

# Servo right-angle gearheads Economy



## **LK+/LPK+**

Economical right-angle precision

The flexible LK+/LPK+ all-round talent with an excellent price/performance ratio is ideal for all applications where economical precision is required.

## **LPBK+**

Economical right-angle precision

The logical further development of the LPK+ is the LPBK+. The highly compact LPBK+ ensures that optimum results can be achieved even under the most confined conditions.

Power density —————

## Simple and convenient

From an optimized design with our cymex® software to the classic, patented WITTENSTEIN alpha motor mounting and grease volume adapted to each model – WITTENSTEIN alpha right-angle gearheads make your life so much easier.

## Reliable and accurate

The low torsional backlash and high torsional rigidity of your WITTENSTEIN alpha right-angle gearhead assure maximum positioning accuracy of your drives and precision of your machines – even during highly dynamic operation up to 50,000 cycles/hour.



#### V-Drive economy

Economical solution with proven  
WITTENSTEIN alpha quality

The servo worm gearhead with solid  
shaft and hollow shaft outputs.

Output type:

VDHe: hollow shaft, smooth/keywayed

VDSe: solid shaft, smooth/keywayed

#### Maximum durability

Your WITTENSTEIN alpha right-angle gearhead is extremely reliable due to the overall design and 100% WITTENSTEIN alpha inspections: **“mount and forget”**. A length compensation feature integrated in your WITTENSTEIN alpha right-angle gearhead as standard maximizes the lifespan of your servo motor during high-speed continuous operation.

Right-angle gearheads  
**Economy**



LK+



LPK+



LPBK+



V-Drive  
economy

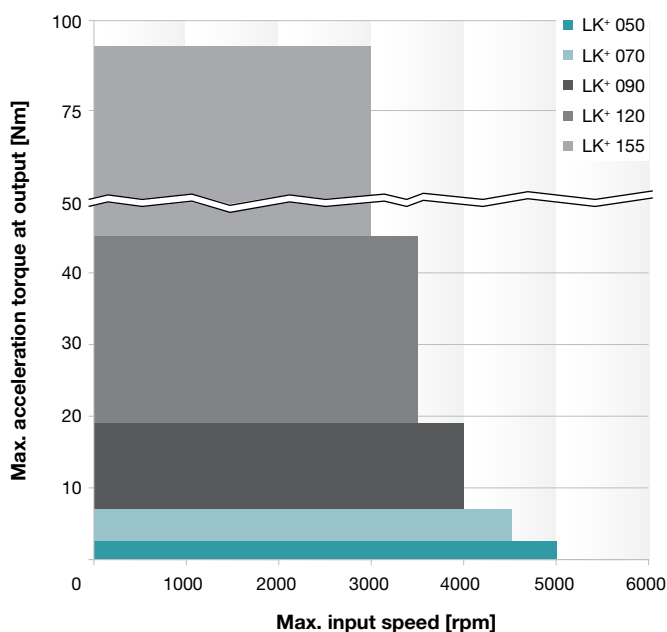
## LK<sup>+</sup>/LPK<sup>+</sup>/LPBK<sup>+</sup> – The economical bevel gears



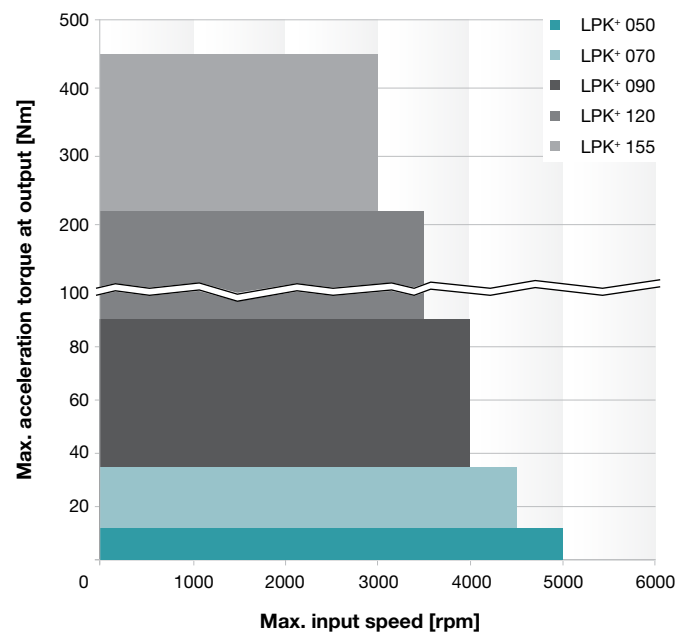
The flexible LK<sup>+</sup>/LPK<sup>+</sup>/LPBK<sup>+</sup> all-round talent with an excellent price/performance ratio is ideal for all applications where economical precision is required. Thanks to their perfectly-matched bevel gear toothing, the LK<sup>+</sup>/LPK<sup>+</sup> and LPBK<sup>+</sup> right-angle gearheads achieve a level of economic precision which is ideally suited to all areas of application.

### Quick size selection

**LK<sup>+</sup>** (example for  $i = 1$ )  
For applications in cyclic operation ( $ED \leq 60\%$ )



**LPK<sup>+</sup>/LPBK<sup>+</sup>** (example for  $i = 5$ )  
For applications in cyclic operation ( $ED \leq 60\%$ )



# Versions and Applications

## LK<sup>+</sup>

- High power density
- High positioning accuracy
- Compact design
- Ratio  $i = 1$

## LPK<sup>+</sup>

- High power density
- High positioning accuracy
- Compact design

## LPBK<sup>+</sup>

- Applications in continuous operation ( $ED \geq 60\%$ )
- Ideal for belt applications
- High positioning accuracy
- Compact design

## Comparison

| Features                                     |          | LK <sup>+</sup><br>from page 282 | LPK <sup>+</sup><br>from page 292 | LPBK <sup>+</sup><br>from page 302 |
|----------------------------------------------|----------|----------------------------------|-----------------------------------|------------------------------------|
| Ratios <sup>c)</sup>                         |          | 1 – 1                            | 3 – 100                           | 3 – 100                            |
| Torsional backlash<br>[arcmin] <sup>c)</sup> | Standard | ≤ 15                             | ≤ 12                              | ≤ 12                               |
|                                              | Reduced  | –                                | –                                 | –                                  |
| <b>Output type</b>                           |          |                                  |                                   |                                    |
| Smooth output shaft                          |          |                                  | •                                 |                                    |
| Keywayed output shaft                        |          | •                                | •                                 |                                    |
| Output flange                                |          |                                  |                                   | •                                  |
| <b>Input type</b>                            |          |                                  |                                   |                                    |
| Motor mounted version                        |          | •                                | •                                 | •                                  |
| <b>Type</b>                                  |          |                                  |                                   |                                    |
| Food-grade lubrication <sup>a) b)</sup>      |          | •                                | •                                 | •                                  |
| <b>Accessories</b>                           |          |                                  |                                   |                                    |
| Coupling                                     |          | •                                | •                                 |                                    |
| Rack                                         |          | •                                | •                                 |                                    |
| Belt pulley                                  |          |                                  |                                   | •                                  |
| NEMA flange                                  |          | •                                | •                                 |                                    |

<sup>a)</sup> Power reduction: technical data available upon request

<sup>b)</sup> Please contact WITTENSTEIN alpha

<sup>c)</sup> In relation to reference sizes



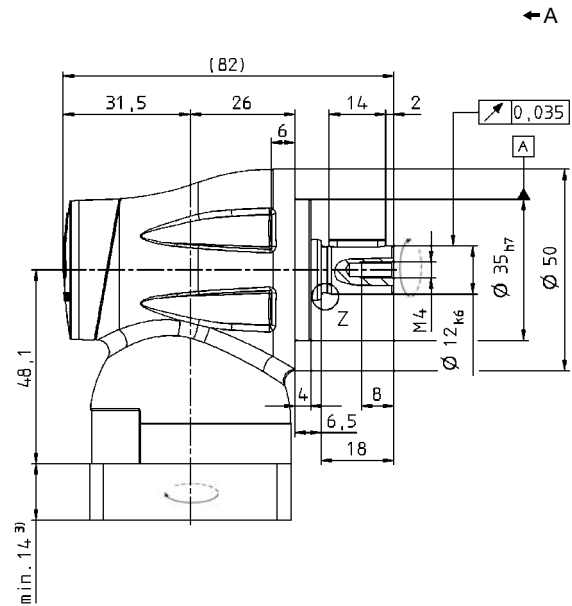
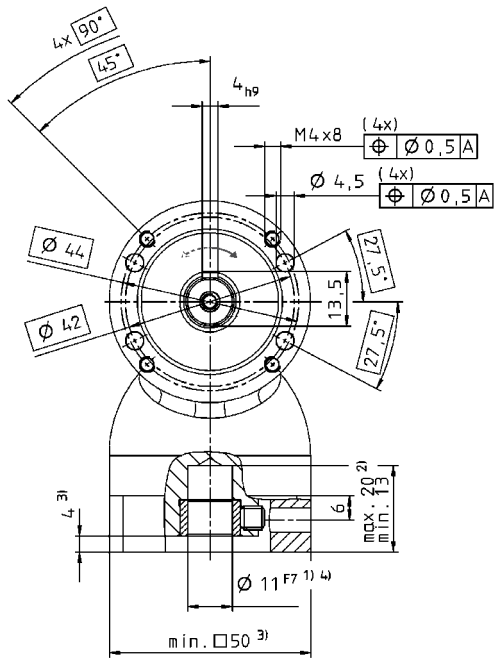
# LK+ 050 1-stage

|                                                                                         |             |                                                            | 1-stage                           |
|-----------------------------------------------------------------------------------------|-------------|------------------------------------------------------------|-----------------------------------|
| Ratio                                                                                   | $i$         |                                                            | 1                                 |
| Max. acceleration torque<br>(max. 1000 cycles per hour)                                 | $T_{2B}$    | Nm                                                         | 2.5                               |
|                                                                                         |             | in.lb                                                      | 22                                |
| Nominal output torque<br>(with $n_{1N}$ )                                               | $T_{2N}$    | Nm                                                         | 1.2                               |
|                                                                                         |             | in.lb                                                      | 11                                |
| Emergency stop torque<br>(permitted 1000 times during the service life of the gearhead) | $T_{2Not}$  | Nm                                                         | 5                                 |
|                                                                                         |             | in.lb                                                      | 44                                |
| Nominal input speed<br>(with $T_{2N}$ and 20°C ambient temperature <sup>a)</sup> )      | $n_{1N}$    | rpm                                                        | 3200                              |
| Max. input speed                                                                        | $n_{1Max}$  | rpm                                                        | 5000                              |
| Mean no load running torque<br>(with $n_1 = 3000$ rpm and 20°C gearhead temperature)    | $T_{012}$   | Nm                                                         | 0.2                               |
|                                                                                         |             | in.lb                                                      | 1.8                               |
| Max. torsional backlash                                                                 | $j_t$       | arcmin                                                     | ≤ 25                              |
| Torsional rigidity                                                                      | $C_{L21}$   | Nm/ arcmin<br>in.lb/ arcmin                                | –                                 |
| Max. axial force <sup>b)</sup>                                                          | $F_{2AMax}$ | N                                                          | 100                               |
|                                                                                         |             | lb <sub>f</sub>                                            | 23                                |
| Max. radial force <sup>b)</sup>                                                         | $F_{2RMax}$ | N                                                          | 650                               |
|                                                                                         |             | lb <sub>f</sub>                                            | 146                               |
| Efficiency at full load                                                                 | $\eta$      | %                                                          | 95                                |
| Service life<br>(For calculation, see the Chapter "Information")                        | $L_h$       | h                                                          | > 20000                           |
| Weight incl. standard adapter plate                                                     | $m$         | kg<br>lb <sub>m</sub>                                      | 0.7<br>1.5                        |
| Operating noise<br>(with $n_1 = 3000$ rpm no load)                                      | $L_{PA}$    | dB(A)                                                      | ≤ 72                              |
| Max. permitted housing temperature                                                      |             | °C                                                         | +90                               |
|                                                                                         |             | F                                                          | 194                               |
| Ambient temperature                                                                     |             | °C                                                         | -15 to +40                        |
|                                                                                         |             | F                                                          | 5 to 104                          |
| Lubrication                                                                             |             |                                                            | Lubricated for life               |
| Paint                                                                                   |             |                                                            | without                           |
| Direction of rotation                                                                   |             |                                                            | Motor and gearhead same direction |
| Protection class                                                                        |             |                                                            | IP 64                             |
| Moment of inertia<br>(relates to the drive)                                             | $J_1$       | kgcm <sup>2</sup><br>10 <sup>-3</sup> in.lb.s <sup>2</sup> | 0.14<br>0.12                      |

<sup>a)</sup> For higher ambient temperatures, please reduce input speed

<sup>b)</sup> Refers to center of the output shaft, if  $n_2 = 1000$  rpm

**1-stage:**



Non-tolerated dimensions  $\pm 1$  mm

- 1) Check motor shaft fit.
- 2) Min./Max. permissible motor shaft length. Longer motor shafts are adaptable, please contact us.
- 3) The dimensions depend on the motor.
- 4) Smaller motor shaft diameter is compensated by a bushing.



