WITTENSTEIN | alpha

Components & Systems
Catalog 2012/2013

Low backlash planetary gearheads

Servo right-angle gearheads

Mechanical systems

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Contents

Dear Customers,

The desire to innovate and a pioneering spirit led to the formation of alpha getriebebau GmbH more than 25 years ago. While the name of the company has changed, the characteristics that made WITTENSTEIN alpha GmbH the success that it is today remain the same.

The true source of our success lies with you, our customers, who have remained steadfast and loyal over the years. Every day you challenge us to examine and re-evaluate our core competencies and thus contribute to their continuous development.

To stand still is to go backwards. This is particularly true when you look at the ever increasing pace of development for automation dealing with extremely precise actuation and control systems, which can be found not only in traditional mechanical engineering, but also in areas such as the aerospace industry or medical technology. As a globally active company and world market leader of products that fulfill their function reliably and precisely in countless cutting-edge applications, we take our responsibilities very seriously.

Your confidence in our experience and our desire to exceed your expectations in mechatronics have led to over a quarter of a century of continuous and mutual growth and success. We would like to extend our sincere thanks to you for your suggestions, your feedback and for a partnership based on fairness and cooperation.

Looking ahead to the future, we intend to continue using these same strengths and doing exactly what made the founders of the WITTENSTEIN Group and WITTENSTEIN alpha GmbH in particular so successful – to utilize the absolute desire to innovate in order to create future trends. We are well positioned to meet this challenge and are working on some of the most important issues affecting mankind today such as health, climate, energy, water and electric mobility.

For us, resource efficiency isn't just a catchy slogan. It is and has always been a cornerstone of the products that we develop for you, our customers, and you can be assured that it will remain so in the future.

Axel Leidner
Head of Product Management
WITTENSTEIN alpha GmbH

Dr. Michael Engelbreit
Head of Technical Office
WITTENSTEIN alpha GmbH

WITTENSTEIN Group

Specialized fields united in one company

– being one with the future

WITTENSTEIN

WITTENSTEIN | alpha

Drives, controls and positional accuracy are areas that require maximum precision. Products manufactured by WITTENSTEIN alpha GmbH are setting benchmarks worldwide in the fields of mechanical engineering and drive technology. From low backlash planetary gearheads, servo right-angle gearheads and complete drive units to the comprehensive cymex® engineering software package and expert technical consultation: WITTENSTEIN alpha GmbH has redefined the meaning of precision.

WITTENSTEIN | electronics

WITTENSTEIN electronics GmbH develops, manufactures and distributes **electronic and software components** for complex mechatronic drive systems and provides tailor-made support for its own innovative technology. The intelligent and efficient electronic components are characterized by outstanding power density and excellent reliability and are capable of working under extreme environmental conditions.

WITTENSTEIN | motion control

Integration plays an innovative role here and is a decisive factor in increasing power density and dynamics. WITTENSTEIN motion control GmbH develops **mechatronic drive systems with a high customer benefit** based on the products of the WITTENSTEIN Group. Under extreme operating conditions, electromechanical servo systems impressively demonstrate characteristics such as controllability, precision, functionality, reliability and durability.

WITTENSTEIN | cyber motor

Outstanding power density and dynamics, minimal weight and maximum reliability characterize the **servo motors** from WITTENSTEIN cyber motor GmbH. Customized motors for increased productivity and longest service life. Thanks to the development of special materials, the motors are suitable for use under extreme environmental conditions such as ultra-high vacuum, radioactive areas and in high-temperature applications.

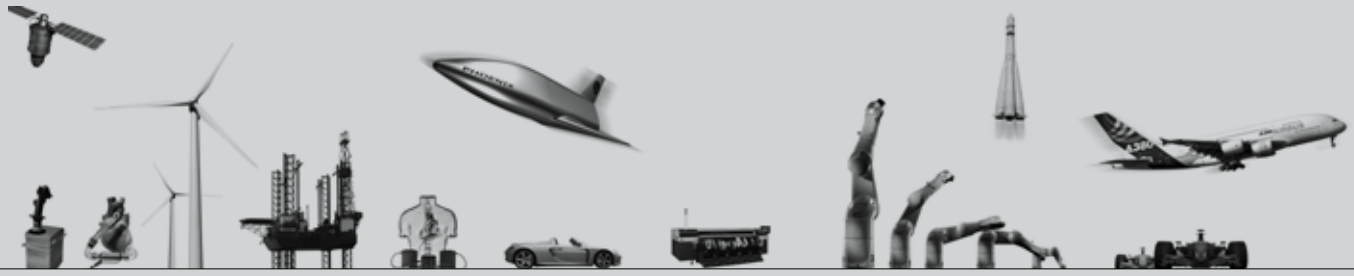


Photo Phoenix: EADS Astrium

WITTENSTEIN – Products that know no limits. High-precision drive systems for diverse branches of industry: Drive technology · Electronics · Machine tools · Manufacturing systems · Robotics, automation, handling · Textile, printing and paper machines · Laser, glass and wood processing machines · Food and packaging machines · Pneumatics · Semiconductor industry · Linear technology · Aerospace industry · Extreme ambient conditions (such as high temperatures, ultra-high vacuums) · Oil exploration · Medical technology · Pharmaceutical industry · Motor racing · Automotive and tire industry · Optical media · Vehicle technology · Defense technology

WITTENSTEIN AG is active in **seven innovative fields of business**, each of which have their own subsidiaries: Servo gearheads, servo drive systems, medical technology, miniature servo units, innovative gearing technology, rotary and linear actuator systems, nanotechnology as well as electronic and software components for drive technology.

WITTENSTEIN AG employs around 1,400 people worldwide and is represented by 60 subsidiaries and dealerships in more than 40 countries.

WITTENSTEIN | intens

Intelligence fascinates, inspires and adds that extra dimension. Innovative medical technology manufactured by WITTENSTEIN intens GmbH, which **focuses mainly on intelligent implants** achieves all of the above. FITBONE® is currently the only fully-implantable, mechatronic intramedullary pin for bone extension worldwide that can be controlled and adjusted through the use of intelligent technology. Intelligence is crucial to every step of the development process, right up to the end product.

WITTENSTEIN | bastian

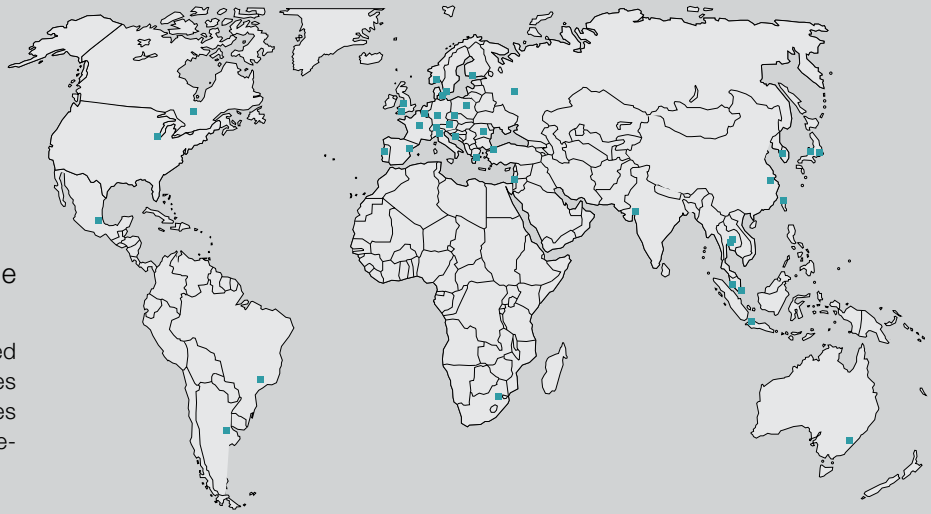
Whether in the design, manufacture, inspection or testing phase – when developing innovative gearing technology, WITTENSTEIN bastian GmbH always considers the unique requirements of the different application areas. Thus, solutions are **created that really connect.** WITTENSTEIN bastian GmbH redefines the concept of individuality on a daily basis: because the company is open to innovation and has the courage to explore unknown territory.

WITTENSTEIN | aerospace & simulation

Maximum effect, minimum weight and efficiency plays a vital role in the aerospace industry. The powerful actuator systems manufactured by WITTENSTEIN aerospace & simulation GmbH represent both high quality and unique compactness. These highly efficient systems are used **in the Airbus A380 as well as in training aircraft and simulators.**

WITTENSTEIN worldwide

No matter where you need us: A comprehensive sales and service network provides quick availability and competent support worldwide.



WITTENSTEIN alpha is setting benchmarks worldwide

in the fields of mechanical engineering and drive technology

3 x 1 = one or
"The whole is more
than the sum of its parts!"

Listening, understanding, calculating, optimizing and implementing tailored solutions for our customers – for WITTENSTEIN alpha, engineering begins at an early stage and continues far beyond successful implementation.

As one of the few manufacturers of mechatronic drive systems worldwide, we unite all core competencies, that are a prerequisite for stringent as well as integrated engineering, under one roof.

