – | – | 134 |
| PH941_K513 | – | – | – | 160 | 172 | 15 | 145 | 174 | 15 | 190 | 177 | 15 | – | – | – | 213 |
| PH1041_K613 | – | – | – | 160 | 191 | 18 | 200 | 193 | 18 | 190 | 196 | 18 | 300 | 210 | 18 | 310 |

# PHQK Series: RIGHT ANGLE – Flange Output

## PHQK Features

- 22:1 to 591:1 ratios (higher ratios available. Contact STOBER.)
- Quiet running (<63dB(A))
- High load capacity and tilting rigidity through symmetrical bearing arrangement
- FKM seals for extended gearbox life
- Large motor input option to accept bigger diameter motor shafts so you don't use an oversized gearbox
- Error free motor mounting and quick changeover with toleranced pilot on motor plate
- Low no load running torque, giving you more torque for your application
- Magnetic oil filtration to remove contaminants to prevent breakdowns
- Build and ship in one day
- Assembled in the USA

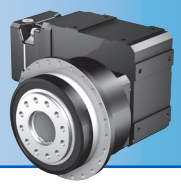
*STOBER PHQK Series combines planetary and helical gearing. The PHQK provides a more compact, precise solution, and can handle higher input speeds. Every gearbox is made to order. STOBER will custom whatever you need to fit your application. Contact us today to learn more.*



SHIPS in 1 DAY!
NO EXPEDITE FEE FOR 24 HOUR SERVICE

## General Specifications

| | |
|---|---|
| **Ambient Temperature** | 0°C to +40°C (104°F) [Unit temperature <90°C Max] |
| **Backlash** | ≤3.5 (see performance overview chart, page 238) |
| **Coating** | Standard Black (RAL-9005) |
| **Degree of Protection** | IP65 |
| **Direction of Rotation** | See page 239 |
| **Efficiency** | PHQK: 94% |
| **Input RPM** | Up to 6,000 RPM |
| **Installation** | Requires 12.9 fasteners. See page 288, for more information |
| **Lubrication** | Lubricated for life – standard Mobil SHC629; option food grade Mobil SHC CIBUS 150 |
| **Mounting Position** | Must be specified, see page 257 |
| **Warranty** | 5 Year Limited (2 Years on normal wear items: bearings, seals, etc.) |



# Overview

## Selection Options *At-a-Glance*

Using the **Selection Data** table later in this section, select the PHKQ Series Gearhead with the appropriate performance and design options tailored to your motor choice and exact application requirements. Use the part number guide below as a reference to build a part number for the complete gearhead assembly.

**Part Number Examples:**

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 0 | ! | @ | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PHQK | PHQ | 5 | 3 | 1 | S | F | S | S | 0030 | K523VF | 0040 | ME10 | EL1 * |

| | Design Option | Part Number Code | Description |
|---|---|---|---|
| 1 | **Series** | PHQ | Rotating flange output with Quattro power planetary |
| 2 | **Size** | 5 7 8 9<br>10 11 12 | 7 sizes of gearhead |
| 3 | **Generation** | 3<br>4 | Sizes 5-8<br>Sizes 9-12 |
| 4 | **# of Stages** | 1 | One stage |
| 5 | **Housing** | S | Standard mounting style |
| 6 | **Output Shaft** | F | Flange output |
| 7 | **Bearing** | S<br>V | Standard<br>Reinforced Bearing (Size 5 Only) |
| 8 | **Backlash** | S | Standard Backlash<br>Reduced Backlash (Sizes 5-9 only) |
| 9 | **Ratio** | 0030 | Ratios range from 3:1 to 6:1 (0030=3:1) |
| 0 | **Secondary Unit** | K523VF | K Series helical/bevel unit: 6 sizes, 1, 2, 3, or 4 stages, with output shaft (V) and flange (F) please specify side 3 or side 4 |
| ! | **Secondary Unit Ratio** | 0040 | Ratios from 4:1 to 99:1 (0040=4:1; 0020=2:1; 0030=3:1) |
| @ | **Motor Adapter** | ME10 - ME50<br>MB | Motor Adapter with EasyAdapt coupling<br>ServoStop with motor adapter with brake (Contact factory) |
| * | **Mounting Position** | EL1 EL2 EL3<br>EL4 EL5 EL6 | Required special instruction for all units, see page 257 |

## Options

### ME Adapter Option

- MSS1 Seal – special input seal for longer life (For sizes PHQ5-8). Contact factory for this option.
- Peak Torque Booster – pinion securing element for shock loads, increasing peak torque up to 80%.

### Integrated Safety Brake

- ServoStop – provides dynamic braking during power failures or emergency stops in hazardous situations. Contact factory for this option.

### Coating Option

- Available with multi-layer, industrial 316 stainless steel epoxy coating. Contact factory for this option.

### ATEX

- ATmosphere EXplosible – rated for explosive environments. Contact factory for this option and allow additional time for delivery.

## PHQK Performance Overview

PHQK Series performance is dependent on several factors including duty cycle, bearing design, gearhead size and stage configuration, among others. Use the chart below for preliminary evaluation, then use the following performance chart and selection information on the following pages for specific performance sizing and selection.

| Size/Generation/# of Stages | | PHQ5 | PHQ7 | PHQ8 | PHQ9 | PHQ10 | PHQ11 | PHQ12 |
|---|---|---|---|---|---|---|---|---|
| Secondary Unit | | K102 | K202 | K402 | K513 | K713 | K813 | K913/K914 |
| **Acceleration Torque** $M_{2BMAX}$ | Nm | 550 | 1050 | 2800 | 5760 | 10,000 | 22,000 | 43,000 |
| **Output Torque Nom.** [1] $M_{2N}$ | Nm | 280 | 500 | 1400 | 3800 | 6500 | 13,000 | 21,772 |
| **Torsional Stiffness** $C_2$ | Nm/arcmin | 70 | 136 | 400 | 771 | 1560 | 2623 | 4664 |
| **Torsional Backlash** [2] $\Delta\phi$ | arcmin | ≤4 | ≤4 | ≤3.5 | ≤4 | ≤4 | ≤4 | ≤4 |
| **Input Speed Max.** $n_{1MAX}$ | Continuous<br>Cyclic | 4000<br>7000 | 4000<br>6500 | 3600<br>5500 | 3400<br>5000 | 2900<br>4200 | 2800<br>4000 | 2600<br>3800 |
| **Efficiency (@nom torque)** | % | 93 | 93 | 93 | 92 | 92 | 92 | 92 |
| **Weight** | kg<br>lbs | 17.9<br>39.4 | 32.6<br>71.7 | 74.4<br>163.7 | 96.7<br>212.7 | 164.1<br>361 | 304.5<br>669.9 | 556.2<br>1223.6 |
| **Noise** [3] | dB(A) | ≤63 | ≤63 | ≤63 | ≤64 | ≤64 | ≤65 | ≤65 |
| **Performance by Bearing Design Option** [4] | | | | | | | | |
| **Permitted Axial Force** $F_{2ax100}$ | N | 4150 | 6150 | 10,050 | 33,000 | 50,000 | 60,000 | 70,000 |
| **Permitted Tilting Torque ≤100RPM** $M_{2K100}$ | Nm | 440 | 1466 | 3500 | 7500 | 8800 | 11,000 | 18,000 |
| **Performance by Reinforced Bearing Design Option – Choose V Option** [4] | | | | | | | | |
| **Permitted Axial Force** $F_{2ax100}$ | N | 5000 | – | – | – | – | – | – |
| **Permitted Tilting Torque ≤100RPM** $M_{2K100}$ | Nm | 572 | – | – | – | – | – | – |

[1] *Ratings based on input speed ($n_1$) of 1500 RPM. To calculate torque at higher input speeds, contact the factory.*

[2] *Tested at 1.5% of nominal torque and recorded on the output side of the gearhead. For lower backlash, contact STOBER technical support.*

[3] *Measurement at one (1) meter distance with input speed ($n_1$) of 1500 RPM.*

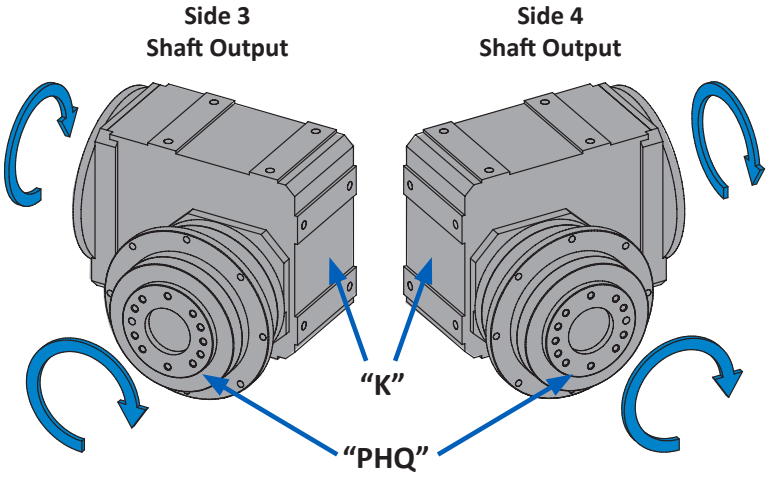
[4] *Rating based on output speed ($n_2$) of 100 RPM. For values at other speeds see page 241.*



## PHQK Series Direction of Rotation

For PHQK units, the “PHQ” Series planetary output unit can be mounted on either the right (Side 3) or the left (Side 4) of the “K” Series right angle secondary unit. Note CCW input direction of rotation and CW output shaft direction with both mounting configurations.

**IMPORTANT: When ordering, Mounting Side 3 or Side 4 MUST BE SPECIFIED.**





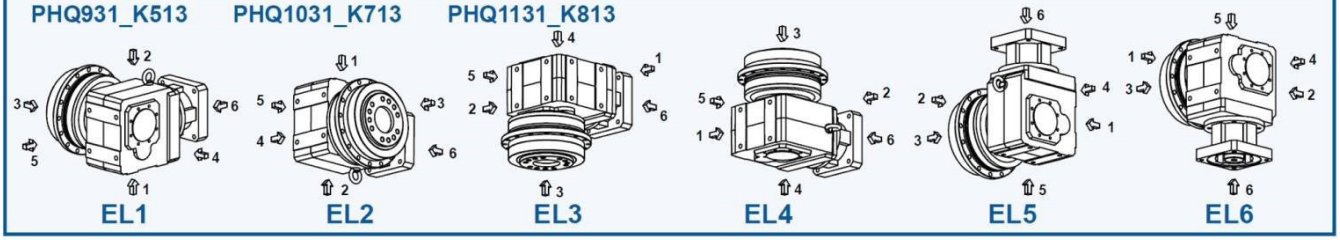

## PHQK Mounting Position Options

**When ordering, the mounting in position (EL1, EL2, EL3, EL4, EL5, EL6) MUST BE SPECIFIED**

PHQ521_K102 PHQ721_K202 PHQ821_K402

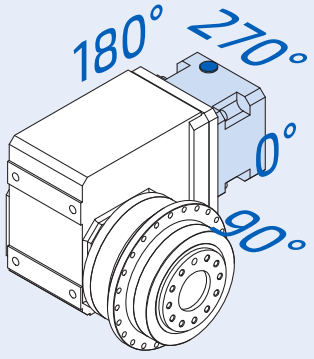



PHQ931_K513 PHQ1031_K713 PHQ1131_K813




## PHQK Series Motor Mounting Plate Access Hole

Access to the clamping screw for the motor coupling is located on the 270° side of the motor mounting plate at the location shown. If necessary, the motor mounting plate can be rotated in the field, if a 0°, 90° or 180° orientation for the access hole is desirable.



## PHQK Series Motor Mounting Plate Option

STOBER Servo Gearheads fit the motor of your choice with the appropriate motor mounting plate assembled between the motor and the gearhead.

**NOTE: When ordering a gearhead:**

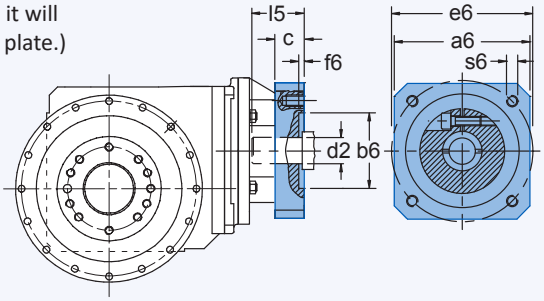
- Specify the motor manufacturer and part number
- Provide the motor drawing with dimensions, or specify the motor mounting dimensions (per the list shown at right)

For a precise dimension on a specific motor, or for general assistance, we recommend you contact STOBER Technical Support.

### Customer Required Dimensions for Properly Sized Motor Mounting Plate

Motor information required with Motor Adapter

| | |
|---|---|
| d2 | Motor Shaft Diameter (If an adapter bushing is required it will be supplied with the motor plate.) |
| b6 | Pilot Diameter |
| e6 | Bolt Circle Diameter |
| s6 | Bolt Diameter |
| l5 | Motor Shaft Length |
| f6 | Pilot Length |
| a6 | Square Flange (Optional – motor plate will typically be made to match this dimension.) |



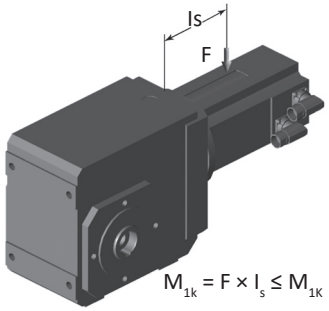

| PHQK Motor Mounting Plate Dimensions — mm (Gearhead Part Number Specific) | ME10 | ME20 | ME30 | ME40 | ME50 |
|---|---|---|---|---|---|
| Maximum Allowed Motor Shaft Dia.d2 | 19 | 32 | 38 | 48 | 60 |
| Minimum Allowed Motor Plate Thickness c* | 21 | 24 | 25 | 33 | 43 |

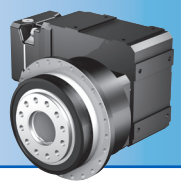
** Note that the c motor plate thickness is determined by the motor shaft length. The minimum motor plate thickness is the value listed.*

## PHQX Series Permissible Motor Tilting Torque

The permissible tilting torque of the motor attached to the gear unit is a result of the static and dynamic load "F" from the motor weight, mass acceleration, and vibration multiplied by the distance from the center of gravity "$l_s$" of the motor.

| $M_{1K}$ | PHQK (ME Motor Adapters) | | | | |
|---|---|---|---|---|---|
| | ME10 | ME20 | ME30 | ME40 | ME50 |
| Nm | 25 | 60 | 125 | 250 | 600 |





## PHQK Series Permissible Output Shaft Load and Tilting Moments – Standard Bearings

| Size | $Z_2$ Distance of Shaft Shoulder to Center of Output Bearing mm | $F_{2ax100}$ Permitted Axial Force N | $F_{2rad100}$ Permitted Radial Force ≤100RPM N | $F_{2rad,acc}$ Radial Acceleration Force N | $M_{2K100}$ Permitted Tilting Torque ≤100RPM Nm | $M_{2K,acc}$ Permitted Acceleration Tilting Torque Nm | $C_{2K}$ Tilting Stiffness Nm/arcmin |
|---|---|---|---|---|---|---|---|
| 5 | 97.0 | 4150 | 4536 | 4897 | 475 | 475 | 429 |
| 7 | 86.0 | 6150 | 17,045 | 17,045 | 1466 | 1466 | 500 |
| 8 | 125.5 | 10,050 | 27,778 | 27,778 | 3486 | 3486 | 1550 |
| 9 | 155.0 | 33,000 | 48,387 | 33,333 | 7500 | 4,183 | 7500 |
| 10 | 171.0 | 50,000 | 51,462 | 73,099 | 8800 | 12,500 | 9500 |
| 11 | 231 | 60,000 | 47,619 | 69,264 | 11,000 | 16,000 | 9500 |
| 12 | 281 | 70,000 | 64,057 | 106,761 | 18,000 | 30,000 | 11,500 |

## PHQK Series Permissible Output Shaft Load and Tilting Moments – Reinforced Bearings

| Size | $Z_2$ Distance of Shaft Shoulder to Center of Output Bearing mm | $F_{2ax100}$ Permitted Axial Force N | $F_{2rad100}$ Permitted Radial Force ≤100RPM N | $F_{2rad,acc}$ Radial Acceleration Force N | $M_{2K100}$ Permitted Tilting Torque ≤100RPM Nm | $M_{2K,acc}$ Permitted Acceleration Tilting Torque Nm | $C_{2K}$ Tilting Stiffness Nm/arcmin |
|---|---|---|---|---|---|---|---|
| 5 | 104.0 | 5000 | 5500 | 5500 | 572 | 572 | 478 |

## PHQK Series Load/Life/Speed Calculations

The permissible load and tilting moment values are based on an output speed of 100 RPM. For higher speeds the following applies, where $n_2$ is the desired speed:

$$F_{2radN} = \frac{F_{2rad100}}{\sqrt[3]{\frac{n_{2m^*}}{100rpm}}} \qquad F_{2AX} = \frac{F_{2ax100}}{\sqrt[3]{\frac{n_2}{100}}} \qquad M_{2KX} = \frac{M_{2K100}}{\sqrt[3]{\frac{n_2}{100}}}$$

The application output tilting moment should be determined by the following formula:

$$M_{2k,acc^*} = \frac{2 \bullet F_{2ax100^*} \bullet y_2 + F_{2rad,acc^*} \bullet (x_2 + Z_2)}{1000} \leq M_{2k,acc}$$

$$M_{2k,eq^*} = \sqrt[3]{\frac{n_{2b1} \bullet t_{b1} \bullet M_{2kb1}{}^3 + \ldots + n_{2bn} \bullet t_{bn} \bullet M_{2kbn}{}^3}{n_{2b1} \bullet t_{b1} + \ldots + n_{2bn} \bullet t_{bn}}} \leq M_{2kN}$$

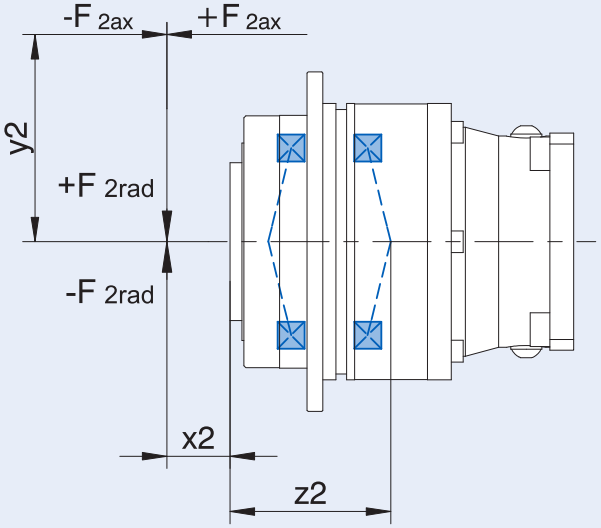
$$F_{2rad,eq^*} = \sqrt[3]{\frac{n_{2b1} \bullet t_{b1} \bullet F_{2rb1}{}^3 + \ldots + n_{2bn} \bullet t_{bn} \bullet F_{2rbn}{}^3}{n_{2b1} \bullet t_{b1} + \ldots + n_{2bn} \bullet t_{bn}}} \leq F_{2radN}$$

Where:

| | |
|---|---|
| $Z_2$ | Distance of Shaft Shoulder to Center of Output Bearing |
| $n_2$ | Actual Average Output Speed |
| $X_2$ | Distance of the Shaft Shoulder to the Force Application Point |
| $Y_2$ | Distance of the Shaft Axis to the Axial Force Application Point |
| $F_{2ax^*}$ | Actual Axial Force at Gear Unit Output |
| $F_{2ax100}$ | Permitted Axial Force |
| $F_{2rad100}$ | Permitted Radial Force ≤100RPM |
| $F_{2rad,acc}$ | Radial Acceleration Force |
| $F_{2rad,acc^*}$ | Radial Acceleration Force at Gear Unit Output |
| $M_{2K100}$ | Permitted Tilting Torque ≤100RPM |
| $M_{2K,acc}$ | Permitted Acceleration Tilting Torque |
| $M_{2k,acc^*}$ | Permitted Acceleration Tilting Torque at Gear Unit Output |
| $C_{2K}$ | Tilting Stiffness |

**All formulas shown are based on METRIC values**

*Upper case letters are permissible values. Lower case letters are for existing values.*




The hours of life ($L_h$) of the unit can be determined by the following formula:

**bearing life for duty cycle ≤ 40%**

$L_h$ > 10,000 hours if $M_{2K100}/M_{2A^*}$ < 1.25 and > 1
$L_h$ > 20,000 hours if $M_{2K100}/M_{2A^*}$ > 1.25 and > 1.5
$L_h$ > 30,000 hours if $M_{2K100}/M_{2A^*}$ < 1.5

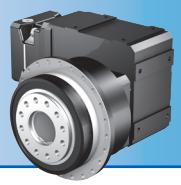
**bearing life for duty cycle ≥ 40%**

$$L_{hA} = L_h \left( \frac{40\%}{\text{Duty Cycle}} \right)$$

| Reducer Ratio (i) | | Output Torque | | | | Back-lash/ Red | Part Number* (Gearhead + Input) | Max. Input Speed RPM (n1) | | | Motor Shaft [3] Max Ø | Input Inertia | Tors. Stiffness |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Nom. [1] | Accel. | M2 accHT | Peak [2] | | | Continuous | | Cyclic | | | |
| Nom. | Exact | $M_{2N}$ | $M_{2acc}$ | | $M_{2NOT}$ | $\Delta\phi_2$ | | EL 1,2 | EL 3,4,5,6 | All | $d_{MW}$ | $J_1$ | $C_2$ |
| | | Nm | Nm | Nm | Nm | arcmin | | | | | mm | kgcm² | Nm/ arcmin |
| **PHQ5K** | **(continued next page)** | | | | | | | | | | | | |
| 22.00 | 22/1 | 280 | 492 | 492 | 667 | 4.0/2.0 | PHQ531_0055K102_0040 ME10 | 3300 | 2800 | 5000 | ≤19 | 1.5 | 69 |
| | | | | | | | PHQ531_0055K102_0040 ME20 | | | | ≤24 | 3.4 | 70 |
| 30.62 | 8360/273 | 280 | 550 | 550 | 929 | 4.0/2.0 | PHQ531_0055K102_0056 ME10 | 3300 | 2800 | 5000 | ≤19 | 1.3 | 70 |
| | | | | | | | PHQ531_0055K102_0056 ME20 | | | | ≤24 | 3.2 | |
| 33.00 | 33/1 | 280 | 550 | 550 | 948 | 4.0/2.0 | PHQ531_0055K102_0060 ME10 | 3300 | 2800 | 5000 | ≤19 | 1.1 | 70 |
| | | | | | | | PHQ531_0055K102_0060 ME20 | | | | ≤24 | 3.0 | |
| 36.54 | 3289/90 | 280 | 550 | 550 | 948 | 4.0/2.0 | PHQ531_0055K102_0066 ME10 | 3600 | 3300 | 5500 | ≤19 | 1.1 | 70 |
| | | | | | | | PHQ531_0055K102_0066 ME20 | | | | ≤24 | 2.9 | |
| 45.70 | 21,021/460 | 280 | 550 | 550 | 948 | 4.0/2.0 | PHQ531_0055K102_0083 ME10 | 3600 | 3300 | 5500 | ≤19 | 0.93 | 70 |
| | | | | | | | PHQ531_0055K102_0083 ME20 | | | | ≤24 | 2.8 | |
| 50.87 | 9614/189 | 280 | 550 | 550 | 948 | 4.0/2.0 | PHQ531_0055K102_0092 ME10 | 3600 | 3300 | 5500 | ≤19 | 0.97 | 70 |
| | | | | | | | PHQ531_0055K102_0092 ME20 | | | | ≤24 | 2.9 | |
| 55.77 | 5577/100 | 280 | 550 | 550 | 948 | 4.0/2.0 | PHQ531_0055K102_0100 ME10 | 4000 | 3800 | 6000 | ≤19 | 0.85 | 70 |
| | | | | | | | PHQ531_0055K102_0100 ME20 | 3700 | 3700 | | ≤24 | 2.7 | |
| 63.61 | 1463/23 | 280 | 550 | 550 | 948 | 4.0/2.0 | PHQ531_0055K102_0115 ME10 | 3600 | 3300 | 5500 | ≤19 | 0.88 | 70 |
| | | | | | | | PHQ531_0055K102_0115 ME20 | | | | ≤24 | 2.8 | |
| 69.40 | 4719/68 | 280 | 550 | 550 | 948 | 4.0/2.0 | PHQ531_0055K102_0125 ME10 | 4000 | 3800 | 6000 | ≤19 | 0.79 | 70 |
| | | | | | | | PHQ531_0055K102_0125 ME20 | 3700 | 3700 | | ≤24 | 2.7 | |
| 77.63 | 2717/35 | 280 | 550 | 550 | 948 | 4.0/2.0 | PHQ531_0055K102_0140 ME10 | 4000 | 3800 | 6000 | ≤19 | 0.82 | 70 |
| | | | | | | | PHQ531_0055K102_0140 ME20 | 3700 | 3700 | | ≤24 | 2.7 | |
| 91.93 | 1287/14 | 280 | 550 | 550 | 948 | 4.0/2.0 | PHQ531_0055K102_0165 ME10 | 4000 | 4000 | 7000 | ≤19 | 0.73 | 70 |
| | | | | | | | PHQ531_0055K102_0165 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.6 | |
| 96.60 | 11,495/119 | 280 | 550 | 550 | 948 | 4.0/2.0 | PHQ531_0055K102_0175 ME10 | 4000 | 3800 | 6000 | ≤19 | 0.77 | 70 |
| | | | | | | | PHQ531_0055K102_0175 ME20 | 3700 | 3700 | | ≤24 | 2.7 | |
| 110.8 | 4433/40 | 280 | 550 | 550 | 948 | 4.0/2.0 | PHQ531_0055K102_0200 ME10 | 4000 | 4000 | 7000 | ≤19 | 0.71 | 70 |
| | | | | | | | PHQ531_0055K102_0200 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.6 | |

[1] *Based on input speed of 2000 RPM. See page <?>.for details on torque calculations.*
[2] *Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
* *Motor shaft adapter code (shaft diameter max - mm): ME10 (19), ME20 (32), ME30 (38), ME40 (48), ME50 (60)*

# Selection Data



| Reducer Ratio (i) | | Output Torque | | | | Back-lash/ Red | Part Number* (Gearhead + Input) | Max. Input Speed RPM (n1) | | | Motor Shaft [3] Max Ø | Input Inertia | Tors. Stiffness |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Nom. [1] | Accel. | M2 accHT | Peak [2] | | | Continuous | | Cyclic | | | |
| Nom. | Exact | Nm | Nm | Nm | Nm | arcmin | | EL 1,2 | EL 3,4,5,6 | All | mm | kgcm² | Nm/ arcmin |
| **PHQ5K** | **(continued from previous page)** | | | | | | | | | | | | |
| 128.0 | 6270/49 | 280 | 550 | 550 | 948 | 4.0/2.0 | PHQ531_0055K102_0230 ME10 | 4000 | 4000 | 7000 | ≤19 | 0.72 | 70 |
| | | | | | | | PHQ531_0055K102_0230 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.6 | |
| 138.7 | 13,871/100 | 280 | 550 | 550 | 948 | 4.0/2.0 | PHQ531_0055K102_0250 ME10 | 4000 | 4000 | 7000 | ≤19 | 0.68 | 70 |
| | | | | | | | PHQ531_0055K102_0250 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.6 | |
| 154.3 | 6479/42 | 280 | 550 | 550 | 948 | 4.0/2.0 | PHQ531_0055K102_0280 ME10 | 4000 | 4000 | 7000 | ≤19 | 0.70 | 70 |
| | | | | | | | PHQ531_0055K102_0280 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.6 | |
| 185.4 | 51,909/280 | 280 | 462 | 462 | 836 | 4.0/2.0 | PHQ531_0055K102_0340 ME10 | 4000 | 4000 | 7000 | ≤19 | 0.63 | 70 |
| 193.1 | 20,273/105 | 280 | 550 | 550 | 948 | 4.0/2.0 | PHQ531_0055K102_0350 ME10 | 4000 | 4000 | 7000 | ≤19 | 0.68 | 70 |
| | | | | | | | PHQ531_0055K102_0350 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.6 | |
| 221.7 | 4433/20 | 280 | 389 | 389 | 704 | 4.0/2.0 | PHQ531_0055K102_0400 ME10 | 4000 | 4000 | 7000 | ≤19 | 0.62 | 70 |
| 258.0 | 25,289/98 | 280 | 550 | 550 | 948 | 4.0/2.0 | PHQ531_0055K102_0470 ME10 | 4000 | 4000 | 7000 | ≤19 | 0.63 | 70 |
| 276.7 | 55,341/200 | 264 | 316 | 316 | 572 | 4.0/2.0 | PHQ531_0055K102_0500 ME10 | 4000 | 4000 | 7000 | ≤19 | 0.62 | 70 |
| 308.5 | 6479/21 | 280 | 542 | 542 | 948 | 4.0/2.0 | PHQ531_0055K102_0560 ME10 | 4000 | 4000 | 7000 | ≤19 | 0.62 | 70 |
| 385.2 | 26,961/70 | 280 | 440 | 440 | 797 | 4.0/2.0 | PHQ531_0055K102_0700 ME10 | 4000 | 4000 | 7000 | ≤19 | 0.62 | 70 |