CAD data is available under [www.wittenstein-alpha.com](http://www.wittenstein-alpha.com)



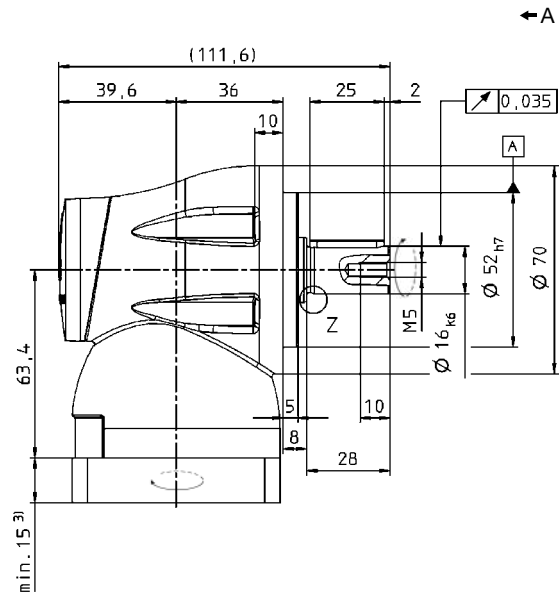
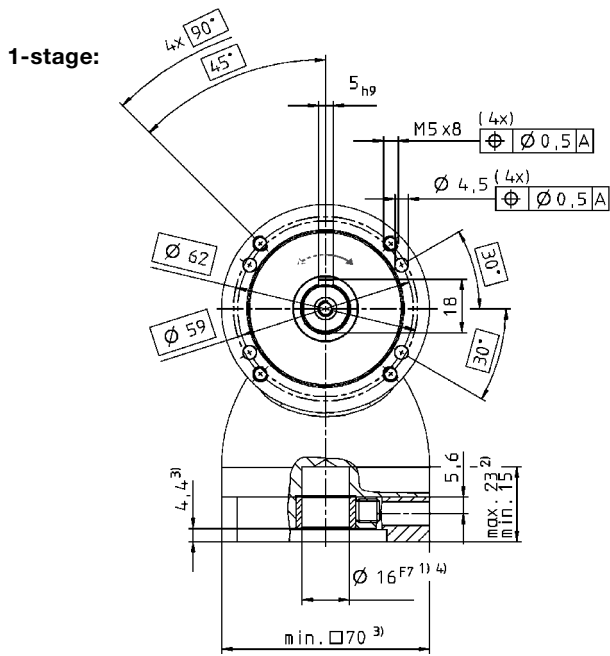
Motor mounting according to operating manual

# LK+ 070 1-stage

|                                                                                         |             |                                       | 1-stage                           |
|-----------------------------------------------------------------------------------------|-------------|---------------------------------------|-----------------------------------|
| Ratio                                                                                   | $i$         |                                       | 1                                 |
| Max. acceleration torque<br>(max. 1000 cycles per hour)                                 | $T_{2B}$    | Nm                                    | 7                                 |
|                                                                                         |             | in.lb                                 | 60                                |
| Nominal output torque<br>(with $n_{1N}$ )                                               | $T_{2N}$    | Nm                                    | 3.7                               |
|                                                                                         |             | in.lb                                 | 33                                |
| Emergency stop torque<br>(permitted 1000 times during the service life of the gearhead) | $T_{2Not}$  | Nm                                    | 15                                |
|                                                                                         |             | in.lb                                 | 130                               |
| Nominal input speed<br>(with $T_{2N}$ and 20°C ambient temperature <sup>a)</sup> )      | $n_{1N}$    | rpm                                   | 3000                              |
| Max. input speed                                                                        | $n_{1Max}$  | rpm                                   | 4500                              |
| Mean no load running torque<br>(with $n_1 = 3000$ rpm and 20°C gearhead temperature)    | $T_{012}$   | Nm                                    | 0.4                               |
|                                                                                         |             | in.lb                                 | 3.5                               |
| Max. torsional backlash                                                                 | $j_t$       | arcmin                                | ≤ 20                              |
| Torsional rigidity                                                                      | $C_{L21}$   | Nm/ arcmin                            | –                                 |
|                                                                                         |             | in.lb/ arcmin                         |                                   |
| Max. axial force <sup>b)</sup>                                                          | $F_{2AMax}$ | N                                     | 200                               |
|                                                                                         |             | lb <sub>f</sub>                       | 45                                |
| Max. radial force <sup>b)</sup>                                                         | $F_{2RMax}$ | N                                     | 1450                              |
|                                                                                         |             | lb <sub>f</sub>                       | 330                               |
| Efficiency at full load                                                                 | $\eta$      | %                                     | 95                                |
| Service life<br>(For calculation, see the Chapter "Information")                        | $L_h$       | h                                     | > 20000                           |
| Weight incl. standard adapter plate                                                     | $m$         | kg                                    | 1.9                               |
|                                                                                         |             | lb <sub>m</sub>                       | 4.2                               |
| Operating noise<br>(with $n_1 = 3000$ rpm no load)                                      | $L_{PA}$    | dB(A)                                 | ≤ 73                              |
| Max. permitted housing temperature                                                      |             | °C                                    | +90                               |
|                                                                                         |             | F                                     | 194                               |
| Ambient temperature                                                                     |             | °C                                    | -15 to 40                         |
|                                                                                         |             | F                                     | 5 to 104                          |
| Lubrication                                                                             |             |                                       | Lubricated for life               |
| Paint                                                                                   |             |                                       | without                           |
| Direction of rotation                                                                   |             |                                       | Motor and gearhead same direction |
| Protection class                                                                        |             |                                       | IP 64                             |
| Moment of inertia<br>(relates to the drive)                                             | $J_1$       | kgcm <sup>2</sup>                     | 0.7                               |
|                                                                                         |             | 10 <sup>-3</sup> in.lb.s <sup>2</sup> | 0.6                               |

<sup>a)</sup> For higher ambient temperatures, please reduce input speed

<sup>b)</sup> Refers to center of the output shaft, if  $n_2 = 1000$  rpm



Non-tolerated dimensions  $\pm 1$  mm

- 1) Check motor shaft fit.
- 2) Min./Max. permissible motor shaft length. Longer motor shafts are adaptable, please contact us.
- 3) The dimensions depend on the motor.
- 4) Smaller motor shaft diameter is compensated by a bushing.



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Motor mounting according to operating manual

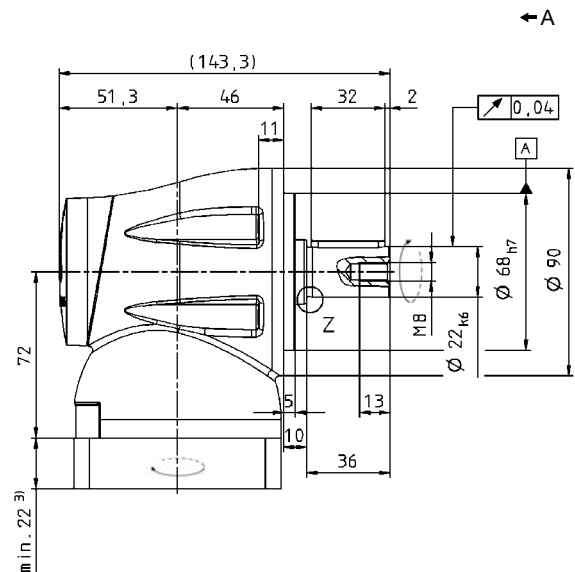
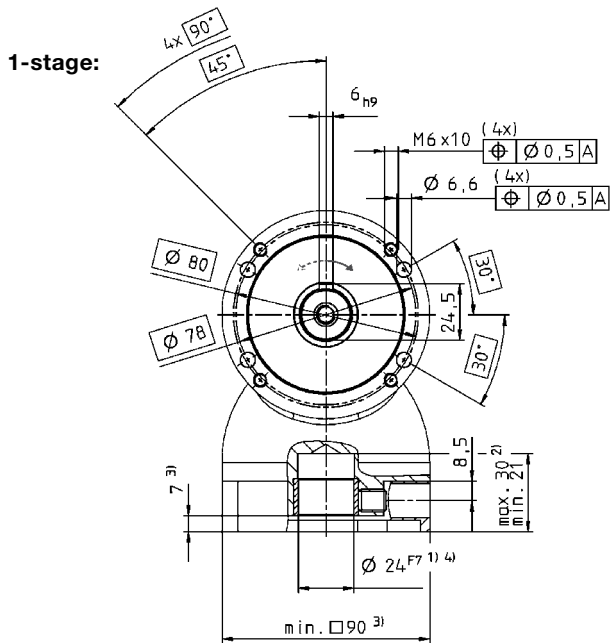


# LK+ 090 1-stage

|                                                                                         |             |                                       | 1-stage                           |
|-----------------------------------------------------------------------------------------|-------------|---------------------------------------|-----------------------------------|
| Ratio                                                                                   | $i$         |                                       | 1                                 |
| Max. acceleration torque<br>(max. 1000 cycles per hour)                                 | $T_{2B}$    | Nm                                    | 19                                |
|                                                                                         |             | in.lb                                 | 170                               |
| Nominal output torque<br>(with $n_{1N}$ )                                               | $T_{2N}$    | Nm                                    | 9.3                               |
|                                                                                         |             | in.lb                                 | 82                                |
| Emergency stop torque<br>(permitted 1000 times during the service life of the gearhead) | $T_{2Not}$  | Nm                                    | 37                                |
|                                                                                         |             | in.lb                                 | 330                               |
| Nominal input speed<br>(with $T_{2N}$ and 20°C ambient temperature) <sup>a)</sup>       | $n_{1N}$    | rpm                                   | 2700                              |
| Max. input speed                                                                        | $n_{1Max}$  | rpm                                   | 4000                              |
| Mean no load running torque<br>(with $n_1 = 3000$ rpm and 20°C gearhead temperature)    | $T_{012}$   | Nm                                    | 0.9                               |
|                                                                                         |             | in.lb                                 | 8.0                               |
| Max. torsional backlash                                                                 | $j_t$       | arcmin                                | ≤ 15                              |
| Torsional rigidity                                                                      | $C_{L21}$   | Nm/ arcmin                            | 1.3                               |
|                                                                                         |             | in.lb/ arcmin                         | 11                                |
| Max. axial force <sup>b)</sup>                                                          | $F_{2AMax}$ | N                                     | 450                               |
|                                                                                         |             | lb <sub>f</sub>                       | 100                               |
| Max. radial force <sup>b)</sup>                                                         | $F_{2RMax}$ | N                                     | 2400                              |
|                                                                                         |             | lb <sub>f</sub>                       | 540                               |
| Efficiency at full load                                                                 | $\eta$      | %                                     | 95                                |
| Service life<br>(For calculation, see the Chapter "Information")                        | $L_h$       | h                                     | > 20000                           |
| Weight incl. standard adapter plate                                                     | $m$         | kg                                    | 3.2                               |
|                                                                                         |             | lb <sub>m</sub>                       | 7.1                               |
| Operating noise<br>(with $n_1 = 3000$ rpm no load)                                      | $L_{PA}$    | dB(A)                                 | ≤ 76                              |
| Max. permitted housing temperature                                                      |             | °C                                    | +90                               |
|                                                                                         |             | F                                     | 194                               |
| Ambient temperature                                                                     |             | °C                                    | -15 to 40                         |
|                                                                                         |             | F                                     | 5 to 104                          |
| Lubrication                                                                             |             |                                       | Lubricated for life               |
| Paint                                                                                   |             |                                       | without                           |
| Direction of rotation                                                                   |             |                                       | Motor and gearhead same direction |
| Protection class                                                                        |             |                                       | IP 64                             |
| Moment of inertia<br>(relates to the drive)                                             | $J_1$       | kgcm <sup>2</sup>                     | 3.3                               |
|                                                                                         |             | 10 <sup>-3</sup> in.lb.s <sup>2</sup> | 2.9                               |

<sup>a)</sup> For higher ambient temperatures, please reduce input speed

<sup>b)</sup> Refers to center of the output shaft, if  $n_2 = 1000$  rpm



Non-tolerated dimensions  $\pm 1$  mm

- 1) Check motor shaft fit.
- 2) Min./Max. permissible motor shaft length. Longer motor shafts are adaptable, please contact us.
- 3) The dimensions depend on the motor.
- 4) Smaller motor shaft diameter is compensated by a bushing.



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Motor mounting according to operating manual