Research &
Development,
Production
and Sales …

… from a single source!

30 years of experience

First low backlash planetary gearheads — Software development — System solutions — Low backlash planetary gearheads

1983 SP

1984 Founding of alpha getriebebau GmbH

1994 TP

1995 SP classic

1996 LP

1999 cymex®

2002 alpha is the most innovative of the German medium-sized companies

2004 SP+/TP+/LP+-product range alpheno®

Competence in many sectors

Machine tools and manufacturing systems
Maximum precision, process reliability and productivity thanks to durable, virtually backlash-free and torsionally-rigid mechanical system solutions used in feed, swivel and auxiliary axes, for example.

Food and packaging machines
A range of gearheads designed for all types of axes used in packaging technology – including washdown models – for maximum operating efficiency, machine flexibility and cycle speeds.

Wood processing machines
Mechanical systems such as gearheads with rack and pinion combined with on-site consultation and a comprehensive knowledge of engineering, form an impressive package that guarantees a high-quality end product with maximum efficiency.

Printing and paper machines
Innovative gearhead products that offer high constant speeds, seamless synchronization and permanent precision – the perfect solution for high-quality printing processes and other continuous applications. Available as an option:
Integrated sensors for monitoring web tension and similar parameters.

Robotics, automation and handling technology
A wide range of servo gearheads and mechanical drive systems, from low-cost to high-end products for all types of robot and auxiliary axles such as drive axles and tool manipulators.

Servo right-angle gearheads

New generation SP+/TP+

2006
alphira®

2007
TPK+/SPK+/
HG+/SK+/TK+

2008
LK+/LPK+

2009
SP+/TP+

2011
High Performance Linear System

Advanced technology

Setting standards

12% of employees are involved in Research & Development.

Every 10th euro is invested in Research & Development

WITTENSTEIN alpha

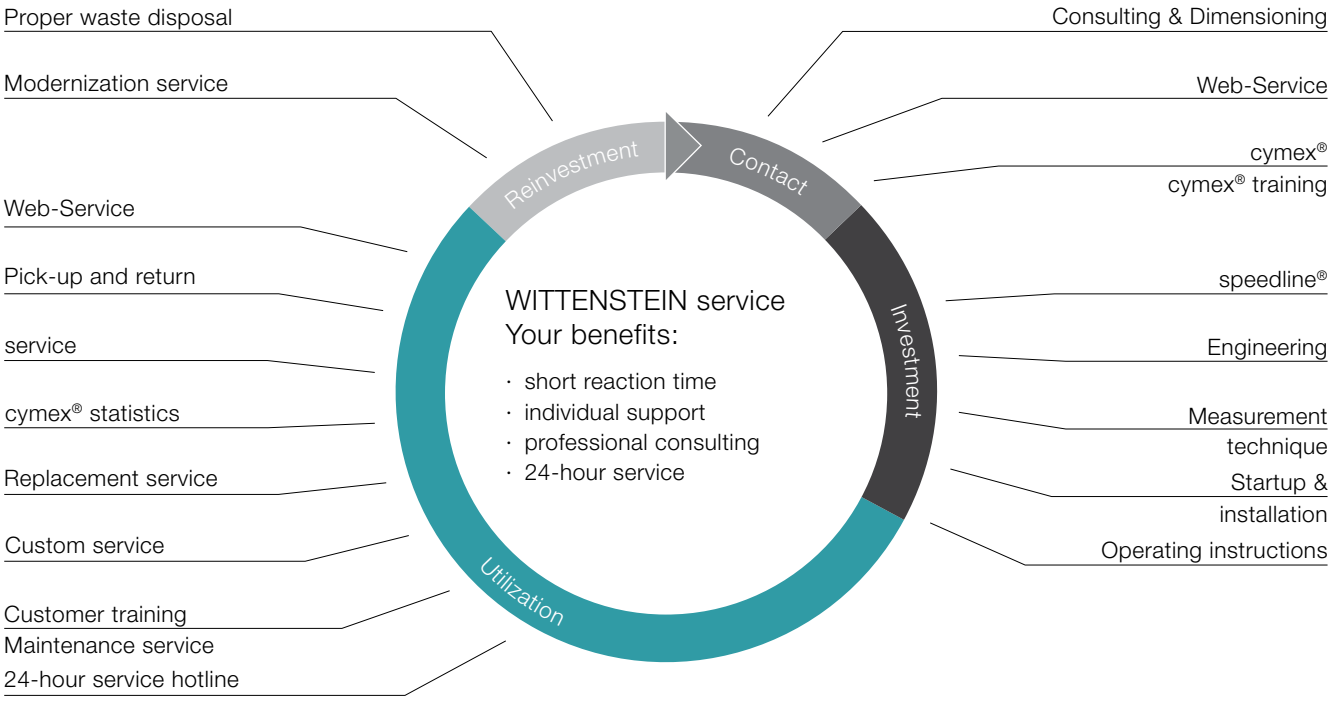
Change of name to WITTENSTEIN alpha GmbH

25 years of WITTENSTEIN alpha

The revolution in linear technology

Our services at a glance

Individual services – in each contact phase



24 h service hotline
Always there for you!

With our 24 h service hotline, we ensure that our service experts are available to you in emergencies and also outside our normal working hours.

Our Customer Service team is available around the clock:

Tel.: +49 7931 493-12900

WITTENSTEIN speedline®
Saves time!

We offer you delivery of the standard SP+, TP+ and LP+ Generation 3 series at attractive conditions within 24 or 48 hours ex works.*

Our speedline® team can be contacted under:

Tel.: +49 7931 493-10333 or
+49 7931 493-10444

speedline® by WITTENSTEIN alpha

*non-binding delivery time depending upon part availability

Web service

Free of charge for you under www.wittenstein-alpha.com

Info & CAD Finder

The Info & CAD Finder enables you to quickly and directly obtain drawings and 3D models via download. Using the intuitive menu guidance, it is easy for you to configure the appropriate drive system and to request the required data.

Your benefits:

- Online comparison with motor geometry
- Transparent and simple selection
- Ordering code generation
- Documentation of selection
- 3D file of selected solution

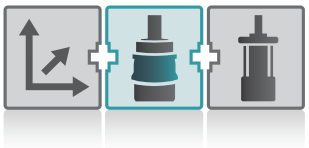
The Info & CAD Finder is available free of charge at:
www.wittenstein-alpha.com

Online product configurator

The online product configurator enables quick and efficient configuration of your application. Through entry of the most important parameters such as torque, speed, precision and forces, the user is guided to the optimal solution. Furthermore, the option is available to quickly and directly obtain drawings and 3D models via download.

Your benefits:

- Optimized for a quick and efficient selection
- Intuitive user guidance
- Automatic comparison between motor and gearhead geometry
- All application information at a glance



The online product configurator is available free of charge at:
www.wittenstein-alpha.com

cymex® (cyber motion explorer) – the software for designing the entire drive train

cymex® enables the simple dimensioning and design of the entire drive train (application + gearhead + motor).

You can download the cymex® software at www.wittenstein-alpha.com

Your benefits:

- Reliable design tool for the quick and simple execution of complex designs
- Takes all products and application-specific details into account
- Discovering hidden potential

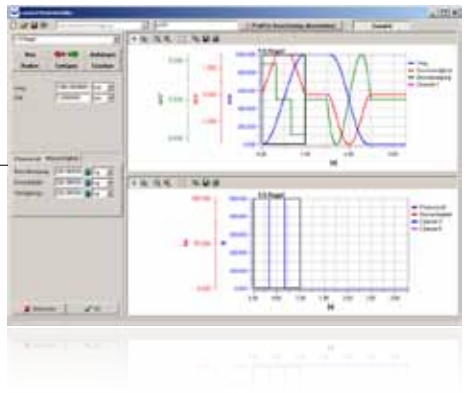
Beyond the limits of the catalog

cymex® 3 accesses a wealth of defined values not available in our product catalogs. The application incorporates many decades of WITTENSTEIN AG design calculation experience and thus enables a 40% increase in gearhead load through extended design options.