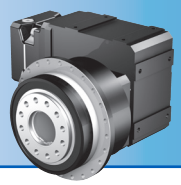


[1] *Based on input speed of 2000 RPM. See page <?>.for details on torque calculations.*
[2] *Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
* *Motor shaft adapter code (shaft diameter max - mm): ME10 (19), ME20 (32), ME30 (38), ME40 (48), ME50 (60)*

| Reducer Ratio (i) | | Output Torque | | | | Back-lash/ Red | Part Number* (Gearhead + Input) | Max. Input Speed RPM (n1) | | | Motor Shaft [3] Max Ø | Input Inertia | Tors. Stiffness |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Nom. [1] | Accel. | M2 accHT | Peak [2] | | | Continuous | | Cyclic | | | |
| Nom. | Exact | Nm | Nm | Nm | Nm | arcmin | | EL 1,2 | EL 3,4,5,6 | All | mm | kgcm² | Nm/ arcmin |
| **PHQ7K** (continued next page) | | | | | | | | | | | | | |
| 22.00 | 22/1 | 500 | 921 | | 1667 | 4.0/2.0 | PHQ731_0055K202_0040 ME20 | 3000 | 2600 | 4500 | ≤32 | 6.6 | 134 |
| | | | | | | | PHQ731_0055K202_0040 ME30 | | | | ≤38 | 12 | 135 |
| 24.00 | 24/1 | 500 | 536 | | 727 | 4.0/2.0 | PHQ731_0055K202_0044 ME10 | 3000 | 2600 | 4500 | ≤19 | 2.8 | 131 |
| | | | 948 | | 1819 | | PHQ731_0055K202_0044 ME20 | | | | ≤32 | 6.2 | 135 |
| | | | | | | | PHQ731_0055K202_0044 ME30 | | | | ≤38 | 12 | |
| 28.47 | 2107/74 | 500 | 1004 | | 2100 | 4.0/2.0 | PHQ731_0055K202_0052 ME20 | 3000 | 2600 | 4500 | ≤32 | 5.7 | 135 |
| | | | | | | | PHQ731_0055K202_0052 ME30 | | | | ≤38 | 11 | |
| 33.00 | 33/1 | 500 | 737 | | 1000 | 4.0/2.0 | PHQ731_0055K202_0060 ME10 | 3000 | 2600 | 4500 | ≤19 | 2.4 | 133 |
| | | | 1050 | | 2100 | | PHQ731_0055K202_0060 ME20 | | | | ≤32 | 5.8 | 135 |
| | | | | | | | PHQ731_0055K202_0060 ME30 | | | | ≤38 | 11 | |
| 36.76 | 2279/62 | 500 | 822 | | 1115 | 4.0/2.0 | PHQ731_0055K202_0067 ME10 | 3500 | 3100 | 5000 | ≤19 | 1.8 | 134 |
| | | | 1050 | | 2100 | | PHQ731_0055K202_0067 ME20 | | | | ≤32 | 5.2 | 135 |
| | | | | | | | PHQ731_0055K202_0067 ME30 | | | | ≤38 | 10 | 136 |
| 39.15 | 23,177/592 | 500 | 1050 | | 2100 | 4.0/2.0 | PHQ731_0055K202_0071 ME20 | 3000 | 2600 | 4500 | ≤32 | 5.4 | 135 |
| | | | | | | | PHQ731_0055K202_0071 ME30 | | | | ≤38 | 11 | 136 |
| 46.18 | 1247/27 | 500 | 1032 | | 1400 | 4.0/2.0 | PHQ731_0055K202_0084 ME10 | 3500 | 3100 | 5000 | ≤19 | 1.4 | 134 |
| | | | 1050 | | 2100 | | PHQ731_0055K202_0084 ME20 | | | | ≤32 | 4.8 | 135 |
| | | | | | | | PHQ731_0055K202_0084 ME30 | | | | ≤38 | 10 | 136 |
| 50.55 | 25,069/496 | 500 | 1050 | | 1533 | 4.0/2.0 | PHQ731_0055K202_0092 ME10 | 3500 | 3100 | 5000 | ≤19 | 1.6 | 135 |
| | | | | | 2100 | | PHQ731_0055K202_0092 ME20 | | | | ≤32 | 5.0 | 136 |
| | | | | | | | PHQ731_0055K202_0092 ME30 | | | | ≤38 | 10 | |
| 55.40 | 2881/52 | 500 | 1050 | | 1680 | 4.0/2.0 | PHQ731_0055K202_0100 ME10 | 3900 | 3500 | 5500 | ≤19 | 1.2 | 135 |
| | | | | | 2100 | | PHQ731_0055K202_0100 ME20 | 3700 | | | ≤32 | 4.6 | 136 |
| | | | | | | | PHQ731_0055K202_0100 ME30 | 3500 | | 5000 | ≤38 | 10 | |
| 63.50 | 13,717/216 | 500 | 1050 | | 1925 | 4.0/2.0 | PHQ731_0055K202_0115 ME10 | 3500 | 3100 | 5000 | ≤19 | 1.3 | 135 |
| | | | | | 2100 | | PHQ731_0055K202_0115 ME20 | | | | ≤32 | 4.7 | 136 |
| | | | | | | | PHQ731_0055K202_0115 ME30 | | | | ≤38 | 10 | |
| 69.88 | 559/8 | 500 | 1050 | | 2100 | 4.0/2.0 | PHQ731_0055K202_0125 ME10 | 3900 | 3500 | 5500 | ≤19 | 1.1 | 135 |
| | | | | | | | PHQ731_0055K202_0125 ME20 | 3700 | | | ≤32 | 4.5 | 136 |
| | | | | | | | PHQ731_0055K202_0125 ME30 | 3500 | | 5000 | ≤38 | 9.8 | |

[1] *Based on input speed of 2000 RPM. See page <?>.for details on torque calculations.*
[2] *Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
* *Motor shaft adapter code (shaft diameter max - mm): ME10 (19), ME20 (32), ME30 (38), ME40 (48), ME50 (60)*

# Selection Data

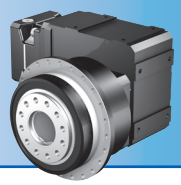


| Reducer Ratio (i) | | Output Torque | | | | Back-lash/ Red $\Delta\phi_2$ | Part Number* (Gearhead + Input) | Max. Input Speed RPM (n1) | | | Motor Shaft [3] Max Ø $d_{MW}$ | Input Inertia $J_1$ | Tors. Stiffness $C_2$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Nom. [1] $M_{2N}$ | Accel. $M_{2acc}$ | M2 accHT | Peak [2] $M_{2NOT}$ | | | Continuous | | Cyclic | | | |
| Nom. | Exact | Nm | Nm | Nm | Nm | arcmin | | EL 1,2 | EL 3,4,5,6 | All | mm | kgcm² | Nm/ arcmin |
| **PHQ7K** | **(continued from previous page)** | | | | | | | | | | | | |
| 76.18 | 31,691/416 | 500 | 1050 | | 2100 | 4.0/2.0 | PHQ731_0055K202_0140 ME10 | 3900 | 3500 | 5500 | ≤19 | 1.1 | 135 |
| | | | | | | | PHQ731_0055K202_0140 ME20 | 3700 | | | ≤32 | 4.5 | 136 |
| | | | | | | | PHQ731_0055K202_0140 ME30 | 3500 | | 5000 | ≤38 | 9.9 | |
| 92.72 | 2967/32 | 500 | 1050 | | 2100 | 4.0/2.0 | PHQ731_0055K202_0170 ME10 | 4000 | 3900 | 6500 | ≤19 | 0.90 | 135 |
| | | | | | | | PHQ731_0055K202_0170 ME20 | 3700 | 3700 | 6000 | ≤32 | 4.3 | 136 |
| | | | | | | | PHQ731_0055K202_0170 ME30 | 3500 | 3500 | 5000 | ≤38 | 9.6 | |
| 96.08 | 6149/64 | 500 | 1050 | | 2100 | 4.0/2.0 | PHQ731_0055K202_0175 ME10 | 3900 | 3500 | 5500 | ≤19 | 1.0 | 135 |
| | | | | | | | PHQ731_0055K202_0175 ME20 | 3700 | | | ≤32 | 4.4 | 136 |
| | | | | | | | PHQ731_0055K202_0175 ME30 | 3500 | | 5000 | ≤38 | 9.7 | |
| 111.8 | 559/5 | 500 | 1050 | | 2100 | 4.0/2.0 | PHQ731_0055K202_0200 ME10 | 4000 | 3900 | 6500 | ≤19 | 0.83 | 136 |
| | | | | | | | PHQ731_0055K202_0200 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.7 | |
| 127.5 | 32,637/256 | 500 | 1050 | | 2100 | 4.0/2.0 | PHQ731_0055K202_0230 ME10 | 4000 | 3900 | 6500 | ≤19 | 0.87 | 136 |
| | | | | | | | PHQ731_0055K202_0230 ME20 | 3700 | 3700 | 6000 | ≤32 | 4.3 | |
| | | | | | | | PHQ731_0055K202_0230 ME30 | 3500 | 3500 | 5000 | ≤38 | 9.6 | |
| 138.2 | 1935/14 | 500 | 1050 | | 2100 | 4.0/2.0 | PHQ731_0055K202_0250 ME10 | 4000 | 3900 | 6500 | ≤19 | 0.77 | 136 |
| | | | | | | | PHQ731_0055K202_0250 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.7 | |
| 153.7 | 6149/40 | 500 | 1050 | | 2100 | 4.0/2.0 | PHQ731_0055K202_0280 ME10 | 4000 | 3900 | 6500 | ≤19 | 0.81 | 136 |
| | | | | | | | PHQ731_0055K202_0280 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.7 | |
| 184.9 | 1849/10 | 500 | 976 | | 1765 | 4.0/2.0 | PHQ731_0055K202_0340 ME10 | 4000 | 3900 | 6500 | ≤19 | 0.71 | 136 |
| | | | | | | | PHQ731_0055K202_0340 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.6 | |
| 190.0 | 21,285/112 | 500 | 1050 | | 2100 | 4.0/2.0 | PHQ731_0055K202_0350 ME10 | 4000 | 3900 | 6500 | ≤19 | 0.76 | 136 |
| | | | | | | | PHQ731_0055K202_0350 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.7 | |
| 222.2 | 1333/6 | 500 | 732 | | 1126 | 4.0/2.0 | PHQ731_0055K202_0400 ME10 | 4000 | 3900 | 6500 | ≤19 | 0.66 | 136 |
| 254.2 | 20,339/80 | 500 | 1050 | | 2100 | 4.0/2.0 | PHQ731_0055K202_0460 ME10 | 4000 | 3900 | 6500 | ≤19 | 0.71 | 136 |
| | | | | | | | PHQ731_0055K202_0460 ME20 | 3700 | 3700 | 6000 | ≤24 | 2.6 | |
| 277.7 | 6665/24 | 500 | 610 | | 1055 | 4.0/2.0 | PHQ731_0055K202_0500 ME10 | 4000 | 3900 | 6500 | ≤19 | 0.64 | 136 |
| 305.5 | 14,663/48 | 500 | 1006 | | 1548 | 4.0/2.0 | PHQ731_0055K202_0560 ME10 | 4000 | 3900 | 6500 | ≤19 | 0.66 | 136 |
| 381.8 | 73,315/192 | 500 | 839 | | 1451 | 4.0/2.0 | PHQ731_0055K202_0690 ME10 | 4000 | 3900 | 6500 | ≤19 | 0.64 | 136 |

*[1] Based on input speed of 2000 RPM. See page <?>.for details on torque calculations.*
*[2] Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
** Motor shaft adapter code (shaft diameter max - mm): ME10 (19), ME20 (32), ME30 (38), ME40 (48), ME50 (60)*

| Reducer Ratio (i) | | Output Torque | | | | Back-lash/ Red | Part Number* (Gearhead + Input) | Max. Input Speed RPM (n1) | | | Motor Shaft [3] Max Ø | Input Inertia | Tors. Stiffness |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Nom. [1] | Accel. | M2 accHT | Peak [2] | | | Continuous | | Cyclic | | | |
| Nom. | Exact | Nm | Nm | Nm | Nm | arcmin | | EL 1,2 | EL 3,4,5,6 | All | mm | kgcm² | Nm/ arcmin |
| **PHQ8K** | **(continued next page)** | | | | | | | | | | | | |
| 22.00 | 22/1 | 1400 | 2421 | 4446 | | 3.5/1.5 | PHQ831_0055K402_0040 ME30 | 2600 | 2200 | 3800 | ≤38 | 20 | 395 |
| | | | | | | | PHQ831_0055K402_0040 ME40 | | | | ≤48 | 42 | 394 |
| 24.00 | 24/1 | 1400 | 2493 | 4850 | | 3.5/1.5 | PHQ831_0055K402_0044 ME30 | 2600 | 2200 | 3800 | ≤38 | 19 | 395 |
| | | | | | | | PHQ831_0055K402_0044 ME40 | | | | ≤48 | 40 | |
| 29.82 | 1849/62 | 1400 | 2680 | 4964 | | 3.5/1.5 | PHQ831_0055K402_0054 ME30 | 2600 | 2200 | 3800 | ≤38 | 16 | 397 |
| | | | | | | | PHQ831_0055K402_0054 ME40 | | | | ≤48 | 38 | |
| 33.00 | 33/1 | 1400 | 2772 | 4964 | | 3.5/1.5 | PHQ831_0055K402_0060 ME30 | 2600 | 2200 | 3800 | ≤38 | 17 | 397 |
| | | | | | | | PHQ831_0055K402_0060 ME40 | | | | ≤48 | 39 | |
| 36.95 | 2365/64 | 1400 | 2065 | 2801 | | 3.5/1.5 | PHQ831_0055K402_0067 ME20 | 3000 | 2600 | 4500 | ≤32 | 8.6 | 395 |
| | | | 2800 | 4964 | | | PHQ831_0055K402_0067 ME30 | | | | ≤38 | 14 | 398 |
| | | | | | | | PHQ831_0055K402_0067 ME40 | | | | ≤48 | 36 | |
| 41.01 | 20,339/496 | 1400 | 2800 | 4964 | | 3.5/1.5 | PHQ831_0055K402_0075 ME30 | 2600 | 2200 | 3800 | ≤38 | 15 | 398 |
| | | | | | | | PHQ831_0055K402_0075 ME40 | | | | ≤48 | 37 | |
| 46.07 | 645/14 | 1400 | 2575 | 3492 | | 3.5/1.5 | PHQ831_0055K402_0084 ME20 | 3000 | 2600 | 4500 | ≤32 | 7.2 | 397 |
| | | | 2800 | 4964 | | | PHQ831_0055K402_0084 ME30 | | | | ≤38 | 13 | 398 |
| | | | | | | | PHQ831_0055K402_0084 ME40 | | | | ≤48 | 35 | |
| 50.81 | 26,015/512 | 1400 | 2800 | 3852 | | 3.5/1.5 | PHQ831_0055K402_0092 ME20 | 3000 | 2600 | 4500 | ≤32 | 7.7 | 397 |
| | | | | 4964 | | | PHQ831_0055K402_0092 ME30 | | | | ≤38 | 13 | 399 |
| | | | | | | | PHQ831_0055K402_0092 ME40 | | | | ≤48 | 35 | |
| 55.54 | 1333/24 | 1400 | 2800 | 4209 | | 3.5/1.5 | PHQ831_0055K402_0100 ME20 | 3400 | 3000 | 5000 | ≤32 | 6.4 | 398 |
| | | | | 4964 | | | PHQ831_0055K402_0100 ME30 | | | | ≤38 | 12 | 399 |
| | | | | | | | PHQ831_0055K402_0100 ME40 | 3000 | | 4500 | ≤48 | 34 | |
| 63.35 | 7095/112 | 1400 | 2800 | 4802 | | 3.5/1.5 | PHQ831_0055K402_0115 ME20 | 3000 | 2600 | 4500 | ≤32 | 6.7 | 398 |
| | | | | 4964 | | | PHQ831_0055K402_0115 ME30 | | | | ≤38 | 12 | 399 |
| | | | | | | | PHQ831_0055K402_0115 ME40 | | | | ≤48 | 34 | |
| 69.62 | 1462/21 | 1400 | 2800 | 4964 | | 3.5/1.5 | PHQ831_0055K402_0125 ME20 | 3400 | 3000 | 5000 | ≤32 | 5.7 | 398 |
| | | | | | | | PHQ831_0055K402_0125 ME30 | | | | ≤38 | 11 | 399 |
| | | | | | | | PHQ831_0055K402_0125 ME40 | 3000 | | 4500 | ≤48 | 33 | |

[1] *Based on input speed of 2000 RPM. See page <?>.for details on torque calculations.*
[2] *Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
* *Motor shaft adapter code (shaft diameter max - mm): ME10 (19), ME20 (32), ME30 (38), ME40 (48), ME50 (60)*



# Selection Data

| Reducer Ratio (i) | | Output Torque | | | | Back-lash/ Red | Part Number* (Gearhead + Input) | Max. Input Speed RPM (n1) | | | Motor Shaft [3] Max Ø | Input Inertia | Tors. Stiffness |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Nom. [1] | Accel. | M2 accHT | Peak [2] | | | Continuous | | Cyclic | | | |
| Nom. | Exact | $M_{2N}$ Nm | $M_{2acc}$ Nm | Nm | $M_{2NOT}$ Nm | $\Delta\phi_2$ arcmin | | EL 1,2 | EL 3,4,5,6 | All | $d_{MW}$ mm | $J_1$ kgcm² | $C_2$ Nm/ arcmin |

## PHQ8K (continued from previous page)

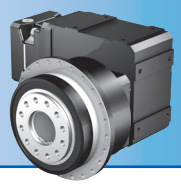
| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 76.37 | 14,663/192 | 1400 | 2800 | 4964 | | 3.5/1.5 | PHQ831_0055K402_0140 ME20 | 3400 | 3000 | 5000 | ≤32 | 6.1 | 399 |
| | | | | | | | PHQ831_0055K402_0140 ME30 | | | | ≤38 | 12 | |
| | | | | | | | PHQ831_0055K402_0140 ME40 | 3000 | | 4500 | ≤48 | 33 | |
| 93.16 | 559/6 | 1400 | 2800 | 4964 | | 3.5/1.5 | PHQ831_0055K402_0170 ME20 | 3600 | 3300 | 5500 | ≤32 | 5.0 | 399 |
| | | | | | | | PHQ831_0055K402_0170 ME30 | 3500 | | 5000 | ≤38 | 11 | |
| | | | | | | | PHQ831_0055K402_0170 ME40 | 3000 | 3000 | 4500 | ≤48 | 32 | |
| 95.73 | 8041/84 | 1400 | 2800 | 4964 | | 3.5/1.5 | PHQ831_0055K402_0175 ME20 | 3400 | 3000 | 5000 | ≤32 | 5.5 | 399 |
| | | | | | | | PHQ831_0055K402_0175 ME30 | | | | ≤38 | 11 | |
| | | | | | | | PHQ831_0055K402_0175 ME40 | 3000 | | 4500 | ≤48 | 33 | |
| 111.1 | 1333/12 | 1400 | 2800 | 4964 | | 3.5/1.5 | PHQ831_0055K402_0200 ME20 | 3600 | 3300 | 5500 | ≤32 | 4.8 | 399 |
| | | | | | | | PHQ831_0055K402_0200 ME30 | 3500 | | 5000 | ≤38 | 10 | |
| 128.1 | 6149/48 | 1400 | 2800 | 4964 | | 3.5/1.5 | PHQ831_0055K402_0230 ME20 | 3600 | 3300 | 5500 | ≤32 | 4.9 | 399 |
| | | | | | | | PHQ831_0055K402_0230 ME30 | 3500 | | 5000 | ≤38 | 10 | |
| | | | | | | | PHQ831_0055K402_0230 ME40 | 3000 | 3000 | 4500 | ≤48 | 32 | |
| 139.0 | 4171/30 | 1400 | 2800 | 4964 | | 3.5/1.5 | PHQ831_0055K402_0250 ME20 | 3600 | 3300 | 5500 | ≤32 | 4.6 | 399 |
| | | | | | | | PHQ831_0055K402_0250 ME30 | 3500 | | 5000 | ≤38 | 9.9 | |
| 152.7 | 14,663/96 | 1400 | 2800 | 4964 | | 3.5/1.5 | PHQ831_0055K402_0280 ME20 | 3600 | 3300 | 5500 | ≤32 | 4.7 | 399 |
| | | | | | | | PHQ831_0055K402_0280 ME30 | 3500 | | 5000 | ≤38 | 10 | |
| 185.2 | 2408/13 | 1400 | 2464 | 4069 | | 3.5/1.5 | PHQ831_0055K402_0340 ME20 | 3600 | 3300 | 5500 | ≤24 | 2.8 | 399 |
| 191.2 | 45,881/240 | 1400 | 2800 | 4964 | | 3.5/1.5 | PHQ831_0055K402_0350 ME20 | 3600 | 3300 | 5500 | ≤32 | 4.5 | 399 |
| | | | | | | | PHQ831_0055K402_0350 ME30 | 3500 | | 5000 | ≤38 | 9.8 | |
| 222.8 | 2451/11 | 1400 | 1952 | 3529 | | 3.5/1.5 | PHQ831_0055K402_0410 ME20 | 3600 | 3300 | 5500 | ≤24 | 2.8 | 399 |
| 254.7 | 3311/13 | 1400 | 2800 | 4964 | | 3.5/1.5 | PHQ831_0055K402_0460 ME20 | 3600 | 3300 | 5500 | ≤24 | 2.8 | 399 |
| 277.3 | 5547/20 | 1400 | 1708 | 3088 | | 3.5/1.5 | PHQ831_0055K402_0500 ME20 | 3600 | 3300 | 5500 | ≤24 | 2.7 | 399 |
| 306.4 | 2451/8 | 1400 | 2684 | 4853 | | 3.5/1.5 | PHQ831_0055K402_0560 ME20 | 3600 | 3300 | 5500 | ≤24 | 2.7 | 399 |
| 381.4 | 61,017/160 | 1400 | 2348 | 4247 | | 3.5/1.5 | PHQ831_0055K402_0690 ME20 | 3600 | 3300 | 5500 | ≤24 | 2.7 | 400 |

*[1] Based on input speed of 2000 RPM. See page <?>.for details on torque calculations.*
*[2] Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
** Motor shaft adapter code (shaft diameter max - mm): ME10 (19), ME20 (32), ME30 (38), ME40 (48), ME50 (60)*

| Reducer Ratio (i) | | Output Torque | | | | Back-lash/ Red $\Delta\phi_2$ | Part Number* (Gearhead + Input) | Max. Input Speed RPM (n1) | | | Motor Shaft [3] Max Ø $d_{MW}$ | Input Inertia $J_1$ | Tors. Stiffness $C_2$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Nom. [1] $M_{2N}$ | Accel. $M_{2acc}$ | M2 accHT | Peak [2] $M_{2NOT}$ | | | Continuous | | Cyclic | | | |
| Nom. | Exact | Nm | Nm | Nm | Nm | arcmin | | EL 1,2 | EL 3,4,5,6 | All | mm | kgcm² | Nm/ arcmin |
| **PHQ9K** (continued next page) | | | | | | | | | | | | | |
| 44.08 | 1102/25 | 3800 | 5760 | 5760 | 8779 | 4.0/2.0 | PHQ941_0060K513_0073 ME30 | 1900 | 1800 | 3200 | ≤38 | 26 | 767 |
| | | | | | | | PHQ941_0060K513_0073 ME40 | | | | ≤48 | 48 | 766 |
| 48.80 | 17081/350 | 3800 | 5760 | 5760 | 9720 | 4.0/2.0 | PHQ941_0060K513_0081 ME30 | 1900 | 1800 | 3200 | ≤38 | 24 | 767 |
| | | | | | | | PHQ941_0060K513_0081 ME40 | | | | ≤48 | 46 | |
| 55.01 | 8526/155 | 3800 | 5760 | 5760 | 10954 | 4.0/2.0 | PHQ941_0060K513_0092 ME30 | 1900 | 1800 | 3200 | ≤38 | 21 | 768 |
| | | | | | | | PHQ941_0060K513_0092 ME40 | | | | ≤48 | 43 | |
| 60.90 | 609/10 | 3800 | 5760 | 5760 | 11250 | 4.0/2.0 | PHQ941_0060K513_0100 ME30 | 1900 | 1800 | 3200 | ≤38 | 20 | 769 |
| | | | | | | | PHQ941_0060K513_0100 ME40 | | | | ≤48 | 42 | 768 |
| 69.41 | 10759/155 | 3800 | 5760 | 5760 | 11250 | 4.0/2.0 | PHQ941_0060K513_0115 ME30 | 2300 | 2200 | 3600 | ≤38 | 18 | 769 |
| | | | | | | | PHQ941_0060K513_0115 ME40 | | | | ≤48 | 40 | |
| 76.85 | 1537/20 | 3800 | 5760 | 5760 | 11250 | 4.0/2.0 | PHQ941_0060K513_0130 ME30 | 2300 | 2200 | 3600 | ≤38 | 17 | 770 |
| | | | | | | | PHQ941_0060K513_0130 ME40 | | | | ≤48 | 39 | 769 |
| 87.22 | 11774/135 | 3800 | 4801 | 4801 | 6512 | 4.0/2.0 | PHQ941_0060K513_0145 ME20 | 2300 | 2200 | 3600 | ≤32 | 9.9 | 768 |
| | | | 5760 | 5760 | 11250 | | PHQ941_0060K513_0145 ME30 | | | | ≤38 | 15 | 770 |
| | | | | | | | PHQ941_0060K513_0145 ME40 | | | | ≤48 | 37 | |
| 96.56 | 26071/270 | 3800 | 5315 | 5315 | 7209 | 4.0/2.0 | PHQ941_0060K513_0160 ME20 | 2300 | 2200 | 3600 | ≤32 | 9.4 | 769 |
| | | | 5760 | 5760 | 11250 | | PHQ941_0060K513_0160 ME30 | | | | ≤38 | 15 | 770 |
| | | | | | | | PHQ941_0060K513_0160 ME40 | | | | ≤48 | 37 | |
| 104.9 | 6293/60 | 3800 | 5760 | 5760 | 7830 | 4.0/2.0 | PHQ941_0060K513_0175 ME20 | 2800 | 2500 | 4200 | ≤32 | 8.5 | 769 |
| | | | | | 11250 | | PHQ941_0060K513_0175 ME30 | | | | ≤38 | 14 | 770 |
| | | | | | | | PHQ941_0060K513_0175 ME40 | | | | ≤48 | 36 | |
| 116.1 | 27869/240 | 3800 | 5760 | 5760 | 8669 | 4.0/2.0 | PHQ941_0060K513_0195 ME20 | 2800 | 2500 | 4200 | ≤32 | 8.2 | 769 |
| | | | | | 11250 | | PHQ941_0060K513_0195 ME30 | | | | ≤38 | 14 | 770 |
| | | | | | | | PHQ941_0060K513_0195 ME40 | | | | ≤48 | 36 | |

[1] *Based on input speed of 2000 RPM. See page <?>.for details on torque calculations.*
[2] *Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
* *Motor shaft adapter code (shaft diameter max - mm): ME10 (19), ME20 (32), ME30 (38), ME40 (48), ME50 (60)*

# Selection Data



| Reducer Ratio (i) | | Output Torque | | | | Back-lash/ Red | Part Number* (Gearhead + Input) | Max. Input Speed RPM (n1) | | | Motor Shaft [3] Max Ø | Input Inertia | Tors. Stiffness |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Nom. [1] | Accel. | M2 accHT | Peak [2] | | | Continuous | | Cyclic | | | |
| | | $M_{2N}$ | $M_{2acc}$ | | $M_{2NOT}$ | $\Delta\phi_2$ | | | | | $d_{MW}$ | $J_1$ | $C_2$ |
| Nom. | Exact | Nm | Nm | Nm | Nm | arcmin | | EL 1,2 | EL 3,4,5,6 | All | mm | kgcm² | Nm/ arcmin |

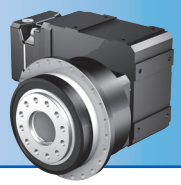
## PHQ9K (continued from previous page)

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 132.0 | 2639/20 | 3800 | 5760 | 5760 | 9158 | 4.0/2.0 | PHQ941_0060K513_0220 ME20 | 2800 | 2500 | 4200 | ≤32 | 7.2 | 770 |
| | | | | | 11250 | | PHQ941_0060K513_0220 ME30 | | | | ≤38 | 13 | 771 |
| | | | | | | | PHQ941_0060K513_0220 ME40 | | | | ≤48 | 35 | |
| 146.1 | 11687/80 | 3800 | 5760 | 5760 | 10139 | 4.0/2.0 | PHQ941_0060K513_0240 ME20 | 2800 | 2500 | 4200 | ≤32 | 7.0 | 770 |
| | | | | | 11250 | | PHQ941_0060K513_0240 ME30 | | | | ≤38 | 12 | 771 |
| | | | | | | | PHQ941_0060K513_0240 ME40 | | | | ≤48 | 34 | |
| 175.1 | 14007/80 | 3800 | 5760 | 5760 | 10349 | 4.0/2.0 | PHQ941_0060K513_0290 ME20 | 3400 | 3000 | 5000 | ≤32 | 6.1 | 770 |
| | | | | | 11250 | | PHQ941_0060K513_0290 ME30 | | | | ≤38 | 12 | 771 |
| | | | | | | | PHQ941_0060K513_0290 ME40 | 3000 | | 4500 | ≤48 | 33 | |
| 193.8 | 62031/320 | 3800 | 5760 | 5760 | 11250 | 4.0/2.0 | PHQ941_0060K513_0320 ME20 | 3400 | 3000 | 5000 | ≤32 | 6.0 | 771 |
| | | | | | | | PHQ941_0060K513_0320 ME30 | | | | ≤38 | 11 | |
| | | | | | | | PHQ941_0060K513_0320 ME40 | 3000 | | 4500 | ≤48 | 33 | |
| 208.8 | 1044/5 | 3800 | 5760 | 5760 | 11129 | 4.0/2.0 | PHQ941_0060K513_0350 ME20 | 3400 | 3000 | 5000 | ≤32 | 5.6 | 771 |
| | | | | | | | PHQ941_0060K513_0350 ME30 | | | | ≤38 | 11 | |
| 231.2 | 8091/35 | 3800 | 5760 | 5760 | 11250 | 4.0/2.0 | PHQ941_0060K513_0390 ME20 | 3400 | 3000 | 5000 | ≤32 | 5.5 | 771 |
| | | | | | | | PHQ941_0060K513_0390 ME30 | | | | ≤38 | 11 | |
| 261.0 | 261/1 | 3800 | 5760 | 5760 | 11250 | 4.0/2.0 | PHQ941_0060K513_0440 ME20 | 3400 | 3000 | 5000 | ≤32 | 5.1 | 771 |
| | | | | | | | PHQ941_0060K513_0440 ME30 | | | | ≤38 | 10 | |
| 289.0 | 8091/28 | 3800 | 5760 | 5760 | 11250 | 4.0/2.0 | PHQ941_0060K513_0480 ME20 | 3400 | 3000 | 5000 | ≤32 | 5.0 | 771 |
| | | | | | | | PHQ941_0060K513_0480 ME30 | | | | ≤38 | 10 | |
| 349.8 | 22736/65 | 3800 | 5760 | 5760 | 11250 | 4.0/2.0 | PHQ941_0060K513_0580 ME20 | 3400 | 3000 | 5000 | ≤32 | 4.7 | 771 |
| | | | | | | | PHQ941_0060K513_0580 ME30 | | | | ≤38 | 10 | |
| 387.3 | 25172/65 | 3800 | 5760 | 5760 | 11250 | 4.0/2.0 | PHQ941_0060K513_0650 ME20 | 3400 | 3000 | 5000 | ≤32 | 4.7 | 771 |
| | | | | | | | PHQ941_0060K513_0650 ME30 | | | | ≤38 | 10 | |
| 420.5 | 841/2 | 3800 | 5673 | 5673 | 7880 | 4.0/2.0 | PHQ941_0060K513_0700 ME20 | 3400 | 3000 | 5000 | ≤24 | 3.0 | 771 |
| 465.6 | 26071/56 | 3800 | 5760 | 5760 | 8724 | 4.0/2.0 | PHQ941_0060K513_0780 ME20 | 3400 | 3000 | 5000 | ≤24 | 3.0 | 771 |
| 523.7 | 26187/50 | 3800 | 4765 | 4765 | 7859 | 4.0/2.0 | PHQ941_0060K513_0870 ME20 | 3400 | 3000 | 5000 | ≤24 | 2.8 | 771 |
| 579.9 | 115971/200 | 3800 | 5275 | 5275 | 8701 | 4.0/2.0 | PHQ941_0060K513_0970 ME20 | 3400 | 3000 | 5000 | ≤24 | 2.8 | 771 |