# LK+ 120 1-stage

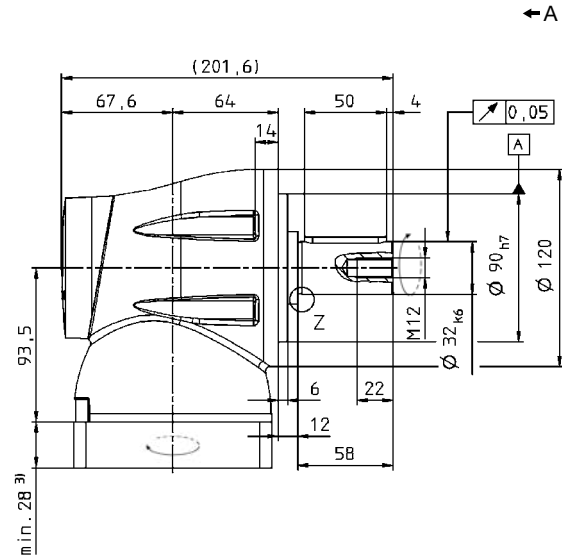
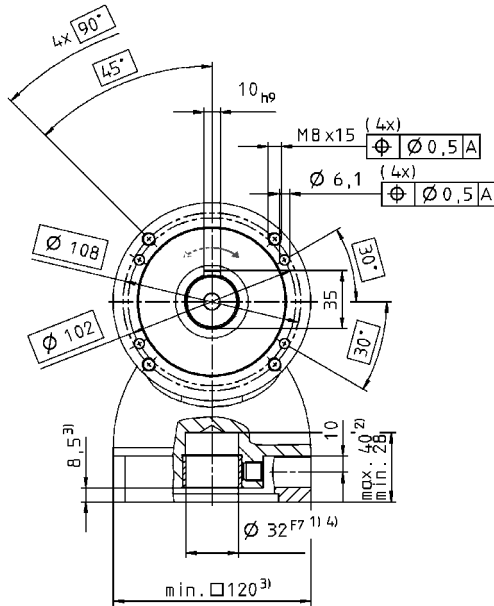
|                                                                                         |             |                                                            | 1-stage                           |
|-----------------------------------------------------------------------------------------|-------------|------------------------------------------------------------|-----------------------------------|
| Ratio                                                                                   | $i$         |                                                            | 1                                 |
| Max. acceleration torque<br>(max. 1000 cycles per hour)                                 | $T_{2B}$    | Nm                                                         | 45                                |
|                                                                                         |             | in.lb                                                      | 400                               |
| Nominal output torque<br>(with $n_{1N}$ )                                               | $T_{2N}$    | Nm                                                         | 23                                |
|                                                                                         |             | in.lb                                                      | 200                               |
| Emergency stop torque<br>(permitted 1000 times during the service life of the gearhead) | $T_{2Not}$  | Nm                                                         | 93                                |
|                                                                                         |             | in.lb                                                      | 820                               |
| Nominal input speed<br>(with $T_{2N}$ and 20°C ambient temperature) <sup>a)</sup>       | $n_{1N}$    | rpm                                                        | 2100                              |
| Max. input speed                                                                        | $n_{1Max}$  | rpm                                                        | 3500                              |
| Mean no load running torque<br>(with $n_1 = 3000$ rpm and 20°C gearhead temperature)    | $T_{012}$   | Nm                                                         | 2.5                               |
|                                                                                         |             | in.lb                                                      | 22                                |
| Max. torsional backlash                                                                 | $j_t$       | arcmin                                                     | ≤ 10                              |
| Torsional rigidity                                                                      | $C_{L21}$   | Nm/ arcmin<br>in.lb/ arcmin                                | –                                 |
| Max. axial force <sup>b)</sup>                                                          | $F_{2AMax}$ | N                                                          | 750                               |
|                                                                                         |             | lb <sub>f</sub>                                            | 170                               |
| Max. radial force <sup>b)</sup>                                                         | $F_{2RMax}$ | N                                                          | 4600                              |
|                                                                                         |             | lb <sub>f</sub>                                            | 1040                              |
| Efficiency at full load                                                                 | $\eta$      | %                                                          | 95                                |
| Service life<br>(For calculation, see the Chapter "Information")                        | $L_h$       | h                                                          | > 20000                           |
| Weight incl. standard adapter plate                                                     | $m$         | kg<br>lb <sub>m</sub>                                      | 8.9<br>20                         |
| Operating noise<br>(with $n_1 = 3000$ rpm no load)                                      | $L_{PA}$    | dB(A)                                                      | ≤ 76                              |
| Max. permitted housing temperature                                                      |             | °C                                                         | +90                               |
|                                                                                         |             | F                                                          | 194                               |
| Ambient temperature                                                                     |             | °C                                                         | -15 to 40                         |
|                                                                                         |             | F                                                          | 5 to 104                          |
| Lubrication                                                                             |             |                                                            | Lubricated for life               |
| Paint                                                                                   |             |                                                            | without                           |
| Direction of rotation                                                                   |             |                                                            | Motor and gearhead same direction |
| Protection class                                                                        |             |                                                            | IP 64                             |
| Moment of inertia<br>(relates to the drive)                                             | $J_i$       | kgcm <sup>2</sup><br>10 <sup>-3</sup> in.lb.s <sup>2</sup> | 14<br>12                          |

<sup>a)</sup> For higher ambient temperatures, please reduce input speed

<sup>b)</sup> Refers to center of the output shaft, if  $n_2 = 1000$  rpm

View A

1-stage:



Non-tolerated dimensions  $\pm 1$  mm

- 1) Check motor shaft fit.
- 2) Min./Max. permissible motor shaft length. Longer motor shafts are adaptable, please contact us.
- 3) The dimensions depend on the motor.
- 4) Smaller motor shaft diameter is compensated by a bushing.



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Motor mounting according to operating manual

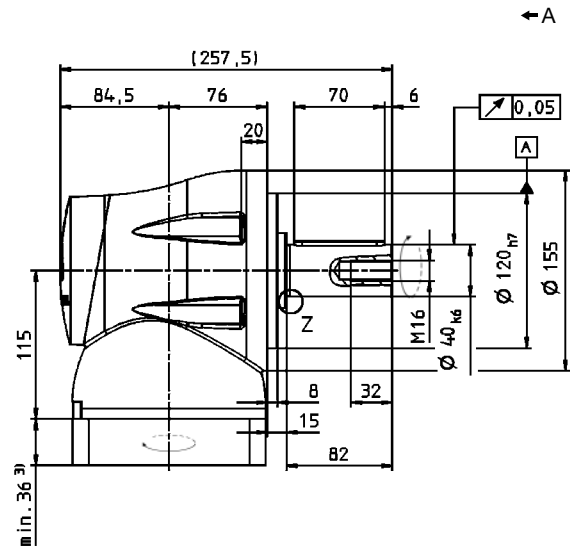
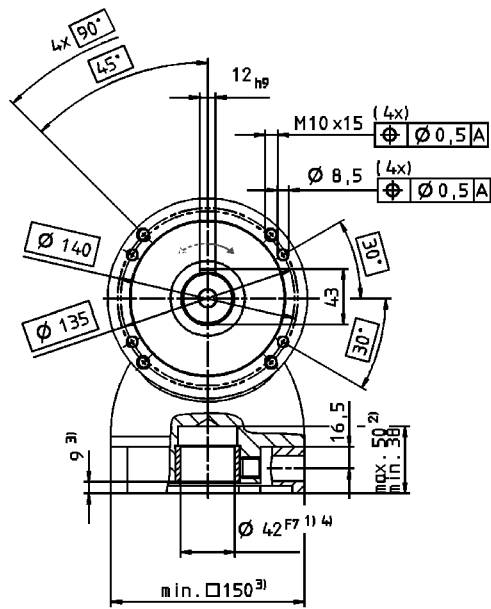
# LK+ 155 1-stage

|                                                                                         |             |                                       | 1-stage                           |
|-----------------------------------------------------------------------------------------|-------------|---------------------------------------|-----------------------------------|
| Ratio                                                                                   | $i$         |                                       | 1                                 |
| Max. acceleration torque<br>(max. 1000 cycles per hour)                                 | $T_{2B}$    | Nm                                    | 93                                |
|                                                                                         |             | in.lb                                 | 820                               |
| Nominal output torque<br>(with $n_{1N}$ )                                               | $T_{2N}$    | Nm                                    | 66                                |
|                                                                                         |             | in.lb                                 | 580                               |
| Emergency stop torque<br>(permitted 1000 times during the service life of the gearhead) | $T_{2Not}$  | Nm                                    | 194                               |
|                                                                                         |             | in.lb                                 | 1720                              |
| Nominal input speed<br>(with $T_{2N}$ and 20°C ambient temperature <sup>a)</sup> )      | $n_{1N}$    | rpm                                   | 1600                              |
| Max. input speed                                                                        | $n_{1Max}$  | rpm                                   | 3000                              |
| Mean no load running torque<br>(with $n_1 = 3000$ rpm and 20°C gearhead temperature)    | $T_{012}$   | Nm                                    | 4.5                               |
|                                                                                         |             | in.lb                                 |                                   |
| Max. torsional backlash                                                                 | $j_t$       | arcmin                                | ≤ 8                               |
|                                                                                         |             |                                       | 40                                |
| Torsional rigidity                                                                      | $C_{L21}$   | Nm/ arcmin                            | –                                 |
|                                                                                         |             | in.lb/ arcmin                         |                                   |
| Max. axial force <sup>b)</sup>                                                          | $F_{2AMax}$ | N                                     | 1000                              |
|                                                                                         |             | lb <sub>f</sub>                       | 225                               |
| Max. radial force <sup>b)</sup>                                                         | $F_{2RMax}$ | N                                     | 7500                              |
|                                                                                         |             | lb <sub>f</sub>                       | 1690                              |
| Efficiency at full load                                                                 | $\eta$      | %                                     | 95                                |
| Service life<br>(For calculation, see the Chapter "Information")                        | $L_h$       | h                                     | > 20000                           |
| Weight incl. standard adapter plate                                                     | $m$         | kg                                    | 19                                |
|                                                                                         |             | lb <sub>m</sub>                       | 42                                |
| Operating noise<br>(with $n_1 = 3000$ rpm no load)                                      | $L_{PA}$    | dB(A)                                 | ≤ 78                              |
| Max. permitted housing temperature                                                      |             | °C                                    | +90                               |
|                                                                                         |             | F                                     | 194                               |
| Ambient temperature                                                                     |             | °C                                    | -15 to 40                         |
|                                                                                         |             | F                                     | 5 to 104                          |
| Lubrication                                                                             |             |                                       | Lubricated for life               |
| Paint                                                                                   |             |                                       | without                           |
| Direction of rotation                                                                   |             |                                       | Motor and gearhead same direction |
| Protection class                                                                        |             |                                       | IP 64                             |
| Moment of inertia<br>(relates to the drive)                                             | $J_1$       | kgcm <sup>2</sup>                     | 57                                |
|                                                                                         |             | 10 <sup>-3</sup> in.lb.s <sup>2</sup> | 51                                |

<sup>a)</sup> For higher ambient temperatures, please reduce input speed

<sup>b)</sup> Refers to center of the output shaft, if  $n_2 = 1000$  rpm

**1-stage:**



Non-tolerated dimensions  $\pm 1$  mm

- 1) Check motor shaft fit.
- 2) Min./Max. permissible motor shaft length. Longer motor shafts are adaptable, please contact us.
- 3) The dimensions depend on the motor.
- 4) Smaller motor shaft diameter is compensated by a bushing.



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Motor mounting according to operating manual

# LPK+ 050 2/3-stage

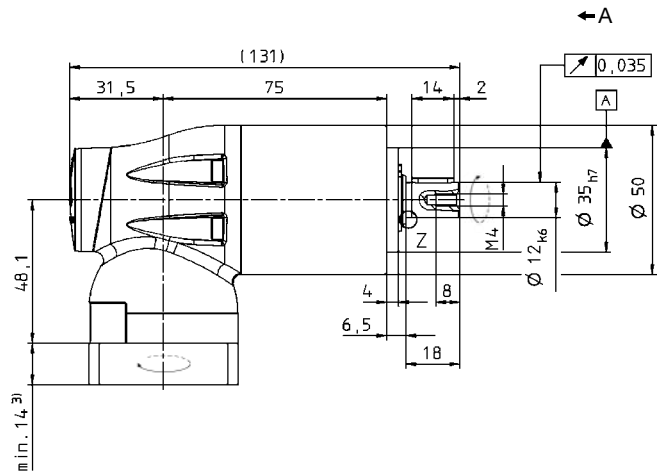
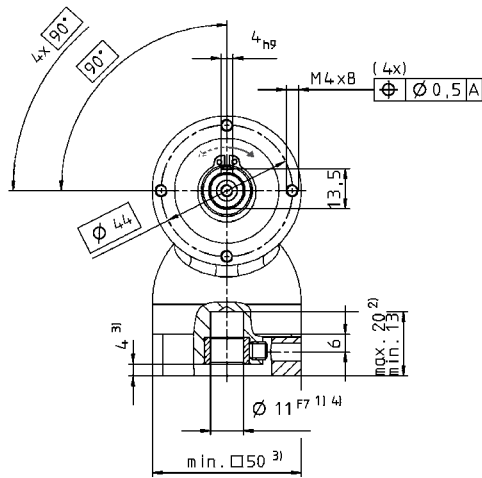
|                                                                                                      |                           |                                       | 2-stage                           |      |      |      | 3-stage |      |      |      |      |      |      |
|------------------------------------------------------------------------------------------------------|---------------------------|---------------------------------------|-----------------------------------|------|------|------|---------|------|------|------|------|------|------|
| Ratio                                                                                                | <i>i</i>                  |                                       | 4                                 | 5    | 7    | 10   | 16      | 20   | 25   | 35   | 50   | 70   | 100  |
| Max. acceleration torque<br>(max. 1000 cycles per hour)                                              | <i>T</i> <sub>2B</sub>    | Nm                                    | 11                                | 12   | 12   | 11   | 11      | 11   | 12   | 12   | 12   | 12   | 11   |
|                                                                                                      |                           | in.lb                                 | 100                               | 110  | 110  | 100  | 100     | 100  | 110  | 110  | 110  | 110  | 100  |
| Nominal output torque<br>(with <i>n</i> <sub>1N</sub> )                                              | <i>T</i> <sub>2N</sub>    | Nm                                    | 5.2                               | 5.7  | 5.7  | 5.2  | 5.2     | 5.2  | 5.7  | 5.7  | 5.7  | 5.7  | 5.2  |
|                                                                                                      |                           | in.lb                                 | 46                                | 50   | 50   | 46   | 46      | 46   | 50   | 50   | 50   | 50   | 46   |
| Emergency stop torque<br>(permitted 1000 times during the service life of the gearhead)              | <i>T</i> <sub>2Not</sub>  | Nm                                    | 26                                | 26   | 26   | 26   | 26      | 26   | 26   | 26   | 26   | 26   | 26   |
|                                                                                                      |                           | in.lb                                 | 230                               | 230  | 230  | 230  | 230     | 230  | 230  | 230  | 230  | 230  | 230  |
| Nominal input speed<br>(with <i>T</i> <sub>2N</sub> and 20°C ambient temperature) <sup>a)</sup>      | <i>n</i> <sub>1N</sub>    | rpm                                   | 3200                              | 3200 | 3200 | 3200 | 3200    | 3200 | 3200 | 3200 | 3200 | 3200 | 3200 |
| Max. input speed                                                                                     | <i>n</i> <sub>1Max</sub>  | rpm                                   | 5000                              | 5000 | 5000 | 5000 | 5000    | 5000 | 5000 | 5000 | 5000 | 5000 | 5000 |
| Mean no load running torque<br>(with <i>n</i> <sub>i</sub> = 3000 rpm and 20°C gearhead temperature) | <i>T</i> <sub>012</sub>   | Nm                                    | 0.2                               | 0.2  | 0.2  | 0.2  | 0.2     | 0.2  | 0.2  | 0.2  | 0.2  | 0.2  | 0.2  |
|                                                                                                      |                           | in.lb                                 | 1.8                               | 1.8  | 1.8  | 1.8  | 1.8     | 1.8  | 1.8  | 1.8  | 1.8  | 1.8  | 1.8  |
| Max. torsional backlash                                                                              | <i>j</i> <sub>t</sub>     | arcmin                                | ≤ 16                              |      |      |      | ≤ 15    |      |      |      |      |      |      |
| Torsional rigidity                                                                                   | <i>C</i> <sub>t21</sub>   | Nm/ arcmin                            | –                                 |      |      |      | –       |      |      |      |      |      |      |
|                                                                                                      |                           | in.lb/ arcmin                         |                                   |      |      |      |         |      |      |      |      |      |      |
| Max. axial force <sup>b)</sup>                                                                       | <i>F</i> <sub>2AMax</sub> | N                                     | 700                               |      |      |      | 700     |      |      |      |      |      |      |
|                                                                                                      |                           | lb <sub>f</sub>                       | 160                               |      |      |      | 160     |      |      |      |      |      |      |
| Max. radial force <sup>b)</sup>                                                                      | <i>F</i> <sub>2RMax</sub> | N                                     | 650                               |      |      |      | 650     |      |      |      |      |      |      |
|                                                                                                      |                           | lb <sub>f</sub>                       | 150                               |      |      |      | 150     |      |      |      |      |      |      |
| Efficiency at full load                                                                              | η                         | %                                     | 92                                |      |      |      | 90      |      |      |      |      |      |      |
| Service life<br>(For calculation, see the Chapter “Information”)                                     | <i>L</i> <sub>h</sub>     | h                                     | > 20000                           |      |      |      | > 20000 |      |      |      |      |      |      |
| Weight incl. standard adapter plate                                                                  | <i>m</i>                  | kg                                    | 1.4                               |      |      |      | 1.6     |      |      |      |      |      |      |
|                                                                                                      |                           | lb <sub>m</sub>                       | 3.1                               |      |      |      | 3.5     |      |      |      |      |      |      |
| Operating noise<br>(for i = 10 and <i>n</i> <sub>i</sub> = 3000 rpm without load)                    | <i>L</i> <sub>PA</sub>    | dB(A)                                 | ≤72                               |      |      |      |         |      |      |      |      |      |      |
| Max. permitted housing temperature                                                                   | °C                        |                                       | +90                               |      |      |      |         |      |      |      |      |      |      |
|                                                                                                      | F                         |                                       | 194                               |      |      |      |         |      |      |      |      |      |      |
| Ambient temperature                                                                                  | °C                        |                                       | -15 to 40                         |      |      |      |         |      |      |      |      |      |      |
|                                                                                                      | F                         |                                       | 5 to 104                          |      |      |      |         |      |      |      |      |      |      |
| Lubrication                                                                                          |                           |                                       | Lubricated for life               |      |      |      |         |      |      |      |      |      |      |
| Paint                                                                                                |                           |                                       | Blue RAL 5002                     |      |      |      |         |      |      |      |      |      |      |
| Direction of rotation                                                                                |                           |                                       | Motor and gearhead same direction |      |      |      |         |      |      |      |      |      |      |
| Protection class                                                                                     |                           |                                       | IP 64                             |      |      |      |         |      |      |      |      |      |      |
| Moment of inertia<br>(relates to the drive)                                                          | <i>J</i> <sub>i</sub>     | kgcm <sup>2</sup>                     | 0.16                              | 0.16 | 0.16 | 0.16 | 0.16    | 0.16 | 0.16 | 0.16 | 0.16 | 0.16 | 0.16 |
|                                                                                                      |                           | 10 <sup>-3</sup> in.lb.s <sup>2</sup> | 0.14                              | 0.14 | 0.14 | 0.14 | 0.14    | 0.14 | 0.14 | 0.14 | 0.14 | 0.14 | 0.14 |