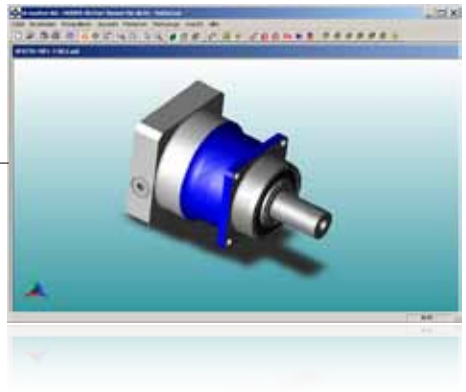
Functions

- Predefined standard applications
- cymex® motion profiler for creating simple or complex motion and load profiles
- Functions for importing motion profiles from SAM, Excel, ASCII
- Documentation of application data and technical data in Microsoft Word
- Offline CAD generator: 3D gearhead files including all attached components, compatible with the selected motor
- Database containing all current WITTENSTEIN alpha products
- Largest global database with more than 10,000 motors offered by all current manufacturers
- Energy assistant for dynamic calculation of drive train energy requirement

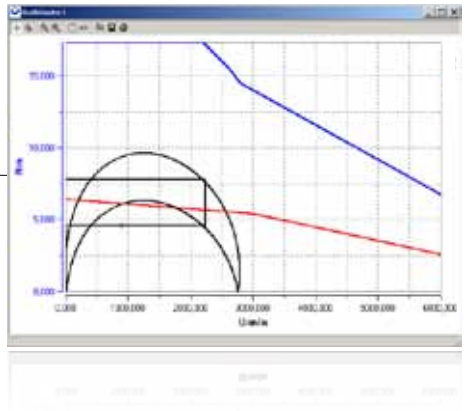
cymex® training courses



cymex®-Profiler



CAD generator: Generation of 3D models



Motor characteristic: Representation of motor load

Our experience – your benefit

We would be pleased to make our expertise available to you in the form of a cymex® design calculation by offering a training course.
Whether for beginners or experts, for occasional through to regular use – we adapt the training course to your wishes and requirements.
We would also be pleased to combine the training course with further topics including products from WITTENSTEIN alpha or Customer Service.
For dates and further information, please contact **tech-schulung@wittenstein.de** or your responsible sales engineer.

Training course – beginners

Possible content of a cymex® training course for beginners:

- Overview of the structure and function of cymex® design software
- Design process and all criteria for the gearhead and motor selection
- Definition of the most important parameters, their application and selection of a suitable gearhead, motor and required accessories
- Independent modeling of complex motion profiles
- Documentation of your design and independent creation of CAD models for your CAD target system

Training course – expert

Further topics for experts:

- Optimization and import of motion profiles in cymex®
- Important information on the optimization and analysis of drive trains
- Additional sector-specific information

Engineering

Your challenge is our drive

Our concept for success: analysis – optimization – implementation

Our range

- Kinematic configuration
- Dynamic simulation
- Multi-body simulation
- FEM analysis
- Support during development

Your benefit

- Time savings through design support
- Reduction of development costs
- Increase in machine and process reliability
- Flexibility during short notice changes
- Increasing productivity

Analysis

In the case of complex applications, our experts support you with a detailed and comprehensive analysis.

Optimization

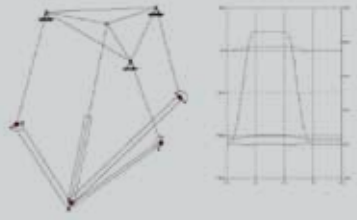
With the aid of advanced calculation and simulation software tools, we optimize your machine in terms of efficiency, design and configuration of the drive systems.

Implementation

Jointly with you, we implement your customized solution and ensure that your plans are converted into practice.

Example: **Multi-body simulation of a Delta robotic systems**

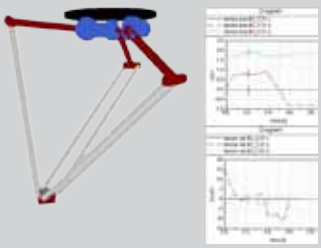
Step 1: **Analysis**



Criteria:

Increasing number of cycles
Reducing installation time

Step 2: **Optimization**



Optimization through:

Multi-body simulation

Step 3: **Implementation**

The result:

Number of cycles **+20%**
Installation time **-60%**

Customer Service

Perfectly coordinated service from a single source!

Our service catalog is available at:
www.wittenstein.de/en

For WITTENSTEIN, customer service means offering customers a quick, reliable and professional service.

Service made to measure – our range of services

- Maintenance & Repairs
- On-site service
- Fetch & bring service
- speedline® service repairs
- Customer training and spare parts service
- Status check analyses
- Lubricant analyses
- Material analyses and hardness tests
- Microscopic analyses
- Analysis of seals
- Measurement of tooth-flank and profile line
- Vibration measurements
- Measurement of tilting clearance and rigidity
- Synchronization measurements and measurement of no-load running torque

24 h service hotline: +49 7931 493-12900

cymex® Statistics

Our cymex® service database allows us to provide you with optimum consultation.

We offer:

- Lifecycle-cost analyses
- MTBF
- Reliability calculations
- Preventive maintenance measures
- Verification of gearhead designs

KOMPETENZPREIS
BADEN-WÜRTTEMBERG

"For outstanding, sustainable implementation of innovation and quality management in operational practice and the achievement of demonstrable corporate success."

Gearhead selection overview

		Low backlash planetary gearheads								
										
Products		**alpheno®**	**RP⁺**	**TP⁺**	**TP⁺ HIGH TORQUE**	**SP⁺**	**SP⁺ HIGH SPEED**	**LP⁺ Generation 3**	**LPB⁺ Generation 3**	**alphira®**
Power density		◄								►
Catalog page		22	26	28		66		118		136
Ratio [c]	min. i =	3	22	4	22	3	3	3	3	4
	max. i =	100	220	100	220	100	100	100	100	100
Torsional backlash [arcmin] [c]	Standard	≤ 3	≤ 1	≤ 3	≤ 1	≤ 3	≤ 4	≤ 8	≤ 8	≤ 20
	Reduced	≤ 1	-	≤ 1	-	≤ 1	≤ 2	-	-	-
Output type										
Output shaft	Smooth	•				•	•	•		
	Keyway	•				•	•	•		•
Output shaft with involute gearing		•				•	•			
Mounted shaft Connected via shrink disc		•				•	•			
Output flange			•	•	•				•	
System output with pinion		•	•	•	•	•	•			
Input type										
Motor mounted version		•	•	•	•	•	•	•	•	•
Input shaft		•		•		•				
Version										
ATEX [a]						•	•			
Food-grade lubrication [a] [b]		•	•	•	•	•	•	•	•	•
Corrosion resistant [a] [b]				•	•	•	•			
Optimized mass moment of inertia [a]		•	•	•	•	•				
Accessories (please refer to the product pages for further options)										
Coupling		•		•	•	•	•	•		•
Rack		•	•	•	•	•	•	•		
Pinion		•	•	•	•	•	•	•		
Belt pulley									•	
Shrink disc		•				•	•			
torqXis sensor flange				•	•	•	•			
NEMA flange								•		•

[a] Power reduction: technical data available upon request [b] Please contact WITTENSTEIN alpha [c] In relation to reference sizes

⚠ **Please refer to the technical information and safety notes in the Glossary.**

			Servo right-angle gearheads											
														
Products		**RPK+**	**TK+**	**TPK+**	**TPK+ HIGH TORQUE**	**SK+**	**SPK+**	**HG+**	**VDT+**	**VDH+ VDHe**	**VDS+ VDSe**	**LK+**	**LPK+**	**LPBK+**
Power density		◄												
Catalog page		148	150			198		236	248		306	278		
Ratio [c]	min. i =	66	3	12	66	3	12	3	4	4	4	1	3	3
	max. i =	5500	100	10000	5500	100	10000	100	40	40	40	1	100	10
Torsional backlash [arcmin] [c]	Standard	≤ 1,3	≤ 4	≤ 4	≤ 1,3	≤ 4	≤ 4	≤ 4	≤ 3	≤ 3	≤ 3	≤ 15	≤ 12	≤ 12
	Reduced	-	-	-	-	-	≤ 2	-	-	-	-	-	-	-
Output type														
Output shaft	Smooth					•	•				•		•	
	Keywayed					•	•				•	•	•	
Output shaft, rear side	Smooth		•	•	•	•	•	•						
	Keywayed		•	•	•	•	•	•						
Output shaft with involute gearing						•	•				•			
Output flange		•		•	•				•					•
Hollow shaft interface Connected via shrink disc	Standard							•	•	•				
	Rear side		•	•	•	•	•	•		•				
Flanged hollow shaft			•						•					
Closed cover, rear side			•	•	•	•	•	•						
System output with pinion		•		•	•									
Shaft on both sides											•			
Input type														
Motor mounted version		•	•	•	•	•	•	•	•	•	•	•	•	•
Version														
ATEX [a]			•			•		•						
Food-grade lubrication [a] [b]			•	•	•	•	•	•	•	•	•	•	•	•
Corrosion resistant [a] [b]			•	•	•	•	•	•	•	•	•			
Optimized mass moment of inertia [a]														
Accessories (please refer to the product pages for further options)														
Coupling			•	•	•	•	•	•	•		•	•	•	
Rack		•	•	•	•	•	•		•		•	•	•	
Pinion		•	•	•	•	•	•		•		•			
Belt pulley														•
Shrink disc			•	•	•	•	•	•		•				
torqXis sensor flange			•	•	•	•	•	•						
NEMA flange												•	•	

[a] Power reduction: technical data available upon request [b] Please contact WITTENSTEIN alpha [c] In relation to reference sizes

⚠ **Please refer to the technical information and safety notes in the Glossary.**

Low backlash planetary gearheads High End

alpheno®
Perfection in a new dimension

Looking for a solution that is tailored to your needs? Your requirements are our challenge.
More performance in less space!
alpheno® – The sure way to success.

RP+
The new high-performance planetary gearhead

The RP+ sets standards in terms of power density, modularity and easy installation.
The highly rigid gearhead design ensures maximum positioning accuracy.