[1] *Based on input speed of 2000 RPM. See page <?>.for details on torque calculations.*
[2] *Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
* *Motor shaft adapter code (shaft diameter max - mm): ME10 (19), ME20 (32), ME30 (38), ME40 (48), ME50 (60)*

| Reducer Ratio (i) | | Output Torque | | | | Back-lash/ Red | Part Number* (Gearhead + Input) | Max. Input Speed RPM (n1) | | | Motor Shaft [3] Max Ø | Input Inertia | Tors. Stiffness |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Nom. [1] | Accel. | M2 accHT | Peak [2] | | | Continuous | | Cyclic | | | |
| Nom. | Exact | $M_{2N}$ | $M_{2acc}$ | | $M_{2NOT}$ | $\Delta\phi_2$ | | EL 1,2 | EL 3,4,5,6 | All | $d_{MW}$ | $J_1$ | $C_2$ |
| | | Nm | Nm | Nm | Nm | arcmin | | | | | mm | kgcm² | Nm/ arcmin |
| **PHQ10K** | **(continued next page)** | | | | | | | | | | | | |
| 45.38 | 59535/1312 | 6500 | 10000 | – | 16947 | 4.0 | PHQ1041_0060K713_0076 ME40 | 1700 | 1600 | 2700 | ≤48 | 93 | 1545 |
| | | | | | | | PHQ1041_0060K713_0076 ME50 | | | | ≤60 | 120 | 1551 |
| 50.24 | 263655/5248 | 6500 | 10000 | – | 18762 | 4.0 | PHQ1041_0060K713_0084 ME40 | 1700 | 1600 | 2700 | ≤48 | 88 | 1548 |
| | | | | | | | PHQ1041_0060K713_0084 ME50 | | | | ≤60 | 116 | 1553 |
| 55.13 | 441/8 | 6500 | 10000 | – | 20000 | 4.0 | PHQ1041_0060K713_0092 ME40 | 1700 | 1600 | 2700 | ≤48 | 77 | 1550 |
| | | | | | | | PHQ1041_0060K713_0092 ME50 | | | | ≤60 | 105 | 1554 |
| 61.03 | 1953/32 | 6500 | 10000 | – | 20000 | 4.0 | PHQ1041_0060K713_0100 ME40 | 1700 | 1600 | 2700 | ≤48 | 74 | 1552 |
| | | | | | | | PHQ1041_0060K713_0100 ME50 | | | | ≤60 | 102 | 1555 |
| 70.69 | 70119/992 | 6500 | 10000 | – | 14077 | 4.0 | PHQ1041_0060K713_0120 ME30 | 2000 | 1900 | 3200 | ≤38 | 41 | 1553 |
| | | | | | 20000 | | PHQ1041_0060K713_0120 ME40 | | | | ≤48 | 63 | 1554 |
| | | | | | | | PHQ1041_0060K713_0120 ME50 | | | | ≤60 | 91 | 1557 |
| 78.26 | 10017/128 | 6500 | 10000 | – | 15584 | 4.0 | PHQ1041_0060K713_0130 ME30 | 2000 | 1900 | 3200 | ≤38 | 39 | 1555 |
| | | | | | 20000 | | PHQ1041_0060K713_0130 ME40 | | | | ≤48 | 62 | |
| | | | | | | | PHQ1041_0060K713_0130 ME50 | | | | ≤60 | 89 | 1557 |
| 88.81 | 1421/16 | 6500 | 10000 | – | 17637 | 4.0 | PHQ1041_0060K713_0150 ME30 | 2000 | 1900 | 3200 | ≤38 | 32 | 1556 |
| | | | | | 20000 | | PHQ1041_0060K713_0150 ME40 | | | | ≤48 | 55 | 1557 |
| | | | | | | | PHQ1041_0060K713_0150 ME50 | | | | ≤60 | 83 | 1558 |
| 98.33 | 6293/64 | 6500 | 10000 | – | 19525 | 4.0 | PHQ1041_0060K713_0165 ME30 | 2000 | 1900 | 3200 | ≤38 | 31 | 1557 |
| | | | | | 20000 | | PHQ1041_0060K713_0165 ME40 | | | | ≤48 | 54 | |
| | | | | | | | PHQ1041_0060K713_0165 ME50 | | | | ≤60 | 81 | 1559 |
| 109.7 | 80703/736 | 6500 | 10000 | – | 20000 | 4.0 | PHQ1041_0060K713_0185 ME30 | 2400 | 2200 | 3600 | ≤38 | 26 | 1558 |
| | | | | | | | PHQ1041_0060K713_0185 ME40 | | | | ≤48 | 49 | |
| | | | | | | | PHQ1041_0060K713_0185 ME50 | | | | ≤60 | 77 | 1559 |
| 121.4 | 357399/2944 | 6500 | 10000 | – | 20000 | 4.0 | PHQ1041_0060K713_0200 ME30 | 2400 | 2200 | 3600 | ≤38 | 26 | 1558 |
| | | | | | | | PHQ1041_0060K713_0200 ME40 | | | | ≤48 | 48 | |
| | | | | | | | PHQ1041_0060K713_0200 ME50 | | | | ≤60 | 76 | 1559 |
| 136.4 | 43659/320 | 6500 | 10000 | – | 20000 | 4.0 | PHQ1041_0060K713_0230 ME30 | 2400 | 2200 | 3600 | ≤38 | 22 | 1559 |
| | | | | | | | PHQ1041_0060K713_0230 ME40 | | | | ≤48 | 44 | |
| | | | | | | | PHQ1041_0060K713_0230 ME50 | | | | ≤60 | 72 | 1560 |

[1] *Based on input speed of 2000 RPM. See page <?>.for details on torque calculations.*
[2] *Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
* *Motor shaft adapter code (shaft diameter max - mm): ME10 (19), ME20 (32), ME30 (38), ME40 (48), ME50 (60)*



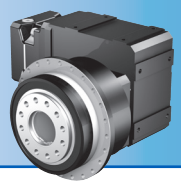
# Selection Data

| Reducer Ratio (i) | | Output Torque | | | | Back-lash/ Red | Part Number* (Gearhead + Input) | Max. Input Speed RPM (n1) | | | Motor Shaft [3] Max Ø | Input Inertia | Tors. Stiffness |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Nom. [1] | Accel. | M2 accHT | Peak [2] | | | Continuous | | Cyclic | | | |
| Nom. | Exact | $M_{2N}$ Nm | $M_{2acc}$ Nm | Nm | $M_{2NOT}$ Nm | $\Delta\phi_2$ arcmin | | EL 1,2 | EL 3,4,5,6 | All | $d_{MW}$ mm | $J_1$ kgcm² | $C_2$ Nm/ arcmin |
| **PHQ10K** | **(continued from previous page)** | | | | | | | | | | | | |
| 151.1 | 193347/1280 | 6500 | 10000 | – | 20000 | 4.0 | PHQ1041_0060K713_0250 ME30 | 2400 | 2200 | 3600 | ≤38 | 21 | 1559 |
| | | | | | | | PHQ1041_0060K713_0250 ME40 | | | | ≤48 | 44 | |
| | | | | | | | PHQ1041_0060K713_0250 ME50 | | | | ≤60 | 72 | 1560 |
| 175.7 | 22491/128 | 6500 | 10000 | – | 20000 | 4.0 | PHQ1041_0060K713_0290 ME30 | 2900 | 2600 | 4200 | ≤38 | 18 | 1559 |
| | | | | | | | PHQ1041_0060K713_0290 ME40 | | | | ≤48 | 40 | 1560 |
| | | | | | | | PHQ1041_0060K713_0290 ME50 | 2500 | 2500 | 4000 | ≤60 | 68 | |
| 194.5 | 99603/512 | 6500 | 10000 | – | 20000 | 4.0 | PHQ1041_0060K713_0320 ME30 | 2900 | 2600 | 4200 | ≤38 | 17 | 1560 |
| | | | | | | | PHQ1041_0060K713_0320 ME40 | | | | ≤48 | 40 | |
| | | | | | | | PHQ1041_0060K713_0320 ME50 | | | 4000 | ≤60 | 68 | |
| 212.6 | 1701/8 | 6500 | 10000 | – | 20000 | 4.0 | PHQ1041_0060K713_0350 ME30 | 2900 | 2600 | 4200 | ≤38 | 16 | 1560 |
| | | | | | | | PHQ1041_0060K713_0350 ME40 | | | | ≤48 | 37 | |
| | | | | | | | PHQ1041_0060K713_0350 ME50 | 2500 | 2500 | 4000 | ≤60 | 66 | |
| 235.4 | 7533/32 | 6500 | 10000 | – | 20000 | 4.0 | PHQ1041_0060K713_0390 ME30 | 2900 | 2600 | 4200 | ≤38 | 15 | 1560 |
| | | | | | | | PHQ1041_0060K713_0390 ME40 | | | | ≤48 | 37 | |
| | | | | | | | PHQ1041_0060K713_0390 ME50 | 2500 | 2500 | 4000 | ≤60 | 66 | |
| 270.3 | 112455/416 | 6500 | 10000 | – | 20000 | 4.0 | PHQ1041_0060K713_0450 ME30 | 2900 | 2600 | 4200 | ≤38 | 14 | 1560 |
| | | | | | | | PHQ1041_0060K713_0450 ME40 | | | | ≤48 | 35 | |
| | | | | | | | PHQ1041_0060K713_0450 ME50 | 2500 | 2500 | 4000 | ≤60 | 65 | |
| 299.3 | 498015/1664 | 6500 | 10000 | – | 20000 | 4.0 | PHQ1041_0060K713_0500 ME30 | 2900 | 2600 | 4200 | ≤38 | 13 | 1560 |
| | | | | | | | PHQ1041_0060K713_0500 ME40 | | | | ≤48 | 35 | |
| | | | | | | | PHQ1041_0060K713_0500 ME50 | 2500 | 2500 | 4000 | ≤60 | 64 | |
| 351.4 | 22491/64 | 6500 | 10000 | – | 20000 | 4.0 | PHQ1041_0060K713_0590 ME30 | 2900 | 2600 | 4200 | ≤38 | 12 | 1560 |
| | | | | | | | PHQ1041_0060K713_0590 ME40 | | | | ≤48 | 34 | |
| | | | | | | | PHQ1041_0060K713_0590 ME50 | 2500 | 2500 | 4000 | ≤60 | 63 | |
| 389.1 | 99603/256 | 6500 | 10000 | – | 20000 | 4.0 | PHQ1041_0060K713_0650 ME30 | 2900 | 2600 | 4200 | ≤38 | 12 | 1560 |
| | | | | | | | PHQ1041_0060K713_0650 ME40 | | | | ≤48 | 34 | |
| | | | | | | | PHQ1041_0060K713_0650 ME50 | 2500 | 2500 | 4000 | ≤60 | 63 | |
| 427.2 | 13671/32 | 6500 | 10000 | – | 17839 | 4.0 | PHQ1041_0060K713_0710 ME30 | 2900 | 2600 | 4200 | ≤38 | 11 | 1560 |
| 473.0 | 60543/128 | 6500 | 10000 | – | 19749 | 4.0 | PHQ1041_0060K713_0790 ME30 | 2900 | 2600 | 4200 | ≤38 | 11 | 1560 |
| 534.0 | 68355/128 | 6500 | 10000 | – | 18207 | 4.0 | PHQ1041_0060K713_0890 ME30 | 2900 | 2600 | 4200 | ≤38 | 11 | 1560 |
| 591.2 | 302715/512 | 6500 | 10000 | – | 20000 | 4.0 | PHQ1041_0060K713_0990 ME30 | 2900 | 2600 | 4200 | ≤38 | 11 | 1560 |

*[1] Based on input speed of 2000 RPM. See page <?>.for details on torque calculations.*
*[2] Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
** Motor shaft adapter code (shaft diameter max - mm): ME10 (19), ME20 (32), ME30 (38), ME40 (48), ME50 (60)*

| Reducer Ratio (i) | | Output Torque | | | | Back-lash/ Red | Part Number* (Gearhead + Input) | Max. Input Speed RPM (n1) | | | Motor Shaft [3] Max Ø | Input Inertia | Tors. Stiffness |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Nom. [1] | Accel. | M2 accHT | Peak [2] | | | Continuous | | Cyclic | | | |
| | | $M_{2N}$ | $M_{2acc}$ | | $M_{2NOT}$ | $\Delta\phi_2$ | | | | | $d_{MW}$ | $J_1$ | $C_2$ |
| Nom. | Exact | Nm | Nm | Nm | Nm | arcmin | | EL 1,2 | EL 3,4,5,6 | All | mm | kgcm² | Nm/ arcmin |
| **PHQ11K** | **(continued next page)** | | | | | | | | | | | | |
| 44.67 | 3127/70 | 12299 | 12299 | – | 16681 | 4.0 | PHQ1141_0060K813_0074 ME40 | 1600 | 1500 | 2600 | ≤48 | 178 | 2578 |
| | | | | | | | PHQ1141_0060K813_0074 ME50 | | | | ≤60 | 206 | 2595 |
| 49.46 | 96937/1960 | 13000 | 13617 | – | 18470 | 4.0 | PHQ1141_0060K813_0082 ME40 | 1600 | 1500 | 2600 | ≤48 | 164 | 2586 |
| | | | | | | | PHQ1141_0060K813_0082 ME50 | | | | ≤60 | 192 | 2600 |
| 55.70 | 11977/215 | 13000 | 15334 | – | 20797 | 4.0 | PHQ1141_0060K813_0093 ME40 | 1600 | 1500 | 2600 | ≤48 | 136 | 2594 |
| | | | | | | | PHQ1141_0060K813_0093 ME50 | | | | ≤60 | 164 | 2605 |
| 61.67 | 53041/860 | 13000 | 16978 | – | 23027 | 4.0 | PHQ1141_0060K813_0105 ME40 | 1600 | 1500 | 2600 | ≤48 | 127 | 2599 |
| | | | | | | | PHQ1141_0060K813_0105 ME50 | | | | ≤60 | 155 | 2608 |
| 89.05 | 28497/320 | 13000 | 22000 | – | 33239 | 4.0 | PHQ1141_0060K813_0150 ME40 | 1900 | 1800 | 3000 | ≤48 | 83 | 2612 |
| | | | | | | | PHQ1141_0060K813_0150 ME50 | | | | ≤60 | 111 | 2616 |
| 98.59 | 126201/1280 | 13000 | 22000 | – | 36803 | 4.0 | PHQ1141_0060K813_0165 ME40 | 1900 | 1800 | 3000 | ≤48 | 79 | 2614 |
| | | | | | | | PHQ1141_0060K813_0165 ME50 | | | | ≤60 | 107 | 2617 |
| 104.0 | 30149/290 | 11663 | 15259 | – | 20696 | 4.0 | PHQ1141_0060K813_0175 ME30 | 2300 | 2100 | 3500 | ≤38 | 50 | 2614 |
| | | | | | | | PHQ1141_0060K813_0175 ME40 | | | | ≤48 | 73 | 2615 |
| | | 13000 | 22000 | – | 38804 | | PHQ1141_0060K813_0175 ME50 | | | | ≤60 | 101 | 2618 |
| 115.1 | 133517/1160 | 12912 | 16895 | – | 22915 | 4.0 | PHQ1141_0060K813_0190 ME30 | 2300 | 2100 | 3500 | ≤38 | 48 | 2616 |
| | | | | | 42965 | | PHQ1141_0060K813_0190 ME40 | | | | ≤48 | 70 | |
| | | | | | | | PHQ1141_0060K813_0190 ME50 | | | | ≤60 | 98 | 2619 |
| 138.3 | 31801/230 | 12400 | 18048 | – | 24479 | 4.0 | PHQ1141_0060K813_0230 ME30 | 2300 | 2100 | 3500 | ≤38 | 36 | 2618 |
| | 31801/230 | 13000 | 22000 | | 44000 | | PHQ1141_0060K813_0230 ME40 | | | | ≤48 | 59 | 2619 |
| | | | | | | | PHQ1141_0060K813_0230 ME50 | | | | ≤60 | 87 | 2620 |
| 153.1 | 140833/920 | 13000 | 19983 | – | 27103 | 4.0 | PHQ1141_0060K813_0260 ME30 | 2300 | 2100 | 3500 | ≤38 | 35 | 2619 |
| | | | 22000 | | 44000 | | PHQ1141_0060K813_0260 ME40 | | | | ≤48 | 57 | |
| | | | | | | | PHQ1141_0060K813_0260 ME50 | | | | ≤60 | 85 | 2621 |
| 175.5 | 7021/40 | 13000 | 21591 | – | 29284 | 4.0 | PHQ1141_0060K813_0290 ME30 | 2800 | 2500 | 4000 | ≤38 | 28 | 2620 |
| | | | 22000 | | 44000 | | PHQ1141_0060K813_0290 ME40 | | | | ≤48 | 50 | |
| | | | | | | | PHQ1141_0060K813_0290 ME50 | | | | ≤60 | 78 | 2621 |

[1] *Based on input speed of 2000 RPM. See page <?>.for details on torque calculations.*
[2] *Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
* *Motor shaft adapter code (shaft diameter max - mm): ME10 (19), ME20 (32), ME30 (38), ME40 (48), ME50 (60)*



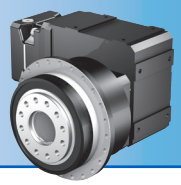
| Reducer Ratio (i) | | Output Torque | | | | Back-lash/ Red | Part Number* (Gearhead + Input) | Max. Input Speed RPM (n1) | | | Motor Shaft [3] Max Ø | Input Inertia | Tors. Stiffness |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Nom. [1] | Accel. | M2 | Peak [2] | | | Continuous | | Cyclic | | | |
| Nom. | Exact | $M_{2N}$ | $M_{2acc}$ | accHT | $M_{2NOT}$ | $\Delta\phi_2$ | | EL 1,2 | EL 3,4,5,6 | All | $d_{MW}$ | $J_1$ | $C_2$ |
| | | Nm | Nm | Nm | Nm | arcmin | | | | | mm | kgcm² | Nm/ arcmin |
| **PHQ11K** | **(continued from previous page)** | | | | | | | | | | | | |
| 194.3 | 31093/160 | 13000 | 22000 | – | 32424 | 4.0 | PHQ1141_0060K813_0320 ME30 | 2800 | 2500 | 4000 | ≤38 | 27 | 2621 |
| | | | | | 44000 | | PHQ1141_0060K813_0320 ME40 | | | | ≤48 | 50 | |
| | | | | | | | PHQ1141_0060K813_0320 ME50 | | | | ≤60 | 77 | 2622 |
| 216.8 | 8673/40 | 13000 | 22000 | – | 30353 | 4.0 | PHQ1141_0060K813_0360 ME30 | 2800 | 2500 | 4000 | ≤38 | 23 | 2621 |
| | | | | | 44000 | | PHQ1141_0060K813_0360 ME40 | | | | ≤48 | 45 | |
| | | | | | | | PHQ1141_0060K813_0360 ME50 | 2500 | | | ≤60 | 73 | 2622 |
| 240.1 | 38409/160 | 13000 | 22000 | – | 33607 | 4.0 | PHQ1141_0060K813_0400 ME30 | 2800 | 2500 | 4000 | ≤38 | 22 | 2622 |
| | | | | | 44000 | | PHQ1141_0060K813_0400 ME40 | | | | ≤48 | 45 | |
| | | | | | | | PHQ1141_0060K813_0400 ME50 | 2500 | | | ≤60 | 72 | |
| 265.5 | 531/2 | 13000 | 22000 | – | 34112 | 4.0 | PHQ1141_0060K813_0440 ME30 | 2800 | 2500 | 4000 | ≤38 | 19 | 2622 |
| | | | | | | | PHQ1141_0060K813_0440 ME40 | | | | ≤48 | 41 | |
| | | | | | | | PHQ1141_0060K813_0440 ME50 | 2500 | | | ≤60 | 70 | |
| 293.9 | 16461/56 | 13000 | 22000 | – | 37770 | 4.0 | PHQ1141_0060K813_0490 ME30 | 2800 | 2500 | 4000 | ≤38 | 18 | 2622 |
| | | | | | | | PHQ1141_0060K813_0490 ME40 | | | | ≤48 | 40 | |
| | | | | | | | PHQ1141_0060K813_0490 ME50 | 2500 | | | ≤60 | 69 | |
| 354.5 | 42539/120 | 13000 | 22000 | – | 39925 | 4.0 | PHQ1141_0060K813_0590 ME30 | 2800 | 2500 | 4000 | ≤38 | 15 | 2622 |
| | | | | | | | PHQ1141_0060K813_0590 ME40 | | | | ≤48 | 37 | |
| | | | | | | | PHQ1141_0060K813_0590 ME50 | 2500 | | | ≤60 | 66 | 2623 |
| 392.5 | 188387/480 | 13000 | 22000 | – | 44000 | 4.0 | PHQ1141_0060K813_0650 ME30 | 2800 | 2500 | 4000 | ≤38 | 15 | 2623 |
| | | | | | | | PHQ1141_0060K813_0650 ME40 | | | | ≤48 | 37 | |
| | | | | | | | PHQ1141_0060K813_0650 ME50 | 2500 | | | ≤60 | 66 | |
| 430.2 | 10325/24 | 13000 | 22000 | – | 43909 | 4.0 | PHQ1141_0060K813_0720 ME30 | 2800 | 2500 | 4000 | ≤38 | 14 | 2623 |
| | | | | | | | PHQ1141_0060K813_0720 ME40 | | | | ≤48 | 35 | |
| | | | | | | | PHQ1141_0060K813_0720 ME50 | 2500 | | | ≤60 | 64 | |
| 476.3 | 45725/96 | 13000 | 22000 | – | 44000 | 4.0 | PHQ1141_0060K813_0790 ME30 | 2800 | 2500 | 4000 | ≤38 | 13 | 2623 |
| | | | | | | | PHQ1141_0060K813_0790 ME40 | | | | ≤48 | 35 | |
| | | | | | | | PHQ1141_0060K813_0790 ME50 | 2500 | | | ≤60 | 64 | |
| 526.6 | 21063/40 | 13000 | 15237 | – | 20667 | 4.0 | PHQ1141_0060K813_0880 ME30 | 2800 | 2500 | 4000 | ≤38 | 12 | 2623 |
| 583.0 | 93279/160 | 13000 | 16871 | – | 22883 | 4.0 | PHQ1141_0060K813_0970 ME30 | 2800 | 2500 | 4000 | ≤38 | 12 | 2623 |

*[1] Based on input speed of 2000 RPM. See page <?>.for details on torque calculations.*
*[2] Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
** Motor shaft adapter code (shaft diameter max - mm): ME10 (19), ME20 (32), ME30 (38), ME40 (48), ME50 (60)*

| Reducer Ratio (i) | | Output Torque | | | | Back-lash/ Red | Part Number* (Gearhead + Input) | Max. Input Speed RPM (n1) | | | Motor Shaft [3] Max Ø | Input Inertia | Tors. Stiffness |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Nom. [1] | Accel. | M2 accHT | Peak [2] | | | Continuous | | Cyclic | | | |
| Nom. | Exact | $M_{2N}$ | $M_{2acc}$ | | $M_{2NOT}$ | $\Delta\phi_2$ | | EL 1,2 | EL 3,4,5,6 | All | $d_{MW}$ | $J_1$ | $C_2$ |
| | | Nm | Nm | Nm | Nm | arcmin | | | | | mm | kgcm² | Nm/ arcmin |
| **PHQ12K** | **(continued next page)** | | | | | | | | | | | | |
| 75.15 | 221247/2944 | 20689 | 20689 | – | 28062 | 4.0 | PHQ1241_0060K913_0125 ME40 | 1800 | 1800 | 2800 | ≤48 | 195 | 4614 |
| | | | | | | | PHQ1241_0060K913_0125 ME50 | | | | ≤60 | 223 | 4633 |
| 114.4 | 915/8 | 25000 | 31485 | – | 42705 | 4.0 | PHQ1241_0060K913_0190 ME40 | 2200 | 2100 | 3300 | ≤48 | 119 | 4643 |
| | | | | | | | PHQ1241_0060K913_0190 ME50 | | | | ≤60 | 147 | 4651 |
| 143.7 | 266631/1856 | 25000 | 39537 | – | 53625 | 4.0 | PHQ1241_0060K913_0240 ME40 | 2200 | 2100 | 3300 | ≤48 | 94 | 4651 |
| | | | | | | | PHQ1241_0060K913_0240 ME50 | | | | ≤60 | 122 | 4656 |
| 192.7 | 141825/736 | 25000 | 43000 | – | 71941 | 4.0 | PHQ1241_0060K913_0320 ME40 | 2600 | 2500 | 3800 | ≤48 | 72 | 4657 |
| | | | | | | | PHQ1241_0060K913_0320 ME50 | 2500 | | | ≤60 | 100 | 4660 |
| 228.3 | 584319/2560 | 25000 | 43000 | – | 78148 | 4.0 | PHQ1241_0060K913_0380 ME40 | 2600 | 2500 | 3800 | ≤48 | 63 | 4659 |
| | | | | | | | PHQ1241_0060K913_0380 ME50 | 2500 | | | ≤60 | 91 | 4661 |
| 293.6 | 300669/1024 | 25000 | 43000 | – | 80000 | 4.0 | PHQ1241_0060K913_0490 ME40 | 2600 | 2500 | 3800 | ≤48 | 52 | 4661 |
| | | | | | | | PHQ1241_0060K913_0490 ME50 | 2500 | | | ≤60 | 80 | 4663 |
| 378.4 | 629703/1664 | 25000 | 43000 | – | 80000 | 4.0 | PHQ1241_0060K913_0630 ME40 | 2600 | 2500 | 3800 | ≤48 | 45 | 4663 |
| | | | | | | | PHQ1241_0060K913_0630 ME50 | 2500 | | | ≤60 | 73 | |
| 450.0 | 187209/416 | 25000 | 39283 | – | 53281 | 4.0 | PHQ1241_0060K913_0750 ME40 | 2600 | 2500 | 3800 | ≤48 | 41 | 4663 |
| | | | | | | | PHQ1241_0060K913_0750 ME50 | 2500 | | | ≤60 | 70 | 4664 |
| 554.1 | 7199037/12992 | 25000 | 39537 | – | 53625 | 4.0 | PHQ1241_0060K914_0920 ME40 | 2600 | 2500 | 3800 | ≤48 | 37 | 4664 |
| 562.7 | 4177219/7424 | 16474 | 16676 | – | 22618 | 4.0 | PHQ1241_0060K914_0940 ME30 | 2600 | 2500 | 3800 | ≤38 | 14 | 4663 |
| 572.5 | 293105/512 | 25000 | 37154 | – | 57728 | 4.0 | PHQ1241_0060K913_0950 ME40 | 2600 | 2500 | 3800 | ≤48 | 38 | 4664 |
| | | | | | | | PHQ1241_0060K913_0950 ME50 | 2500 | | | ≤60 | 67 | |
| 743.3 | 3829275/5152 | 25000 | 43000 | – | 71941 | 4.0 | PHQ1241_0060K914_1240 ME40 | 2600 | 2500 | 3800 | ≤48 | 36 | 4664 |
| 754.7 | 2221925/2944 | 22100 | 22369 | – | 30340 | 4.0 | PHQ1241_0060K914_1260 ME30 | 2600 | 2500 | 3800 | ≤38 | 12 | 4664 |
| 880.4 | 15776613/17920 | 25000 | 43000 | – | 78148 | 4.0 | PHQ1241_0060K914_1470 ME40 | 2600 | 2500 | 3800 | ≤48 | 35 | 4664 |
| 894.0 | 9154331/10240 | 25000 | 26496 | – | 35937 | 4.0 | PHQ1241_0060K914_1490 ME30 | 2600 | 2500 | 3800 | ≤38 | 12 | 4664 |

*[1] Based on input speed of 2000 RPM. See page <?>.for details on torque calculations.*
*[2] Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
** Motor shaft adapter code (shaft diameter max - mm): ME10 (19), ME20 (32), ME30 (38), ME40 (48), ME50 (60)*

# Selection Data



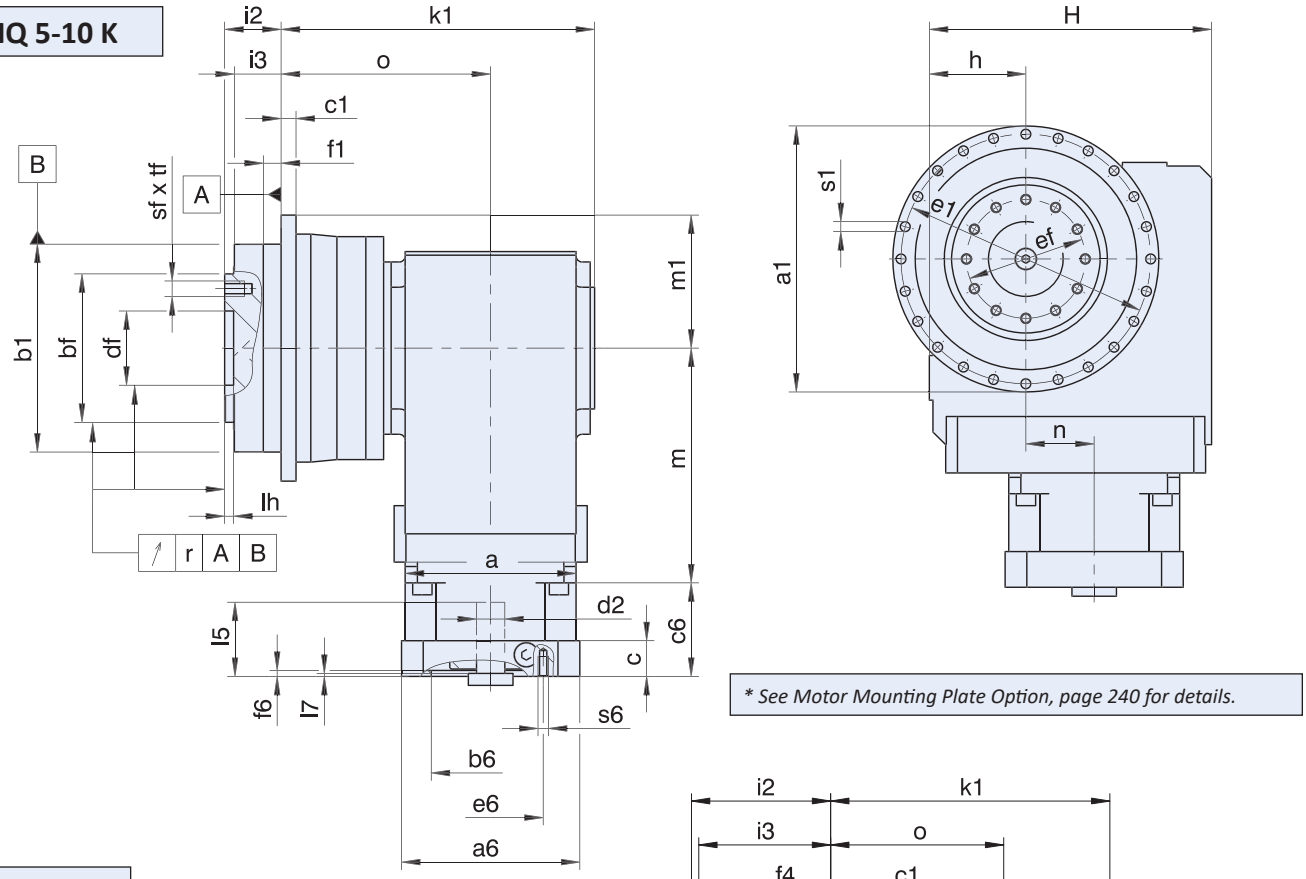
| Reducer Ratio (i) | | Output Torque | | | | Back-lash/ Red | Part Number* (Gearhead + Input) | Max. Input Speed RPM (n1) | | | Motor Shaft [3] Max Ø | Input Inertia | Tors. Stiffness |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Nom. [1] | Accel. | M2 | Peak [2] | | | Continuous | | Cyclic | | | |
| Nom. | Exact | Nm | Nm | Nm | Nm | arcmin | | EL 1,2 | EL 3,4,5,6 | All | mm | kgcm² | Nm/ arcmin |
| **PHQ12K** | **(continued next page)** | | | | | | | | | | | | |
| 1133 | 8118063/7168 | 25000 | 43000 | – | 80000 | 4.0 | PHQ1241_0060K914_1890 ME40 | 2600 | 2500 | 3800 | ≤48 | 34 | 4664 |
| 1150 | 4710481/4096 | 25000 | 29221 | – | 39634 | 4.0 | PHQ1241_0060K914_1920 ME30 | 2600 | 2500 | 3800 | ≤38 | 11 | 4664 |
| 1460 | 17001981/11648 | 25000 | 43000 | – | 80000 | 4.0 | PHQ1241_0060K914_2430 ME40 | 2600 | 2500 | 3800 | ≤48 | 34 | 4665 |
| 1482 | 9865347/6656 | 25000 | 33011 | – | 44775 | 4.0 | PHQ1241_0060K914_2470 ME30 | 2600 | 2500 | 3800 | ≤38 | 11 | 4665 |
| 1763 | 2932941/1664 | 25000 | 39283 | – | 53281 | 4.0 | PHQ1241_0060K914_2940 ME30 | 2600 | 2500 | 3800 | ≤38 | 10 | 4665 |
| 2242 | 13775935/6144 | 25000 | 37154 | – | 57728 | 4.0 | PHQ1241_0060K914_3740 ME30 | 2600 | 2500 | 3800 | ≤38 | 10 | 4665 |



[1] *Based on input speed of 2000 RPM. See page <?>.for details on torque calculations.*
[2] *Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
* *Motor shaft adapter code (shaft diameter max - mm): ME10 (19), ME20 (32), ME30 (38), ME40 (48), ME50 (60)*