<sup>a)</sup> For higher ambient temperatures, please reduce input speed

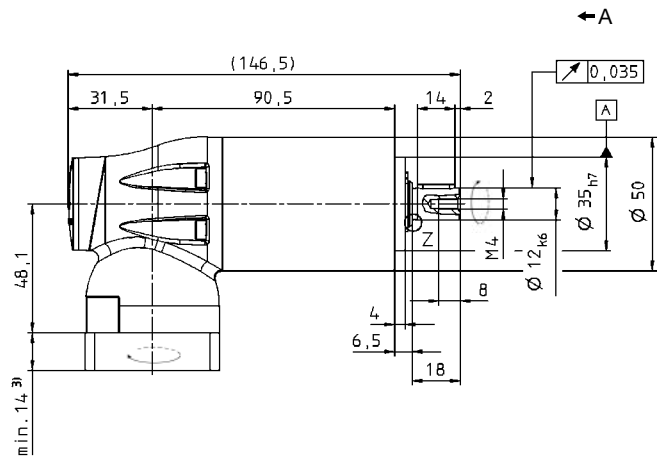
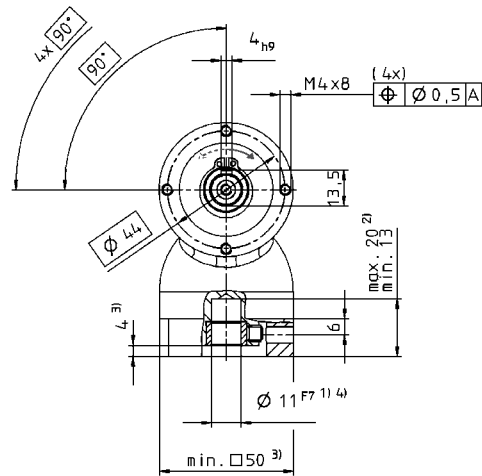
<sup>b)</sup> Refers to center of the output shaft, if  $n_2 = 100$  rpm

View A

2-stage:



3-stage:



Non-tolerated dimensions  $\pm 1$  mm

- 1) Check motor shaft fit.
- 2) Min./Max. permissible motor shaft length. Longer motor shafts are adaptable, please contact us.
- 3) The dimensions depend on the motor.
- 4) Smaller motor shaft diameter is compensated by a bushing.



CAD data is available under [www.wittenstein-alpha.com](http://www.wittenstein-alpha.com)



Motor mounting according to operating manual



# LPK+ 070 2/3-stage

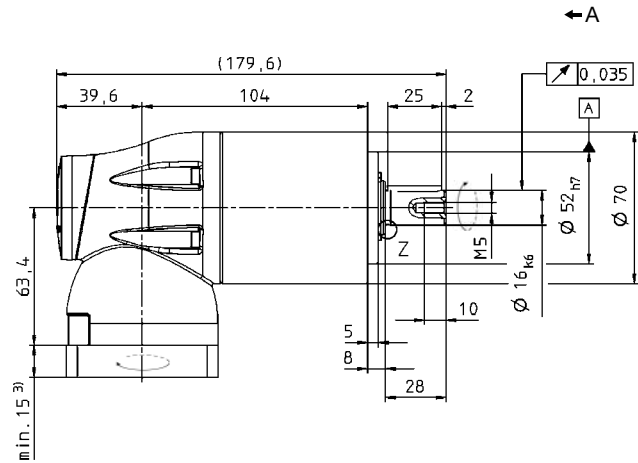
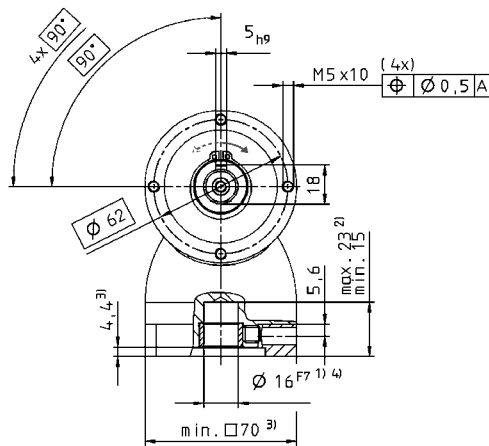
|                                                                                                      |                           |                           | 2-stage                           |      |      |      |      | 3-stage |      |      |      |      |      |      |
|------------------------------------------------------------------------------------------------------|---------------------------|---------------------------|-----------------------------------|------|------|------|------|---------|------|------|------|------|------|------|
| Ratio                                                                                                | <i>i</i>                  |                           | 3                                 | 4    | 5    | 7    | 10   | 16      | 20   | 25   | 30   | 50   | 70   | 100  |
| Max. acceleration torque<br>(max. 1000 cycles per hour)                                              | <i>T</i> <sub>2B</sub>    | Nm                        | 22                                | 29   | 35   | 35   | 32   | 35      | 35   | 35   | 32   | 35   | 35   | 32   |
|                                                                                                      |                           | in.lb                     | 190                               | 260  | 310  | 310  | 280  | 310     | 310  | 310  | 280  | 310  | 310  | 280  |
| Nominal output torque<br>(with <i>n</i> <sub>N</sub> )                                               | <i>T</i> <sub>2N</sub>    | Nm                        | 11                                | 15   | 18   | 18   | 16.5 | 18      | 18   | 18   | 16.5 | 18   | 18   | 16.5 |
|                                                                                                      |                           | in.lb                     | 100                               | 130  | 160  | 160  | 150  | 160     | 160  | 160  | 160  | 160  | 160  | 160  |
| Emergency stop torque<br>(permitted 1000 times during the service life of the gearhead)              | <i>T</i> <sub>2Not</sub>  | Nm                        | 45                                | 60   | 75   | 75   | 75   | 75      | 75   | 75   | 75   | 75   | 75   | 75   |
|                                                                                                      |                           | in.lb                     | 400                               | 530  | 664  | 660  | 660  | 660     | 660  | 660  | 660  | 660  | 660  | 660  |
| Nominal input speed<br>(with <i>T</i> <sub>2N</sub> and 20°C ambient temperature) <sup>a)</sup>      | <i>n</i> <sub>1N</sub>    | rpm                       | 3000                              | 3000 | 3000 | 3000 | 3000 | 3000    | 3000 | 3000 | 3000 | 3000 | 3000 | 3000 |
| Max. input speed                                                                                     | <i>n</i> <sub>1Max</sub>  | rpm                       | 4500                              | 4500 | 4500 | 4500 | 4500 | 4500    | 4500 | 4500 | 4500 | 4500 | 4500 | 4500 |
| Mean no load running torque<br>(with <i>n</i> <sub>i</sub> = 3000 rpm and 20°C gearhead temperature) | <i>T</i> <sub>012</sub>   | Nm                        | 0.6                               | 0.55 | 0.5  | 0.44 | 0.44 | 0.44    | 0.44 | 0.44 | 0.44 | 0.44 | 0.44 | 0.4  |
|                                                                                                      |                           | in.lb                     | 5.3                               | 4.9  | 4.4  | 3.9  | 3.9  | 3.9     | 3.9  | 3.9  | 3.9  | 3.9  | 3.9  | 3.5  |
| Max. torsional backlash                                                                              | <i>j</i> <sub>t</sub>     | arcmin                    | ≤ 14                              |      |      |      |      | ≤ 12    |      |      |      |      |      |      |
| Torsional rigidity                                                                                   | <i>C</i> <sub>t21</sub>   | Nm/ arcmin                | 1                                 | 1,5  | 2    | 2    | 2    | 3       | 3    | 3    | 3    | 3    | 3    | 3    |
|                                                                                                      |                           | in.lb/ arcmin             | 9                                 | 13   | 17   | 21   | 21   | 27      | 27   | 27   | 25   | 28   | 28   | 25   |
| Max. axial force <sup>b)</sup>                                                                       | <i>F</i> <sub>2AMax</sub> | N                         | 1550                              |      |      |      |      | 1550    |      |      |      |      |      |      |
|                                                                                                      |                           | lb <sub>f</sub>           | 350                               |      |      |      |      | 350     |      |      |      |      |      |      |
| Max. radial force <sup>b)</sup>                                                                      | <i>F</i> <sub>2RMax</sub> | N                         | 1450                              |      |      |      |      | 1450    |      |      |      |      |      |      |
|                                                                                                      |                           | lb <sub>f</sub>           | 330                               |      |      |      |      | 330     |      |      |      |      |      |      |
| Efficiency at full load                                                                              | η                         | %                         | 92                                |      |      |      |      | 90      |      |      |      |      |      |      |
| Service life<br>(For calculation, see the Chapter “Information”)                                     | <i>L</i> <sub>h</sub>     | h                         | > 20000                           |      |      |      |      | > 20000 |      |      |      |      |      |      |
| Weight incl. standard adapter plate                                                                  | <i>m</i>                  | kg                        | 3.8                               |      |      |      |      | 4.2     |      |      |      |      |      |      |
|                                                                                                      |                           | lb <sub>m</sub>           | 8.4                               |      |      |      |      | 9.3     |      |      |      |      |      |      |
| Operating noise<br>(for i = 10 and <i>n</i> <sub>i</sub> = 3000 rpm without load)                    | <i>L</i> <sub>PA</sub>    | dB(A)                     | ≤73                               |      |      |      |      |         |      |      |      |      |      |      |
| Max. permitted housing temperature                                                                   | °C                        |                           | +90                               |      |      |      |      |         |      |      |      |      |      |      |
|                                                                                                      | F                         |                           | 194                               |      |      |      |      |         |      |      |      |      |      |      |
| Ambient temperature                                                                                  | °C                        |                           | -15 to 40                         |      |      |      |      |         |      |      |      |      |      |      |
|                                                                                                      | F                         |                           | 5 to 104                          |      |      |      |      |         |      |      |      |      |      |      |
| Lubrication                                                                                          |                           |                           | Lubricated for life               |      |      |      |      |         |      |      |      |      |      |      |
| Paint                                                                                                |                           |                           | Blue RAL 5002                     |      |      |      |      |         |      |      |      |      |      |      |
| Direction of rotation                                                                                |                           |                           | Motor and gearhead same direction |      |      |      |      |         |      |      |      |      |      |      |
| Protection class                                                                                     |                           |                           | IP 64                             |      |      |      |      |         |      |      |      |      |      |      |
| Moment of inertia<br>(relates to the drive)                                                          | <i>J</i> <sub>i</sub>     | kgcm²                     | 0.85                              | 0.85 | 0.85 | 0.85 | 0.85 | 0.85    | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 | 0.85 |
|                                                                                                      |                           | 10 <sup>-3</sup> in.lb.s² | 0.75                              | 0.75 | 0.75 | 0.75 | 0.75 | 0.75    | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 |