TP+ and TP+ HIGH TORQUE
Compact precision

Compact top performers with drive flange. The standard version is ideally suited for high positioning accuracy and highly dynamic cyclic operation. The TP+ HIGH TORQUE is particularly well suited for high-precision applications where high torsional rigidity is required.

Power density ◄

Maximum power density

And the torques?
Although the previous series achieved outstanding results, we managed to increase the torques by up to 40%. Raising the limits – Typical of WITTENSTEIN alpha!

Versatile installation

In whatever position you install it – your gearhead always contains the same quantity of oil/grease.
The gearheads are so flexible, you can install them vertically, horizontally or with the output facing upwards or downwards.

Simple motor installation

Safe, and secure motor installation is possible in a single step. The WITTENSTEIN alpha-patented motor mounting is also available with integrated thermal length compensation as an option.

Maximum positioning accuracy

Upon request, the High End planetary gearheads are available with torsional backlash of less than one arc minute. This significantly increases the positioning accuracy of your application.

SP+ and SP+ HIGH SPEED
The classic all-rounder among planetary gearheads

The standard version is ideally suited for high positioning accuracy and highly dynamic cyclic operation.
The SP+ HIGH SPEED is particularly well suited for applications with maximum speeds during continuous operation.

Superior running thanks to helical teeth

Our High End planetary gearheads “whisper”. Compared to the straight-toothed gearheads, our helical-toothed gearheads are 6 dB(A) quieter during operation. And what a difference 64 instead of 70 decibels makes to added value. You will barely notice vibrations because these gearheads run so smoothly.

World-class lifespan

The seal rings on the High End planetary gearheads were specially developed and the material and geometry are both optimized to ensure an extremely long lifespan!

alpheno®

Perfection in a new dimension

alpheno®

Specifications \ Version	alpheno®		
	+	++	+++
Positioning accuracy			
Rigidity			
Smooth-running			
Speed capacity			
Power density			
Max. axial/radial forces			

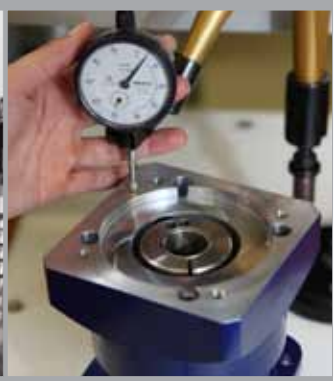
al [pha] + pheno [menal] = alpheno®

Perfect is not yet perfect enough

The performance capability of the planetary gear reducer reaches a new dimension with alpheno®. While others are still dealing with precision and operating noise, WITTENSTEIN alpha is once again a step ahead. alpheno® has already been used in highly challenging applications where the individual requirements exceed the performance capabilities of the standard product range for several years. In comparison to the SP+, it was possible to increase the power density by up to 140% with alpheno® – exceeding all current standards in the market.

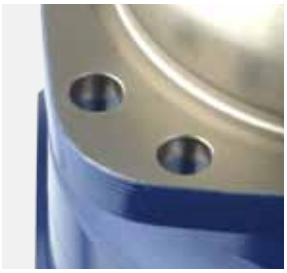
Quality & reliability

We define quality as a philosophy to live by.
A universal QM system with the latest measuring and testing methods ensures quality.
We guarantee quality and reliability of your alpheno® with 100% final inspection.



Incomparably powerful

WITTENSTEIN alpha sets standards



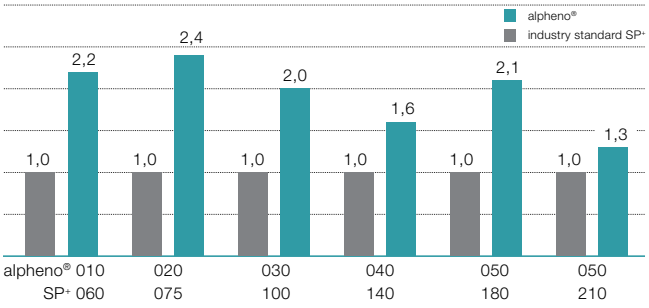
The alpheno® gear output interface facilitates a higher power transmission when compared to the industry standard which limits the transmitting torques of the gearhead. alpheno® transcends these limitations.

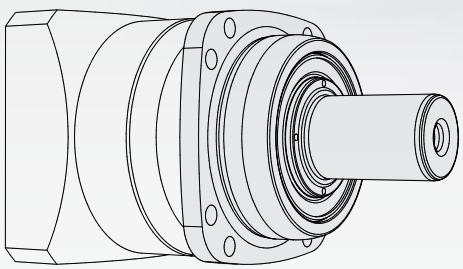
The technical advancement of alpheno® and its increased power can be directly utilized for your applications with the new design of the gear output.

alpheno® convinces with highest power density

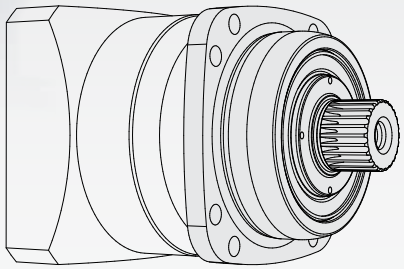
We offer you more performance in less space for the most compact drive requirements. This will allow your machine to perform better if specific system solutions are required.

Power density of the industry standard and alpheno®

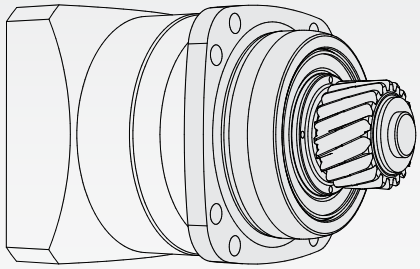




Smooth shaft



Involute



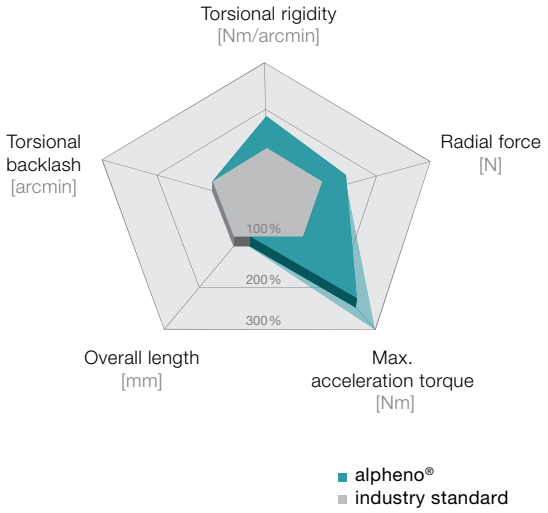
Incl. pinion

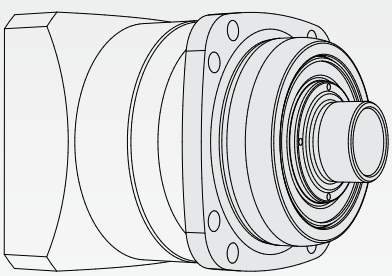
Performance data

Looking for a solution that is tailored to your needs? We will collaborate with you to develop your customized solution and ensure the ideal design of your drive.

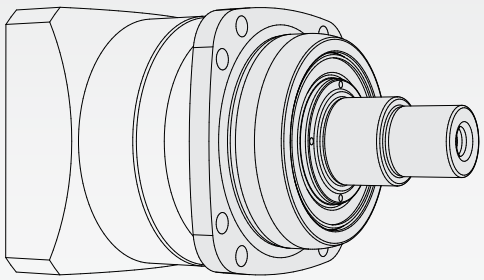
Torsional backlash [arcmin]	< 1
Ratio [-]	3 - 100
Max. acceleration torque [Nm]	2800
alpha peak torque [Nm]	3360
Max. input speed [min^{-1}]	6000
Efficiency [%]	97

alpheno® in comparison to the industry standard





Slip-on shaft



Customer-specific

Options

Like the SP+ shaft gearhead, alpheno® is also available in a HIGH SPEED version and with a slip-on shaft at the gear output. A variant with optimized mass inertia guarantees a maximum level of energy efficiency. In combination with the WITTENSTEIN alpha rack-and-pinion portfolio, alpheno® represents an unbeatable drive bearing arrangement in the field of linear motion.

RP+ – the new high-performance planetary gearhead

Sets standards in terms of power density, modularity and easy installation.

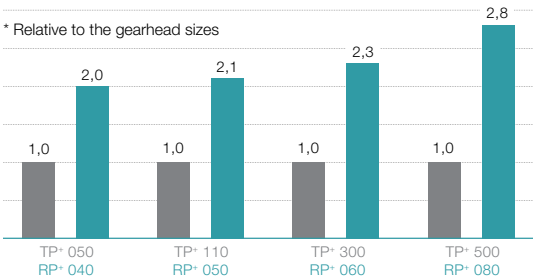
The new standard for flange gearheads

The RP+ gearhead series combines all the advantages of the familiar gearhead series.
Features include reduced backlash of < 1 arcmin, maximum power density, modular mounting position, simple motor installation, superior running thanks to helical teeth, maximum positioning accuracy and world-class lifespan.