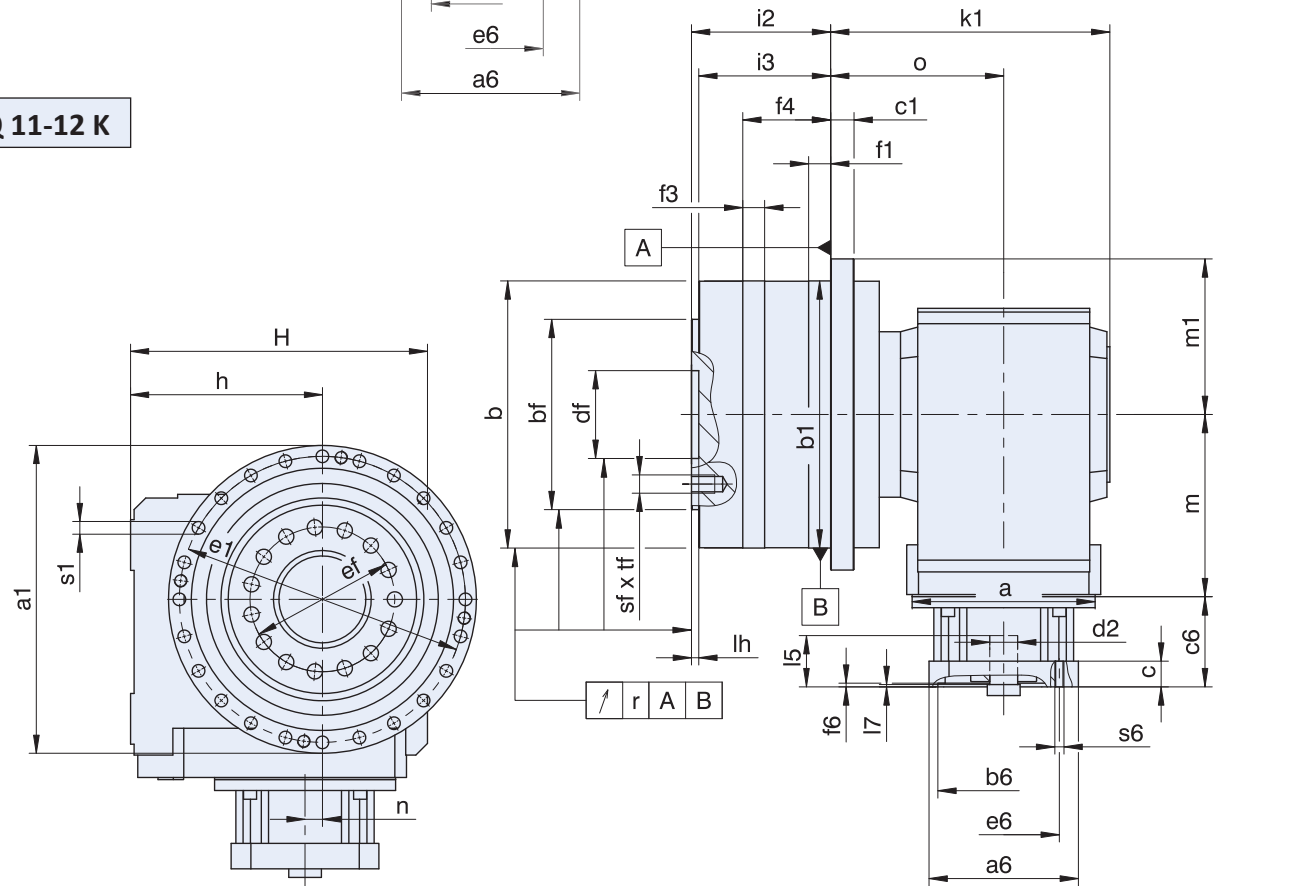
## PHQK Series Dimensions — All Units

**PHQ 5-10 K**

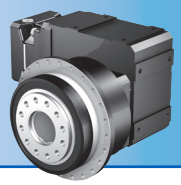



** See Motor Mounting Plate Option, page 240 for details.*

**PHQ 11-12 K**



# Dimensional Data



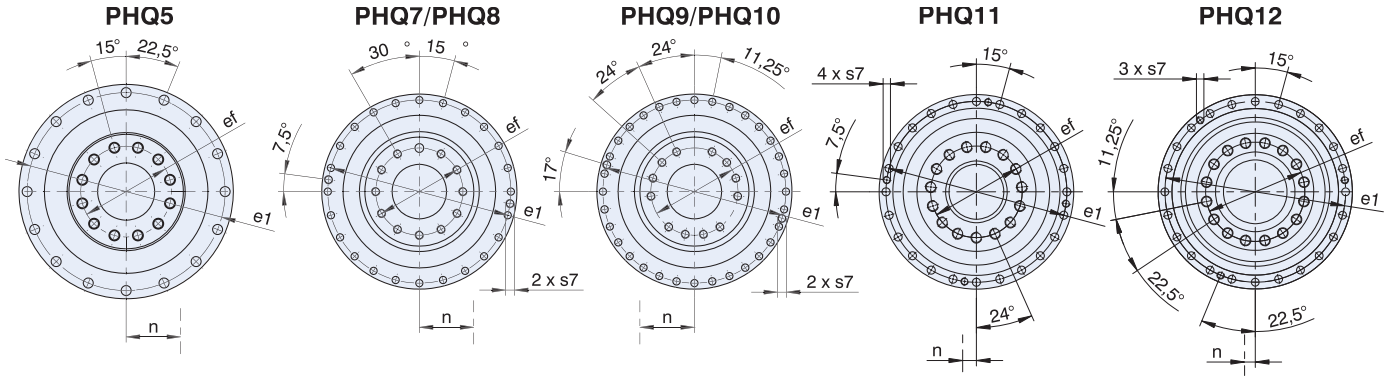



**Table 1** Dimensions (mm)

| Unit | Øa1 | Øb | Øb1 | Øbf | c1 | Ødf | Øe1 | Øef | f1 | f3 | f4 | h | H | i2 | i3 | k1 | lh | m1 | o | r | Øs1 | s7 | sf | tf |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PHQ531_K102 | 145 | – | 110$^{h7}$ | 80$^{h7}$ | 8 | 40$^{H6}$ | 135 | 63 | 12 | – | – | 60 | 160 | 29 | 23 | 180.0 | 6 | 72.5 | 124.0 | 0.020 | 5.5 | – | M8 | 12 |
| PHQ731_K202 | 179 | – | 140$^{h7}$ | 100$^{h7}$ | 10 | 50$^{H6}$ | 168 | 80 | 12 | – | – | 65 | 190 | 38 | 32 | 211.0 | 6 | 89.5 | 141.0 | 0.025 | 6.6 | – | M10 | 16 |
| PHQ831_K402 | 247 | – | 200$^{h7}$ | 160$^{h7}$ | 12 | 80$^{H6}$ | 233 | 125 | 15 | – | – | 90 | 240 | 50 | 42 | 289.0 | 8 | 123.5 | 199.0 | 0.030 | 9.0 | M10 | M12 | 17 |
| PHQ941_K513 | 300 | – | 255$^{h7}$ | 180$^{h7}$ | 18 | 90$^{H6}$ | 280 | 145 | 20 | – | – | 160 | 260 | 66 | 55 | 292.5 | 12 | 150.0 | 196.5 | 0.030 | 13.5 | M8 | M20 | 28 |
| PHQ1041_K713 | 330 | – | 285$^{h7}$ | 200$^{h7}$ | 20 | 95$^{H6}$ | 310 | 166 | 20 | – | – | 212 | 342 | 75 | 60 | 354.5 | 10 | 165.0 | 238.0 | 0.040 | 13.5 | M10 | M24 | 35 |
| PHQ1141_K813 | 425 | 365$^{g6}$ | 365$^{h6}$ | 260$^{h7}$ | 32 | 120$^{H6}$ | 395 | 200 | 30 | 30 | 120 | 265 | 410 | 190 | 180 | 381.5 | 10 | 212.5 | 236.5 | 0.040 | 17.5 | M16 | M24 | 35.5 |
| PHQ1241_K913 | 550 | 470$^{g6}$ | 470$^{h6}$ | 330$^{h7}$ | 45 | 180$^{H7}$ | 510 | 280 | 30 | 30 | 145 | 315 | 495 | 206.5 | 195.5 | 452.0 | 10 | 275.0 | 282.0 | 0.040 | 22.0 | M16 | M30 | 47 |
| PHQ1241_K914 | 550 | 470$^{g6}$ | 470$^{h6}$ | 330$^{h7}$ | 45 | 180$^{H7}$ | 510 | 280 | 30 | 30 | 145 | 315 | 495 | 206.5 | 195.5 | 452.0 | 10 | 275.0 | 282.0 | 0.040 | 22.0 | M16 | M30 | 47 |

# Motor Mounting Plate

**Table 2** Dimensions (mm)

| Base Module | Motor Adapter Code | | | | | | | | | | | | | | | Wt. lbs. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ME10 | | | ME20 | | | ME30 | | | ME40 | | | ME50 | | | |
| | a | m | n | a | m | n | a | m | n | a | m | n | a | m | n | |
| PHQ531_K102 | 98 | 124 | 36 | 115 | 128 | 36 | – | – | – | – | – | – | – | – | – | 43 |
| PHQ731_K202 | 98 | 143 | 46 | 115 | 147 | 46 | 145 | 149 | 46 | | | | – | – | – | 69 |
| PHQ831_K402 | – | – | – | 160 | 187 | 60 | 145 | 189 | 60 | 190 | 192 | 60 | – | – | – | 116 |
| PHQ941_K513 | – | – | – | 160 | 172 | 15 | 145 | 174 | 15 | 190 | 177 | 15 | – | – | – | 213 |
| PHQ1041_K713 | – | – | – | – | – | – | 200 | 221 | 20 | 190 | 224 | 20 | 300 | 237 | 20 | 310 |
| PHQ1141_K813 | – | – | – | – | – | – | 200 | 247 | 24 | 250 | 249 | 24 | 300 | 262 | 24 | |
| PHQ1241_K913 | – | – | – | – | – | – | – | – | – | 250 | 294 | 25 | 300 | 307 | 25 | |
| PHQ1241_K914 | – | – | – | – | – | – | 200 | 353 | 25 | 250 | 365 | 25 | – | – | – | |

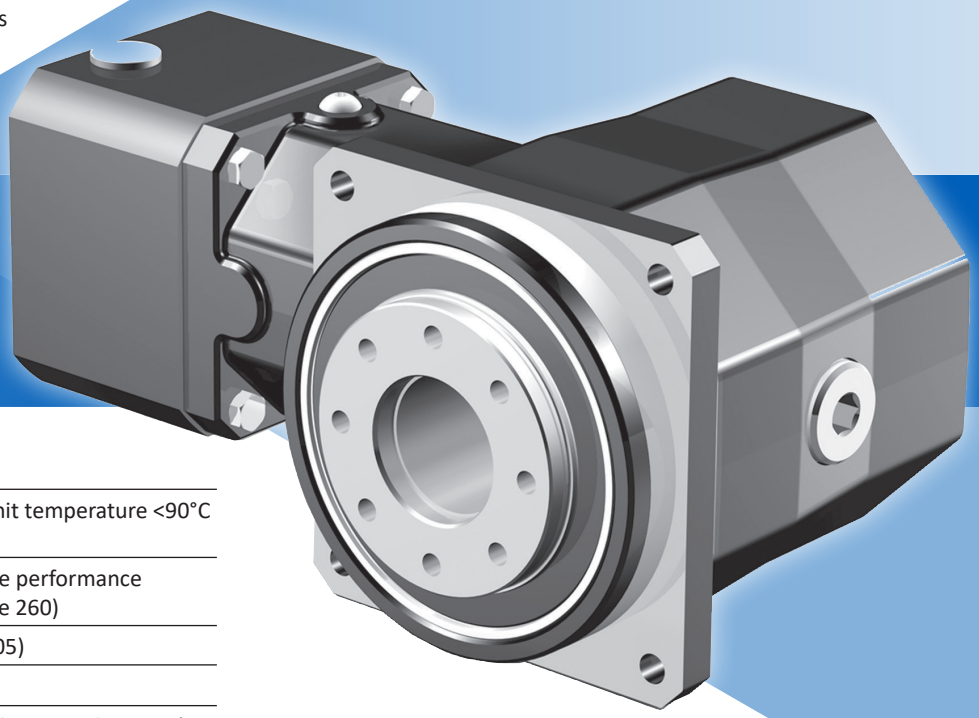
# KS Series: RIGHT ANGLE – Versatile Outputs

## KS Features

- 6:1 to 200:1 ratios (higher ratios available. Contact STOBER.)
- Quiet running (<62dB(A))
- Flexilibity for mounting
- Adaptability: shafts available in metric and imperial to meet your requirements
- Large motor input option to accept bigger diameter motor shafts so you don't use an oversized gearbox
- Error free motor mounting and quick changeover with toleranced pilot on motor plate
- Low no load running torque, giving you more torque for your application
- Magnetic oil filtration to remove contaminants to prevent breakdowns
- Build and ship in one day
- Assembled in the USA

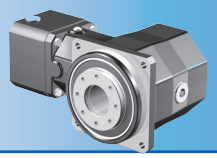
*STOBER KS Series uses helical and bevel gearing to provide a low backlash unit, that is smooth running, with high efficiency, high power density, and high input speed capacity. The KS also offers flexibly with three output options: shaft, flange, and hollow. Every gearbox is made to order. STOBER will custom whatever you need to fit your application. Contact us today to learn more.*

SHIPS in 1 DAY!
NO EXPEDITE FEE FOR 24 HOUR SERVICE



## General Specifications

| | |
|---|---|
| **Ambient Temperature** | 0°C to +40°C (104°F) [Unit temperature <90°C Max] |
| **Backlash** | ≤4 standard arcmins (see performance overview chart, see page 260) |
| **Coating** | Standard Black (RAL-9005) |
| **Degree of Protection** | IP65 |
| **Direction of Rotation** | Input and output rotate the SAME direction (see page 260) |
| **Efficiency** | 2 stage 95%; 3 stage 93%; |
| **Input RPM** | Up to 6,000 RPM |
| **Installation** | Requires 12.9 fasteners for tapped holes housing. See page 288, for more information |
| **Lubrication** | Lubricated for life – standard Mobil SHC629; option food grade Mobil SHC CIBUS 150 |
| **Mounting Position** | Must be specified, see page 261 |
| **Warranty** | 5 Year Limited (2 Years on normal wear items: bearings, seals, etc.) |



# Overview

## Selection Options *At-a-Glancee*

Using the **Selection Data** table later in this section, select the KS Series Gearhead with the appropriate performance and design options tailored to your motor choice and exact application requirements. Use the part number guide below as a reference to build a part number for the complete gearhead assembly.

**Part Number Examples:**

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | | |
|---|---|---|---|---|---|---|---|---|---|---|
| KS | 4 | 0 | 2 | P | F | 0060 | ME | L | EL1 | * |

| | Design Option | Part Number Code | Description |
|---|---|---|---|
| 1 | **Series** | KS | Concentric helical |
| 2 | **Size** | 4 5 7 | 3 sizes of gearhead |
| 3 | **Generation** | 0 | Version of gearhead |
| 4 | **# of Stages** | 2<br>3 | Two stage for ratios ≤20:1<br>Three stage for ratios >20:1 |
| 5 | **Output** | P<br>G<br>F<br>S | Shaft with key<br>Plain shaft (no key)<br>Flanged hollow<br>Shrink ring |
| 6 | **Housing** | F | Standard |
| 7 | **Ratio** | 0060 | Ratios range from 6:1 to 200:1<br>(0060=6:1; 0200=20:1; 2000=200:1) |
| 8 | **Motor Adapter** | ME | ME Motor adapter<br>(See also motor mounting plate option, page 261) |
| 0 | **Options** | L | Large Input |
| * | **Mounting Position** | EL1 EL2 EL3 EL4<br>EL5 EL6 | Required special instruction for all units, see page 261 |

## Options

### Coating Option

- Available with multi-layer, industrial 316 stainless steel epoxy coating. Contact factory for this option.

### Large Input

- Accommodates a larger diameter motor shaft without going to a larger size gearbox.

### ATEX

- ATmosphere EXplosible – rated for explosive environments. Contact factory for this option and allow additional time for delivery.

### Oil Reservoir

- Use with 3 stage units (for vertical EL5 orientation, see page 260).

## KS Performance Overview

KS Series performance is dependent on several factors including duty cycle, bearing design, gearhead size and stage configuration, among others. Use the chart below for preliminary evaluation, then use the following performance chart and selection information on the following pages for specific performance sizing and selection.

| Size/Generation | | KS40 | | KS50 | | KS70 | |
|---|---|---|---|---|---|---|---|
| # of Stages | | 2 | 3 | 2 | 3 | 2 | 3 |
| **Acceleration Torque** $M_{2BMAX}$ | Nm | 90 | | 200 | | 400 | |
| **Output Torque Nom.** [1] $M_{2N}$ | Nm | 65 | | 125 | | 250 | |
| **Torsional Stiffness** $C_2$ | Nm/arcmin | ≤8.5 | | ≤17 | | ≤42 | |
| **Torsional Backlash** [2] $\Delta\phi$ | arcmin | ≤6 | | ≤5 | | ≤4 | |
| **Input Speed Max.** $n_{1MAX}$ | Continuous<br>Cyclic | 4000<br>6000 | 4500<br>6000 | 3500<br>6000 | 4200<br>6000 | 3200<br>6000 | 4000<br>6000 |
| **Efficiency (@nom torque)** | % | 95 | 93 | 95 | 93 | 95 | 93 |
| **Weight** | kg<br>lbs | 8.4<br>18.5 | 8.2<br>18.1 | 13.6<br>30 | 14.4<br>31.8 | 26.8<br>59.1 | 28.1<br>62 |
| **Noise** [3] | dB(A) | ≤65 | | ≤62 | | ≤63 | |

**Performance by Output Option (P = Shaft with Key; G = Shaft without Key; F = Flanged Hollow Output; S = Shrink Ring)** [4]

| Size/Generation | | | KS40 | KS50 | KS70 |
|---|---|---|---|---|---|
| **Axial Load Max.** $F_{2AMAX}$ | **P/G** | N | 3400 | 6000 | 10,000 |
| | **F** | N | 4000 | 6000 | 10,000 |
| | **S** | N | 4000 | 6000 | 10,000 |
| **Radial Load Max.** $F_{2RMAX}$ | **P/G** | N | 5000 | 8000 | 10,000 |
| **Tilting Moment Max.** $M_{2KMAX}$ | **F/S** | Nm | 210 | 460 | 780 |

[1] *Ratings based on input speed ($n_1$) of 1500 RPM.*

*For torque at higher input speeds ($M_{2NX}$) solve the formula:*
*where $n_1$ = Actual Input Speed.*

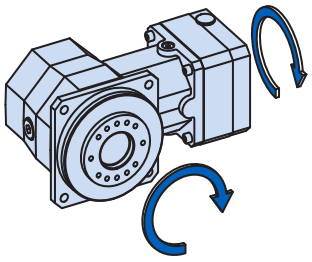
$$M_{2NX} = \frac{M_{2N}}{\sqrt[3]{\frac{n_1}{1500}}}$$

[2] *Tested at 1.5% of nominal torque and recorded on the output side of the gearhead. For lower backlash, contact STOBER technical support.*

[3] *Measurement at one (1) meter distance with input speed ($n_1$) of 2000 RPM.*

[4] *Rating based on output speed ($n_2$) of 100 RPM. For values at other speeds see page 262.*

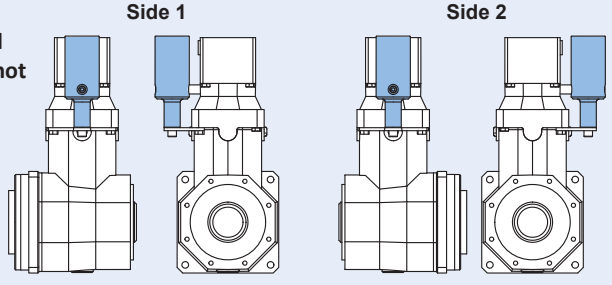
## KS Direction of Rotation

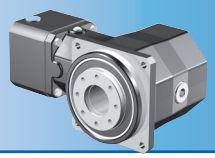


## Oil Reservoir Orientation

**For 3 stage units in vertical EL5 mounting position — not available with large input option**

**When ordering, Side 1 or Side 2 MUST BE SPECIFIED.**





# Overview

## KS Series Motor Mounting Plate Option (Motor information required with Motor Adapter ME option)

STOBER Servo Gearheads fit the motor of your choice with the appropriate motor mounting plate assembled between the motor and the gearhead.

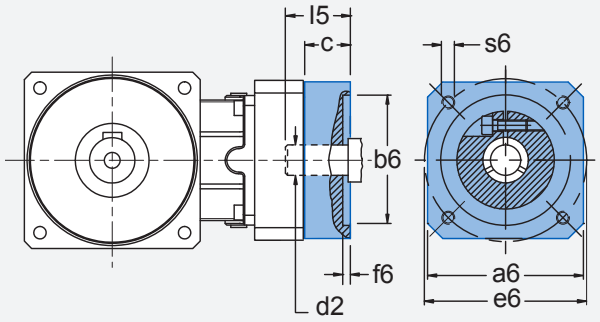
**NOTE: When ordering a gearhead:**

- Specify the motor manufacturer and part number
- Provide the motor drawing with dimensions, or specify the motor mounting dimensions (per the list shown at right)

For a precise dimension on a specific motor, or for general assistance, we recommend you contact STOBER Technical Support.

### Customer Required Dimensions for Properly Sized Motor Mounting Plate

| | |
|---|---|
| d2 | Motor Shaft Diameter (If an adapter bushing is required it will be supplied with the motor plate.) |
| b6 | Pilot Diameter |
| e6 | Bolt Circle Diameter |
| s6 | Bolt Diameter |
| l5 | Motor Shaft Length |
| f6 | Pilot Length |
| a6 | Square Flange (Optional – motor plate will typically be made to match this dimension.) |

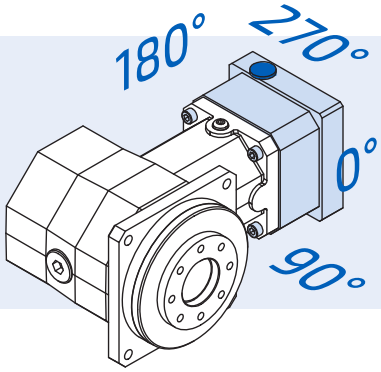



| Motor Mounting Plate Dimensions — mm (Gearhead Part Number Specific) | KS403 | KS402<br>KS403...L<br>KS503 | KS402...L<br>KS502<br>KS503...L<br>KS703 | KS502...L<br>KS702<br>KS703...L | KS702...L |
|---|---|---|---|---|---|
| Maximum Allowed Motor Shaft Dia. d2 | 14 | 19 | 24 | 32 | 38 |
| Minimum Allowed Motor Plate Thickness c | 15 | 18 | 21 | 24 | 25 |

** Note that the c motor plate thickness is determined by the motor shaft length. The minimum motor plate thickness is the value listed.*

## KS Series Motor Mounting Plate Access Hole

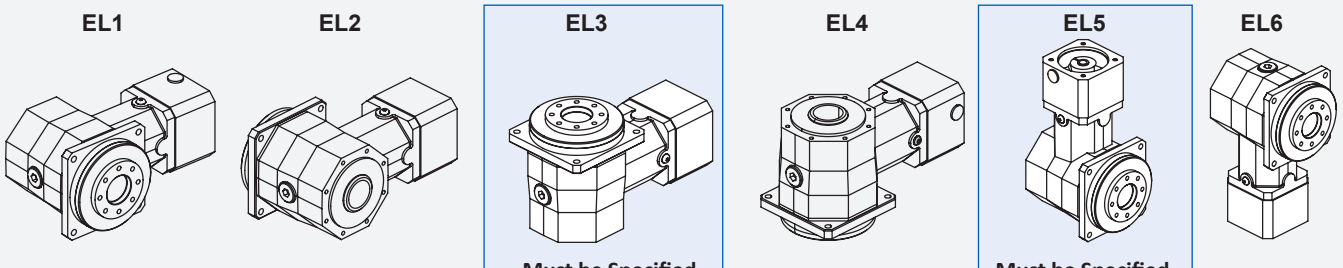
Access to the clamping screw for the motor coupling is located on the 270° side of the motor mounting plate at the location shown. If necessary, the motor mounting plate can be rotated in the field, if a 0°, 90° or 180° orientation for the access hole is desirable.




## KS Mounting Position Options

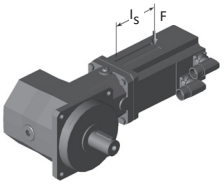
**KS Units can be mounted in any of the positions illustrated below.**

When ordering KS units mounted in a vertical position (EL3) or in a horizontal position (EL5), the mounting position MUST BE SPECIFIED. NOTE: EL5 3 stage units are only available with the oil reservoir option.



## Permissible Motor Tilting Torque

The permissible tilting torque of the motor attached to the gear unit is a result of the static and dynamic load "F" from the motor weight, mass acceleration, and vibration multiplied by the distance from the center of gravity "$l_S$" of the motor.




$$M_{1k} = F \times l_S \leq M_{1K}$$

| $M_{1K}$ | KS403 | KS402 KS503 | KS502 KS703 | KS702 |
|---|---|---|---|---|
| Nm | 10 | 20 | 40 | 80 |

## Permissible Output Shaft Load and Tilting Moments*

| Unit | $Z_2$ mm | $F_{2A}$ N | $F_{2R}$ N | $F_{2RB}$ N | $M_{2K}$ Nm | $M_{2KB}$ Nm |
|---|---|---|---|---|---|---|
| **P/G Solid Shaft (with/without key** | | | | | | |
| KS4 | 34 | 3400 | 5000 | 5000 | 260 | 260 |
| KS5 | 40 | 6000 | 8000 | 8000 | 550 | 550 |
| KS7 | 51 | 10,000 | 10,000 | 10,000 | 920 | 920 |
| **F Flange Hollow Output** | | | | | | |
| KS4 | 38 | 4000 | 6842 | 10,263 | 260 | 390 |
| KS5 | 45 | 6000 | 12,222 | 18,333 | 550 | 825 |
| KS7 | 55 | 10,000 | 16,727 | 25,091 | 920 | 1380 |
| **S Hollow Output with Shrink Ring** | | | | | | |
| KS4 | 36 | 4000 | 5000 | 5000 | 260 | 260 |
| KS5 | 42 | 6000 | 8000 | 8000 | 550 | 550 |
| KS7 | 52 | 10,000 | 10,000 | 10,000 | 920 | 920 |

** Refer to illustration and definitions below.*

*During EMERGENCY OFF operation (maximum stops per gearhead = 1000) the permissible values in the table for $F_{2A}$, $F_{2R}$, and $M_{2K}$ can be multiplied by a factor of 2.*

## KS Series Load/Life/Speed Calculations

**All formulas shown are based on METRIC values**

*Upper case letters are permissible values. Lower case letters are for existing values.*

The permissible load and tilting moment values are based on an output speed of 100 RPM. For higher speeds the following applies, where $n_2$ is the desired speed:

$$F_{2axN} = \frac{F_{2ax100}}{\sqrt[3]{\frac{n_{2m*}}{100\ rpm}}} \qquad F_{2radN} = \frac{F_{2rad100}}{\sqrt[3]{\frac{n_{2m*}}{100\ rpm}}} \qquad M_{2kN} = \frac{M_{2k100}}{\sqrt[3]{\frac{n_{2m*}}{100\ rpm}}}$$

The application output tilting moment should be determined by the following formula:

**Output P & G**

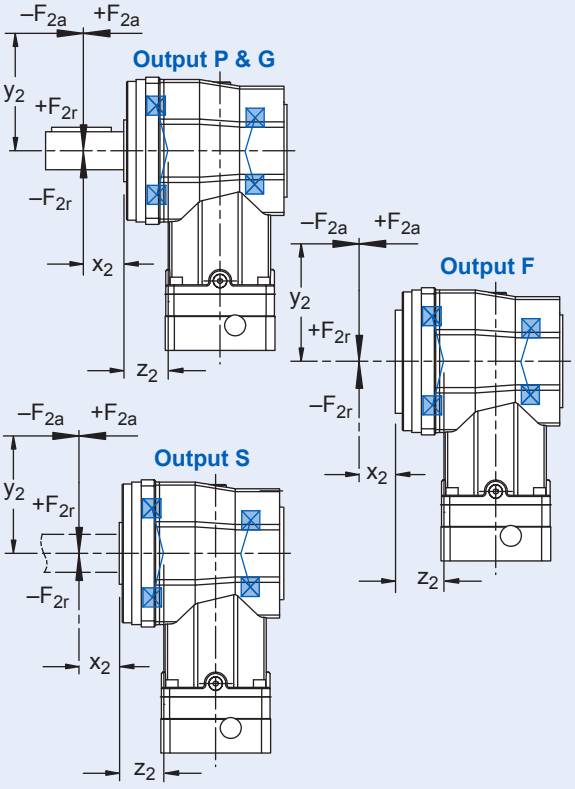
$$M_{2k,acc*} = \frac{2 \bullet F_{2ax100*} \bullet y_2 + F_{2rad,acc*} \bullet (x_2 + Z_2)}{1000} \leq M_{2k,acc}$$

**Output F & S**

$$M_{2k,acc*} = \frac{F_{2ax100*} \bullet y_2 + F_{2rad,acc*} \bullet (x_2 + Z_2)}{1000} \leq M_{2k,acc}$$

$$M_{2k,eq*} = \sqrt[3]{\frac{n_{2m,1*} \bullet t_{1*} \bullet M_{2k,acc,1*}{}^3 + \ldots + n_{2m,n*} \bullet t_{n*} \bullet M_{2k,acc,n*}{}^3}{n_{2m,1*} \bullet t_{1*} + \ldots + n_{2m,n*} \bullet t_{n*}}} \leq M_{2kN}$$

$$F_{2ax,eq*} = \sqrt[3]{\frac{n_{2m,1*} \bullet t_{1*} \bullet F_{2rad,acc,1*}{}^3 + \ldots + n_{2m,n*} \bullet t_{n*} \bullet F_{2rad,acc,n*}{}^3}{n_{2m,1*} \bullet t_{1*} + \ldots + n_{2m,n*} \bullet t_{n*}}} \leq F_{2radN}$$




Where:

| | | | |
|---|---|---|---|
| $z_2$ | Distance of Shaft Shoulder to Center of Output Bearing | $F_{2rad100}$ | Permitted Radial Force ≤100RPM |
| $n_2$ | Actual Average Output Speed | $F_{2rad,acc}$ | Radial Acceleration Force |
| $x_2$ | Distance of the Shaft Shoulder to the Force Application Point | $F_{2rad,acc*}$ | Radial Acceleration Force at Gear Unit Output |
| $y_2$ | Distance of the Shaft Axis to the Axial Force Application Point | $M_{2K100}$ | Permitted Tilting Torque ≤100RPM |
| $F_{2ax*}$ | Actual Axial Force at Gear Unit Output | $M_{2K,acc}$ | Permitted Acceleration Tilting Torque |
| $F_{2ax100}$ | Permitted Axial Force | $M_{2k,acc*}$ | Permitted Acceleration Tilting Torque at Gear Unit Output |
| | | $C_{2K}$ | Tilting Stiffness |

The hours of life ($L_h$) of the unit can be determined by the following formula:

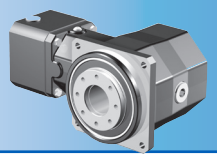
**bearing life for duty cycle ≤ 40%**

$L_h$ > 10,000 hours if $M_{2K100}/M_{2A*} < 1.25$ and > 1
$L_h$ > 20,000 hours if $M_{2K100}/M_{2A*} > 1.25$ and > 1.5
$L_h$ > 30,000 hours if $M_{2K100}/M_{2A*} < 1.5$