<sup>a)</sup> For higher ambient temperatures, please reduce input speed

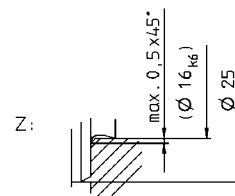
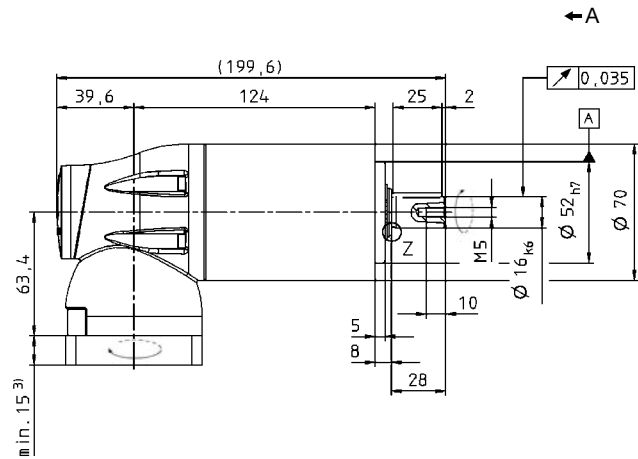
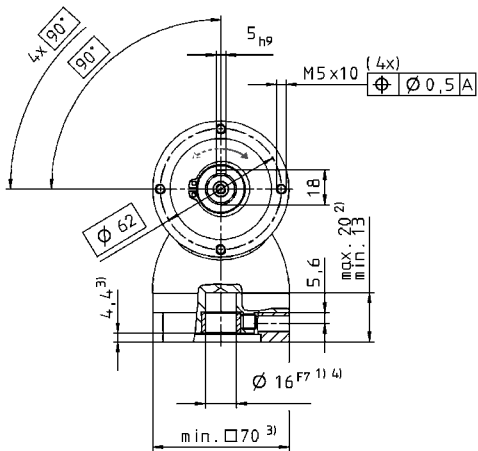
<sup>b)</sup> Refers to center of the output shaft, if  $n_2 = 100$  rpm

View A

2-stage:



3-stage:



Non-tolerated dimensions  $\pm 1$  mm

- 1) Check motor shaft fit.
- 2) Min./Max. permissible motor shaft length. Longer motor shafts are adaptable, please contact us.
- 3) The dimensions depend on the motor.
- 4) Smaller motor shaft diameter is compensated by a bushing.



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Motor mounting according to operating manual

# LPK+ 090 2/3-stage

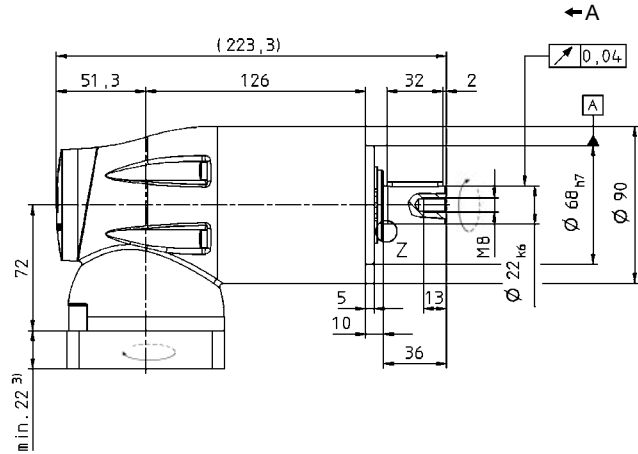
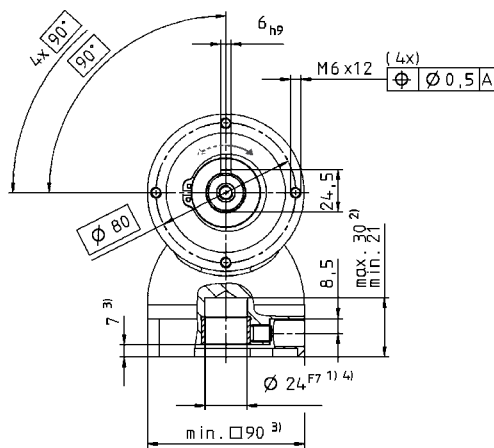
|                                                                                                      |                           |                           | 2-stage                           |      |      |      |      | 3-stage |      |      |      |      |      |      |
|------------------------------------------------------------------------------------------------------|---------------------------|---------------------------|-----------------------------------|------|------|------|------|---------|------|------|------|------|------|------|
| Ratio                                                                                                | <i>i</i>                  |                           | 3                                 | 4    | 5    | 7    | 10   | 16      | 20   | 25   | 30   | 50   | 70   | 100  |
| Max. acceleration torque<br>(max. 1000 cycles per hour)                                              | <i>T</i> <sub>2B</sub>    | Nm                        | 56                                | 74   | 90   | 90   | 80   | 90      | 90   | 90   | 80   | 90   | 90   | 80   |
|                                                                                                      |                           | in.lb                     | 500                               | 650  | 800  | 800  | 710  | 800     | 800  | 800  | 710  | 800  | 800  | 710  |
| Nominal output torque<br>(with <i>n</i> <sub>1N</sub> )                                              | <i>T</i> <sub>2N</sub>    | Nm                        | 28                                | 37   | 45   | 45   | 40   | 45      | 45   | 45   | 40   | 45   | 45   | 40   |
|                                                                                                      |                           | in.lb                     | 250                               | 330  | 400  | 400  | 350  | 400     | 400  | 400  | 400  | 400  | 400  | 350  |
| Emergency stop torque<br>(permitted 1000 times during the service life of the gearhead)              | <i>T</i> <sub>2Not</sub>  | Nm                        | 110                               | 150  | 190  | 190  | 190  | 190     | 190  | 190  | 190  | 190  | 190  | 190  |
|                                                                                                      |                           | in.lb                     | 970                               | 1330 | 1680 | 1680 | 1680 | 1680    | 1680 | 1680 | 1680 | 1680 | 1680 | 1680 |
| Nominal input speed<br>(with <i>T</i> <sub>2N</sub> and 20°C ambient temperature) <sup>a)</sup>      | <i>n</i> <sub>1N</sub>    | rpm                       | 2700                              | 2700 | 2700 | 2700 | 2700 | 2700    | 2700 | 2700 | 2700 | 2700 | 2700 | 2700 |
| Max. input speed                                                                                     | <i>n</i> <sub>1Max</sub>  | rpm                       | 4000                              | 4000 | 4000 | 4000 | 4000 | 4000    | 4000 | 4000 | 4000 | 4000 | 4000 | 4000 |
| Mean no load running torque<br>(with <i>n</i> <sub>1</sub> = 3000 rpm and 20°C gearhead temperature) | <i>T</i> <sub>012</sub>   | Nm                        | 1.3                               | 1.3  | 1.2  | 1.1  | 1.1  | 1.1     | 1.1  | 1.1  | 1.1  | 1.1  | 1.1  | 1.0  |
|                                                                                                      |                           | in.lb                     | 12                                | 11   | 11   | 10   | 10   | 10      | 10   | 10   | 10   | 10   | 10   | 9    |
| Max. torsional backlash                                                                              | <i>j</i> <sub>t</sub>     | arcmin                    | ≤ 12                              |      |      |      |      | ≤ 11    |      |      |      |      |      |      |
| Torsional rigidity                                                                                   | <i>C</i> <sub>L21</sub>   | Nm/ arcmin                | 4.9                               | 6.5  | 7.3  | 8.2  | 8.0  | 9.2     | 9.4  | 9.4  | 8.4  | 9.5  | 9.5  | 8.5  |
|                                                                                                      |                           | in.lb/ arcmin             | 43                                | 58   | 65   | 73   | 71   | 81      | 83   | 83   | 74   | 84   | 84   | 75   |
| Max. axial force <sup>b)</sup>                                                                       | <i>F</i> <sub>2AMax</sub> | N                         | 1900                              |      |      |      |      | 1900    |      |      |      |      |      |      |
|                                                                                                      |                           | lb <sub>f</sub>           | 430                               |      |      |      |      | 430     |      |      |      |      |      |      |
| Max. radial force <sup>b)</sup>                                                                      | <i>F</i> <sub>2RMax</sub> | N                         | 2400                              |      |      |      |      | 2400    |      |      |      |      |      |      |
|                                                                                                      |                           | lb <sub>f</sub>           | 540                               |      |      |      |      | 540     |      |      |      |      |      |      |
| Efficiency at full load                                                                              | η                         | %                         | 92                                |      |      |      |      | 90      |      |      |      |      |      |      |
| Service life<br>(For calculation, see the Chapter “Information”)                                     | <i>L</i> <sub>h</sub>     | h                         | > 20000                           |      |      |      |      | > 20000 |      |      |      |      |      |      |
| Weight incl. standard adapter plate                                                                  | <i>m</i>                  | kg                        | 6.9                               |      |      |      |      | 7.9     |      |      |      |      |      |      |
|                                                                                                      |                           | lb <sub>m</sub>           | 15                                |      |      |      |      | 17      |      |      |      |      |      |      |
| Operating noise<br>(for i = 10 and <i>n</i> <sub>1</sub> = 3000 rpm without load)                    | <i>L</i> <sub>PA</sub>    | dB(A)                     | ≤ 76                              |      |      |      |      |         |      |      |      |      |      |      |
| Max. permitted housing temperature                                                                   | °C                        |                           | +90                               |      |      |      |      |         |      |      |      |      |      |      |
|                                                                                                      | F                         |                           | 194                               |      |      |      |      |         |      |      |      |      |      |      |
| Ambient temperature                                                                                  | °C                        |                           | -15 to 40                         |      |      |      |      |         |      |      |      |      |      |      |
|                                                                                                      | F                         |                           | 5 to 104                          |      |      |      |      |         |      |      |      |      |      |      |
| Lubrication                                                                                          |                           |                           | Lubricated for life               |      |      |      |      |         |      |      |      |      |      |      |
| Paint                                                                                                |                           |                           | Blue RAL 5002                     |      |      |      |      |         |      |      |      |      |      |      |
| Direction of rotation                                                                                |                           |                           | Motor and gearhead same direction |      |      |      |      |         |      |      |      |      |      |      |
| Protection class                                                                                     |                           |                           | IP 64                             |      |      |      |      |         |      |      |      |      |      |      |
| Moment of inertia<br>(relates to the drive)                                                          | <i>J</i> <sub>1</sub>     | kgcm²                     | 4.1                               | 4.1  | 4.1  | 4.1  | 4.1  | 4.1     | 4.1  | 4.1  | 4.1  | 4.1  | 4.1  | 4.1  |
|                                                                                                      |                           | 10 <sup>-3</sup> in.lb.s² | 3.6                               | 3.6  | 3.6  | 3.6  | 3.6  | 3.6     | 3.6  | 3.6  | 3.6  | 3.6  | 3.6  | 3.6  |

<sup>a)</sup> For higher ambient temperatures, please reduce input speed

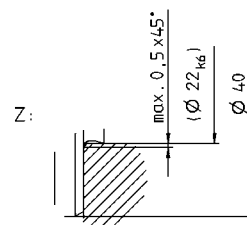
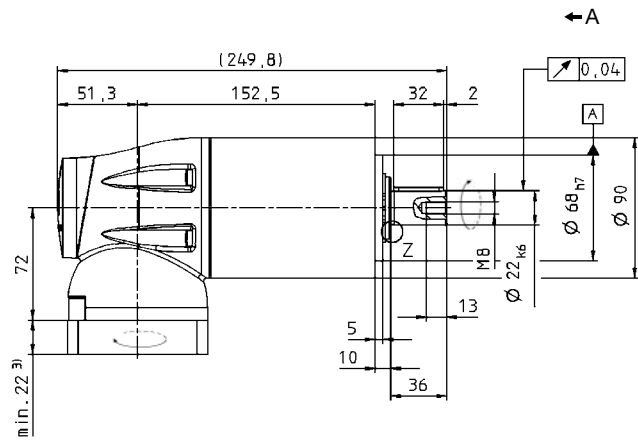
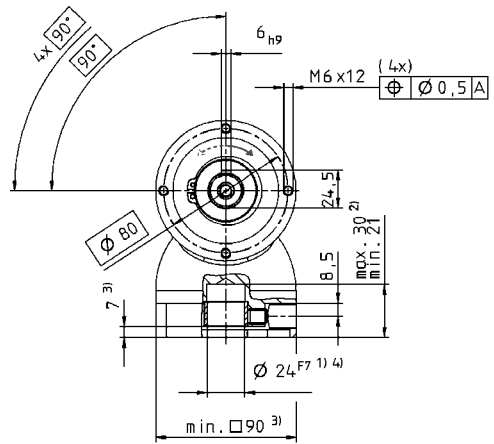
<sup>b)</sup> Refers to center of the output shaft, if  $n_2 = 100$  rpm

View A

2-stage:



3-stage:



Non-tolerated dimensions  $\pm 1$  mm

- 1) Check motor shaft fit.
- 2) Min./Max. permissible motor shaft length. Longer motor shafts are adaptable, please contact us.
- 3) The dimensions depend on the motor.
- 4) Smaller motor shaft diameter is compensated by a bushing.