The RP+ impresses with maximum power density

- If your drive requires maximum performance
- If you value world-class engineering
- If you require an even more compact system

Power density comparison between industry standard & RP+ *

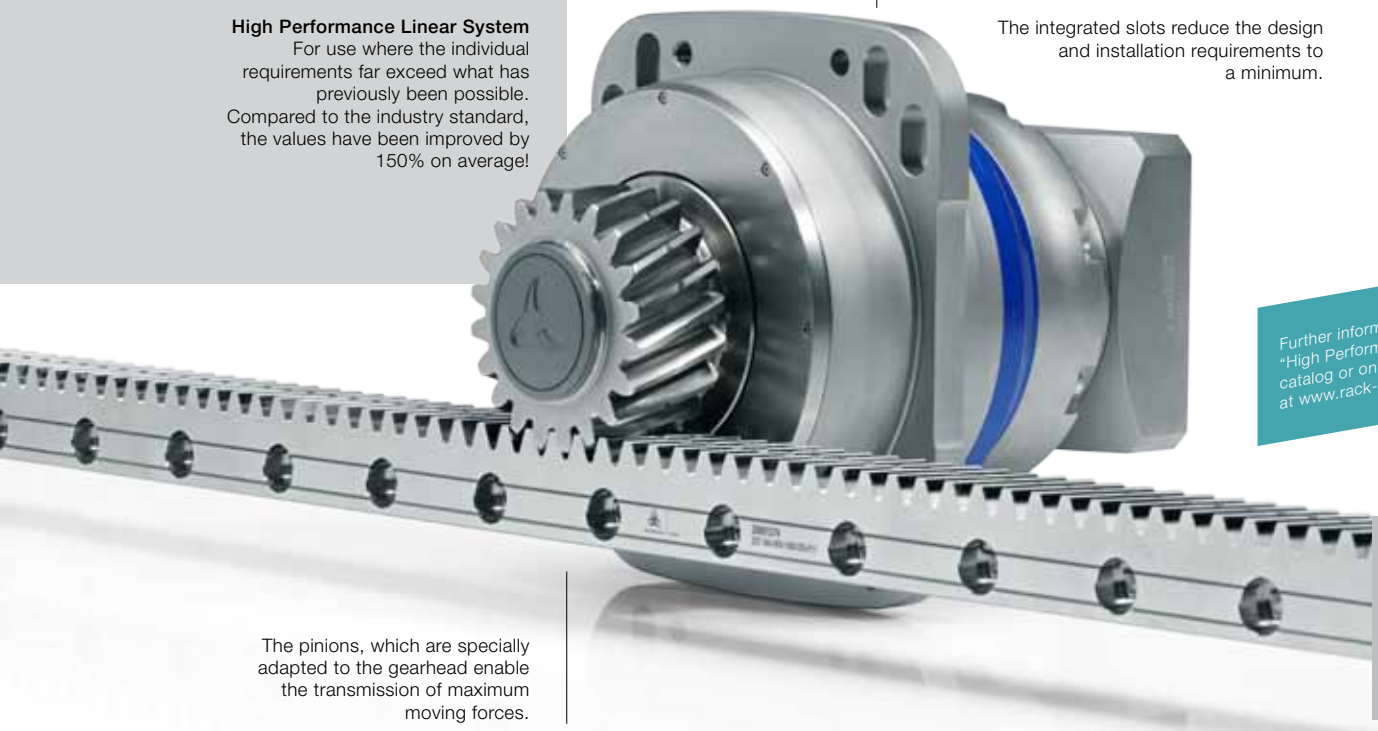


The geometry of the RP+ output flange is perfectly adapted to the power density.

The RP+ highperformance planetary gearhead is optimized for rack and pinion applications.

High Performance Linear System
For use where the individual requirements far exceed what has previously been possible. Compared to the industry standard, the values have been improved by 150% on average!

The integrated slots reduce the design and installation requirements to a minimum.



Further information is available in the "High Performance Linear System" catalog or on the Internet at www.rack-pinion.com

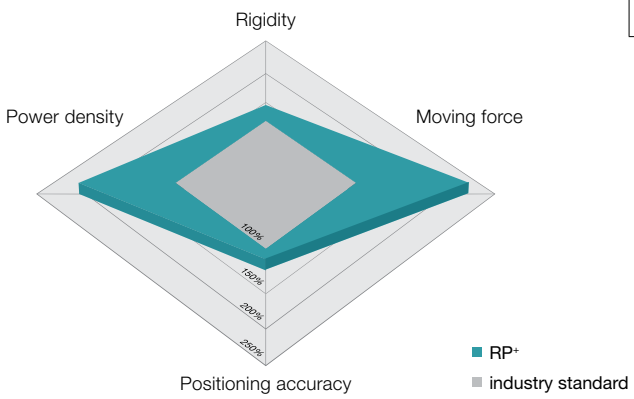
The pinions, which are specially adapted to the gearhead enable the transmission of maximum moving forces.

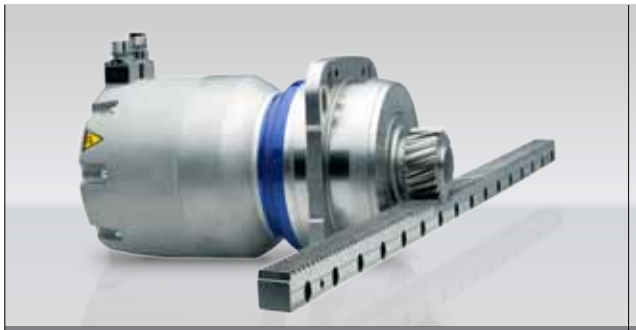
Performance data for RP+

Positioning accuracy [µm]	< 5*
Ratios [-]	4-220
Max. moving force per drive [N]	112,000
Movement speed [m/min]	400
Efficiency [%]	≥ 97
System rigidity [%]	+ 50**

* Direct measuring system required
** Compared to industry standard

Performance data as linear system





The RP+ is also available as the RPM+ actuator version. The RPM+ combines the advantages of the RP+ series in an even more compact design. Thanks to its special design, the permanently excited servo motor ensures maximum power density.

The RPK+, which combines the hypoid angle section and the high performance planetary gearhead RP+ completes the series.

TP+/TP+ HIGH TORQUE – Compact precision

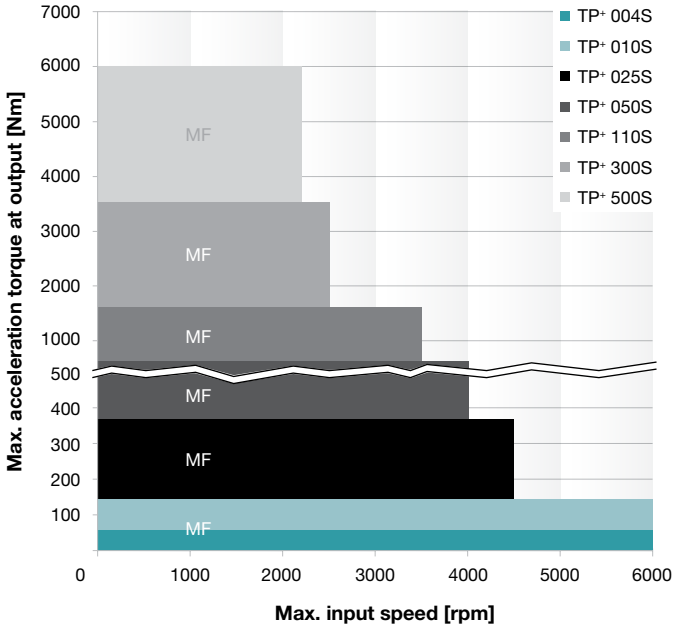
TP+ HIGH TORQUE

TP+

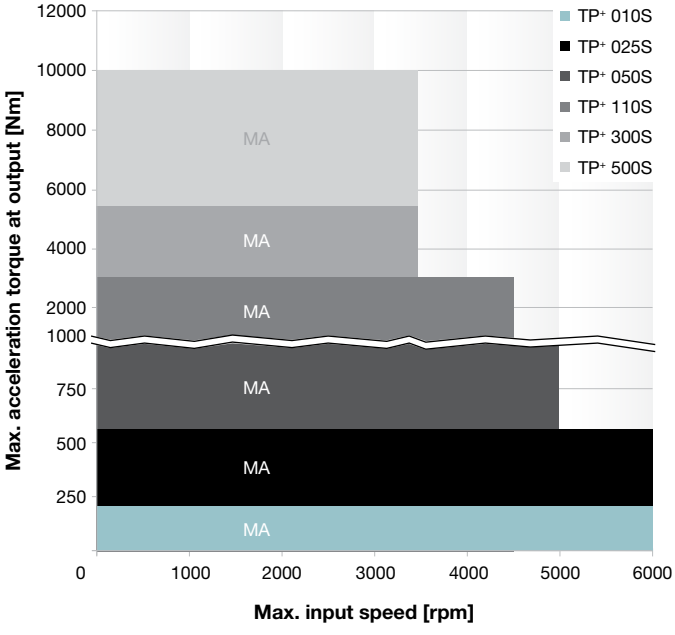
Compact top performers with drive flange. The standard version is ideally suited for high positioning accuracy and highly dynamic cyclic operation. The TP+ HIGH TORQUE is particularly well suited for high-precision applications in which high torsional rigidity is required.