**bearing life for duty cycle ≥ 40%**

$$L_{hA} = L_h \left( \frac{40\%}{\text{Duty Cycle}} \right)$$

# Selection Data



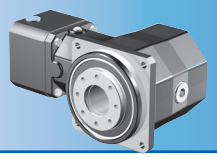
| Exact Ratio (i) | Output Torque: Nom. [1] $M_{2N}$ Nm | Output Torque: Accel. $M_{2acc}$ Nm | Output Torque: Peak [2] $M_{2NOT}$ Nm | Backlash $\Delta\phi_2$ arcmin | Part Number* (Gearhead + Input) | Max. Input Speed RPM (n1): Cont. | Max. Input Speed RPM (n1): Cyclic | Motor Shaft Max Ø $d_{MW}$ mm | Input Inertia [3] $J_1$ kgcm² | Tors. Stiffness $C_2$ Nm/arcmin |
|---|---|---|---|---|---|---|---|---|---|---|
| **KS4** | | | | | | | | | | |
| 6.000 | 60 | 90 | 140 | 6 | KS402_0060ME | 3000 | 6000 | 19 | 1.1 | 8.1 |
| | | | | | KS402_0060MEL | | | 24 | 1.5 | 8.4 |
| 8.000 | 65 | 90 | 140 | 6 | KS402_0080ME | 3500 | 6000 | 19 | 0.7 | 8.3 |
| | | | | | KS402_0080MEL | | | 24 | 1.2 | 8.4 |
| 10.00 | 65 | 90 | 140 | 6 | KS402_0100ME | 3800 | 6000 | 19 | 0.6 | 8.3 |
| | | | | | KS402_0100MEL | | | 24 | 1.1 | 8.4 |
| 14.00 | 65 | 90 | 140 | 6 | KS402_0140ME | 4000 | 6000 | 19 | .47 | 8.4 |
| | | | | | KS402_0140MEL | | | 24 | 0.96 | 8.5 |
| 20.00 | 60 | 90 | 140 | 6 | KS402_0200ME | 4000 | 6000 | 19 | 0.43 | 8.5 |
| | | | | | KS402_0200MEL | | | 24 | 0.9 | |
| 24.00 | 60 | 90 | 140 | 6 | KS403_0240ME | 3500 | 6000 | 14 | 0.2 | 8.5 |
| | | | | | KS403_0240MEL | | | 19 | 0.5 | |
| 32.00 | 65 | 90 | 140 | 6 | KS403_0320ME | 3500 | 6000 | 14 | 0.2 | 8.5 |
| | | | | | KS403_0320MEL | | | 19 | 0.5 | |
| 40.00 | 65 | 90 | 140 | 6 | KS403_0400ME | 3500 | 6000 | 14 | 0.2 | 8.5 |
| | | | | | KS403_0400MEL | | | 19 | 0.5 | |
| 50.00 | 65 | 90 | 140 | 6 | KS403_0500ME | 4000 | 6000 | 14 | 0.1 | 8.5 |
| | | | | | KS403_0500MEL | | | 19 | 0.4 | |
| 70.00 | 65 | 90 | 140 | 6 | KS403_0700ME | 4500 | 6000 | 14 | 0.1 | 8.5 |
| | | | | | KS403_0700MEL | | | 19 | 0.4 | |
| 80.00 | 65 | 90 | 140 | 6 | KS403_0800ME | 4500 | 6000 | 14 | 0.1 | 8.5 |
| | | | | | KS403_0800MEL | | | 19 | 0.4 | |
| 100.0 | 65 | 90 | 140 | 6 | KS403_1000MET | 4500 | 6000 | 14 | 0.1 | 8.5 |
| | | | | | KS403_1000MEL | | | 19 | 0.4 | |
| 140.0 | 65 | 90 | 140 | 6 | KS403_1400ME | 4500 | 6000 | 14 | 0.1 | 8.5 |
| | | | | | KS403_1400MEL | | | 19 | 0.4 | |
| 200.0 | 60 | 90 | 140 | 6 | KS403_2000ME | 4500 | 6000 | 14 | 0.1 | 8.5 |
| | | | | | KS403_2000MEL | | | 19 | 0.4 | |

[1] *Based on input speed of 2000 RPM. See page 260 for details on torque calculations.*
[2] *Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
[3] *Inertia based on maximum input. For lower inertia, using smaller diameter input, contact STOBER.*
* *MT = Motor Adapter  L = Large Input Option*

| Exact Ratio (i) | Output Torque Nom. [1] $M_{2N}$ Nm | Output Torque Accel. $M_{2acc}$ Nm | Output Torque Peak [2] $M_{2NOT}$ Nm | Backlash $\Delta\phi_2$ arcmin | Part Number* (Gearhead + Input) | Max. Input Speed RPM (n1) Cont. | Max. Input Speed RPM (n1) Cyclic | Motor Shaft Max Ø $d_{MW}$ mm | Input Inertia [3] $J_1$ kgcm² | Tors. Stiffness $C_2$ Nm/arcmin |
|---|---|---|---|---|---|---|---|---|---|---|
| **KS5** | | | | | | | | | | |
| 6.000 | 100 | 200 | 300 | 5 | KS502_0060ME | 2500 | 5500 | 24 | 2.5 | 16.0 |
| | | | | | KS502_0060MEL | | | 32 | 4.1 | 17.0 |
| 8.000 | 125 | 200 | 300 | 5 | KS502_0080ME | 2800 | 6000 | 24 | 1.9 | 17.0 |
| | | | | | KS502_0080MEL | | | 32 | 3.5 | |
| 10.00 | 125 | 200 | 300 | 5 | KS502_0100ME | 3000 | 6000 | 24 | 1.5 | 17.0 |
| | | | | | KS502_0100MEL | | | 32 | 3.1 | |
| 14.00 | 125 | 200 | 300 | 5 | KS502_0140ME | 3200 | 6000 | 24 | 1.1 | 17.0 |
| | | | | | KS502_0140MEL | | | 32 | 2.8 | |
| 20.00 | 120 | 200 | 300 | 5 | KS502_0200ME | 3500 | 6000 | 24 | 1.0 | 17.0 |
| | | | | | KS502_0200MEL | | | 32 | 2.6 | |
| 24.00 | 100 | 200 | 300 | 5 | KS503_0240ME | 3100 | 6000 | 19 | 0.6 | 17.0 |
| | | | | | KS503_0240MEL | | | 24 | 1.1 | |
| 32.00 | 125 | 200 | 300 | 5 | KS503_0320ME | 3100 | 6000 | 19 | 0.6 | 17.0 |
| | | | | | KS503_0320MEL | | | 24 | 1.1 | |
| 40.00 | 125 | 200 | 300 | 5 | KS503_0400ME | 3100 | 6000 | 19 | 0.6 | 17.0 |
| | | | | | KS503_0400MEL | | | 24 | 1.1 | |
| 50.00 | 125 | 200 | 300 | 5 | KS503_0500ME | 3500 | 6000 | 19 | 0.5 | 17.0 |
| | | | | | KS503_0500MEL | | | 24 | 1.0 | |
| 70.00 | 125 | 200 | 300 | 5 | KS503_0700ME | 4200 | 6000 | 19 | 0.4 | 17.0 |
| | | | | | KS503_0700MEL | | | 24 | 0.9 | |
| 80.00 | 125 | 200 | 300 | 5 | KS503_0800ME | 4200 | 6000 | 19 | 0.4 | 17.0 |
| | | | | | KS503_0800MEL | | | 24 | 0.9 | |
| 100.0 | 125 | 200 | 300 | 5 | KS503_1000ME | 4200 | 6000 | 19 | 0.4 | 17.0 |
| | | | | | KS503_1000MEL | | | 24 | 0.9 | |
| 140.0 | 125 | 200 | 300 | 5 | KS503_1400ME | 4200 | 6000 | 19 | 0.4 | 17.0 |
| | | | | | KS503_1400MEL | | | 24 | 0.9 | |
| 200.0 | 120 | 200 | 300 | 5 | KS503_2000ME | 4200 | 6000 | 19 | 0.4 | 17.0 |
| | | | | | KS503_2000MEL | | | 24 | 0.9 | |

[1] *Based on input speed of 2000 RPM. See page 260 for details on torque calculations.*
[2] *Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
[3] *Inertia based on maximum input. For lower inertia, using smaller diameter input, contact STOBER.*
* *MT = Motor Adapter L = Large Input Option*

# Selection Data

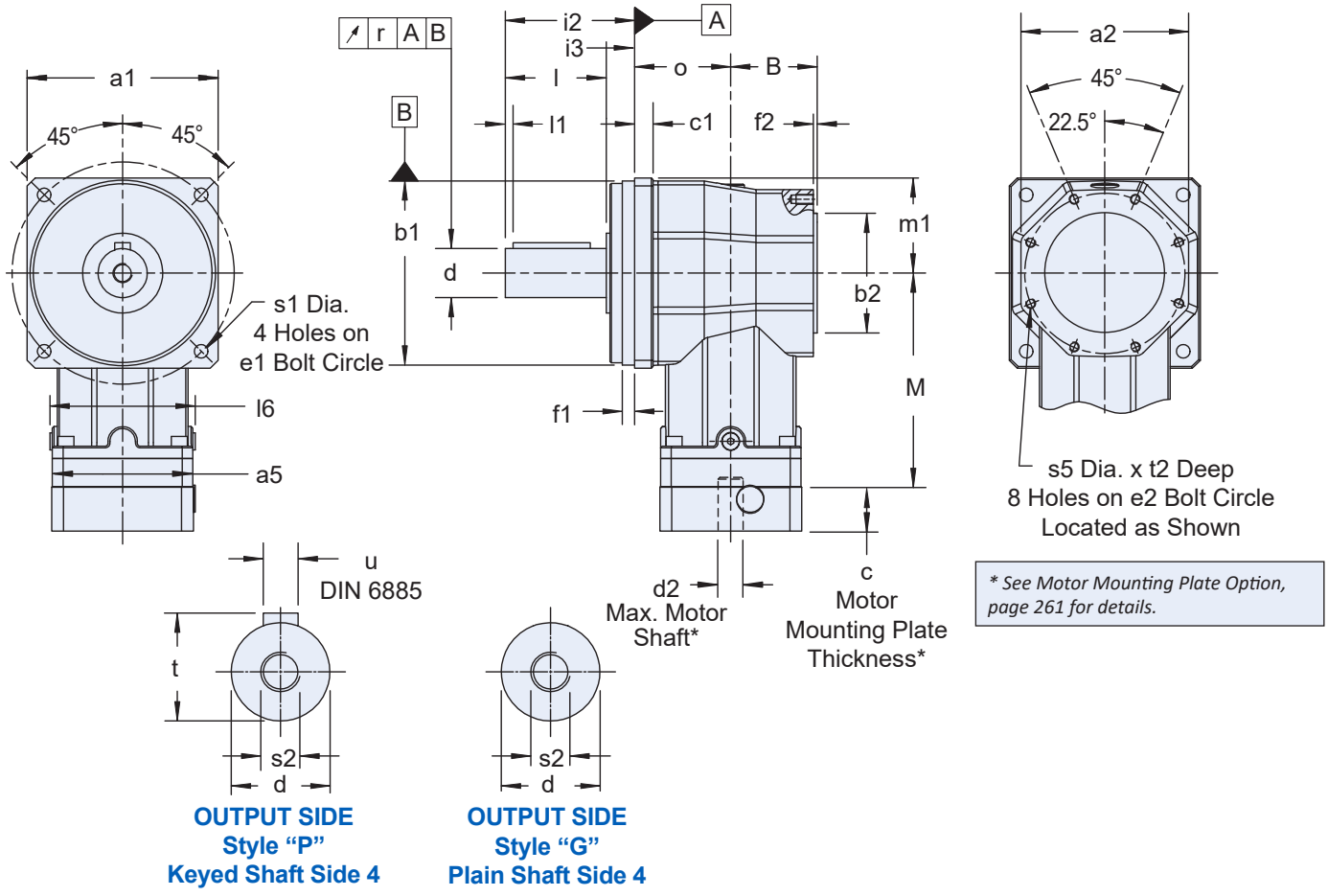


| Exact Ratio (i) | Output Torque: Nom. [1] $M_{2N}$ | Output Torque: Accel. $M_{2acc}$ | Output Torque: Peak [2] $M_{2NOT}$ | Backlash $\Delta\phi_2$ | Part Number* (Gearhead + Input) | Max. Input Speed RPM (n1): Cont. | Max. Input Speed RPM (n1): Cyclic | Motor Shaft Max Ø $d_{MW}$ | Input Inertia [3] $J_1$ | Tors. Stiffness $C_2$ |
|---|---|---|---|---|---|---|---|---|---|---|
| | Nm | Nm | Nm | arcmin | | | | mm | kgcm² | Nm/arcmin |
| **KS7** | | | | | | | | | | |
| 6.000 | 240 | 400 | 600 | 4 | KS702_0060ME | 2100 | 4500 | 32 | 8.3 | 40.0 |
| | | | | | KS702_0060MEL | | | 38 | 12.0 | 41.0 |
| 8.000 | 250 | 400 | 600 | 4 | KS702_0080ME | 2500 | 5000 | 32 | 5.5 | 41.0 |
| | | | | | KS702_0080MEL | | | 38 | 9.2 | |
| 10.00 | 250 | 400 | 600 | 4 | KS702_0100ME | 2800 | 6000 | 32 | 4.4 | 41.0 |
| | | | | | KS702_0100MEL | | | 38 | 8.2 | 42.0 |
| 14.00 | 250 | 400 | 600 | 4 | KS702_0140ME | 3000 | 6000 | 32 | 3.4 | 42.0 |
| | | | | | KS702_0140MEL | | | 38 | 7.1 | |
| 20.00 | 250 | 400 | 600 | 4 | KS702_0200ME | 3200 | 6000 | 32 | 2.9 | 42.0 |
| | | | | | KS702_0200MEL | | | 38 | 6.7 | |
| 24.00 | 240 | 400 | 600 | 4 | KS703_0240ME | 3000 | 6000 | 24 | 1.6 | 42.0 |
| | | | | | KS703_0240MEL | | | 32 | 3.2 | |
| 32.00 | 250 | 400 | 600 | 4 | KS703_0320ME | 3000 | 6000 | 24 | 1.5 | 42.0 |
| | | | | | KS703_0320MEL | | | 32 | 3.1 | |
| 40.00 | 250 | 400 | 600 | 4 | KS703_0400ME | 3000 | 6000 | 24 | 1.4 | 42.0 |
| | | | | | KS703_0400MEL | | | 32 | 3.0 | |
| 50.00 | 250 | 400 | 600 | 4 | KS703_0500ME | 3200 | 6000 | 24 | 1.2 | 42.0 |
| | | | | | KS703_0500MEL | | | 32 | 2.8 | |
| 70.00 | 250 | 400 | 600 | 4 | KS703_0700ME | 3500 | 6000 | 24 | 1.0 | 42.0 |
| | | | | | KS703_0700MEL | | | 32 | 2.6 | |
| 80.00 | 250 | 400 | 600 | 4 | KS703_0800ME | 4000 | 6000 | 24 | 0.9 | 42.0 |
| | | | | | KS703_0800MEL | | | 32 | 2.6 | |
| 100.0 | 250 | 400 | 600 | 4 | KS703_1000ME | 4000 | 6000 | 24 | 0.9 | 42.0 |
| | | | | | KS703_1000MEL | | | 32 | 2.6 | |
| 140.0 | 250 | 400 | 600 | 4 | KS703_1400ME | 4000 | 6000 | 24 | 0.9 | 42.0 |
| | | | | | KS703_1400MEL | | | 32 | 2.5 | |
| 200.0 | 250 | 400 | 600 | 4 | KS703_2000ME | 4000 | 6000 | 24 | 0.9 | 42.0 |
| | | | | | KS703_2000MEL | | | 32 | 2.5 | |

[1] *Based on input speed of 2000 RPM. See page 260 for details on torque calculations.*
[2] *Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*
[3] *Inertia based on maximum input. For lower inertia, using smaller diameter input, contact STOBER.*
* *MT = Motor Adapter  L = Large Input Option*

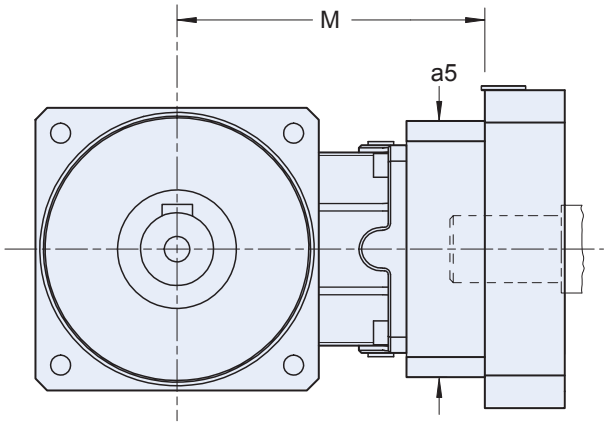
## Shaft Output — "P" (with key) & "G" (without key)

### With Standard Input



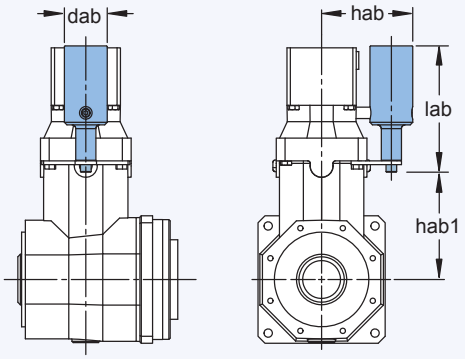

** See Motor Mounting Plate Option, page 261 for details.*

### With Large Input Option




#### Oil Reservoir

**(For 3 stage units in vertical EL5 mounting position) — not available with large input option**



# Dimensional Data

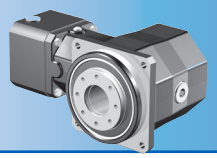


**Table 1** Dimensions (mm)

| Unit | a1 | a2 | B | b1 | h6 | b2 | h6 | c1 | d | k6 | e1 | e2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| KS4 | 101 | 93 | 51 | 95 | +0.000/-0.022 | 75 | +0.000/-0.019 | 10 | 22 | +0.015/+0.002 | 120 | 88 |
| KS5 | 125 | 109 | 58 | 120 | +0.000/-0.022 | 90 | +0.000/-0.022 | 10 | 32 | +0.018/+0.002 | 145 | 105 |
| KS7 | 155 | 135 | 70 | 150 | +0.000/-0.025 | 110 | +0.000/-0.022 | 15 | 40 | +0.018/+0.002 | 180 | 130 |

**Table 2** Dimensions (mm)

| Unit | f1 | f2 | i2 | i3 | l | l1 | l6 | m1 | o | r | s1 | s2 | s5 | t | t2 | u |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| KS4 | 8 | 3 | 52 | 14.0 | 36 | 3 | 77.5 | 50.5 | 53 | 0.020 | 6.6 | M8 | M5x0.80 | 24.5 | 9 | A6x6x28 |
| KS5 | 9 | 3 | 75.5 | 15.5 | 58 | 3 | 98 | 62.5 | 62 | 0.020 | 9 | M12 | M6x1.00 | 35 | 11 | A10x8x50 |
| KS7 | 10 | 3 | 105 | 20.0 | 82 | 4 | 120 | 77.5 | 78 | 0.025 | 11 | M16 | M8x1.25 | 43 | 14 | A12x8x70 |

**Table 3** Dimensions (mm)

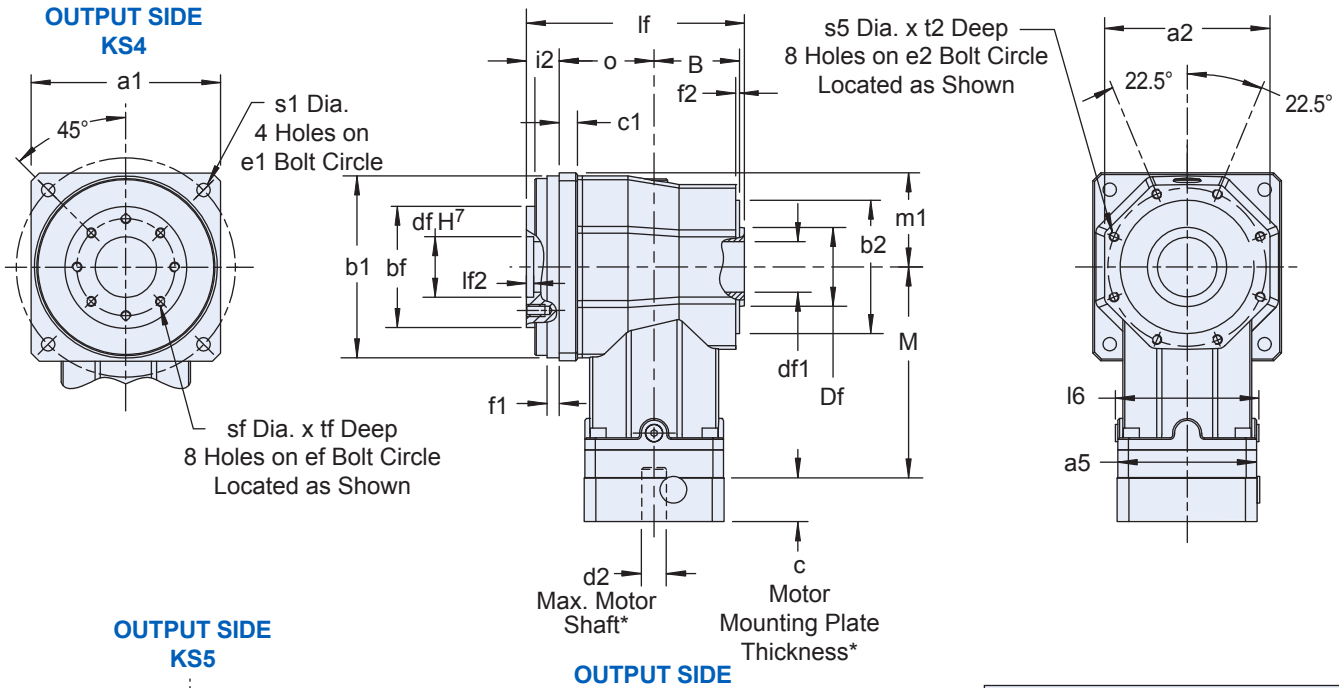
| Standard Input | | | Large Input | | |
|---|---|---|---|---|---|
| Unit | a5 | M | Unit | a5 | M |
| KS402 | 72 | 137.5 | KS402_L | 100 | 141.5 |
| KS403 | 55 | 161.0 | KS403_L | 75 | 177.5 |
| KS502 | 98 | 158.0 | KS502_L | 115 | 166.5 |
| KS503 | 72 | 205.5 | KS503_L | 100 | 209.5 |
| KS702 | 115 | 191.0 | KS702_L | 145 | 205.0 |
| KS703 | 98 | 240.5 | KS703_L | 115 | 249.0 |

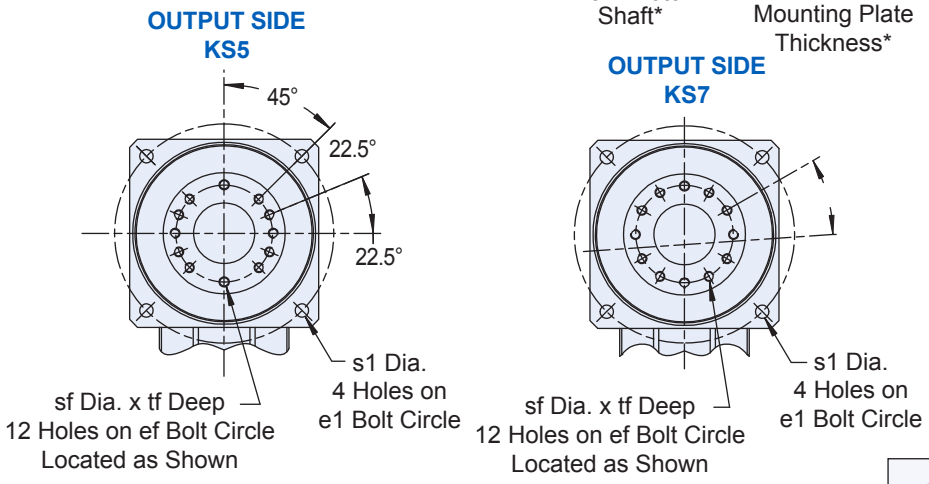
**Table 4** Oil Reservoir Dimensions (mm)

| Unit Type | dab | hab | hab1 | lab |
|---|---|---|---|---|
| KS403 | 34 | 74.5 | 85 | 100 |
| KS503 | 39 | 92 | 105 | 122 |
| KS703 | 49 | 109.5 | 132 | 134 |

## Flanged Hollow Output — "F"

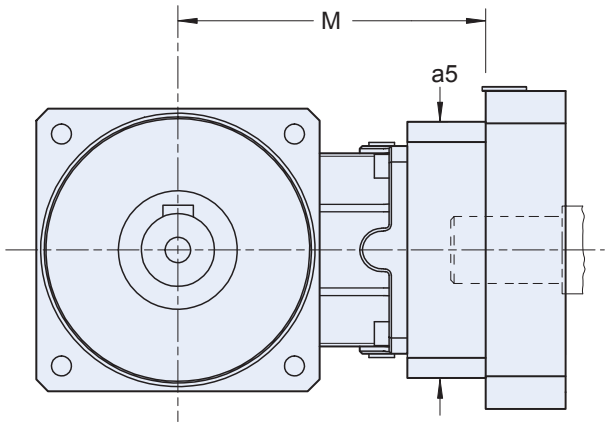
### With Standard Input



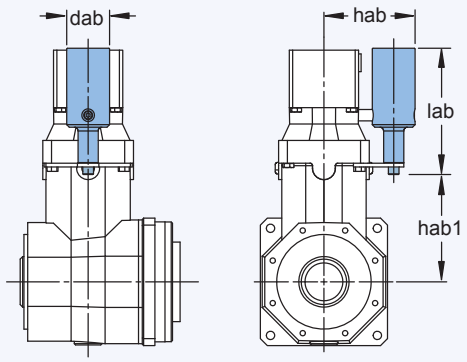

** See Motor Mounting Plate Option, page 261 for details.*

### With Large Input Option




### Oil Reservoir

**(For 3 stage units in vertical EL5 mounting position) — not available with large input option**



# Dimensional Data

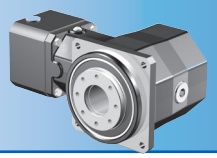


**Table 1** Dimensions (mm)

| Unit | a1 | a2 | B | b1 | h6 | b2 | h6 | bf | h7 | c1 | Df | $d^{9}$ | df | $H^{7}$ | df1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| KS4 | 101 | 93 | 51 | 95 | +0.000/-0.022 | 75 | +0.000/-0.019 | 63 | +0.000/-0.030 | 10 | 40 | -0.080/-0.180 | 31.5 | +0.025/-0.0 | 30 |
| KS5 | 125 | 109 | 58 | 120 | +0.000/-0.022 | 90 | +0.000/-0.022 | 80 | +0.000/-0.030 | 10 | 48 | -0.080/-0.180 | 40 | +0.025/-0.0 | 38 |
| KS7 | 155 | 135 | 70 | 150 | +0.000/-0.025 | 110 | +0.000/-0.022 | 100 | +0.000/-0.035 | 15 | 60 | -0.100/-0.174 | 50 | +0.025/-0.0 | 49 |

**Table 2** Dimensions (mm)

| Unit | e1 | e2 | ef | f1 | f2 | i2 | l6 | lf | lf2 | m1 | o | s1 | s5 | sf | t2 | tf |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| KS4 | 120 | 88 | 50 | 8 | 3 | 20 | 77.5 | 127 | 6 | 50.5 | 53 | 6.6 | M5x0.80 | M6x1.00 | 9 | 11 |
| KS5 | 145 | 105 | 63 | 9 | 3 | 22 | 98 | 145 | 6.5 | 62.5 | 62 | 9 | M6x1.00 | M6x1.00 | 11 | 12 |
| KS7 | 180 | 130 | 80 | 10 | 3 | 27 | 120 | 178 | 7 | 77.5 | 78 | 11 | M8x1.25 | M8x1.25 | 14 | 15 |

**Table 3** Dimensions (mm)

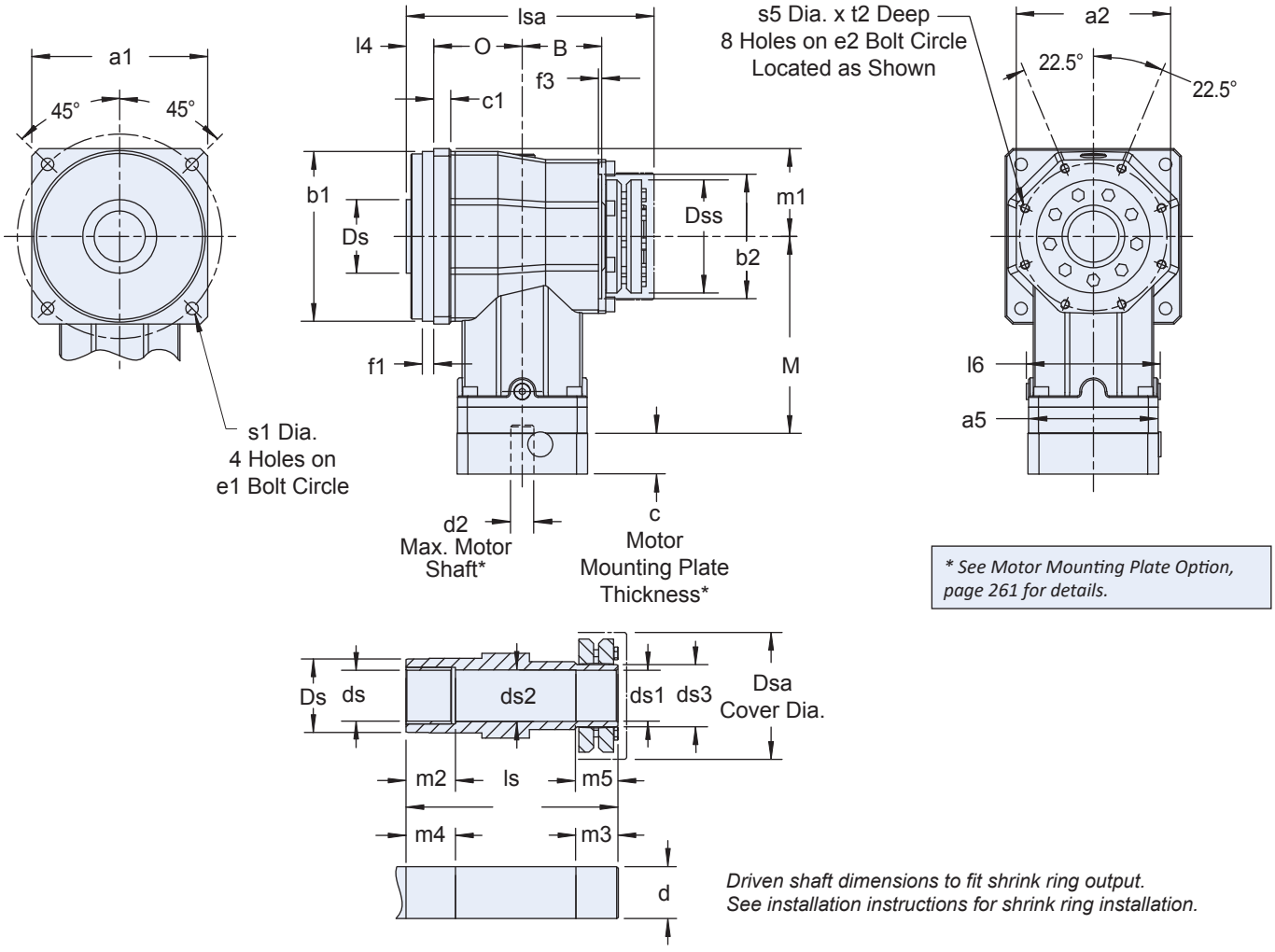
| Standard Input | | | Large Input | | |
|---|---|---|---|---|---|
| Unit | a5 | M | Unit | a5 | M |
| KS402 | 72 | 137.5 | KS402_L | 100 | 141.5 |
| KS403 | 55 | 161.0 | KS403_L | 75 | 177.5 |
| KS502 | 98 | 158.0 | KS502_L | 115 | 166.5 |
| KS503 | 72 | 205.5 | KS503_L | 100 | 209.5 |
| KS702 | 115 | 191.0 | KS702_L | 145 | 205.0 |
| KS703 | 98 | 240.5 | KS703_L | 115 | 249.0 |