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Motor mounting according to operating manual

# LPK+ 120 2/3-stage

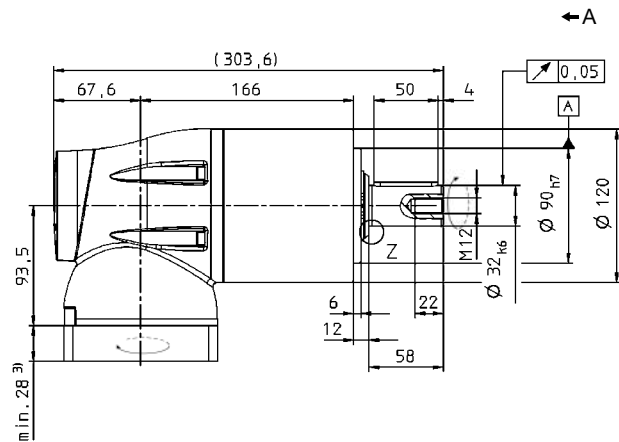
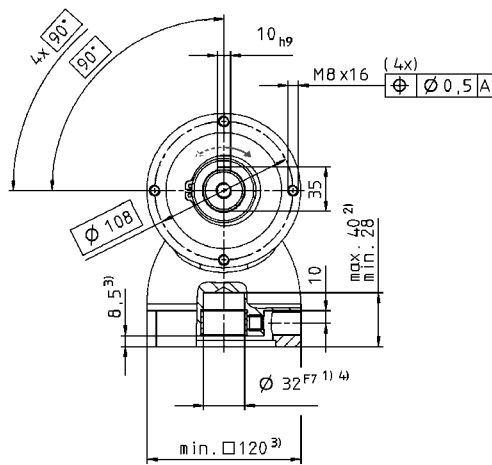
|                                                                                                      |                           |                           | 2-stage                           |      |      |      |      | 3-stage |      |      |      |      |      |      |
|------------------------------------------------------------------------------------------------------|---------------------------|---------------------------|-----------------------------------|------|------|------|------|---------|------|------|------|------|------|------|
| Ratio                                                                                                | <i>i</i>                  |                           | 3                                 | 4    | 5    | 7    | 10   | 16      | 20   | 25   | 30   | 50   | 70   | 100  |
| Max. acceleration torque<br>(max. 1000 cycles per hour)                                              | <i>T</i> <sub>2B</sub>    | Nm                        | 136                               | 181  | 220  | 220  | 200  | 220     | 220  | 220  | 200  | 220  | 220  | 200  |
|                                                                                                      |                           | in.lb                     | 1200                              | 1600 | 1950 | 1950 | 1770 | 1950    | 1950 | 1950 | 1770 | 1950 | 1950 | 1770 |
| Nominal output torque<br>(with <i>n</i> <sub>N</sub> )                                               | <i>T</i> <sub>2N</sub>    | Nm                        | 68                                | 91   | 110  | 110  | 100  | 110     | 110  | 110  | 100  | 110  | 110  | 100  |
|                                                                                                      |                           | in.lb                     | 600                               | 810  | 970  | 970  | 890  | 970     | 970  | 970  | 890  | 970  | 970  | 890  |
| Emergency stop torque<br>(permitted 1000 times during the service life of the gearhead)              | <i>T</i> <sub>2Not</sub>  | Nm                        | 280                               | 380  | 480  | 480  | 480  | 480     | 480  | 480  | 480  | 480  | 480  | 480  |
|                                                                                                      |                           | in.lb                     | 2500                              | 3400 | 4200 | 4200 | 4200 | 4200    | 4200 | 4200 | 4200 | 4200 | 4200 | 4200 |
| Nominal input speed<br>(with <i>T</i> <sub>2N</sub> and 20°C ambient temperature) <sup>a)</sup>      | <i>n</i> <sub>1N</sub>    | rpm                       | 2100                              | 2100 | 2100 | 2100 | 2100 | 2100    | 2100 | 2100 | 2100 | 2100 | 2100 | 2100 |
| Max. input speed                                                                                     | <i>n</i> <sub>1Max</sub>  | rpm                       | 3500                              | 3500 | 3500 | 3500 | 3500 | 3500    | 3500 | 3500 | 3500 | 3500 | 3500 | 3500 |
| Mean no load running torque<br>(with <i>n</i> <sub>i</sub> = 3000 rpm and 20°C gearhead temperature) | <i>T</i> <sub>012</sub>   | Nm                        | 3.5                               | 3.3  | 3.2  | 3.1  | 3.1  | 2.9     | 2.8  | 2.8  | 2.7  | 2.7  | 2.7  | 2.7  |
|                                                                                                      |                           | in.lb                     | 31                                | 29   | 28   | 27   | 27   | 26      | 25   | 25   | 24   | 24   | 24   | 24   |
| Max. torsional backlash                                                                              | <i>j</i> <sub>t</sub>     | arcmin                    | ≤ 11                              |      |      |      |      | ≤ 11    |      |      |      |      |      |      |
| Torsional rigidity                                                                                   | <i>C</i> <sub>t21</sub>   | Nm/ arcmin                | 19                                | 22   | 23   | 24   | 22   | 25      | 25   | 25   | 22   | 25   | 25   | 22   |
|                                                                                                      |                           | in.lb/ arcmin             | 170                               | 190  | 210  | 210  | 190  | 220     | 220  | 220  | 190  | 220  | 220  | 190  |
| Max. axial force <sup>b)</sup>                                                                       | <i>F</i> <sub>2AMax</sub> | N                         | 4000                              |      |      |      |      | 4000    |      |      |      |      |      |      |
|                                                                                                      |                           | lb <sub>f</sub>           | 900                               |      |      |      |      | 900     |      |      |      |      |      |      |
| Max. radial force <sup>b)</sup>                                                                      | <i>F</i> <sub>2RMax</sub> | N                         | 4600                              |      |      |      |      | 4600    |      |      |      |      |      |      |
|                                                                                                      |                           | lb <sub>f</sub>           | 1040                              |      |      |      |      | 1040    |      |      |      |      |      |      |
| Efficiency at full load                                                                              | η                         | %                         | 92                                |      |      |      |      | 90      |      |      |      |      |      |      |
| Service life<br>(For calculation, see the Chapter “Information”)                                     | <i>L</i> <sub>h</sub>     | h                         | > 20000                           |      |      |      |      | > 20000 |      |      |      |      |      |      |
| Weight incl. standard adapter plate                                                                  | <i>m</i>                  | kg                        | 17                                |      |      |      |      | 19      |      |      |      |      |      |      |
|                                                                                                      |                           | lb <sub>m</sub>           | 37                                |      |      |      |      | 42      |      |      |      |      |      |      |
| Operating noise<br>(for i = 10 and <i>n</i> <sub>i</sub> = 3000 rpm without load)                    | <i>L</i> <sub>PA</sub>    | dB(A)                     | ≤ 76                              |      |      |      |      |         |      |      |      |      |      |      |
| Max. permitted housing temperature                                                                   | °C                        |                           | +90                               |      |      |      |      |         |      |      |      |      |      |      |
|                                                                                                      | F                         |                           | 194                               |      |      |      |      |         |      |      |      |      |      |      |
| Ambient temperature                                                                                  | °C                        |                           | -15 to 40                         |      |      |      |      |         |      |      |      |      |      |      |
|                                                                                                      | F                         |                           | 5 to 104                          |      |      |      |      |         |      |      |      |      |      |      |
| Lubrication                                                                                          |                           |                           | Lubricated for life               |      |      |      |      |         |      |      |      |      |      |      |
| Paint                                                                                                |                           |                           | Blue RAL 5002                     |      |      |      |      |         |      |      |      |      |      |      |
| Direction of rotation                                                                                |                           |                           | Motor and gearhead same direction |      |      |      |      |         |      |      |      |      |      |      |
| Protection class                                                                                     |                           |                           | IP 64                             |      |      |      |      |         |      |      |      |      |      |      |
| Moment of inertia<br>(relates to the drive)                                                          | <i>J</i> <sub>i</sub>     | kgcm²                     | 17                                | 17   | 17   | 17   | 17   | 17      | 17   | 17   | 17   | 17   | 17   | 17   |
|                                                                                                      |                           | 10 <sup>-3</sup> in.lb.s² | 15                                | 15   | 15   | 15   | 15   | 15      | 15   | 15   | 15   | 15   | 15   | 15   |

<sup>a)</sup> For higher ambient temperatures, please reduce input speed

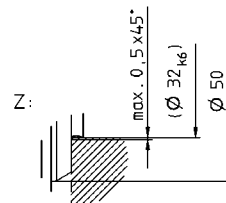
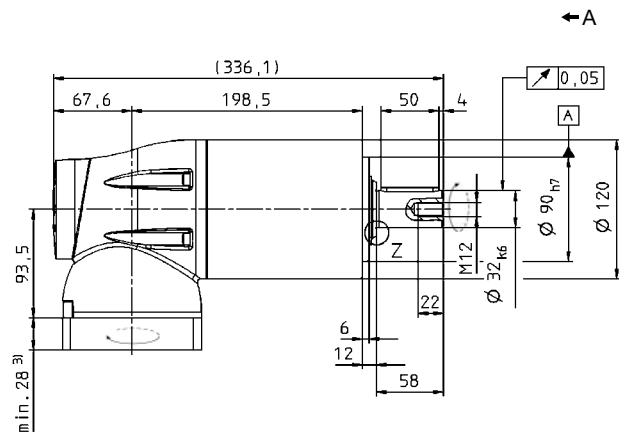
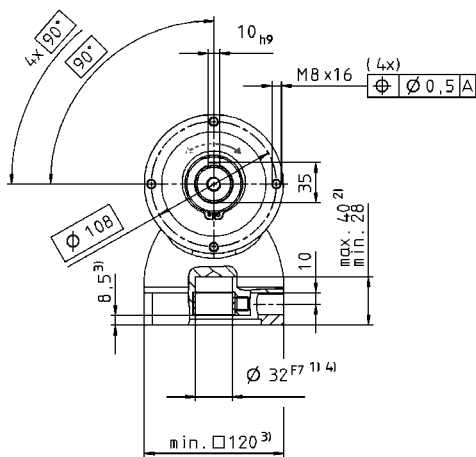
<sup>b)</sup> Refers to center of the output shaft, if  $n_2 = 100$  rpm

## View A

## 2-stage:



## 3-stage:


Non-tolerated dimensions  $\pm 1$  mm

- 1) Check motor shaft fit.
- 2) Min./Max. permissible motor shaft length. Longer motor shafts are adaptable, please contact us.
- 3) The dimensions depend on the motor.
- 4) Smaller motor shaft diameter is compensated by a bushing.


CAD data is available under [www.wittenstein-alpha.com](http://www.wittenstein-alpha.com)


Motor mounting according to operating manual

# LPK+ 155 2/3-stage

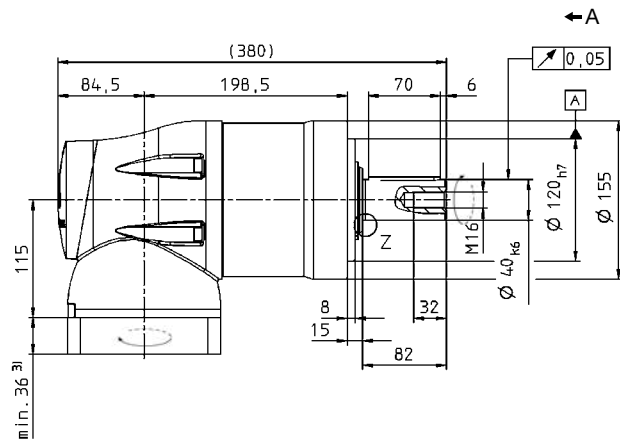
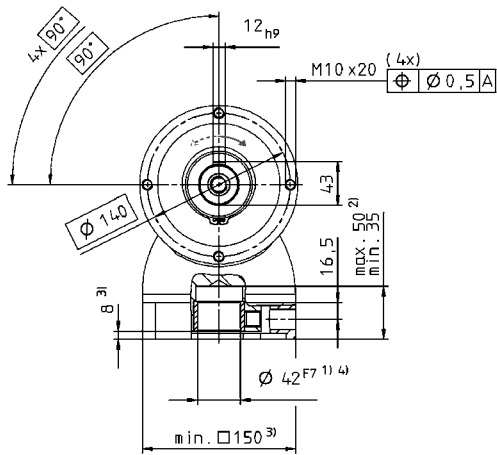
|                                                                                                                |             |                                       | 2-stage                           |      | 3-stage |      |      |
|----------------------------------------------------------------------------------------------------------------|-------------|---------------------------------------|-----------------------------------|------|---------|------|------|
| Ratio                                                                                                          | <i>i</i>    |                                       | 5                                 | 10   | 25      | 50   | 100  |
| Max. acceleration torque<br><small>(max. 1000 cycles per hour)</small>                                         | $T_{2B}$    | Nm                                    | 450                               | 350  | 450     | 450  | 350  |
|                                                                                                                |             | in.lb                                 | 4000                              | 3100 | 4000    | 4000 | 3100 |
| Nominal output torque<br><small>(with <math>n_{1N}</math>)</small>                                             | $T_{2N}$    | Nm                                    | 320                               | 190  | 320     | 320  | 190  |
|                                                                                                                |             | in.lb                                 | 2800                              | 1700 | 2800    | 2800 | 1700 |
| Emergency stop torque<br><small>(permitted 1000 times during the service life of the gearhead)</small>         | $T_{2Not}$  | Nm                                    | 1000                              | 1000 | 1000    | 1000 | 1000 |
|                                                                                                                |             | in.lb                                 | 8850                              | 8850 | 8850    | 8850 | 8850 |
| Nominal input speed<br><small>(with <math>T_{2N}</math> and 20°C ambient temperature) <sup>a)</sup></small>    | $n_{1N}$    | rpm                                   | 1600                              | 1600 | 1600    | 1600 | 1600 |
| Max. input speed                                                                                               | $n_{1Max}$  | rpm                                   | 3000                              | 3000 | 3500    | 3500 | 3500 |
| Mean no load running torque<br><small>(with <math>n_1</math> = 3000 rpm and 20°C gearhead temperature)</small> | $T_{012}$   | Nm                                    | 7.3                               | 7.0  | 3.5     | 3.3  | 3.2  |
|                                                                                                                |             | in.lb                                 |                                   |      |         |      |      |
| Max. torsional backlash                                                                                        | $j_t$       | arcmin                                | ≤ 10                              |      | ≤ 11    |      |      |
| Torsional rigidity                                                                                             | $C_{t21}$   | Nm/ arcmin                            | 44                                | 42   | 55      | 55   | 44   |
|                                                                                                                |             | in.lb/ arcmin                         | 390                               | 370  | 480     | 490  | 390  |
| Max. axial force <sup>b)</sup>                                                                                 | $F_{2AMax}$ | N                                     | 6000                              |      | 6000    |      |      |
|                                                                                                                |             | lb <sub>f</sub>                       | 1350                              |      | 1350    |      |      |
| Max. radial force <sup>b)</sup>                                                                                | $F_{2RMax}$ | N                                     | 7500                              |      | 7500    |      |      |
|                                                                                                                |             | lb <sub>f</sub>                       | 1690                              |      | 1690    |      |      |
| Efficiency at full load                                                                                        | $\eta$      | %                                     | 92                                |      | 90      |      |      |
| Service life<br><small>(For calculation, see the Chapter "Information")</small>                                | $L_h$       | h                                     | > 20000                           |      | > 20000 |      |      |
| Weight incl. standard adapter plate                                                                            | $m$         | kg                                    | 35                                |      | 39      |      |      |
|                                                                                                                |             | lb <sub>m</sub>                       | 77                                |      | 86      |      |      |
| Operating noise<br><small>(for i = 10 and <math>n_1</math> = 3000 rpm without load)</small>                    | $L_{PA}$    | dB(A)                                 | ≤ 78                              |      |         |      |      |
| Max. permitted housing temperature                                                                             |             | °C                                    | +90                               |      |         |      |      |
|                                                                                                                |             | F                                     | 194                               |      |         |      |      |
| Ambient temperature                                                                                            |             | °C                                    | -15 to 40                         |      |         |      |      |
|                                                                                                                |             | F                                     | 5 to 104                          |      |         |      |      |
| Lubrication                                                                                                    |             |                                       | Lubricated for life               |      |         |      |      |
| Paint                                                                                                          |             |                                       | Blue RAL 5002                     |      |         |      |      |
| Direction of rotation                                                                                          |             |                                       | Motor and gearhead same direction |      |         |      |      |
| Protection class                                                                                               |             |                                       | IP 64                             |      |         |      |      |
| Moment of inertia<br><small>(relates to the drive)</small>                                                     | $J_1$       | kgcm <sup>2</sup>                     | 75                                | 75   | 17      | 17   | 17   |
|                                                                                                                |             | 10 <sup>-3</sup> in.lb.s <sup>2</sup> | 66                                | 66   | 15      | 15   | 15   |