Quick size selection

TP+ MF (example for i = 5)
For applications in cyclic operation (ED ≤ 60%)



TP+ HIGH TORQUE MA (example for i = 22)
For applications in cyclic operation (ED ≤ 60%)



Versions and Applications

TP+
MF version
(standard version)

- Highly dynamic applications
- High positioning accuracy (e.g. clamped drives)
- Space-saving designs

TP+ HIGH TORQUE
MA version

- Maximum power density
- Maximum positioning accuracy (e.g. clamped drives)
- High torsional rigidity
- Demanding safety requirements (e.g. vertical axes)

Comparison

Features		**TP+ MF version** from page 30	**TP+ HIGH TORQUE MA version** from page 54
Ratios [c]		4 - 100	22 - 220
Torsional backlash [arcmin] [c]	Standard	≤ 3	≤ 1
	Reduced	≤ 1	-
Output type			
Output flange		•	•
System output with pinion		•	•
Input type			
Motor mounted version		•	•
Input shaft		•	
Type			
Food-grade lubrication [a] [b]		•	•
Corrosion resistant [a] [b]		•	•
Optimized mass moment of inertia [a]		•	•
Accessories			
Coupling		•	•
Rack		•	•
Pinion		•	•
torqXis sensor flange		•	•
Flange shaft		•	•
Intermediate plate for cooling connection		•	•
For Delta robot applications		•	•

[a] Power reduction: technical data available upon request [b] Please contact WITTENSTEIN alpha [c] In relation to reference sizes

					1-stage			
Ratio [a]			*i*		**4**	**5**	**7**	**10**
cymex®-optimized acceleration torque (please contact us regarding the design)			T_{2Bcym}	Nm	60	62	60	–
				in.lb	531	549	531	–
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B}	Nm	55	55	55	35
				in.lb	487	487	487	310
Nominal output torque (with n_{1N})			T_{2N}	Nm	28	28	28	18
				in.lb	248	248	248	159
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not}	Nm	100	100	100	100
				in.lb	885	885	885	885
Nominal input speed (with T_{2N} and 20 °C ambient temperature) [b]			n_{1N}	rpm	3300	3300	4000	4000
Max. input speed			n_{1Max}	rpm	6000	6000	6000	6000
Mean no load running torque (with n_1 = 3000 rpm and 20 °C gearhead temperature) [c]			T_{012}	Nm	0.95	0.80	0.60	0.45
				in.lb	8.41	7.08	5.31	3.98
Max. torsional backlash			j_t	arcmin	Standard ≤ 4 / Reduced ≤ 2			
Torsional rigidity [c]			C_{t21}	Nm/ arcmin	12	12	11	8
				in.lb/ arcmin	106	106	97	71
Tilting rigidity			C_{2K}	Nm/ arcmin	–			
				in.lb/ arcmin				
Max. axial force [d]			F_{2AMax}	N	1630			
				lb_f	367			
Max. tilting moment			M_{2KMax}	Nm	110			
				in.lb	974			
Efficiency at full load			η	%	97			
Service life (For calculation, see the Chapter "Information")			L_h	h	> 20000			
Weight incl. standard adapter plate			*m*	kg	1.4			
				lb_m	3.1			
Operating noise (with *i*=10 and n_1 = 3000 rpm no load)			L_{PA}	dB(A)	≤ 58			
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 65			
Moment of inertia (relates to the drive)	B	11	J_1	kgcm²	0.17	0.14	0.11	0.09
				10^{-3} in.lb.s²	0.15	0.12	0.10	0.08
Clamping hub diameter [mm]	C	14	J_1	kgcm²	0.25	0.21	0.18	0.17
				10^{-3} in.lb.s²	0.22	0.19	0.16	0.15
	E	19	J_1	kgcm²	0.57	0.54	0.51	0.49
				10^{-3} in.lb.s²	0.50	0.47	0.45	0.43

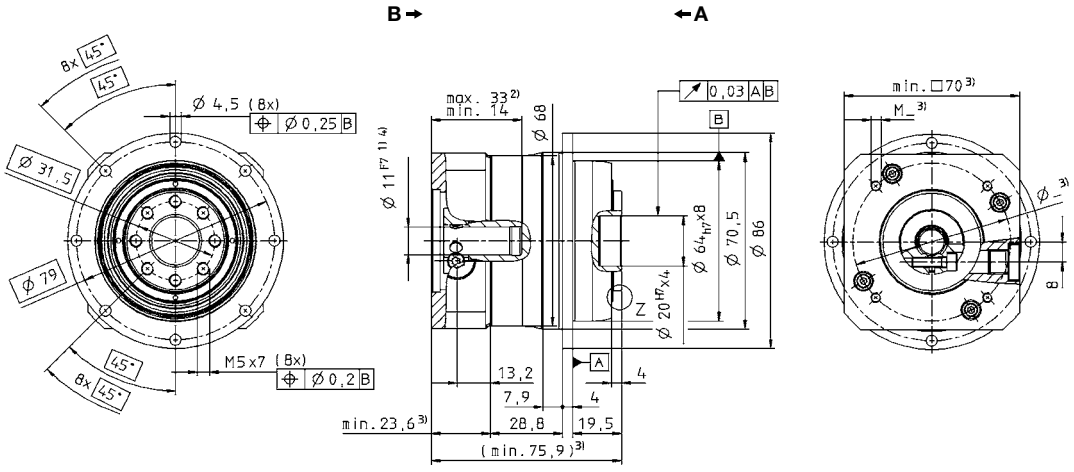
Reduced mass moments of inertia available on request.

[a] Other ratios available on request
[b] For higher ambient temperatures, please reduce input speed
[c] Valid for clamping hub diameter of 14 mm
[d] Refers to center of the output shaft or flange

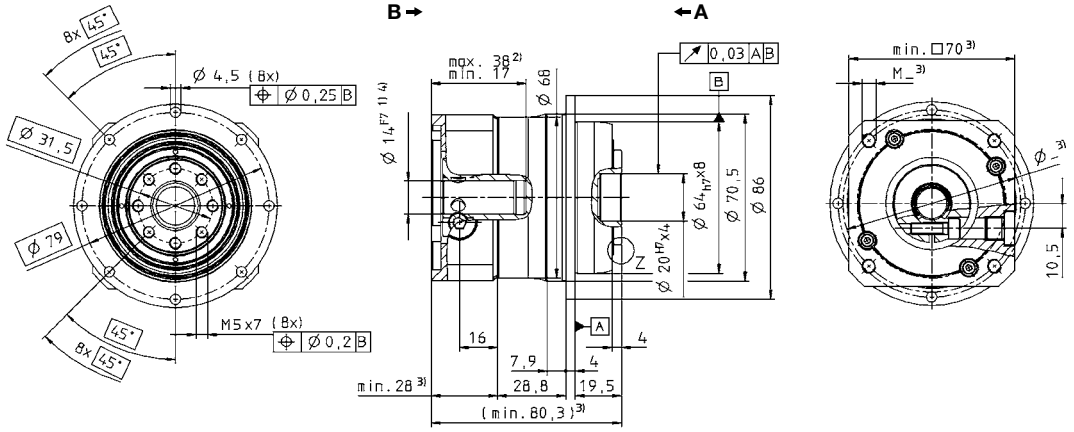
View A View B

Motor shaft diameter [mm]

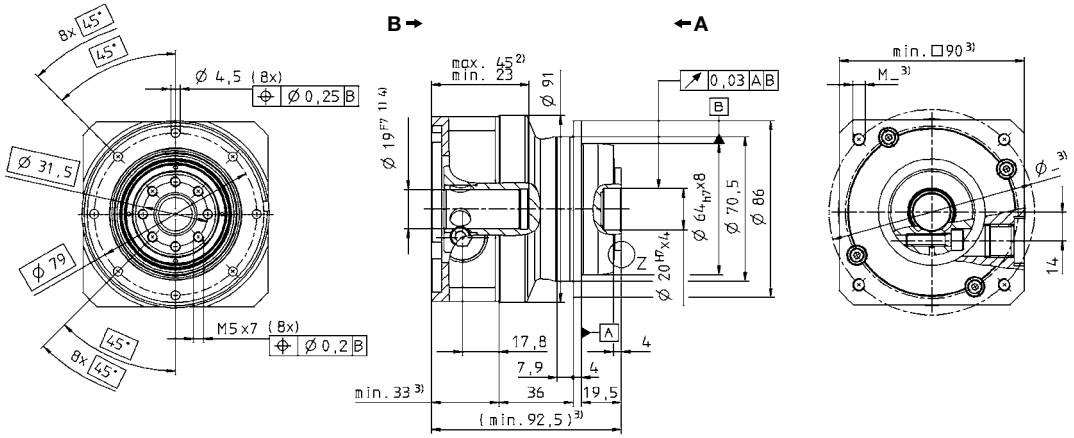
up to 11 [4] (B) clamping hub diameter

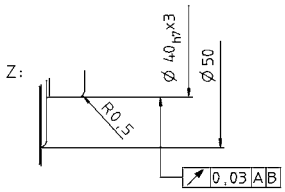


up to 14 [4] (C) clamping hub diameter



up to 19 [4] (E) clamping hub diameter





Non-tolerated dimensions ±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 with a minimum thickness of 1 mm.