**Table 4** Oil Reservoir Dimensions (mm)

| Unit Type | dab | hab | hab1 | lab |
|---|---|---|---|---|
| KS403 | 34 | 74.5 | 85 | 100 |
| KS503 | 39 | 92 | 105 | 122 |
| KS703 | 49 | 109.5 | 132 | 134 |

## Shrink Ring Output — "S"

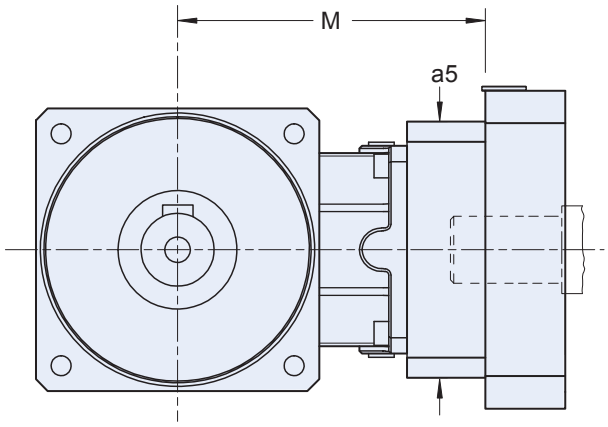
### With Standard Input




** See Motor Mounting Plate Option, page 261 for details.*

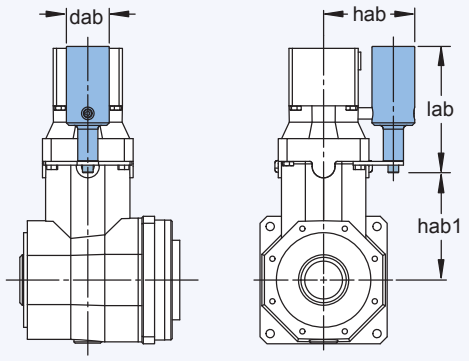
*Driven shaft dimensions to fit shrink ring output.*
*See installation instructions for shrink ring installation.*

### With Large Input Option




### Oil Reservoir

**(For 3 stage units in vertical EL5 mounting position) — not available with large input option**



# Dimensional Data

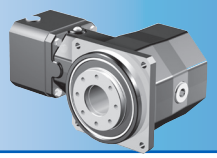


**Table 1** Dimensions (mm)

| Unit | a1 | a2 | B | b1 | h6 | b2 | h6 | c1 | Ds | Dsa | Dss | ds | h9 | ds1 Bore$^{H9}$ | ds1 Shaft$^{h9}$ | ds2 | ds3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| KS4 | 101 | 93 | 51 | 95 | +0.000/-0.022 | 75 | +0.000/-0.019 | 10 | 40 | 72 | 60 | 25 | +0.000/-0.052 | 25 | 25 | 25.5 | 30 |
| KS5 | 125 | 109 | 58 | 120 | +0.000/-0.022 | 90 | +0.000/-0.022 | 10 | 50 | 92 | 80 | 35 | +0.000/-0.062 | 35 | 35 | 35.5 | 44 |
| KS7 | 155 | 135 | 70 | 150 | +0.000/-0.025 | 110 | +0.000/-0.022 | 15 | 65 | 112 | 100 | 45 | +0.000/-0.062 | 45 | 45 | 45.5 | 55 |

**Table 2** Dimensions (mm)

| Unit | e1 | e2 | f1 | f2 | l4 | l6 | ls | lsa | m1 | m2 | m3 | m4 | m5 | o | s1 | s5 | t2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| KS4 | 120 | 88 | 8 | 3 | 18 | 77.5 | 151 | 158 | 50.5 | 20 | 34 | 25 | 29 | 53 | 6.6 | M5x0.80 | 9 |
| KS5 | 145 | 105 | 9 | 3 | 19.5 | 98 | 171.5 | 179.5 | 62.5 | 30 | 39 | 35 | 34 | 62 | 9 | M6x1.00 | 11 |
| KS7 | 180 | 130 | 10 | 3 | 24 | 120 | 211 | 218 | 77.5 | 40 | 42 | 45 | 37 | 78 | 11 | M8x1.25 | 14 |

**Table 3** Dimensions (mm)

| Standard Input | | | Large Input | | |
|---|---|---|---|---|---|
| Unit | a5 | M | Unit | a5 | M |
| KS402 | 72 | 137.5 | KS402_L | 100 | 141.5 |
| KS403 | 55 | 161.0 | KS403_L | 75 | 177.5 |
| KS502 | 98 | 158.0 | KS502_L | 115 | 166.5 |
| KS503 | 72 | 205.5 | KS503_L | 100 | 209.5 |
| KS702 | 115 | 191.0 | KS702_L | 145 | 205.0 |
| KS703 | 98 | 240.5 | KS703_L | 115 | 249.0 |

**Table 4** Oil Reservoir Dimensions (mm)

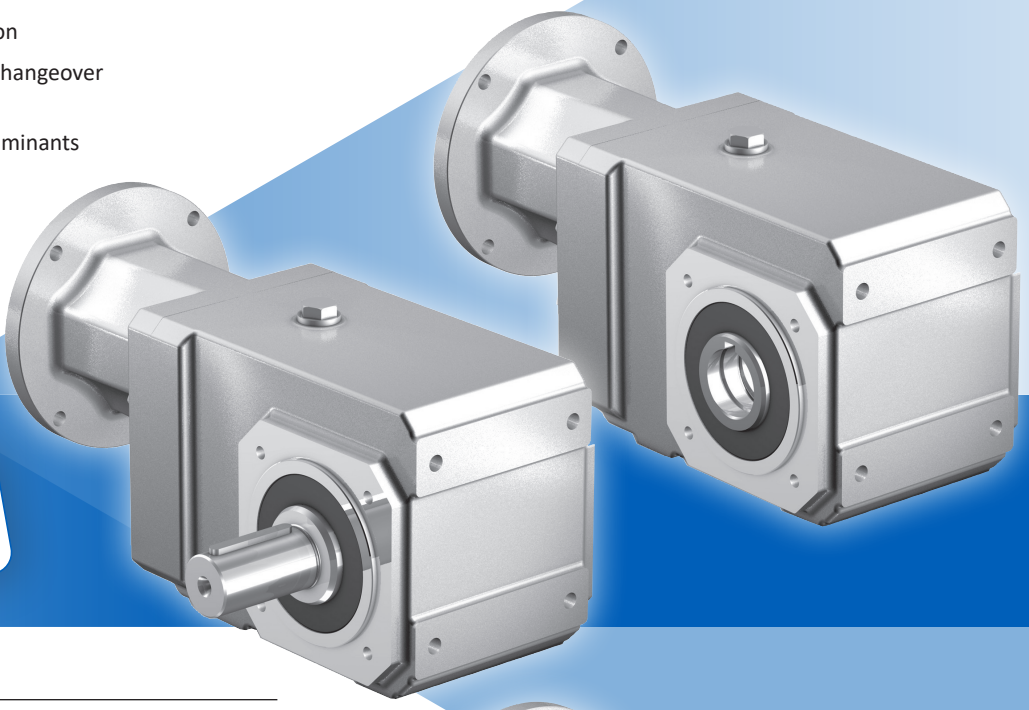
| Unit Type | dab | hab | hab1 | lab |
|---|---|---|---|---|
| KS403 | 34 | 74.5 | 85 | 100 |
| KS503 | 39 | 92 | 105 | 122 |
| KS703 | 49 | 109.5 | 132 | 134 |

# KSS Series: RIGHT ANGLE — Solid Shaft/Hollow Output

## KSS Features

- 4:1 to 55:1 ratios (higher ratios available. Contact STOBER.)
- Quiet running (<53dB(A))
- Extra seal between motor and reducer to prevent ingress
- Totally enclosed – no breather to allow contaminates in or oil out
- Mounting flexibility to fit the application
- Error free motor mounting and quick changeover with toleranced pilot on motor plate
- Magnetic oil filtration to remove contaminants to prevent breakdowns
- Build and ship in one day
- Assembled in the USA

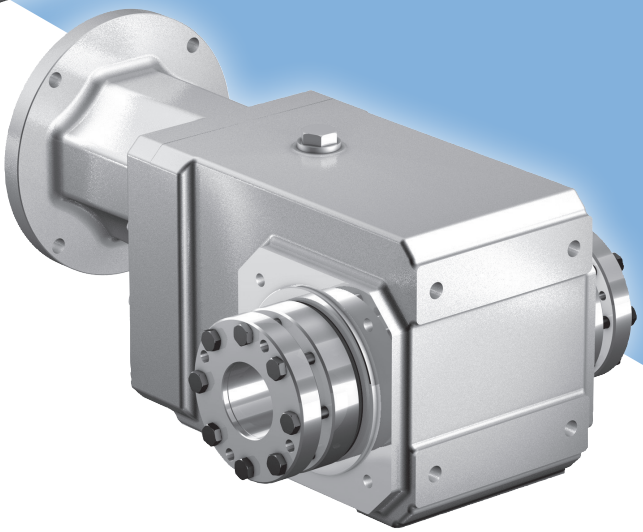
*The KSS is the stainless steel version of our K gearbox. Capable of handling the harshest washdowns and requiring zero maintenance, the KSS is ideal for your caustic environments. Every gearbox is made to order. STOBER will custom whatever you need to fit your application. Contact us today to learn more.*



SHIPS in 1 DAY!
NO EXPEDITE FEE FOR 24 HOUR SERVICE

## General Specifications

| | |
|---|---|
| **Ambient Temperature** | 0°C to +40°C (104°F) [Unit temperature <80°C Max] |
| **Backlash** | ≤10 standard arcmins (see performance overview chart, (page 274) |
| **Coating** | Stainless steel housing |
| **Degree of Protection** | IP69K |
| **Direction of Rotation** | Input and output rotate the SAME direction, see page 275 |
| **Efficiency** | 97% |
| **Input RPM** | Up to 6,000 RPM |
| **Installation** | Requires 10.9 fasteners for tapped holes housing. See page 288, for more information |
| **Lubrication** | Lubricated for life - food grade Mobil SHC CIBUS 220 standard |
| **Mounting Position** | Must be specified, see page 275 |
| **Warranty** | 3 year standard warranty |



Lubricated for life* - standard Mobil 600XP200, option food grade Mobil SHC CIBUS 220



## KSS Series Ordering Options At-a-Glance

Using the **Selection Data** table later in this section, select the KSS Series Gearhead with the appropriate performance and design options tailored to your motor choice and exact application requirements. Use the part number guide below as a reference to build a part number for the complete gearhead assembly.

**Part Number Examples:**

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | |
|---|---|---|---|---|---|---|---|---|---|
| KSS | 1 | 0 | 2 | V | F | 0040 | MS1R | E12 | * |

| | Design Option | Part Number Code | Description |
|---|---|---|---|
| 1 | **Series** | KSS | Stainless steel housing; right angle helical/bevel |
| 2 | **Size** | 1 2 3 | 3 sizes of gearhead |
| 3 | **Generation** | 0 | Version of gearhead |
| 4 | **# of Stages** | 2 | Two stage |
| 5 | **Output** | V<br>A<br>W | Shaft output (side 3 or 4 only, please specify)<br>Hollow output<br>Double wobble-free bushing |
| 6 | **Housing** | F<br>G<br>NG | Round output flange (side 3 or 4 only, please specify)<br>Pitch Circle Diameter (PCD) tapped holes<br>Foot mounting (side 1 or 5 only) |
| 7 | **Ratio** | 0040 | Ratios range from 4:1 to 272:1 (0040=4:1; 0272=272:1) |
| 8 | **Motor Adapter** | MS1R<br>MS2R<br>MS3R | 3 input sizes (see also motor mounting plate option)<br>(See “Motor Mounting Plate Option”, page 275) |
| * | **Mounting Position** | E12, E34<br>EL5, EL6 | Please specify. Required special instruction for all units (See “KSS Mounting Position Options”, page 275) |

## Options

### Lubrication

- KSS Series comes standard with food grade lubrication; optional synthetic available. Contact STOBER for details.

## KSS Performance Overview

KSS Series performance is dependent on several factors including duty cycle, bearing design, gearhead size and stage configuration, among others. Use the chart below for preliminary evaluation, then use the following performance chart and selection information on the following pages for specific performance sizing and selection.

| | | | Size/Generation | KSS10 | KSS20 | KSS30 |
|---|---|---|---|---|---|---|
| | | | # of Stages | 2 | 2 | 2 |
| **Acceleration Torque** $M_{2BMAX}$ | | | Nm | 135 | 220 | 385 |
| **Output Torque Nom.** $M_{2N}$ | | | Nm | 119 | 200 | 350 |
| **Torsional Stiffness** $C_2$ | | | Nm/arcmin | ≤5.8 | ≤8.1 | ≤9.6 |
| **Torsional Backlash** [1] $\Delta\phi$ | | | arcmin | ≤12 | ≤10 | ≤10 |
| **Input Speed Max.** $n_{1MAX}$ | Continuous | | EL1, 2, 5, 6 | 4000 | 4000 | 3500 |
| | | | EL3, 4 | 4000 | 3900 | 3500 |
| | Cyclic | | | 6000 | 5500 | 5000 |
| **Efficiency (@nom torque)** | | | % | 97 | 97 | 97 |
| **Weight** | | | kg<br>lbs | 13.1<br>29 | 18.1<br>40 | 30.4<br>67 |
| **Noise** [2] | | | dB(A) | ≤53 | | |
| **Axial Load Max.** $F_{2AMAX}$ | | | N | 1900 | 2100 | 2400 |
| **Radial Load Max.** [3] $F_{2RMAX}$ | | | N | 5000 | 6000 | 7000 |
| **Tilting Moment Max.** [3] $M_{2KMAX}$ | Solid Shaft | | Nm | 360. | 430 | 525 |
| | Hollow Bore | | Nm | 240 | 310 | 380 |

[1] *Tested at 1.5% of nominal torque and recorded on the output side of the gearhead. For lower backlash, contact STOBER technical support.*

[2] *Measurement at one (1) meter distance with input speed ($n_1$) of 2000 RPM.*

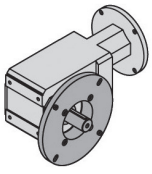
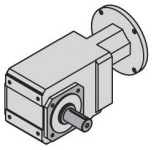
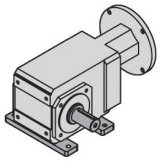
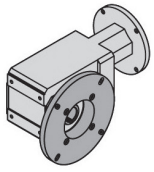
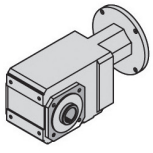
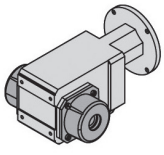
[3] *Rating based on output speed ($n_2$) of 20 RPM. For values at other speeds see page 276*

## KSS Series Output Options

Diameters in **BOLD BLUE** are configurations readily available from inventory. Contact STOBER for delivery on other output sizes.

| | "V" Solid Shaft (Stainless Steel – Inches) | "A" Hollow Bore (Stainless Steel – Inches) | "WFBSS" Double Side Bushings Stock Bore (Stainless Steel – Inches) |
|---|---|---|---|
| KSS1 | **1.000** | **1.000** | **1.000** |
| KSS2 | **1.250** | **1.250** | 1.000 1.1875 **1.250** 1.375 **1.4375** **1.500** |
| KSS3 | **1.250** | **1.375** | 1.000 1.1875 **1.250** 1.375 **1.4375** **1.500** |

** Stainless steel options are ideal for food and corrosion resistant, harsh washdown environments.*

| Design Option | | | | | | |
|---|---|---|---|---|---|---|
| |  |  |  |  |  |  |
| **Output** | **V** Solid Shaft | **V** Solid Shaft | **V** Solid Shaft | **A** Hollow | **A** Hollow | **W** Double Bushing |
| **Housing** | **F** Round Flange | **G** Tapped Holes | **NG** Foot Mount | **F** Round Flange | **G** Tapped Holes | **G** Tapped Holes |



## KSS Series Motor Mounting Plate Option (Motor information required with Motor Adapter option)

STOBER Servo Gearheads fit the motor of your choice with the appropriate motor mounting plate assembled between the motor and the gearhead.

**NOTE: When ordering a gearhead:**

- Specify the motor manufacturer and part number
- Provide the motor drawing with dimensions, or specify the motor mounting dimensions (per the list shown at right)

### Customer Required Dimensions for Properly Sized Motor Mounting Plate

*For a precise dimension on a specific motor, or for general assistance, we recommend you contact STOBER Technical Support.*

| | | | |
|---|---|---|---|
| d2 | Motor Shaft Diameter (If an adapter bushing is required it will be supplied with the motor plate.) | s6 | Bolt Diameter |
| b6 | Pilot Diameter | l5 | Motor Shaft Length |
| e6 | Bolt Circle Diameter | f6 | Pilot Length |
| | | a6 | Square Flange (Optional – motor plate will typically be made to match this dimension.) |

## Overhung Load Calculations

Pulling forces or overhung load of pulleys, sheaves, sprockets, etc. on the reducer output shaft must not exceed the allowable limits shown in the load/life/speed calculations, page page 276.

Note: Overhung load is measured at the center of the shaft extension. No overhung load is encountered when a reducer is flange mounted and/or coupling connected to another unit. However, the shafts of all components must be accurately aligned and secured to prevent pre-loading of the bearings and premature bearing failure.

Use the following formula to determine actual overhung load for a given drive:

$$\text{Imperial OHL (lbs)} = \frac{126{,}000 \times HP \times K}{D \times n}$$

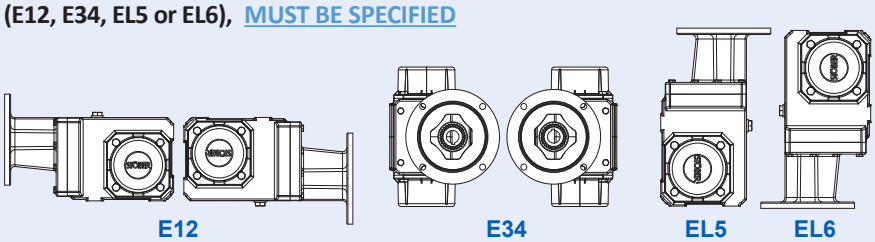
$$\text{Metric OHL (N)} = \frac{19{,}100 \times kW \times K}{D \times n}$$

Where:

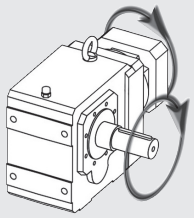
| | |
|---|---|
| **OHL** | Overhung load (N or lbs) |
| **HP** | Horsepower |
| **kW** | Transmitted Kilowatt |
| **D** | Pitch Diameter (inches or meters) of Sprocket, Gear, Sheave, Pulley, etc. |
| **n** | Maximum Shaft RPM |
| **K** | 1.00 Single Chain Drive; 1.25 Timing Belt Drive; 1.25 Spur or Helical Gear Drive; 1.50 V-Belt Drive; 2.50 Flat Belt Drive |

## KSS Mounting Position Options

**When ordering, the mounting position (E12, E34, EL5 or EL6), MUST BE SPECIFIED**

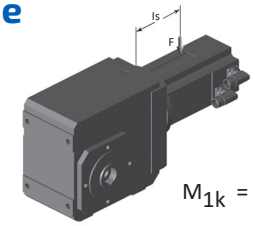



## KSS Direction of Rotation



## Permissible Motor Tilting Torque

The permissible tilting torque of the motor attached to the gear unit is a result of the static and dynamic load "F" from the motor weight, mass acceleration, and vibration multiplied by the distance from the center of gravity "$l_S$" of the motor.




$M_{1k} = F \times l_S \leq M_{1K}$

| $M_{1K}$ | MS1R | MS2R | MS3R |
|---|---|---|---|
| Nm | 25 | 60 | 125 |

## Permissible Output Shaft Load and Tilting Moments*

| | V Solid Shaft Output [1] | | | | A, S, W Hollow Output [2] | | |
|---|---|---|---|---|---|---|---|
| Unit | $Z_2$ mm | $F_{2A}$ N | $F_{2R}$ N | $M_{2K}$ Nm | $Z_2$ mm | $F_{2A}$ N | $M_{2K}$ Nm |
| KSS1 | 40 | 1900 | 5000 | 360 | 40 | 1900 | 240 |
| KSS2 | 42 | 2100 | 6000 | 430 | 42 | 2100 | 310 |
| KSS3 | 45 | 2400 | 7000 | 525 | 45 | 2400 | 380 |

** Refer to illustration and definitions below.*

[1] For DOUBLE output shaft: $F_{2R}$ x 0.7

[2] Values shown for "W" Style are for double bushings. For single bushings use value $M_{2K}$ x 0.5 and $F_{2A}$ x 0.5

[3] Solid Shaft unit with a Flange – $Z_2$ value is 132mm/5.20"; $F_{2R}$ value is 64,000N/14,400 lbs.

## KSS Series Load/Life/Speed Calculations

The permissible load and tilting moment values are based on an output speed of 20 RPM. For higher speeds the following applies, where $n_2$ is the desired speed:

$$F_{2AX} = \frac{F_{2A}}{\sqrt[3]{\frac{n_2}{20}}} \qquad F_{2RX} = \frac{F_{2R}}{\sqrt[3]{\frac{n_2}{20}}} \qquad M_{2KX} = \frac{M_{2K}}{\sqrt[3]{\frac{n_2}{20}}}$$

The application output tilting moment should be determined by the following formula:

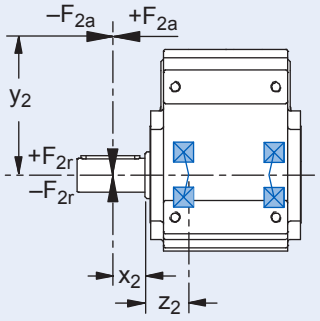
$$M_{2A} = \frac{2 \bullet F_{2a} \bullet y_2 + F_{2rb} \bullet (x_2 + Z_2)}{1000} \leq M_{2K}$$

Where:

| | | | |
|---|---|---|---|
| $Z_2$ | Distance of Shaft Shoulder to Center of Output Bearing | $F_{2rad100}$ | Permitted Radial Force ≤100RPM |
| $n_2$ | Actual Average Output Speed | $F_{2rad,acc}$ | Radial Acceleration Force |
| $X_2$ | Distance of the Shaft Shoulder to the Force Application Point | $F_{2rad,acc*}$ | Radial Acceleration Force at Gear Unit Output |
| $Y_2$ | Distance of the Shaft Axis to the Axial Force Application Point | $M_{2K100}$ | Permitted Tilting Torque ≤100RPM |
| $F_{2ax*}$ | Actual Axial Force at Gear Unit Output | $M_{2K,acc}$ | Permitted Acceleration Tilting Torque |
| $F_{2ax100}$ | Permitted Axial Force | $M_{2k,acc*}$ | Permitted Acceleration Tilting Torque at Gear Unit Output |
| | | $C_{2K}$ | Tilting Stiffness |

**All formulas shown are based on METRIC values**

*Upper case letters are permissible values. Lower case letters are for existing values.*





| Reducer Ratio (i) | | Output Torque | | | Backlash | Part Number* (Gearhead + Input) | Max. Input Speed RPM (n1) | | | Input Inertia | Tors. Stiffness |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Nom. [1] | Accel. | Peak [2] | | | Continuous | | Cyclic | | |
| | | $M_{2N}$ | $M_{2acc}$ | $M_{2NOT}$ | $\Delta\phi_2$ | | EL | EL | | $J_1$ | $C_2$ |
| Nom. | Exact | Nm | Nm | Nm | arcmin | | 1,2 | 3,4,5,6 | All | kgcm² | Nm/ arcmin |
| **KSS1** | | | | | | | | | | | |
| 4.000 | 4/1 | 42 | 42 | 52 | ≤12 | KSS102_0040 MS1R | 3300 | 2800 | 4500 | 1.4 | 2.8 |
| 5.568 | 1520/273 | 58 | 58 | 72 | ≤12 | KSS102_0056 MS1R | 3300 | 2800 | 4500 | 1.3 | 4.3 |
| 6.644 | 299/45 | 64 | 64 | 80 | ≤12 | KSS102_0066 MS1R | 3600 | 3300 | 5000 | 1.0 | 3.5 |
| 9.249 | 1748/189 | 76 | 90 | 112 | ≤12 | KSS102_0092 MS1R | 3600 | 3300 | 5000 | 0.9 | 5.2 |
| 10.14 | 507/50 | 79 | 91 | 114 | ≤12 | KSS102_0100 MS1R | 4000 | 3800 | 5500 | 0.8 | 3.8 |
| 14.11 | 494/35 | 88 | 127 | 158 | ≤12 | KSS102_0140 MS1R | 4000 | 3800 | 5500 | 0.8 | 5.5 |
| 16.71 | 117/7 | 93 | 125 | 172 | ≤12 | KSS102_0165 MS1R | 4000 | 4000 | 6000 | 0.7 | 4.0 |
| 20.15 | 403/20 | 99 | 125 | 199 | ≤12 | KSS102_0200 MS1R | 4000 | 4000 | 6000 | 0.7 | 4.0 |
| 23.27 | 1140/49 | 104 | 135 | 239 | ≤12 | KSS102_0230 MS1R | 4000 | 4000 | 6000 | 0.7 | 5.7 |
| 25.22 | 1261/50 | 96 | 115 | 192 | ≤12 | KSS102_0250 MS1R | 4000 | 4000 | 6000 | 0.6 | 4.0 |
| 28.05 | 589/21 | 111 | 135 | 240 | ≤12 | KSS102_0280 MS1R | 4000 | 4000 | 6000 | 0.7 | 5.7 |
| 33.71 | 4719/140 | 73 | 88 | 146 | ≤12 | KSS102_0340 MS1R | 4000 | 4000 | 6000 | 0.6 | 4.0 |
| 35.11 | 3686/105 | 119 | 135 | 240 | ≤12 | KSS102_0350 MS1R | 4000 | 4000 | 6000 | 0.6 | 5.8 |
| 40.30 | 403/10 | 61 | 74 | 96 | ≤12 | KSS102_0400 MS1R | 4000 | 4000 | 6000 | 0.6 | 4.1 |
| 46.92 | 2299/49 | 102 | 122 | 203 | ≤12 | KSS102_0470 MS1R | 4000 | 4000 | 6000 | 0.6 | 5.8 |
| 56.10 | 1178/21 | 86 | 103 | 133 | ≤12 | KSS102_0560 MS1R | 4000 | 4000 | 6000 | 0.6 | 5.8 |
| **KSS2** | | | | | | | | | | | |
| 4.000 | 4/1 | 103 | 171 | 245 | ≤10 | KSS202_0040 MS2R | 3000 | 2600 | 4000 | 3.7 | 3.9 |
| 5.177 | 2107/407 | 113 | 190 | 308 | ≤10 | KSS202_0052 MS2R | 3000 | 2600 | 4000 | 2.9 | 4.7 |
| 7.118 | 2107/296 | 125 | 211 | 400 | ≤10 | KSS202_0071 MS2R | 3000 | 2600 | 4000 | 2.6 | 6.4 |
| 8.397 | 2494/297 | 132 | 220 | 400 | ≤10 | KSS202_0084 MS2R | 3500 | 3100 | 4500 | 2.0 | 5.7 |
| 10.07 | 2881/286 | 141 | 220 | 400 | ≤10 | KSS202_0100 MS2R | 3500 | 3500 | 5000 | 1.8 | 6.0 |
| 11.55 | 1247/108 | 147 | 220 | 400 | ≤10 | KSS202_0115 MS2R | 3500 | 3100 | 4500 | 1.9 | 7.4 |
| 12.71 | 559/44 | 152 | 220 | 400 | ≤10 | KSS202_0125 MS2R | 3500 | 3500 | 5000 | 1.6 | 6.2 |
| 13.85 | 2881/208 | 156 | 220 | 400 | ≤10 | KSS202_0140 MS2R | 3500 | 3500 | 5000 | 1.7 | 7.6 |
| 17.47 | 559/32 | 169 | 220 | 400 | ≤10 | KSS202_0175 MS2R | 3500 | 3500 | 5000 | 1.6 | 7.8 |
| 20.33 | 1118/55 | 178 | 220 | 400 | ≤10 | KSS202_0200 MS2R | 3500 | 3500 | 5000 | 1.4 | 6.5 |
| 25.13 | 1935/77 | 191 | 220 | 400 | ≤10 | KSS202_0250 MS2R | 3500 | 3500 | 5000 | 1.3 | 6.5 |
| 27.95 | 559/20 | 197 | 220 | 400 | ≤10 | KSS202_0280 MS2R | 3500 | 3500 | 5000 | 1.4 | 8.0 |
| 33.62 | 1849/55 | 154 | 185 | 308 | ≤10 | KSS202_0340 MS2R | 3500 | 3500 | 5000 | 1.3 | 6.6 |
| 34.55 | 1935/56 | 200 | 220 | 400 | ≤10 | KSS202_0350 MS2R | 3500 | 3500 | 5000 | 1.3 | 8.1 |
| 46.23 | 1849/40 | 200 | 220 | 400 | ≤10 | KSS202_0460 MS2R | 3500 | 3500 | 5000 | 1.3 | 8.1 |

[1] *Maximum torque for continuous input 1500 RPM - horizontal output position.*

[2] *Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*

* *Motor adapter code (shaft diameter max - mm): MS1R (19), MS2R (24), MS3R (28)*

| Reducer Ratio (i) | | Output Torque | | | Backlash | Part Number* (Gearhead + Input) | Max. Input Speed RPM (n1) | | | Input Inertia | Tors. Stiffness |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Nom. [1] | Accel. | Peak [2] | | | Continuous | | Cyclic | | |
| | | $M_{2N}$ | $M_{2acc}$ | $M_{2NOT}$ | $\Delta\phi_2$ | | | | | $J_1$ | $C_2$ |
| Nom. | Exact | Nm | Nm | Nm | arcmin | | EL 1,2 | EL 3,4,5,6 | All | kgcm² | Nm/ arcmin |
| **KSS3** | | | | | | | | | | | |
| 4.000 | 4/1 | 155 | 171 | 253 | ≤10 | **KSS302_0040 MS3R** | 2700 | 2300 | 3800 | 6.4 | 4.5 |
| 5.375 | 43/8 | 200 | 229 | 326 | ≤10 | **KSS302_0054 MS3R** | 2700 | 2300 | 3800 | 4.5 | 5.7 |
| 7.391 | 473/64 | 222 | 315 | 448 | ≤10 | **KSS302_0074 MS3R** | 2700 | 2300 | 3800 | 3.9 | 7.5 |
| 8.444 | 2322/275 | 232 | 360 | 479 | ≤10 | **KSS302_0084 MS3R** | 3200 | 2800 | 4200 | 2.8 | 7.1 |
| 10.14 | 3010/297 | 247 | 385 | 554 | ≤10 | **KSS302_0100 MS3R** | 3500 | 3100 | 5000 | 2.4 | 7.4 |
| 11.61 | 1161/100 | 258 | 385 | 659 | ≤10 | **KSS302_0115 MS3R** | 3200 | 2800 | 4200 | 2.6 | 8.6 |
| 12.58 | 3182/253 | 265 | 385 | 661 | ≤10 | **KSS302_0125 MS3R** | 3500 | 3100 | 5000 | 2.1 | 7.8 |
| 13.94 | 1505/108 | 274 | 385 | 700 | ≤10 | **KSS302_0140 MS3R** | 3500 | 3100 | 5000 | 2.3 | 8.9 |
| 16.94 | 559/33 | 293 | 385 | 700 | ≤10 | **KSS302_0170 MS3R** | 3500 | 3500 | 5000 | 1.7 | 8.1 |
| 17.29 | 1591/92 | 295 | 385 | 700 | ≤10 | **KSS302_0175 MS3R** | 3500 | 3100 | 5000 | 2.0 | 9.2 |
| 20.28 | 3569/176 | 311 | 385 | 700 | ≤10 | **KSS302_0200 MS3R** | 3500 | 3500 | 5000 | 1.6 | 8.2 |
| 23.29 | 559/24 | 325 | 385 | 700 | ≤10 | **KSS302_0230 MS3R** | 3500 | 3500 | 5000 | 1.7 | 9.4 |
| 25.26 | 3612/143 | 334 | 385 | 489 | ≤10 | **KSS302_0250 MS3R** | 3500 | 3500 | 5000 | 1.5 | 8.3 |
| 27.88 | 3569/128 | 346 | 385 | 700 | ≤10 | **KSS302_0280 MS3R** | 3500 | 3500 | 5000 | 1.6 | 9.5 |
| 33.62 | 1849/55 | 250 | 300 | 501 | ≤10 | **KSS302_0340 MS3R** | 3500 | 3500 | 5000 | 1.4 | 8.3 |
| 34.73 | 903/26 | 350 | 385 | 672 | ≤10 | **KSS302_0350 MS3R** | 3500 | 3500 | 5000 | 1.5 | 9.5 |
| 40.51 | 4902/121 | 193 | 231 | 376 | ≤10 | **KSS302_0410 MS3R** | 3500 | 3500 | 5000 | 1.3 | 8.4 |
| 46.23 | 1849/40 | 344 | 385 | 688 | ≤10 | **KSS302_0460 MS3R** | 3500 | 3500 | 5000 | 1.4 | 9.6 |
| 55.71 | 2451/44 | 265 | 318 | 517 | ≤10 | **KSS302_0560 MS3R** | 3500 | 3500 | 5000 | 1.3 | 9.6 |