<sup>a)</sup> For higher ambient temperatures, please reduce input speed

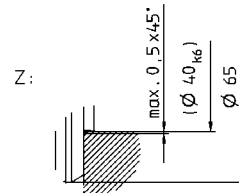
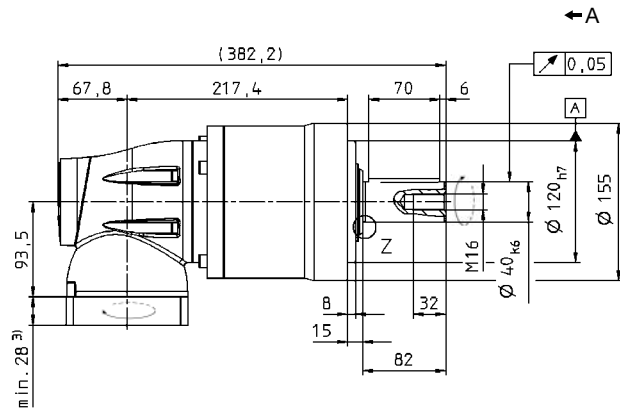
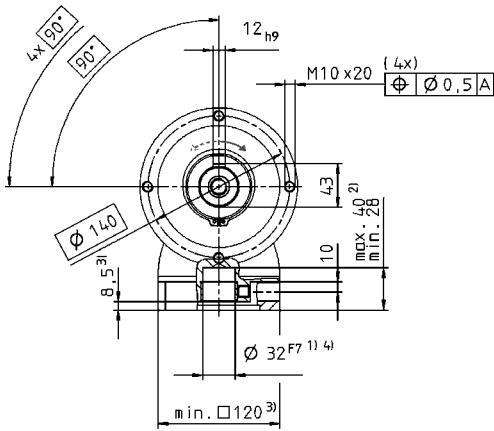
<sup>b)</sup> Refers to center of the output shaft, if = 100 rpm

View A

2-stage:



3-stage:



Non-tolerated dimensions  $\pm 1$  mm

- 1) Check motor shaft fit.
- 2) Min./Max. permissible motor shaft length. Longer motor shafts are adaptable, please contact us.
- 3) The dimensions depend on the motor.
- 4) Smaller motor shaft diameter is compensated by a bushing.



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Motor mounting according to operating manual



# LPBK+ 070 2-stage

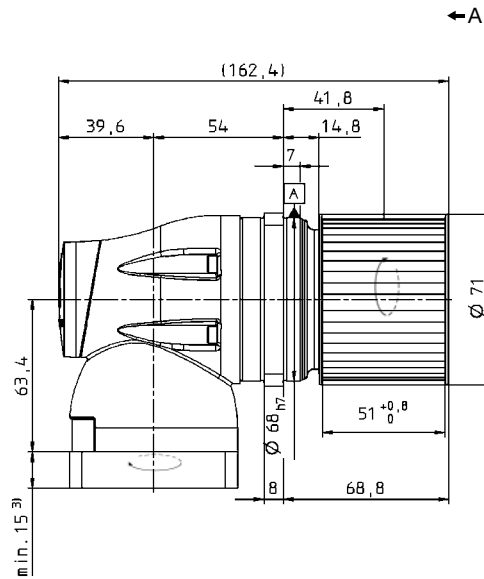
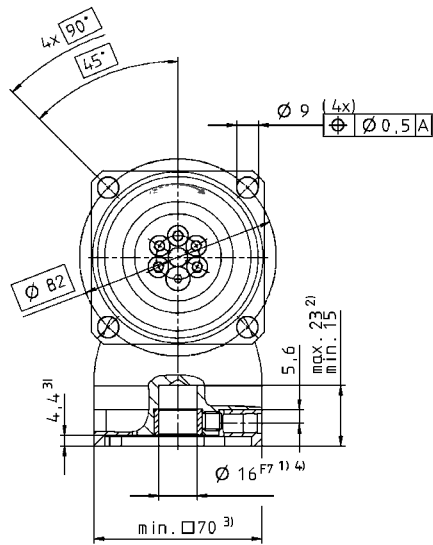
|                                                                                         |             |                                       | 2-stage                           |      |      |      |      |
|-----------------------------------------------------------------------------------------|-------------|---------------------------------------|-----------------------------------|------|------|------|------|
| Ratio                                                                                   | <i>i</i>    |                                       | 3                                 | 4    | 5    | 7    | 10   |
| Max. acceleration torque<br>(max. 1000 cycles per hour)                                 | $T_{2B}$    | Nm                                    | 22                                | 29   | 35   | 35   | 32   |
|                                                                                         |             | in.lb                                 | 190                               | 260  | 310  | 310  | 280  |
| Nominal output torque<br>(with $n_{1N}$ )                                               | $T_{2N}$    | Nm                                    | 11                                | 15   | 18   | 18   | 16.5 |
|                                                                                         |             | in.lb                                 | 100                               | 130  | 160  | 160  | 150  |
| Emergency stop torque<br>(permitted 1000 times during the service life of the gearhead) | $T_{2Not}$  | Nm                                    | 45                                | 60   | 75   | 75   | 75   |
|                                                                                         |             | in.lb                                 | 400                               | 530  | 660  | 660  | 660  |
| Nominal input speed<br>(with $T_{2N}$ and 20°C ambient temperature) <sup>a)</sup>       | $n_{1N}$    | rpm                                   | 3000                              | 3000 | 3000 | 3000 | 3000 |
| Max. input speed                                                                        | $n_{1Max}$  | rpm                                   | 4500                              | 4500 | 4500 | 4500 | 4500 |
| Mean no load running torque<br>(with $n_1 = 3000$ rpm and 20°C gearhead temperature)    | $T_{012}$   | Nm                                    | 0.6                               | 0.55 | 0.5  | 0.45 | 0.45 |
|                                                                                         |             | in.lb                                 | 5.3                               | 4.9  | 4.4  | 4.0  | 4.0  |
| Max. torsional backlash                                                                 | $j_t$       | arcmin                                | $\leq 14$                         |      |      |      |      |
| Torsional rigidity                                                                      | $C_{L21}$   | Nm/ arcmin                            | —                                 | —    | —    | —    | —    |
|                                                                                         |             | in.lb/ arcmin                         | —                                 | —    | —    | —    | —    |
| Max. axial force <sup>b)</sup>                                                          | $F_{2AMax}$ | N                                     | 1550                              |      |      |      |      |
|                                                                                         |             | lb <sub>f</sub>                       | 350                               |      |      |      |      |
| Max. radial force <sup>c)</sup>                                                         | $F_{2RMax}$ | N                                     | 3000                              |      |      |      |      |
|                                                                                         |             | lb <sub>f</sub>                       | 680                               |      |      |      |      |
| Efficiency at full load                                                                 | $\eta$      | %                                     | 92                                |      |      |      |      |
| Service life<br>(For calculation, see the Chapter "Information")                        | $L_h$       | h                                     | > 20000                           |      |      |      |      |
| Weight incl. standard adapter plate                                                     | $m$         | kg                                    | 3.4                               |      |      |      |      |
|                                                                                         |             | lb <sub>m</sub>                       | 7.5                               |      |      |      |      |
| Operating noise<br>(for $i = 10$ and $n_1 = 3000$ rpm without load)                     | $L_{PA}$    | dB(A)                                 | $\leq 73$                         |      |      |      |      |
| Max. permitted housing temperature                                                      |             | °C                                    | +90                               |      |      |      |      |
|                                                                                         |             | F                                     | 194                               |      |      |      |      |
| Ambient temperature                                                                     |             | °C                                    | -15 to 40                         |      |      |      |      |
|                                                                                         |             | F                                     | 5 to 104                          |      |      |      |      |
| Lubrication                                                                             |             |                                       | Lubricated for life               |      |      |      |      |
| Paint                                                                                   |             |                                       | Blue RAL 5002                     |      |      |      |      |
| Direction of rotation                                                                   |             |                                       | Motor and gearhead same direction |      |      |      |      |
| Protection class                                                                        |             |                                       | IP 64                             |      |      |      |      |
| Moment of inertia<br>(relates to the drive)                                             | $J_1$       | kgcm <sup>2</sup>                     | 0.85                              | 0.85 | 0.85 | 0.85 | 0.85 |
|                                                                                         |             | 10 <sup>-3</sup> in.lb.s <sup>2</sup> | 0.75                              | 0.75 | 0.75 | 0.75 | 0.75 |

<sup>a)</sup> For higher ambient temperatures, please reduce input speed

<sup>b)</sup> Refers to center of the output shaft, if  $n_2 = 100$  rpm

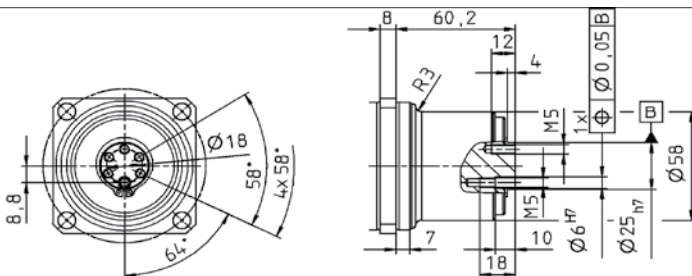
<sup>c)</sup> With mounted PLPB+ belt pulley and 100 rpm

**2-stage:**



Supplement: Belt pulley PLPB<sup>+</sup> (not included in the scope of delivery – please order separately)

Illustration: Output flange without belt pulley



| Belt Pulley PLPB+ 070 Profile AT5-0 |                         |      |
|-------------------------------------|-------------------------|------|
| Pitch                               | $p$ mm                  | 5    |
| Number of teeth                     | $z$                     | 43   |
| Circumference                       | $z \cdot p$ mm/rotation | 215  |
| Inertia                             | $J$ kgcm <sup>2</sup>   | 3.86 |
| Mass                                | $m$ kg                  | 0.48 |

Non-tolerated dimensions  $\pm 1$  mm

- 1) Check motor shaft fit.
- 2) Min./Max. permissible motor shaft length. Longer motor shafts are adaptable, please contact us.
- 3) The dimensions depend on the motor.
- 4) Smaller motor shaft diameter is compensated by a bushing.