CAD data is available under www.wittenstein-alpha.com

Motor mounting according to operating manual

				2-stage												
Ratio [a]	i			**16**	**20**	**21**	**25**	**28**	**31**	**35**	**40**	**50**	**61**	**70**	**91**	**100**
cymex®-optimized acceleration torque (please contact us regarding the design)	T_{2Bcym}	Nm		60	60	–	62	60	–	62	62	62	–	60	–	–
		in.lb		531	531	–	549	531	–	549	549	549	–	531	–	–
Max. acceleration torque (max. 1000 cycles per hour)	T_{2B}	Nm		55	55	40	55	55	40	55	55	55	45	55	32	35
		in.lb		487	487	354	487	487	354	487	487	487	398	487	283	310
Nominal output torque (with n_{1N})	T_{2N}	Nm		40	40	30	40	40	30	40	40	40	30	40	15	18
		in.lb		354	354	266	354	354	266	354	354	354	266	354	133	159
Emergency stop torque (permitted 1000 times during the service life of the gearhead)	T_{2Not}	Nm		100	100	100	100	100	100	100	100	100	100	100	100	100
		in.lb		885	885	885	885	885	885	885	885	885	885	885	885	885
Nominal input speed (with T_{2N} and 20 °C ambient temperature) [b]	n_{1N}	rpm		4000	4000	4000	4000	4000	4000	4000	4000	4800	5500	5500	5500	5500
Max. input speed	n_{1Max}	rpm		6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000
Mean no load running torque (with n_1 = 3000 rpm and 20 °C gearhead temperature) [c]	T_{012}	Nm		0.55	0.45	0.45	0.45	0.35	0.35	0.30	0.25	0.25	0.20	0.20	0.20	0.20
		in.lb		4.87	3.98	3.98	3.98	3.10	3.10	2.66	2.21	2.21	1.77	1.77	1.77	1.77
Max. torsional backlash	j_t	arcmin		Standard ≤ 4 / Reduced ≤ 2												
Torsional rigidity [c]	C_{t21}	Nm/ arcmin		12	12	10	12	12	9	12	11	12	9	11	7	8
		in.lb/ arcmin		106	106	89	106	106	80	106	97	106	80	97	62	71
Tilting rigidity	C_{2K}	Nm/ arcmin		–												
		in.lb/ arcmin														
Max. axial force [d]	F_{2AMax}	N		1630												
		lb_f		367												
Max. tilting moment	M_{2KMax}	Nm		110												
		in.lb		974												
Efficiency at full load	η	%		94												
Service life (For calculation, see the Chapter "Information")	L_h	h		> 20000												
Weight incl. standard adapter plate	m	kg		1.5												
		lb_m		3.3												
Operating noise (with i=100 and n_1 = 3000 rpm no load)	L_{PA}	dB(A)		≤ 58												
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 65												
Moment of inertia (relates to the drive) Clamping hub diameter [mm]	B	11	J_1	kgcm²	0.078	0.070	0.074	0.068	0.062	0.072	0.061	0.051	0.057	0.058	0.056	0.057	0.056
				10^{-3} in.lb.s²	0.069	0.062	0.066	0.060	0.054	0.064	0.054	0.051	0.050	0.051	0.050	0.051	0.050
	C	14	J_1	kgcm²	0.17	0.17	0.17	0.16	0.16	0.17	0.16	0.15	0.15	0.15	0.15	0.15	0.15
				10^{-3} in.lb.s²	0.15	0.15	0.15	0.14	0.14	0.15	0.14	0.14	0.13	0.13	0.13	0.13	0.13

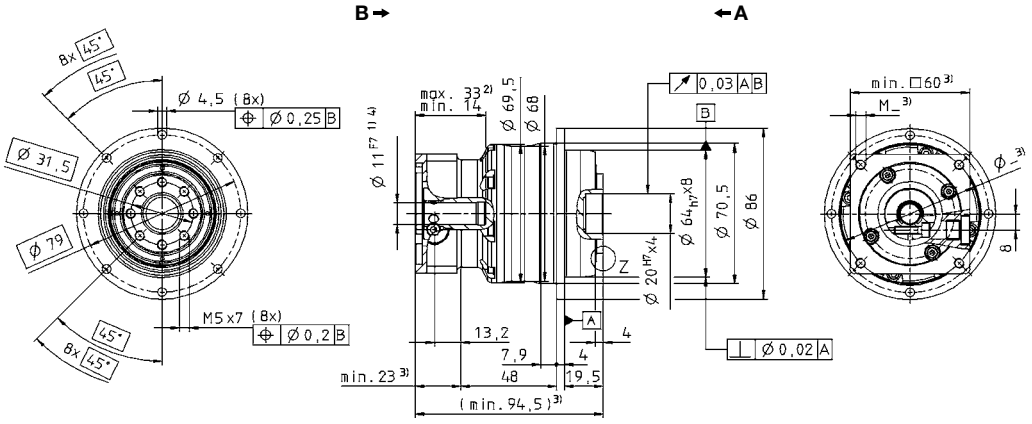
Reduced mass moments of inertia available on request.

[a] Other ratios available on request
[b] For higher ambient temperatures, please reduce input speed
[c] Valid for clamping hub diameter of 11 mm
[d] Refers to center of the output shaft or flange

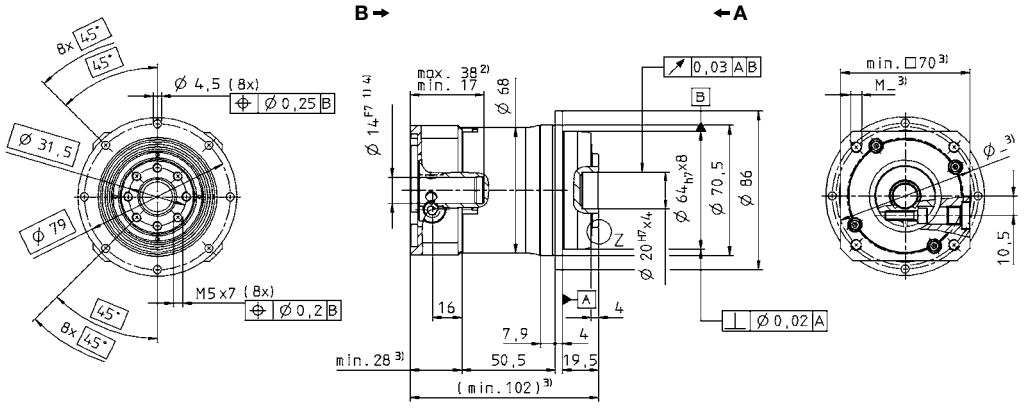
View A View B

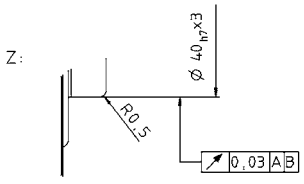
Motor shaft diameter [mm]

up to 11 [4] (B) clamping hub diameter



up to 14 [4] (C) clamping hub diameter





Non-tolerated dimensions ±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 with a minimum thickness of 1 mm.

CAD data is available under www.wittenstein-alpha.com

Motor mounting according to operating manual

					1-stage			
Ratio [a]			*i*		**4**	**5**	**7**	**10**
cymex®-optimized acceleration torque (please contact us regarding the design)			T_{2Bcym}	Nm	150	162	162	–
				in.lb	1328	1434	1434	–
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B}	Nm	143	143	143	105
				in.lb	1266	1266	1266	929
Nominal output torque (with n_{1N})			T_{2N}	Nm	75	75	75	60
				in.lb	664	664	664	531
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not}	Nm	250	250	250	250
				in.lb	2213	2213	2213	2213
Nominal input speed (with T_{2N} and 20 °C ambient temperature) [b]			n_{1N}	rpm	2600	2900	3100	3100
Max. input speed			n_{1Max}	rpm	6000	6000	6000	6000
Mean no load running torque (with n_1 = 3000 rpm and 20 °C gearhead temperature) [c]			T_{012}	Nm	1.6	1.3	1.0	0.7
				in.lb	14.2	11.5	8.85	6.20
Max. torsional backlash			j_t	arcmin	Standard ≤ 3 / Reduced ≤ 1			
Torsional rigidity [c]			C_{t21}	Nm/ arcmin	32	33	30	23
				in.lb/ arcmin	283	292	266	204
Tilting rigidity			C_{2K}	Nm/ arcmin	225			
				in.lb/ arcmin	1991			
Max. axial force [d]			F_{2AMax}	N	2150			
				lb_f	484			
Max. tilting moment			M_{2KMax}	Nm	270			
				in.lb	2390			
Efficiency at full load			η	%	97			
Service life (For calculation, see the Chapter "Information")			L_h	h	> 20000			
Weight incl. standard adapter plate			*m*	kg	3.8			
				lb_m	8.4			
Operating noise (with *i*=10 and n_1 = 3000 rpm no load)			L_{PA}	dB(A)	≤ 59			
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 65			
Moment of inertia (relates to the drive)	C	14	J_1	kgcm²	0.78	0.62	0.48	0.40
				10^{-3} in.lb.s²	0.69	0.55	0.42	0.35
Clamping hub diameter [mm]	E	19	J_1	kgcm²	0.95	0.79	0.64	0.57
				10^{-3} in.lb.s²	0.84	0.70	0.57	0.50
	G	24	J_1	kgcm²	2.32	2.16	2.02	1.94
				10^{-3} in.lb.s²	2.05	1.91	1.78	1.72

Reduced mass moments of inertia available on request.