*[1] Maximum torque for continuous input 1500 RPM - horizontal output position.*

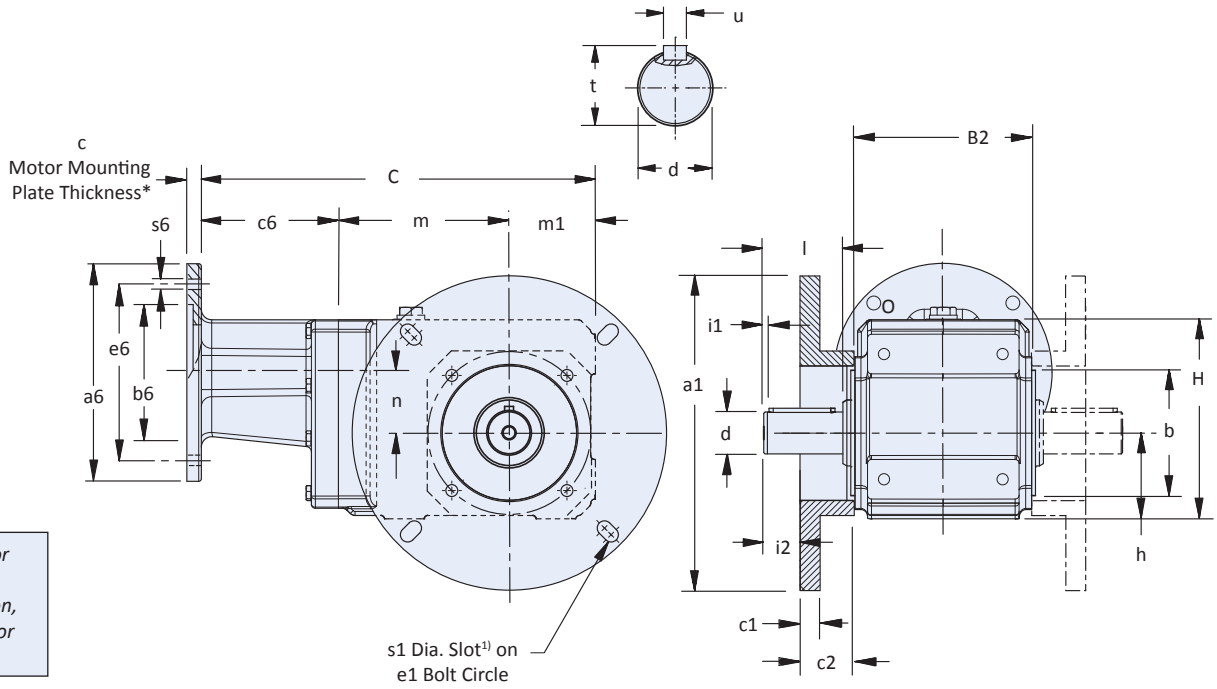
*[2] Maximum momentary torque for emergency stops or heavy shock load. (Admissible stops per life of gearhead = 1,000 stops maximum.)*

** Motor adapter code (shaft diameter max - mm): MS1R (19), MS2R (24), MS3R (28)*

# Notes



## "V" Solid Shaft Output with "F" Round Flange Housing




** See Motor Mounting Plate Option, page 275 for details.*

**Table 1** KSS Series – "V" Solid Shaft Output with "F" Round Flange Housing – Dimensions (mm)

| Unit | a1 | B2 | b | C | c1 | c2 | c6 | e1 Min. | e1 Max.1) |
|---|---|---|---|---|---|---|---|---|---|
| KSS102VF | 171.5 | 106 | 75 | 256.5 | 14 | 38.1 | 82.5 | 149.2 | – |
| KSS202VF | 222 | 134 | 95 | 299 | 14 | 38.1 | 104 | 190 | 203.2 |
| KSS302VF | 222 | 146 | 95 | 327.5 | 14 | 38.1 | 102.5 | 190 | 203.2 |

*1) KSS1 mounting bolt hole is not a slot.*

**Table 2** KSS Series – "V" Solid Shaft Output with "F" Round Flange Housing – Dimensions (mm)

| Unit | H | h | i2 | l | l1 | m | m1 | n | s1 | Wt. lbs. |
|---|---|---|---|---|---|---|---|---|---|---|
| KSS102VF | 126 | 60 | 20.5 | 50 | 4 | 111 | 60 | 36 | 8.5 | 29 |
| KSS202VF | 151 | 65 | 28 | 60 | 4 | 130 | 65 | 46 | 10.5 | 40 |
| KSS302VF | 166.5 | 75 | 28 | 60 | 4 | 150 | 75 | 53 | 10.5 | 55 |

*1) KSS1 mounting bolt hole is not a slot.*
*All weights are approximate.*

**Table 3** "V" Solid Shaft Output — Standard Sizes

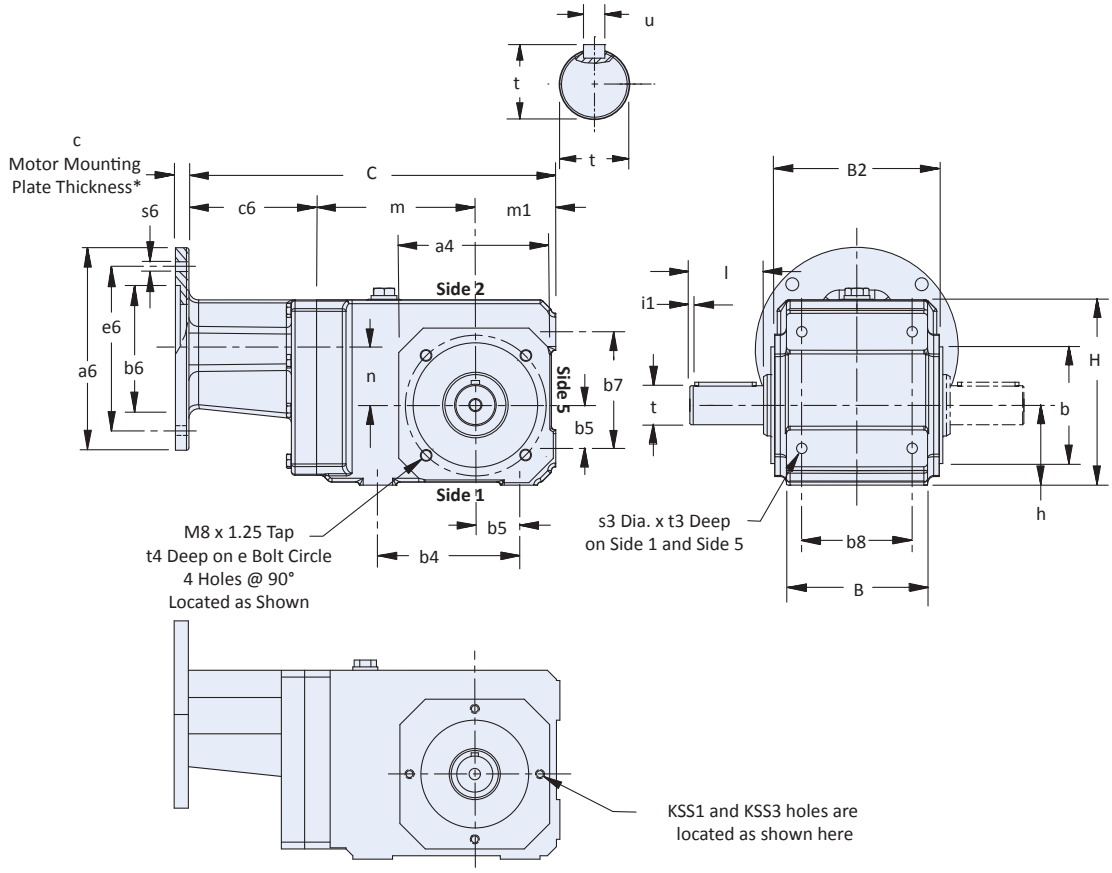
| Unit | Inches d | t | u – Key |
|---|---|---|---|
| KSS1 | 1.000 | 1.11 | 1/4 x 1/4 x 1-9/16 |
| KSS2 | 1.250 | 1.36 | 1/4 x 1/4 x 1-15/16 |
| KSS3 | 1.250 | 1.36 | 1/4 x 1/4 x 1-15/16 |

**Table 4** Servo Motor Adapter Flange (mm)

| Unit | a6 | b6 | e6 | s6 |
|---|---|---|---|---|
| KSS1 | 112 | 80 | 100 | 6.4 |
| KSS2 | 112 | 80 | 100 | 6.5 |
| | 143 | 110 | 130 | 8.4 |
| KSS3 | 112 | 80 | 100 | 6.4 |
| | 143 | 110 | 130 | 8.4 |
| | 180 | 130 | 165 | 10.5 |



## "V" Solid Shaft Output with "G" Pitch Circle Diameter (PCD) Tapped Holes




** See Motor Mounting Plate Option, page 275 for details.*

**Table 1** KSS Series – "V" Solid Shaft Output with "G" Pitch Circle Diameter (PCD) Tapped Holes – Dimensions (mm)

| Unit | a4 | B2 | b5 | C | c6 | D | e | F[1] | F[5] | G | H |
|---|---|---|---|---|---|---|---|---|---|---|---|
| KSS102VG | 105 | 106 | 30 | 256.5 | 85.5 | 126 | 90 | 90 | 75 | 70 | 60 |
| KSS202VG | 116 | 134 | 35 | 299 | 104 | 151 | 115 | 115 | 95 | 90 | 65 |
| KSS302VG | 116 | 146 | 35 | 327.5 | 102.5 | 166.5 | 115 | 130 | 105 | 105 | 75 |

**Table 2** KSS Series – "V" Solid Shaft Output with "G" Pitch Circle Diameter (PCD) Tapped Holes – Dimensions (mm)

| Unit | l | M | m | m1 | n | Q | R | s3 | t3 | t4 | Wt. lbs. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| KSS102VG | 50 | 75 | 111 | 60 | 36 | 4 | 90 | M8 x 1.25 | 13 | 13 | 29 |
| KSS202VG | 60 | 95 | 130 | 65 | 46 | 4 | 112 | M10 x 1.50 | 16 | 13 | 40 |
| KSS302VG | 60 | 95 | 150 | 75 | 53 | 4 | 140 | M10 x 1.50 | 16 | 14 | 55 |

*All weights are approximate.*

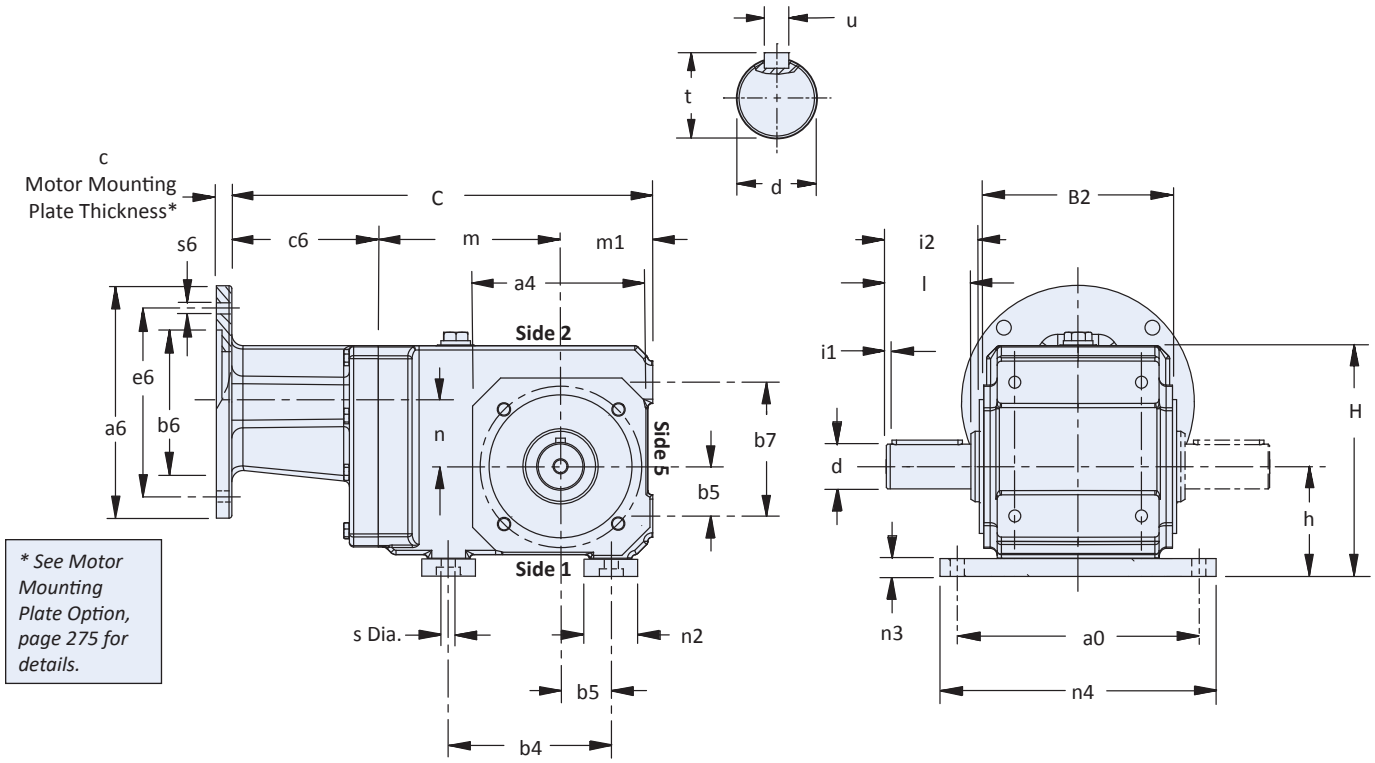
**Table 3** "V" Solid Shaft Output — Standard Sizes

| | Inches | | |
|---|---|---|---|
| Unit | d | t | u – Key |
| KSS1 | 1.000 | 1.11 | 1/4 x 1/4 x 1-9/16 |
| KSS2 | 1.250 | 1.36 | 1/4 x 1/4 x 1-15/16 |
| KSS3 | 1.250 | 1.36 | 1/4 x 1/4 x 1-15/16 |

**Table 4** Servo Motor Adapter Flange (mm)

| Unit | a6 | b6 | e6 | s6 |
|---|---|---|---|---|
| KSS1 | 112 | 80 | 100 | 6.4 |
| KSS2 | 112 | 80 | 100 | 6.5 |
| | 143 | 110 | 130 | 8.4 |
| KSS3 | 112 | 80 | 100 | 6.4 |
| | 143 | 110 | 130 | 8.4 |
| | 180 | 130 | 165 | 10.5 |

## "V" Solid Shaft Output with "NG" Foot Mount Housing




** See Motor Mounting Plate Option, page 275 for details.*

**Table 1** KSS Series – "V" Solid Shaft Output with "NG" Foot Mount Housing – Dimensions (mm)

| Unit | a0 | a4 | B2 | b4 | b5 | b7 | C | c6 | H | h | n4 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| KSS102VNG | 115 | 115 | 106 | 90 | 30 | 75 | 256.5 | 85.5 | 126 | 60 | 140 |
| KSS202VNG | 171 | 126 | 134 | 115 | 35 | 95 | 299 | 104 | 164 | 78 | 196 |
| KSS302VNG | 171 | 132 | 146 | 130 | 35 | 105 | 327.5 | 102.5 | 179.5 | 87.5 | 196 |

**Table 2** KSS Series – "V" Solid Shaft Output with "NG" Foot Mount Housing – Dimensions (mm)

| Unit | i2 | l | l1 | m | m1 | n | n2 | n3 | s | Wt. lbs. |
|---|---|---|---|---|---|---|---|---|---|---|
| KSS102VNG | 59 | 50 | 4 | 111 | 60 | 36 | 38.1 | 12.7 | 8.4 | 29 |
| KSS202VNG | 66 | 60 | 4 | 130 | 65 | 46 | 38.1 | 12.7 | 10 | 40 |
| KSS302VNG | 66 | 60 | 4 | 150 | 75 | 53 | 38.1 | 12.7 | 10 | 55 |

*All weights are approximate.*

**Table 3** "V" Solid Shaft Output — Standard Sizes

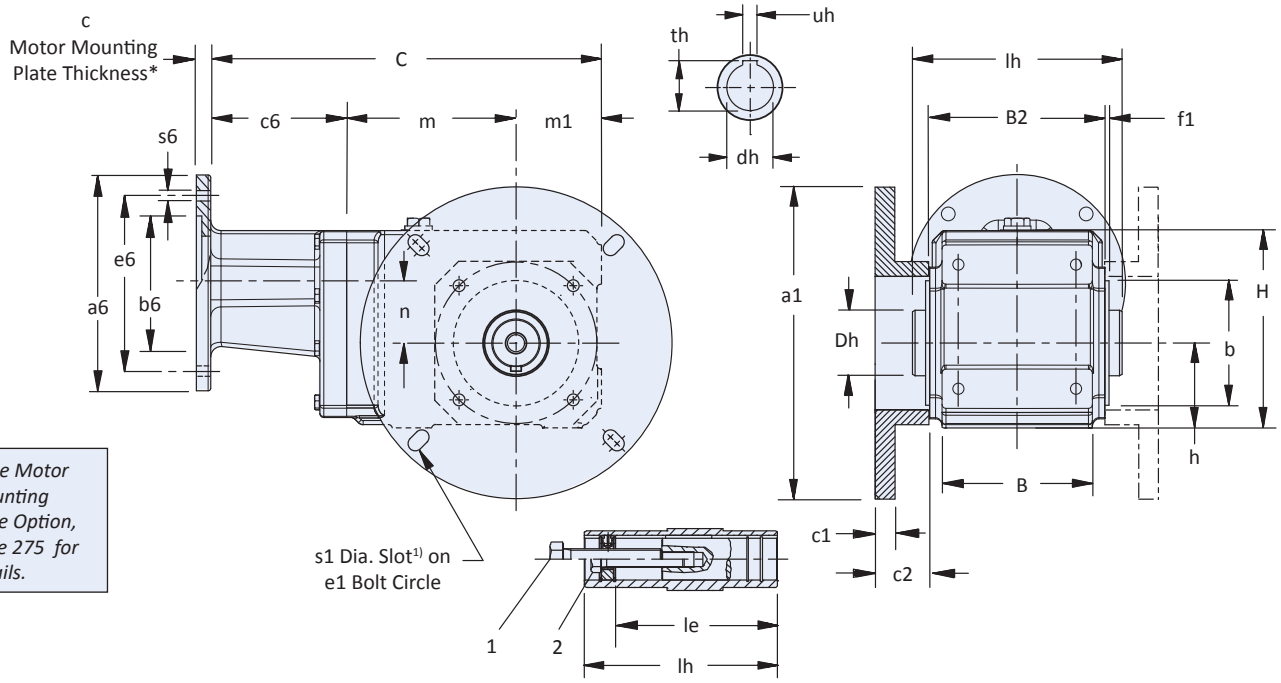
| | Inches | | |
|---|---|---|---|
| Unit | d | t | u – Key |
| KSS1 | 1.000 | 1.11 | 1/4 x 1/4 x 1-9/16 |
| KSS2 | 1.250 | 1.36 | 1/4 x 1/4 x 1-15/16 |
| KSS3 | 1.250 | 1.36 | 1/4 x 1/4 x 1-15/16 |

**Table 4** Servo Motor Adapter Flange (mm)

| Unit | a6 | b6 | e6 | s6 |
|---|---|---|---|---|
| KSS1 | 112 | 80 | 100 | 6.4 |
| KSS2 | 112<br>143 | 80<br>110 | 100<br>130 | 6.5<br>8.4 |
| KSS3 | 112<br>143<br>180 | 80<br>110<br>130 | 100<br>130<br>165 | 6.4<br>8.4<br>10.5 |



## "A" Hollow Bore Output with "F" Round Flange Housing




** See Motor Mounting Plate Option, page 275 for details.*

*1. Removal Bolt — not supplied. Must be smaller than mounting bolt. See Installation Guide for details.*
*2. Mounting Bolt*
*See installation guide for installation of hollow output.*

**Table 1 KSS Series – "A" Hollow Output with "F" Round Flange Housing – Dimensions (mm)**

| Unit | a1 | lh | B | B2 | b | C | c1 | c2 | c6 | Dh |
|---|---|---|---|---|---|---|---|---|---|---|
| KSS102AF | 171.5 | 120 | 90 | 106 | 75 | 256.5 | 14 | 38.1 | 82.5 | 40 |
| KSS202AF | 222 | 148 | 112 | 134 | 95 | 299 | 14 | 38.1 | 104 | 50 |
| KSS302AF | 222 | 160 | 140 | 146 | 95 | 327.5 | 14 | 38.1 | 102.5 | 50 |

*1) KSS1 mounting bolt hole is not a slot*

**Table 2 KSS Series – "A" Hollow Output with "F" Round Flange Housing – Dimensions (mm)**

| Unit | e1 Min. | e1 Max.1) | f1 | h | le | m | m1 | n | s1 | Wt. lbs. |
|---|---|---|---|---|---|---|---|---|---|---|
| KSS102AF | 149.2 | – | 3 | 60 | 98 | 111 | 60 | 36 | 8.5 | 29 |
| KSS202AF | 190 | 203.2 | 3 | 65 | 113 | 130 | 65 | 46 | 10.5 | 40 |
| KSS302AF | 190 | 203.2 | 3 | 75 | 125 | 150 | 75 | 53 | 10.5 | 55 |

*1) KSS1 mounting bolt hole is not a slot.*
*All weights are approximate.*

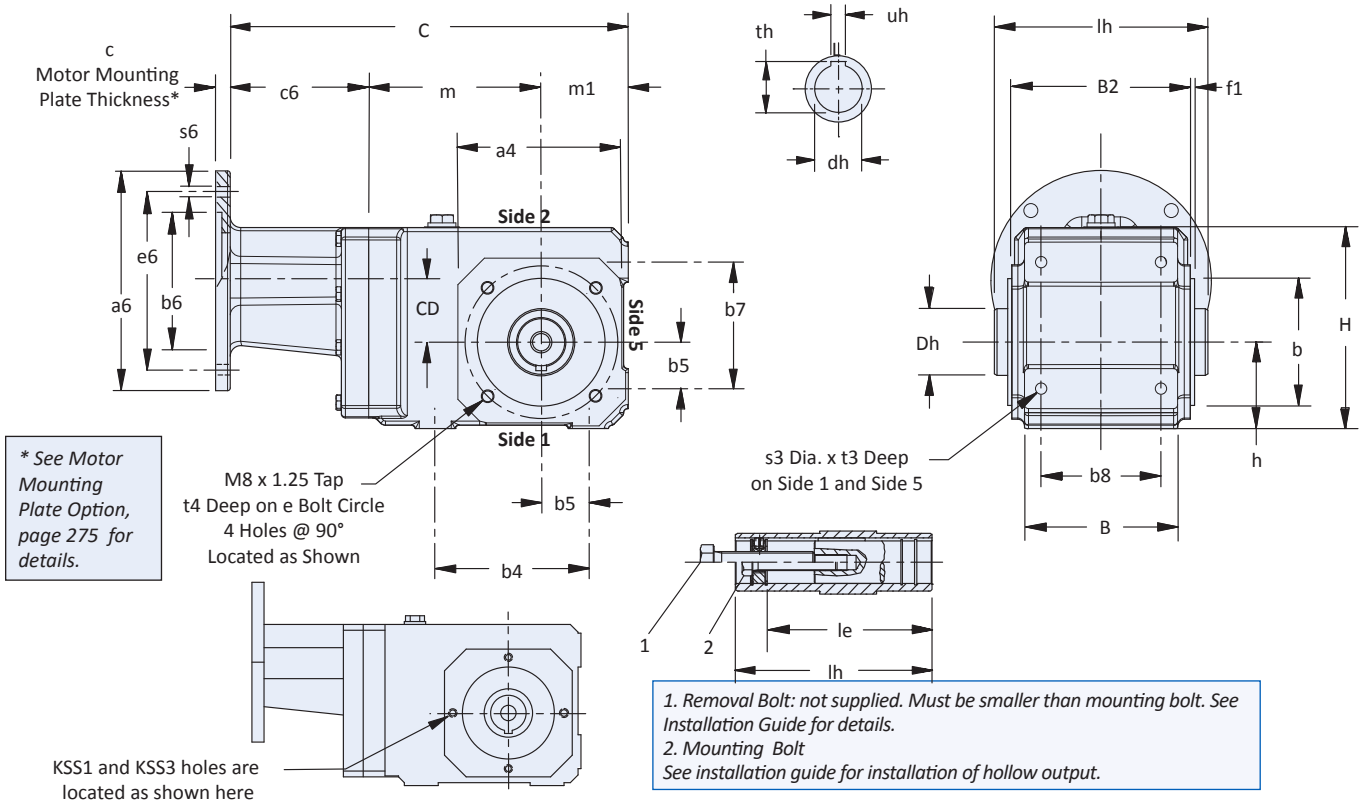
**Table 3 "A" Hollow Bore Output — Standard Sizes**

| Unit | Inches dh | th | UA | 1 |
|---|---|---|---|---|
| KSS1 | 1.000 | 1.11 | 0.250 | 1/2 – 13 |
| KSS2 | 1.250 | 1.37 | 0.250 | 5/8 – 11 |
| KSS3 | 1.375 | 1.52 | 0.312 | 5/8 – 11 |

**Table 4 Servo Motor Adapter Flange (mm)**

| Unit | a6 | b6 | e6 | s6 |
|---|---|---|---|---|
| KSS1 | 112 | 80 | 100 | 6.4 |
| KSS2 | 112 | 80 | 100 | 6.5 |
| | 143 | 110 | 130 | 8.4 |
| KSS3 | 112 | 80 | 100 | 6.4 |
| | 143 | 110 | 130 | 8.4 |
| | 180 | 130 | 165 | 10.5 |

## "A" Hollow Bore Output with "G" Pitch Circle Diameter (PCD) Tapped Holes




** See Motor Mounting Plate Option, page 275 for details.*

*1. Removal Bolt: not supplied. Must be smaller than mounting bolt. See Installation Guide for details.*
*2. Mounting Bolt*
*See installation guide for installation of hollow output.*

**Table 1 KSS Series – "A" Hollow Output with "G" Pitch Circle Diameter (PCD) Tapped Holes – Dimensions (mm)**

| Unit | a4 | B | B2 | b | b4 | b5 | b7 | b8 | C | c6 | Dh | e |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| KSS102AG | 105 | 90 | 106 | 75 | 90 | 30 | 75 | 70 | 256.5 | 85.5 | 40 | 90 |
| KSS202AG | 116 | 112 | 134 | 95 | 115 | 35 | 95 | 90 | 299 | 104 | 50 | 115 |
| KSS302AG | 116 | 140 | 146 | 95 | 130 | 35 | 105 | 105 | 327.5 | 102.5 | 50 | 115 |

**Table 2 KSS Series – "A" Hollow Output with "G" Pitch Circle Diameter (PCD) Tapped Holes – Dimensions (mm)**

| Unit | f1 | H | h | le | lh | m | m1 | n | s3 | t3 | t4 | Wt. lbs. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| KSS102AG | 3 | 126 | 60 | 98 | 120 | 111 | 60 | 36 | M8 x 1.25 | 13 | 13 | 29 |
| KSS202AG | 3 | 151 | 65 | 113 | 148 | 130 | 65 | 46 | M10 x 1.50 | 16 | 13 | 40 |
| KSS302AG | 3 | 166.5 | 75 | 125 | 160 | 150 | 75 | 53 | M10 x 1.50 | 16 | 14 | 55 |

*1) Removal bolt, supplied by customer, must be smaller than mounting bolt. See Page 298.*
*All weights are approximate.*

**Table 3 "A" Hollow Bore Output — Standard Sizes**

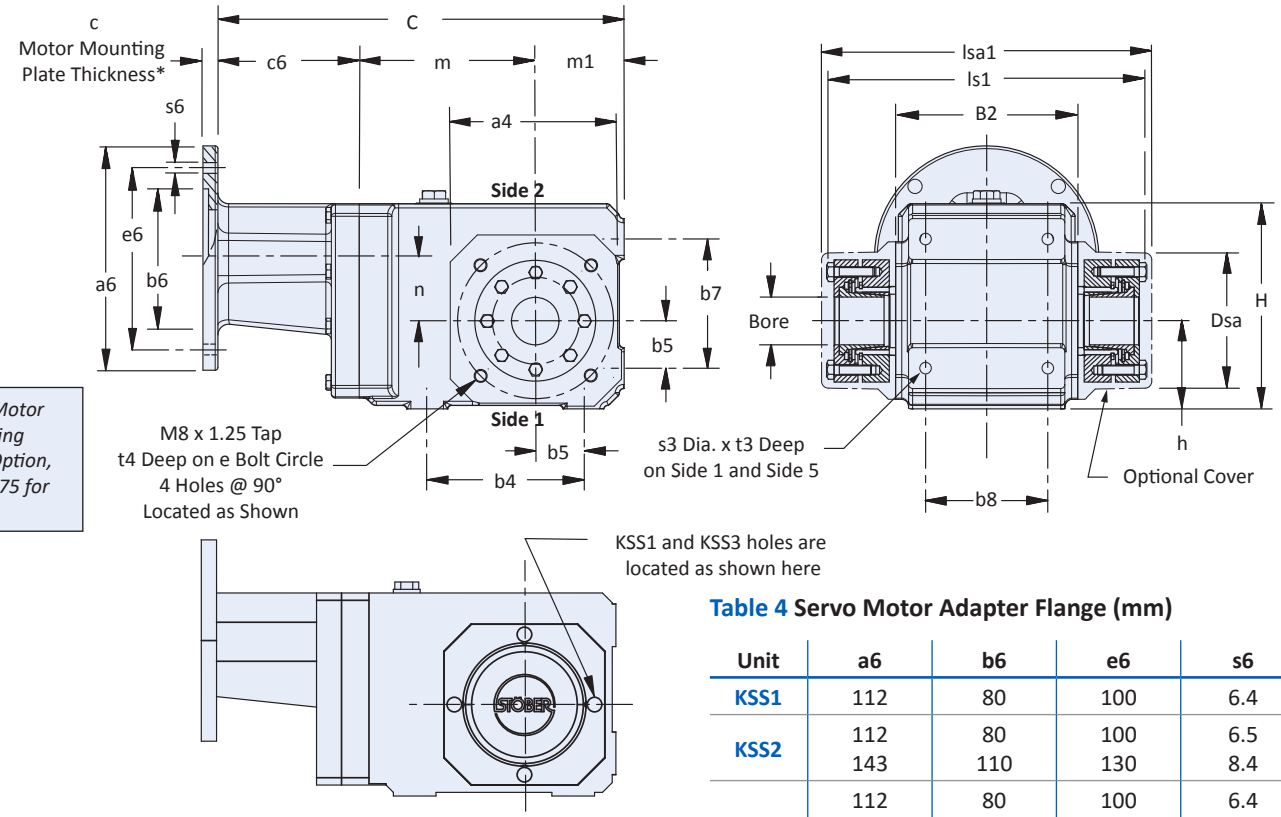
| | Inches | | | |
|---|---|---|---|---|
| Unit | dh | th | UA | 1 |
| KSS1 | 1.000 | 1.11 | 0.250 | 1/2 – 13 |
| KSS2 | 1.250 | 1.37 | 0.250 | 5/8 – 11 |
| KSS3 | 1.375 | 1.52 | 0.312 | 5/8 – 11 |