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Motor mounting according to operating manual

# LPBK+ 090 2-stage

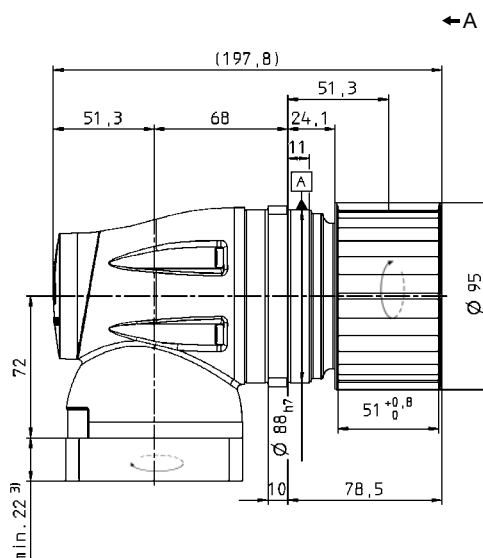
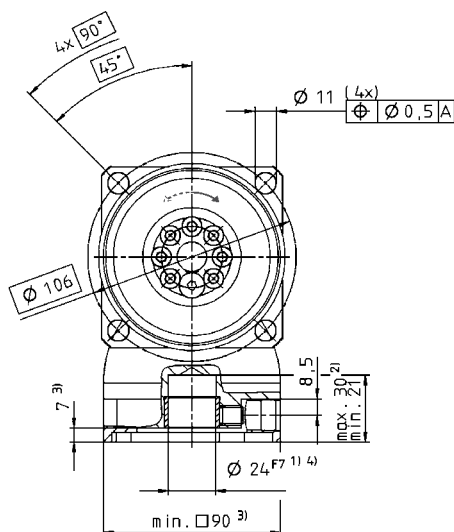
|                                                                                         |             |                                       | 2-stage                           |      |      |      |      |
|-----------------------------------------------------------------------------------------|-------------|---------------------------------------|-----------------------------------|------|------|------|------|
| Ratio                                                                                   | <i>i</i>    |                                       | 3                                 | 4    | 5    | 7    | 10   |
| Max. acceleration torque<br>(max. 1000 cycles per hour)                                 | $T_{2B}$    | Nm                                    | 56                                | 74   | 90   | 90   | 80   |
|                                                                                         |             | in.lb                                 | 500                               | 650  | 800  | 800  | 710  |
| Nominal output torque<br>(with $n_{1N}$ )                                               | $T_{2N}$    | Nm                                    | 28                                | 37   | 45   | 45   | 40   |
|                                                                                         |             | in.lb                                 | 250                               | 330  | 400  | 400  | 350  |
| Emergency stop torque<br>(permitted 1000 times during the service life of the gearhead) | $T_{2Not}$  | Nm                                    | 110                               | 150  | 190  | 190  | 190  |
|                                                                                         |             | in.lb                                 | 970                               | 1330 | 1680 | 1680 | 1680 |
| Nominal input speed<br>(with $T_{2N}$ and 20°C ambient temperature) <sup>a)</sup>       | $n_{1N}$    | rpm                                   | 2700                              | 2700 | 2700 | 2700 | 2700 |
| Max. input speed                                                                        | $n_{1Max}$  | rpm                                   | 4000                              | 4000 | 4000 | 4000 | 4000 |
| Mean no load running torque<br>(with $n_1 = 3000$ rpm and 20°C gearhead temperature)    | $T_{012}$   | Nm                                    | 1.3                               | 1.3  | 1.2  | 1.1  | 1.1  |
|                                                                                         |             | in.lb                                 | 12                                | 11   | 11   | 10   | 10   |
| Max. torsional backlash                                                                 | $j_t$       | arcmin                                | $\leq 12$                         |      |      |      |      |
| Torsional rigidity                                                                      | $C_{L21}$   | Nm/ arcmin                            | —                                 | —    | —    | —    | —    |
|                                                                                         |             | in.lb/ arcmin                         | —                                 | —    | —    | —    | —    |
| Max. axial force <sup>b)</sup>                                                          | $F_{2AMax}$ | N                                     | 1900                              |      |      |      |      |
|                                                                                         |             | lb <sub>f</sub>                       | 430                               |      |      |      |      |
| Max. radial force <sup>c)</sup>                                                         | $F_{2RMax}$ | N                                     | 4300                              |      |      |      |      |
|                                                                                         |             | lb <sub>f</sub>                       | 970                               |      |      |      |      |
| Efficiency at full load                                                                 | $\eta$      | %                                     | 92                                |      |      |      |      |
| Service life<br>(For calculation, see the Chapter "Information")                        | $L_h$       | h                                     | > 20000                           |      |      |      |      |
| Weight incl. standard adapter plate                                                     | $m$         | kg                                    | 6.2                               |      |      |      |      |
|                                                                                         |             | lb <sub>m</sub>                       | 14                                |      |      |      |      |
| Operating noise<br>(for $i = 10$ and $n_1 = 3000$ rpm without load)                     | $L_{PA}$    | dB(A)                                 | $\leq 76$                         |      |      |      |      |
| Max. permitted housing temperature                                                      |             | °C                                    |                                   |      |      |      |      |
|                                                                                         |             | F                                     | 194                               |      |      |      |      |
| Ambient temperature                                                                     |             | °C                                    | -15 to 40                         |      |      |      |      |
|                                                                                         |             | F                                     | 5 to 104                          |      |      |      |      |
| Lubrication                                                                             |             |                                       | Lubricated for life               |      |      |      |      |
| Paint                                                                                   |             |                                       | Blue RAL 5002                     |      |      |      |      |
| Direction of rotation                                                                   |             |                                       | Motor and gearhead same direction |      |      |      |      |
| Protection class                                                                        |             |                                       | IP 64                             |      |      |      |      |
| Moment of inertia<br>(relates to the drive)                                             | $J_1$       | kgcm <sup>2</sup>                     | 4.1                               | 4.1  | 4.1  | 4.1  | 4.1  |
|                                                                                         |             | 10 <sup>-3</sup> in.lb.s <sup>2</sup> | 3.6                               | 3.6  | 3.6  | 3.6  | 3.6  |

<sup>a)</sup> For higher ambient temperatures, please reduce input speed

<sup>b)</sup> Refers to center of the output shaft, if  $n_2 = 100$  rpm

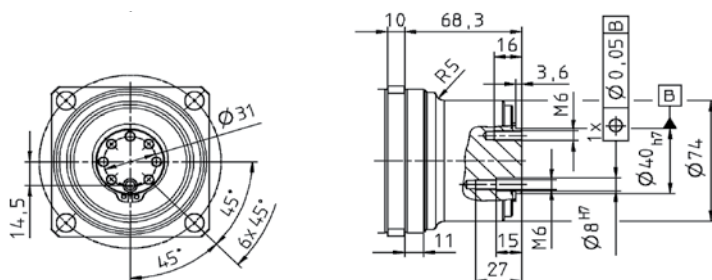
<sup>c)</sup> With mounted PLPB+ belt pulley and 100 rpm

## 2-stage:



Supplement: Belt pulley PLPB+ (not included in the scope of delivery – please order separately)

Illustration: Output flange without belt pulley



| Belt Pulley PLPB+ 090 Profile AT10-0 |             |                   |       |
|--------------------------------------|-------------|-------------------|-------|
| Pitch                                | $p$         | mm                | 10    |
| Number of teeth                      | $z$         |                   | 28    |
| Circumference                        | $z \cdot p$ | mm/rotation       | 280   |
| Inertia                              | $J$         | kgcm <sup>2</sup> | 10.95 |
| Mass                                 | $m$         | kg                | 0.82  |

Non-tolerated dimensions  $\pm 1$  mm

- 1) Check motor shaft fit.
- 2) Min./Max. permissible motor shaft length. Longer motor shafts are adaptable, please contact us.
- 3) The dimensions depend on the motor.
- 4) Smaller motor shaft diameter is compensated by a bushing.

CAD data is available under [www.wittenstein-alpha.com](http://www.wittenstein-alpha.com)

Motor mounting according to operating manual

# LPBK+ 120 2-stage

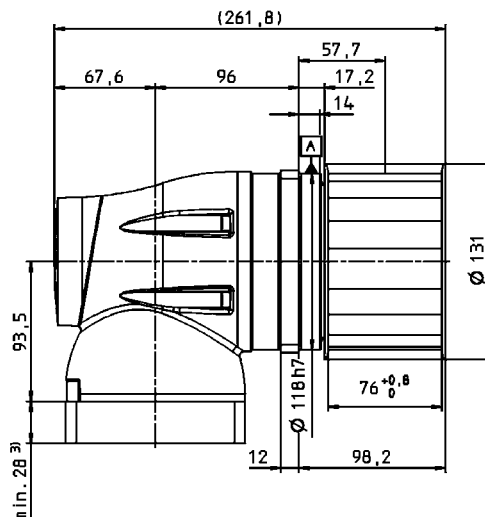
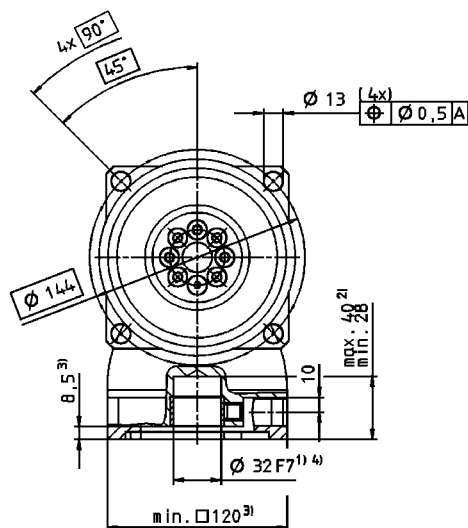
|                                                                                         |             |                                       | 2-stage                           |      |      |      |      |
|-----------------------------------------------------------------------------------------|-------------|---------------------------------------|-----------------------------------|------|------|------|------|
| Ratio                                                                                   | <i>i</i>    |                                       | 3                                 | 4    | 5    | 7    | 10   |
| Max. acceleration torque<br>(max. 1000 cycles per hour)                                 | $T_{2B}$    | Nm                                    | 136                               | 181  | 220  | 220  | 200  |
|                                                                                         |             | in.lb                                 | 1200                              | 1600 | 1950 | 1950 | 1770 |
| Nominal output torque<br>(with $n_{1N}$ )                                               | $T_{2N}$    | Nm                                    | 68                                | 91   | 110  | 110  | 100  |
|                                                                                         |             | in.lb                                 | 600                               | 810  | 970  | 970  | 890  |
| Emergency stop torque<br>(permitted 1000 times during the service life of the gearhead) | $T_{2Not}$  | Nm                                    | 280                               | 380  | 480  | 480  | 480  |
|                                                                                         |             | in.lb                                 | 2500                              | 3400 | 4200 | 4200 | 4200 |
| Nominal input speed<br>(with $T_{2N}$ and 20°C ambient temperature) <sup>a)</sup>       | $n_{1N}$    | rpm                                   | 2100                              | 2100 | 2100 | 2100 | 2100 |
| Max. input speed                                                                        | $n_{1Max}$  | rpm                                   | 3500                              | 3500 | 3500 | 3500 | 3500 |
| Mean no load running torque<br>(with $n_1 = 3000$ rpm and 20°C gearhead temperature)    | $T_{012}$   | Nm                                    | 3,5                               | 3,3  | 3,2  | 3,1  | 3,1  |
|                                                                                         |             | in.lb                                 | 31                                | 29   | 28   | 27   | 27   |
| Max. torsional backlash                                                                 | $j_t$       | arcmin                                | ≤ 11                              |      |      |      |      |
| Torsional rigidity                                                                      | $C_{L21}$   | Nm/ arcmin                            | —                                 | —    | —    | —    | —    |
|                                                                                         |             | in.lb/ arcmin                         | —                                 | —    | —    | —    | —    |
| Max. axial force <sup>b)</sup>                                                          | $F_{2AMax}$ | N                                     | 4000                              |      |      |      |      |
|                                                                                         |             | lb <sub>f</sub>                       | 900                               |      |      |      |      |
| Max. radial force <sup>c)</sup>                                                         | $F_{2RMax}$ | N                                     | 9500                              |      |      |      |      |
|                                                                                         |             | lb <sub>f</sub>                       | 2100                              |      |      |      |      |
| Efficiency at full load                                                                 | $\eta$      | %                                     | 92                                |      |      |      |      |
| Service life<br>(For calculation, see the Chapter "Information")                        | $L_h$       | h                                     | > 20000                           |      |      |      |      |
| Weight incl. standard adapter plate                                                     | $m$         | kg                                    | 16                                |      |      |      |      |
|                                                                                         |             | lb <sub>m</sub>                       | 34                                |      |      |      |      |
| Operating noise<br>(for $i = 10$ and $n_1 = 3000$ rpm without load)                     | $L_{PA}$    | dB(A)                                 | ≤ 76                              |      |      |      |      |
| Max. permitted housing temperature                                                      |             | °C                                    | 90                                |      |      |      |      |
|                                                                                         |             | F                                     | 194                               |      |      |      |      |
| Ambient temperature                                                                     |             | °C                                    | -15 to 40                         |      |      |      |      |
|                                                                                         |             | F                                     | 5 to 104                          |      |      |      |      |
| Lubrication                                                                             |             |                                       | Lubricated for life               |      |      |      |      |
| Paint                                                                                   |             |                                       | Blue RAL 5002                     |      |      |      |      |
| Direction of rotation                                                                   |             |                                       | Motor and gearhead same direction |      |      |      |      |
| Protection class                                                                        |             |                                       | IP 64                             |      |      |      |      |
| Moment of inertia<br>(relates to the drive)                                             | $J_i$       | kgcm <sup>2</sup>                     | 17                                | 17   | 17   | 17   | 17   |
|                                                                                         |             | 10 <sup>-3</sup> in.lb.s <sup>2</sup> | 15                                | 15   | 15   | 15   | 15   |

<sup>a)</sup> For higher ambient temperatures, please reduce input speed

<sup>b)</sup> Refers to center of the output shaft, if  $n_2 = 100$  rpm

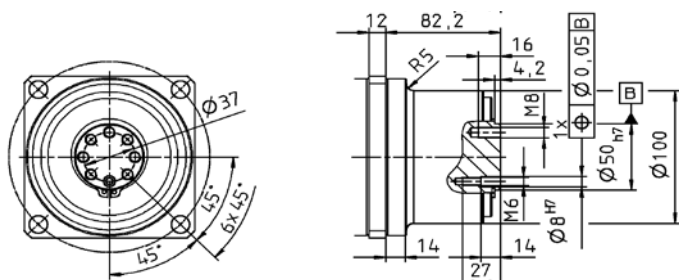
<sup>c)</sup> With mounted PLPB+ belt pulley and 100 rpm

2-stage:



Supplement: Belt pulley PLPB+ (not included in the scope of delivery – please order separately)

Illustration: Output flange without belt pulley



| Belt Pulley PLPB+ 120 Profile AT20-0 |             |                   |       |
|--------------------------------------|-------------|-------------------|-------|
| Pitch                                | $p$         | mm                | 20    |
| Number of teeth                      | $z$         |                   | 19    |
| Circumference                        | $z \cdot p$ | mm/rotation       | 380   |
| Inertia                              | $J$         | kgcm <sup>2</sup> | 50.62 |
| Mass                                 | $m$         | kg                | 2.61  |

Non-tolerated dimensions  $\pm 1$  mm

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Motor mounting according to operating manual