**Table 4 Servo Motor Adapter Flange (mm)**

| Unit | a6 | b6 | e6 | s6 |
|---|---|---|---|---|
| KSS1 | 112 | 80 | 100 | 6.4 |
| KSS2 | 112<br>143 | 80<br>110 | 100<br>130 | 6.5<br>8.4 |
| KSS3 | 112<br>143<br>180 | 80<br>110<br>130 | 100<br>130<br>165 | 6.4<br>8.4<br>10.5 |



## "W" Double Bushing Output with "G" Pitch Circle Diameter (PCD) Tapped Holes




** See Motor Mounting Plate Option, page 275 for details.*

**Table 4** Servo Motor Adapter Flange (mm)

| Unit | a6 | b6 | e6 | s6 |
|---|---|---|---|---|
| KSS1 | 112 | 80 | 100 | 6.4 |
| KSS2 | 112<br>143 | 80<br>110 | 100<br>130 | 6.5<br>8.4 |
| KSS3 | 112<br>143<br>180 | 80<br>110<br>130 | 100<br>130<br>165 | 6.4<br>8.4<br>10.5 |

**Table 1** KSS Series – "W" Double Wobble-Free Bushing Output with "G" Pitch Circle Diameter (PCD) Tapped Holes – Dimensions (mm)

| Unit | a4 | B2 | b4 | b5 | b7 | b8 | C | c6 | Dsa | e |
|---|---|---|---|---|---|---|---|---|---|---|
| KSS102WG | 105 | 105.9 | 90 | 30 | 75 | 70 | 256.5 | 85.5 | 78 | 90 |
| KSS202WG | 116 | 134.1 | 115 | 35 | 95 | 90 | 299 | 104 | 99.5 | 115 |
| KSS302WG | 116 | 146.1 | 130 | 35 | 105 | 105 | 327.5 | 102.5 | 96 | 115 |

**Table 2** KSS Series – "W" Double Wobble-Free Bushing Output with "G" Pitch Circle Diameter (PCD) Tapped Holesg – Dimensions (mm)

| Unit | H | h | lsa | ls1 | m | m1 | n | s3 | t3 | t4 | Wt. lbs. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| KSS102WG | 126 | 60 | 198.12 | 194.06 | 111 | 60 | 36 | M8 x 1.25 | 13 | 13 | 29 |
| KSS202WG | 151 | 65 | 237.74 | 226.06 | 130 | 65 | 46 | M10 x 1.50 | 16 | 13 | 40 |
| KSS302WG | 166.5 | 75 | 252.73 | 239.014 | 150 | 75 | 53 | M10 x 1.50 | 16 | 14 | 55 |

*All weights are approximate.*

**Table 3** "WFBSS" Double Side Bushings Stock Bore Sizes

| | Inches | | | | | |
|---|---|---|---|---|---|---|
| Unit | 1 | 1-3/16 | 1-1/4 | 1-3/8 | 1-7/16 | 1-1/2 |
| KSS1 | WFBSS1-100 | — | — | — | — | — |
| KSS2 | WFBSS2-100 | WFBSS2-103 | WFBSS2-104 | WFBSS2-106 | WFBSS2-107 | WFBSS2-108 |
| KSS3 | WFBSS3-100 | WFBSS3-103 | WFBSS3-104 | WFBSS3-106 | WFBSS3-107 | WFBSS3-108 |

## Output Options

**BLUE:** standard output diameters in stock
BLACK: optional diameters in stock
*Other options are available upon request. Please contact STOBER to learn about other options and their deliveries.*

### KSS Series (Stainless Steel)

| | | KSS1 | KSS2 | KSS3 |
|---|---|---|---|---|
| Solid Shaft | Inches | 1 | 1-1/4 | 1-1/4 |
| Hollow Bore | Inches | 1 | 1-1/4 | 1-3/8 |
| Wobble Free Bushing | Inches | 1 | 1 1-3/16 1-1/4<br>1-3/8 1-7/16 1-1/2 | 1 1-3/16 1-1/4<br>1-3/8 1-7/16 1-1/2 |

### KS Series (Carbon Steel — Metric)

| | KS4 | KS5 | KS7 |
|---|---|---|---|
| Solid Shaft | 22 | 32 | 40 |
| Hollow Bore | 31.5 | 40 | 50 |
| Shrink Ring | 25.5 | 35.5 | 45.5 |

### KL Series

| | | | KL1 | KL2 |
|---|---|---|---|---|
| Solid Shaft | Carbon Steel | Inches | 5/8 | 3/4 |
| | | Metric | 16 | 20 |
| | Stainless Steel | Inches | 5/8 | 3/4 |
| | | Metric | 16 | 20 |
| Hollow Bore | Carbon Steel | Inches | 5/8 | 3/4 |
| | | Metric | 16 | 20 |
| | Stainless Steel | Inches | 5/8 | 3/4 |
| | | Metric | 16 | 20 |
| Wobble Free Double Bushing | Stainless Steel | Inches | — | 3/4 |
| Shirnk Ring | Carbon Steel | Metric | 16 | 20 |

### K Series

| | | | K1 | K2 | K3 | K4 | K5 | K6 | K7 | K8 | K9 | K10 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Solid Shaft | Carbon Steel | Inches | 1 | 1-1/4 | 1-1/4 | 1-3/8 | 1-3/4 | 1-3/4 | 2-3/8 | 2-7/8 | 3-5/8 | 4-3/8 |
| | | Metric | 25 | 30 | 30 | 40 | 45 | 50 | 60 | 70 | 90 | — |
| | Stainless Steel | Inches | 1 | 1-1/4 | 1-1/4 | 1-3/8 | 1-3/4 | 1-3/4 | 2-3/8 | 2-7/8 | 3-5/8 | — |
| | | Metric | 25 | — | — | — | 45 | — | — | — | — | — |
| Hollow Bore | Carbon Steel | Inches | 1 | 1-3/16 | 1-3/8 | 1-1/2 | 2 | 2 | 2-3/8 | 2-3/4 | 3-1/4 | 4 |
| | | Metric | 25 | 30 | 35 | 40 | 50 | 50 | 60 | 70 | 90 | — |
| | Stainless Steel | Inches | 1 | 1-1/4 | 1-3/8 | 1-1/2 | 2 | 2 | 2-3/8 | — | 2-15/16<br>3<br>3-7/16 | — |
| | | Metric | 25 | 30 | 35 | 40 | 50 | — | 60 | — | — | — |
| Wobble Free Bushing (Single and Double Bushings**) | Stainless Steel* | Inches | 1 | 1<br>1-3/16<br>1-1/4 | 1<br>1-3/16<br>1-1/4<br>1-3/8<br>1-7/16<br>1-1/2 | 1-1/4<br>1-7/16<br>1-1/2 | 1-7/16<br>1-1/2<br>1-15/16<br>2 | 1-7/16<br>1-1/2<br>1-15/16<br>2<br>2-3/16 | 1-15/16<br>2<br>2-3/8 | 2-3/16<br>2-3/8<br>2-7/16<br>2-3/4 | — | — |
| | | Metric | — | — | — | 40 | 40 | — | — | — | — | — |
| Shirnk Ring | Carbon Steel | Metric | 25 | 30 | 35 | 40 | 50 | 50 | 60 | 70 | 90 | 100 |

**Also available in carbon steel*

## C Series

| | | | C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Solid Shaft | Carbon Steel | Inches | 3/4 | 1 | 1-1/4 | 1-1/4 | 1-5/8 | 1-5/8 | 2-1/8 | 2-3/8 | 2-7/8 | 3-5/8 |
| | | Metric | 20 | 25 | 30 | 30 | 40 | 40 | 50 | 60 | 70 | 90 |
| | Stainless Steel | Inches | 3/4 | 1 | 1-1/4 | 1-1/4 | 1-5/8 | 1-5/8 | 2-1/8 | 2-3/8 | 2-7/8 | — |
| | | Metric | 20 | 25 | 30 | 30 | 40 | — | 60 | — | — | — |

## F Series

| | | | F1 | F2 | F3 | F4 | F6 |
|---|---|---|---|---|---|---|---|
| Solid Shaft | Carbon Steel | Inches | 1 | 1-1/4 | 1-3/8 | 1-5/8 | 2-1/8 |
| | | Metric | — | — | — | — | — |
| | Stainless Steel | Inches | — | — | — | — | — |
| | | Metric | — | — | — | — | — |
| Hollow Bore | Carbon Steel | Inches | 3/4 | 1 | 1-1/4 | 1-7/16<br>1-1/2 | 2 |
| | | Metric | 20 | 25 | 30 | 40 | 50 |
| | Stainless Steel | Inches | — | — | 1-1/4 | 1-1/2 | — |
| | | Metric | — | — | — | — | — |
| Wobble Free Bushing (Single and Double Bushings**) | Stainless Steel | Inches | 3/4 | 1<br>1-3/16 | 1<br>1-3/16<br>1-1/4<br>1-7/16<br>1-1/2 | 1-7/16<br>1-1/2 | 1-7/16<br>1-1/2 |
| | | Metric | 20 | — | — | 40 | — |
| Shrink Ring | Carbon Steel | Metric | 20 | 25 | 30 | 40 | 50 |

** Double bushings only available with two stage units  ** Double bushing only*

## Standard & Optional Output Flange Sizes

### C Series

| Base Module | Flange Size | | |
|---|---|---|---|
| C0 | 120 | 140 | 160* |
| C1 | 140 | 160 | 200* |
| C2 | 160 | 200* | 250 |
| C3 | 160 | 200 | 250* |
| C4 | 200 | 250* | 300 |
| C5 | 250 | 300* | |
| C6 | | 300* | |
| C7 | | 350* | |
| C8 | 350 | 400* | 450 |
| C9 | | 450* | |

### K Series

| Base Module | Flange Size |
|---|---|
| K1 | 140, 160* |
| K2 | 160, 200* |
| K3 | 160, 200*, 250 |
| K4 | 250* |
| K5 | 250* |
| K6 | 300* |
| K7 | 300, 350* |
| K8 | 350 400* 450 |
| K9 | 450* |
| K10 | 550* |

** This is the standard flange size and will be shipped unless otherwise specified. Optional flanges are not available for all sizes.*

## P; PE; PK/PKX Series (Carbon Steel — Metric)

| | P2<br>PE2<br>PKX2 | P3<br>PE3<br>PKX3 | P4<br>PE4<br>PKX4 | P5<br>PE5<br>PK/PKX5 | P7<br>PK/PKX7 | P8<br>PK/PKX8 | P9<br>PK/PKX9 |
|---|---|---|---|---|---|---|---|
| Solid Shaft | 12 | 16 | 22 | 32 | 40 | 55 | 75 |

## PH; PHQ; PHK/PHKX; PHQK Series (Carbon Steel — Metric)

| | PH3<br>PHKX3 | PH4<br>PHQ4<br>PHKX4 | PH5<br>PHQ5<br>PHK/PHKX5<br>PHQK5 | PH7<br>PHQ7<br>PHK/PHKX7<br>PHQK7 | PH8<br>PHQ8<br>PHK/PHKX8<br>PHQK8 | PH9<br>PHQ9<br>PHK/PHKX9<br>PHQK9 | PH10<br>PHQ10<br>PHK/PHKX10<br>PHQK10 | PHQK11 |
|---|---|---|---|---|---|---|---|---|
| Hollow Bore | 20 | 31.5* | 40 | 50 | 80 | 90 | 95 | 120 |

*32 for PHQA4

## Backlash Comparison – ArcMinute vs Linear Distance

| | | Linear Distance in Inches | | | |
|---|---|---|---|---|---|
| ArcMinute | Degrees | @ 3" R | @ 12" R | @ 24" R | @ 48" R |
| 1 | 0.017 | 0.0009 | 0.0035 | 0.0070 | 0.0140 |
| 2 | 0.033 | 0.0017 | 0.0070 | 0.0140 | 0.0279 |
| 3 | 0.050 | 0.0026 | 0.0105 | 0.0209 | 0.0419 |
| 4 | 0.067 | 0.0035 | 0.0140 | 0.0279 | 0.0558 |
| 5 | 0.083 | 0.0044 | 0.0175 | 0.0349 | 0.0698 |
| 6 | 0.100 | 0.0052 | 0.0209 | 0.0419 | 0.0838 |
| 7 | 0.117 | 0.0061 | 0.0244 | 0.0489 | 0.0977 |
| 8 | 0.133 | 0.0070 | 0.0279 | 0.0558 | 0.1117 |
| 9 | 0.150 | 0.0079 | 0.0314 | 0.0628 | 0.1257 |
| 10 | 0.167 | 0.0087 | 0.0349 | 0.0698 | 0.1396 |
| 11 | 0.183 | 0.0096 | 0.0384 | 0.0768 | 0.1536 |
| 12 | 0.200 | 0.0105 | 0.0419 | 0.0838 | 0.1675 |
| 13 | 0.217 | 0.0113 | 0.0454 | 0.0908 | 0.1815 |
| 14 | 0.233 | 0.0122 | 0.0489 | 0.0977 | 0.1955 |
| 15 | 0.250 | 0.0131 | 0.0524 | 0.1047 | 0.2094 |
| 16 | 0.267 | 0.0140 | 0.0558 | 0.1117 | 0.2234 |
| 17 | 0.283 | 0.0148 | 0.0593 | 0.1187 | 0.2373 |
| 18 | 0.300 | 0.0157 | 0.0628 | 0.1257 | 0.2513 |
| 19 | 0.317 | 0.0166 | 0.0663 | 0.1326 | 0.2653 |
| 20 | 0.333 | 0.0175 | 0.0698 | 0.1396 | 0.2792 |

These values can be interpolated for backlash or distances not shown in the table.

$$\text{Backlash in ArcMinutes} = \left( \frac{\text{Linear Backlash in inches x 57.296}}{\text{Radius}} \right) 60$$

## Calculation Example

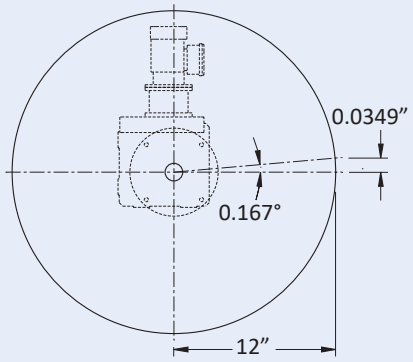
The Backlash Comparison chart can be used to determine the amount of linear movement that will be realized with a given backlash value.

**Example:**

A "K" Series gearhead is mounted, with the output shaft vertical, under a 24" diameter turntable. The gearhead backlash is 10 arcminutes.

Reading across the table, the angular value of 10 arcminutes is 0.167 degrees.

Further determination indicates 10 arcminutes backlash will allow a linear movement of 0.0349 inches when measured at a 12 inch radius.




## Gearhead Installation Notes

Servo Gearheads are a high torque product. To insure that the specified torque ratings are attained, several series require high quality grade fasteners to attach the gear units to the machine:

| Servo Series | Grade |
|---|---|
| C, F, K, KL, KS, KSS, PE | 10.9 |
| P, PH, PHQ, PHV, PK, PKX, PHK, PHQK, PHKX, KS | 12.9 |

For dynamic applications key connections should be avoided and the clearance of the key connection increases.

## Shaft Height in Foot-Mounted Gear Units

*The shaft height tolerance of STÖBER drives complies with DIN 747 requirements.*

**Shaft height tolerances are:**

Up to shaft height 50 mm: -0.4 mm

Up to shaft height 250 mm: -0.5 mm

Up to shaft height 630 mm: -0.6 mm

**Solid Shaft Specifications:** The shaft end fit corresponds to DIN 748; i.e. diameter d [ 50 = tolerance ISO k6 diameter d >50 = tolerance ISO m6 Center holes in shafts with or without key correspond to DIN 332 T2 shape DR. The keys are in accordance with DIN 6885 Sheet 1 (tall shape A). In helical bevel and helical worm gear units solid shafts are available with an output on both sides. Keys are aligned to 0.03 mm.

## Values and Symbols

| Symbol | Description | Value | | |
|---|---|---|---|---|
| | | Imperial | *Multiplier* | Metric |
| $F_{2a}$ | Axial Force @ Output Shaft | lbs. | 4.45 | N |
| $F_{2A}$ | Permissible Axial Force | | | |
| $F_{2r}$ | Radial Force @ Output Shaft | | | |
| $F_{2R}$ | Permissible Radial Load | | | |
| $F_{2RB}$ | Acceleration Permissible Radial Load | | | |
| $f^{B}$ | Load Factor | — | — | — |
| i | Reducer Ratio | — | — | — |
| $J_D$ | Motor + Reducer Inertia @ Motor RPM | lb-in-s$^2$ | 1.13×10$^3$ | kgcm$^2$ |
| $J_Z$ | Total Inertia @ Reducer RPM | | | |
| M | Torque | in.lbs. | 0.113 | Nm |
| $M_2$ | Application Torque | | | |
| $M_{2e}$ | Equivalent Torque (Average RMS Torque) | | | |
| $M_L$ | Friction Torque (Losses) | | | |
| $M_{2b}$ | Application Acceleration Torque | | | |
| $M_{2B}$ | Reducer Acceleration Torque | | | |
| $M_{2K}$ | Reducer Tilting Moment | | | |
| $M_{2KB}$ | Reducer Acceleration Tilting Moment | | | |
| $M_{2N}$ | Reducer Nominal Output Torque | | | |
| $M_{2peak}$ | Application Peak Torque | | | |
| $M_{2PEAK}$ | Reducer Peak Torque | | | |
| $M_{2V}$ | Application Deceleration Torque | | | |
| n | Speed | RPM | — | min$^{-1}$ |
| $n_b$ | Acceleration Speed | | | |
| nv | Deceleration Speed | | | |
| $n_1$ | Input Speed | | | |
| $n_2$ | Reducer Output Speed | | | |
| t | Time | seconds | — | seconds |
| $t_b$ | Acceleration Time | | | |
| $t_d$ | Duration Time | | | |
| $t_v$ | Deceleration Time | | | |
| $t_p$ | Pause Time | | | |
| $t_r$ | Running Time | | | |

## Conversions

**Imperial to Metric**

- 1 inch x 25.4 = mm
- 1 in$^2$ x 645.16 = mm$^2$
- 1 lb x 0.453 = kg
- 1 US gal x 3.785 = L
- 1 HP x 0.746 = kW
- 1 lb x 4.45 = N
- 1 lb in x 0.113 = Nm
- 1 lb ft x 1.36 = Nm
- 1 lb ft x .1383 = kgm
- 1 lb in x .0115 = kgm
- 1 lb in$^2$ x 0.00029 = kgm$^2$
- 1 PSI x 0.0689 = bar
- 1 PSI x 0.00689 = N/mm$^2$
- °F = 32 + 9/5 x °C

**Metric to Imperial**

- mm x 0.03937 = inch
- 1 mm$^2$ x 0.0015 = in$^2$
- 1 kg x 2.205 = lb
- 1 L x 0.264 = US gal
- 1 kW x 1.341 = HP
- 1 N x 0.225 = lb
- 1 Nm x 8.85 = lb in
- 1 Nm x 0.737 = lb ft
- 1 kgm x 7.233 = lb ft
- 1 kgm x 86.798 = lb ft
- 1 kgm$^2$ (J) x 3418.0 = lb in$^2$ (WR$^2$)
- 1 bar x 14.5 = PSI
- 1 N/mm$^2$ x 145.04 = PSI
- °C = 5/9 (°F-32)

**Formulas**

- 0.2618 x Dia.(in) x RPM = Feet/Minute
- 0.00314 x Dia.(mm) x RPM = Meter/Minute

# Terms and Conditions of Sale

1. **GENERAL.** All orders for products supplied by STOBER DRIVES INC. ("STOBER") shall be subject to these terms and conditions of sales. All transactions shall be governed by the laws of the Commonwealth of Kentucky. No modifications hereto will be binding unless agreed to in writing by STOBER.

2. **CUSTOMER.** The term "Customer," as used herein, means the distributor, resale dealer, original equipment manufacturer or first end-user customer that purchases the STOBER products.

3. **WARRANTY.** STOBER products shall be free from defects in material and workmanship for a maximum of 5-years (single shift operation or 30 months multiple shift operation) for Servo products (Servo Modular System, Servo Precision Planetary Gearheads, and Servo Geared Motors); 3-years (single shift operation or 18 months multiple shift operation) for MGS products; 2-years (single shift operation or 12 months multiple shift operation) for ComTrac products, from the date of shipment to the Customer. For Servo products, the motor on Servo Geared Motors, as well as all normal wear items, including oil seals and bearings, shall be covered for a period of 2-years (single shift operation or 12 months multiple shift operation). In the event that a product proves to be defective, STOBER's sole obligation shall be, at its option, to repair or replace the product. The repaired or replacement product will be shipped F.O.B. STOBER's facilities, freight prepaid by STOBER.

No employee, agent or representative of STOBER has the authority to waive, alter, vary or add to the terms hereof without the prior written approval of an officer of STOBER. It is expressly agreed that (a) this section constitutes the final expression of the parties' understanding with respect to the warranty and (b) this section is a complete and exclusive statement of the terms of the warranty.

STOBER shall have no obligation under the warranty set forth above in the event that:

(a) The Customer fails, within the warranty period to notify STOBER in writing and provide STOBER with evidence satisfactory to STOBER of the alleged defect within five (5) days after it becomes known to the customer;

(b) After inspection of a product, STOBER determines, in its sole discretion, that it is not defective in material or workmanship;

(c) Repair or replacement of a product is required through normal wear and tear;

(d) Any part in a product or any ingredient contained in a product requires replacement or repair through routine usage or normal wear and tear;

(e) A product is not maintained or used in accordance with STOBER's applicable operating and/or maintenance manuals, whether by the Customer or any third party;

(f) A product has been subject to misuse, misapplication, negligence, neglect (including, but not limited to, improper maintenance or storage), accident, catastrophe, improper installation, modification, adjustment, repair or lubrication, whether by the Customer or any third party, without the prior written consent of STOBER. Misuse shall include, but not be limited to, deterioration in a product due to chemical action and wear caused by the presence of abrasive materials;

(g) The system of connected rotating parts into which the product becomes incorporated is not compatible with the product, or it is not free from critical speed or torsional or other type of vibration within the specified operating range, no matter how induced; or

(h) The transmitted load and imposed torsional thrust and overhung loads are not within the published capacity limits for the unit sold.

Items manufactured by other parties but installed in or affixed to STOBER's products are not warranted by STOBER and bear only those warranties, express or implied, which are given by the manufacturer of such items, if any.

THE WARRANTY SET FORTH ABOVE IS INTENDED SOLELY FOR THE BENEFIT OF THE Customer AND DOES NOT APPLY TO ANY THIRD PARTY. ALL CLAIMS MUST BE MADE BY THE Customer AND MAY NOT BE MADE BY ANY THIRD PARTY. THIS WARRANTY MAY NOT BE TRANSFERRED OR ASSIGNED, IN WHOLE OR IN PART, BY THE Customer FOR ANY REASON WHATSOEVER. ANY SUCH ATTEMPTED TRANSFER OR ASSIGNMENT SHALL BE NULL AND VOID.

THIS WARRANTY TAKES THE PLACE OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, WHICH ARE HEREBY DISCLAIMED AND EXCLUDED BY STOBER, INCLUDING WITHOUT LIMITATION, ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OF USE AND ALL OBLIGATIONS OR LIABILITIES ON THE PART OF STOBER FOR DAMAGES ARISING OUT OF OR IN CONNECTION WITH THE USE, REPAIR OR PERFORMANCE OF THE PRODUCTS.

4. **MODIFICATIONS.** STOBER reserves the right, without notice to the Customer, to (a) change the specifications of any product, (b) improve a product in any manner that STOBER deems necessary or appropriate and (c) discontinue the manufacture of any product.

5. **PURCHASE ORDERS.** The Customer will submit purchase orders for the products to STOBER in writing, whether by mail or telefax, which shall set forth, at a minimum: (a) an identification of the products ordered, (b) prices for such products, (c) quantities, (d) requested delivery dates and (e) shipping instructions and shipping addresses.

6. **ACCEPTANCE OF ORDERS.** All purchase orders received from the Customer are subject to acceptance by STOBER in writing.

7. **MODIFICATION OF ORDERS.** No accepted purchase order shall be modified or canceled except upon the written agreement of STOBER and the Customer. Mutually agreed cancellations shall be subject to reasonable charges based upon expenses already incurred by STOBER and commitments made by STOBER. Mutually agreed change orders shall be subject to all provisions of these Terms and Conditions of Sale.

8. **PRICE INCREASES.** STOBER may increase its prices for the products by providing the original purchaser of the products with at least thirty (30) days' prior written notice. Increased prices for products shall not apply to purchase orders accepted prior to the effective date of the price increase unless such orders provide for delivery more than thirty (30) days after the date of acceptance of the order.

9. **PRICING AND DELIVERY TERMS.** In accordance with KRS 355.2-319(1)(b), all products are delivered F.O.B. STOBER's warehouse facility in Maysville, Kentucky, or such other facility as STOBER may designate. Orders are then shipped per Customer's shipping instructions as set forth in Customer's purchase order. **CATALOG PRICING DOES NOT INCLUDE SHIPPING, HANDLING AND TAXES.** Once delivered to a common carrier of the Customer's choosing [or of STOBER's choosing if Customer has failed to specify a common carrier on or before five (5) days prior to the requested delivery date] STOBER shall have no further responsibility for the products and all risk of damage, loss or delay shall pass to the Customer. A handling fee is added to freight costs by STOBER to cover the cost of having to pay the carrier within seven (7) days when the terms with the Customer are net 30. The Customer has the option of shipping collect with our carrier or the carrier of choice.

10. **PAYMENT TERMS.** Net 30 days. All orders will be shipped either prepaid by the Customer or C.O.D., at STOBER's option, unless the Customer has established a previously approved credit line. If STOBER approves a credit line for the Customer, all payments shall be due within thirty (30) days of the date of the invoice. If any invoice is not paid in full within such thirty (30) day period, then finance charges shall be assessed at the rate of one and one-half percent ($1^1/_2$%) per month (eighteen percent (18%) per year). If such rate is deemed to be usurious at any time, it shall be reduced to the maximum rate permitted by applicable law. STOBER may stop or withhold shipment of products if the Customer does not fulfill its payment obligations. If STOBER is insecure about payment for any reason, STOBER may require full or partial payment in advance and as a condition to the continuation of its delivery of products.

11. **SECURITY INTEREST.** Unless and until the products are paid for in full, STOBER reserves a security interest in them to secure the unpaid balance of the purchase price. The Customer hereby grants to STOBER a power of attorney, coupled with an interest, to execute and file on behalf of the Customer all necessary financing statements and other documents required or appropriate to protect the security interest granted herein.

12. **ACCEPTANCE OF PRODUCTS.** The Customer will conduct any incoming inspection tests as soon as possible upon arrival of the products, but in no event later than ten (10) days after the date of receipt. Any products not rejected by written notice to STOBER within such period shall be deemed accepted by the Customer. STOBER shall not be liable for any additional costs, expenses or damages incurred by the Customer, directly or indirectly, as a result of any shortage, damage or discrepancy in a shipment.

13. **LIMITATION OF REMEDIES.**

(a) STOBER SHALL NOT BE LIABLE FOR ANY LOSS OR DAMAGE CAUSED BY DELAY IN FURNISHING THE CUSTOMER WITH PRODUCTS.

(b) IN NO EVENT SHALL STOBER'S LIABILITY INCLUDE ANY SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL LOSSES OR DAMAGES, EVEN IF STOBER HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH POTENTIAL LOSS OR DAMAGE.

14. **MADE-TO-ORDER PRODUCTS.** STOBER reserves the right to revoke and amend any price quotations offered to the Customer for made-to-order products, provided that such price quotations have not been accepted by the Customer prior to the date of revocation or amendment.

15. **DIES, TOOLS AND EQUIPMENT.** Charges incurred by the Customer for dies, tools and other equipment shall not confer ownership or the right to possession therein by the Customer. All such dies, tools and equipment shall remain the property of STOBER, and STOBER shall have the exclusive right to possession thereof. STOBER shall maintain such tools and equipment in good working order.

16. **REGULATORY LAWS AND STANDARDS.** STOBER makes no representation that its products conform to state or local laws, ordinances, regulations, codes or standards except as may be otherwise agreed to in writing by STOBER.

17. **SIZES AND WEIGHTS.** STOBER's products are made only in the sizes and to the specifications set forth in its catalogs and other literature. If any alteration is requested, such altered product will be treated as a made-to-order item. STOBER assumes no responsibility for typographical errors which may appear in its catalogs or literature, and cannot accept alteration charges caused by such errors. Since weights shown in STOBER's catalogs are approximate, they cannot be used in determining freight allowances set forth in its catalogs and other literature. Freight allowances will be determined at the time of shipment and shall be based on actual shipping weight.

18. **SYSTEM DESIGN.** Responsibility for system design to ensure proper use and application of STOBER's products within their published specifications and ratings rests solely with the Customer. This includes, but is not limited to, an analysis of loads created by torsional vibrations within the entire system, regardless of how induced.

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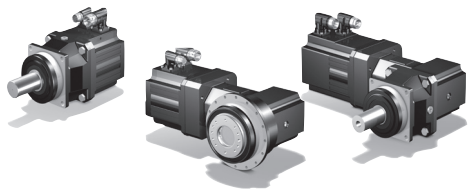


## ServoStop

**Motor Adapter with Integrated Brake**

Motor adapter integrated brake module provides redundant braking during power failures or emergency stops in hazardous situations. Available with Servo P, PA, PH, PHA, PK, PHK, C, F and K Series Gearheads.

- Saves braking at EMERGENCY STOP and power cut
- Prevents accidental sliding or falling of vertical axis with gravity load absolutely reliable
- Manual hand release available
- Fits all standard servo motors
- IP54 Rated; CSA Approved
- Higher safety for vertical applications per EN ISO 13849, Category 1, 2 & 3



## Servo Geared Motors

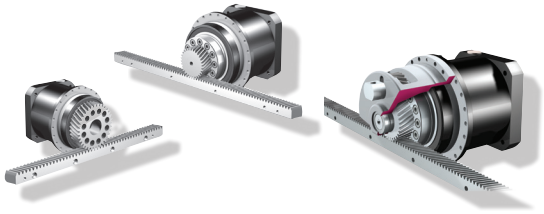
ED and EZ Series are compact, highly-dynamic, electronically commutated, permanent magnet brushless servo motors coupled to STOBER gearheads.

- Mounting the motor directly to the gearbox eliminates a motor coupling and housing, adapter or additional input seals and bearings to reduce inertia up to 75%
- Smoother running for optimal performance; dynamic, minimal torque/speed ripple; UL/CE/CSA approved
- Options include: washdown, food coatings, spring and magnetic brakes, forced air cooling, water cooling, high dynamic performance with low inertia, encoder options, PTC or KTY winding protection, high inertia option, motor speeds up to 6000 RPM, and high torque density



## NEMA Compatible Speed Reducers

- Inline concentric, offset or right angle
- Helical, bevel or worm gear driven
- 1/6 to 165 HP
- Output torques to 106,296 in. lbs.
- Output speeds from 875 to 2.5 RPM
- Ratios from 2:1 to 683:1
- Food and corrosion resistant duty, stainless steel available



## Rack and Pinion Systems

STOBER ZV, ZR, ZTR, ZTRS Series are high efficiency rack and pinion drives which feature an innovative pinion bearing for high linear force applications.

- Gear unit and rack optimally mated together as a system
- Ready to install drive solutions
- Easy selection and calculations done by STOBER for a total engineered solution
- Optimize inertia mismatch by changing the gear ratio or pinion tooth count
- Forces up to 122 kN or 27,400 lbs.
- Precision linear backlash as low as 7 µm
- Gearing size ranges from Mod. 2 – 10

# Notes

Servo Gearboxes Version 33 Form #442934 06/24




STÖBER

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