[a] Other ratios available on request
[b] For higher ambient temperatures, please reduce input speed
[c] Valid for clamping hub diameter of 19 mm
[d] Refers to center of the output shaft or flange

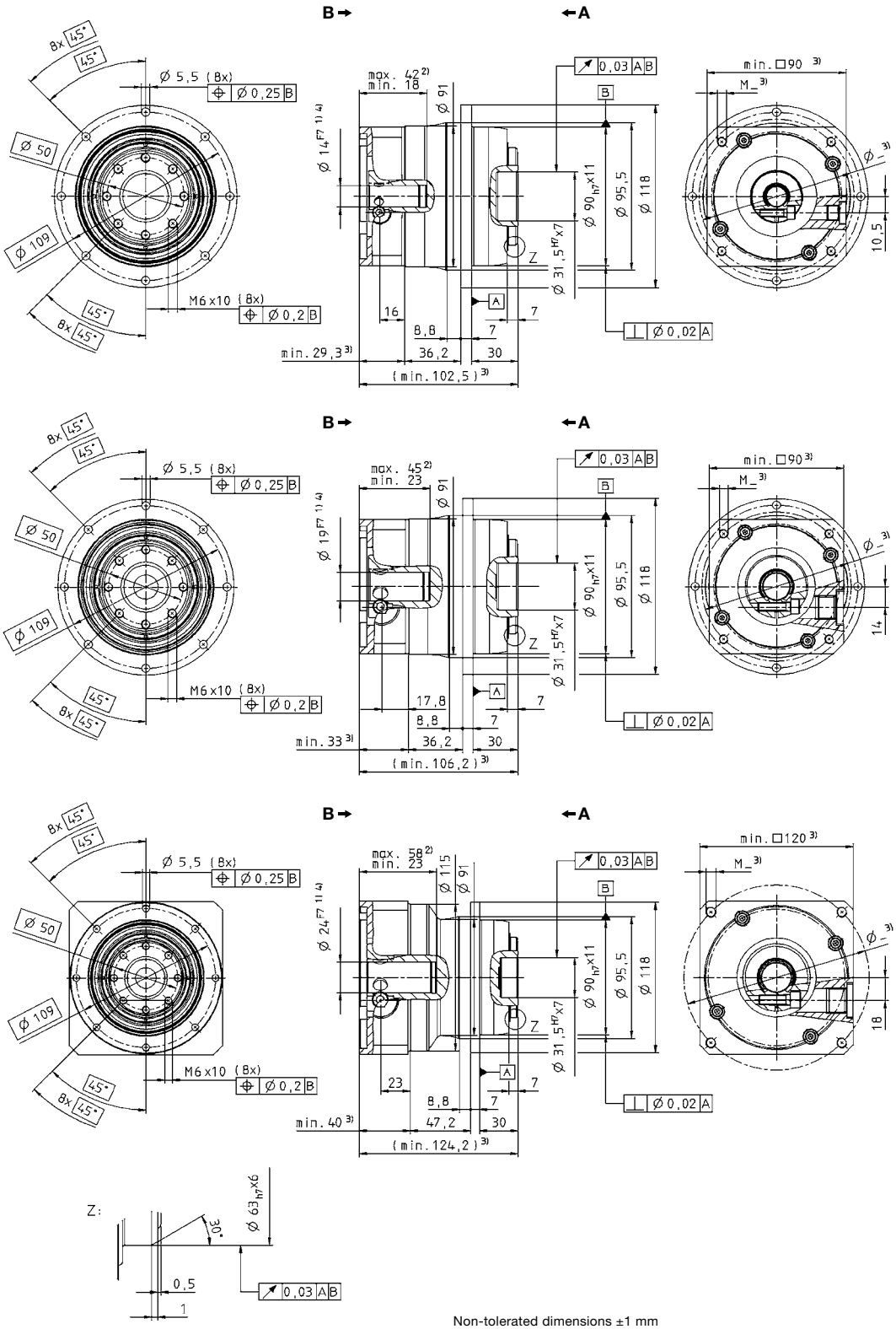
View A View B

Motor shaft diameter [mm]

up to 14 4) (C) clamping hub diameter

up to 19 4) (E) clamping hub diameter

up to 24 4) (G) clamping hub diameter



Non-tolerated dimensions ±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 with a minimum thickness of 1 mm.

CAD data is available under www.wittenstein-alpha.com

Motor mounting according to operating manual

				2-stage												
Ratio [a]			*i*	**16**	**20**	**21**	**25**	**28**	**31**	**35**	**40**	**50**	**61**	**70**	**91**	**100**
cymex®-optimized acceleration torque (please contact us regarding the design)			T_{2Bcym} Nm	162	162	–	162	162	–	162	–	162	–	162	–	–
			in.lb	1434	1434	–	1434	1434	–	1434	–	1434	–	1434	–	–
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B} Nm	143	143	100	143	143	110	143	140	143	110	143	80	105
			in.lb	1266	1266	885	1266	1266	974	1266	1239	1266	974	1266	708	929
Nominal output torque (with n_{1N})			T_{2N} Nm	90	90	80	90	90	70	90	80	90	70	90	35	60
			in.lb	797	797	708	797	797	620	797	708	797	620	797	310	531
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not} Nm	250	250	250	250	250	250	250	250	250	250	250	250	250
			in.lb	2213	2213	2213	2213	2213	2213	2213	2213	2213	2213	2213	2213	2213
Nominal input speed (with T_{2N} and 20 °C ambient temperature) [b]			n_{1N} rpm	3500	3500	3500	3500	3500	3500	3500	3500	3800	4500	4500	4500	4500
Max. input speed			n_{1Max} rpm	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000
Mean no load running torque (with n_1 = 3000 rpm and 20 °C gearhead temperature) [c]			T_{012} Nm	0.90	0.75	0.70	0.65	0.55	0.50	0.50	0.40	0.35	0.35	0.35	0.30	0.30
			in.lb	7.97	6.64	6.20	5.75	4.87	4.43	4.43	3.54	3.10	3.10	3.10	2.66	2.66
Max. torsional backlash			j_t arcmin	Standard ≤ 3 / Reduced ≤ 1												
Torsional rigidity [c]			C_{t21} Nm/ arcmin	32	32	26	32	31	24	32	30	30	24	28	21	22
			in.lb/ arcmin	283	283	230	283	274	212	283	266	266	212	248	186	195
Tilting rigidity			C_{2K} Nm/ arcmin	225												
			in.lb/ arcmin	1991												
Max. axial force [d]			F_{2AMax} N	2150												
			lb_f	484												
Max. tilting moment			M_{2KMax} Nm	270												
			in.lb	2390												
Efficiency at full load			η %	94												
Service life (For calculation, see the Chapter "Information")			L_h h	> 20000												
Weight incl. standard adapter plate			*m* kg	3.6												
			lb_m	8.0												
Operating noise (with *i*=100 and n_1 = 3000 rpm no load)			L_{PA} dB(A)	≤ 59												
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 65												
Moment of inertia (relates to the drive)	B	11	J_1 kgcm²	0.17	0.14	0.15	0.13	0.11	0.13	0.10	0.09	0.09	0.09	0.09	0.09	0.09
			10^{-3} in.lb.s²	0.15	0.12	0.13	0.12	0.10	0.12	0.09	0.08	0.08	0.08	0.08	0.08	0.08
Clamping hub diameter [mm]	C	14	J_1 kgcm²	0.24	0.21	0.22	0.20	0.18	0.21	0.18	0.17	0.17	0.17	0.16	0.16	0.16
			10^{-3} in.lb.s²	0.21	0.19	0.19	0.19	0.16	0.18	0.16	0.15	0.15	0.15	0.14	0.15	0.14
	E	19	J_1 kgcm²	0.56	0.53	0.55	0.53	0.51	0.53	0.50	0.49	0.49	0.49	0.49	0.49	0.49
			10^{-3} in.lb.s²	0.50	0.47	0.49	0.47	0.45	0.47	0.44	0.43	0.43	0.43	0.43	0.43	0.43

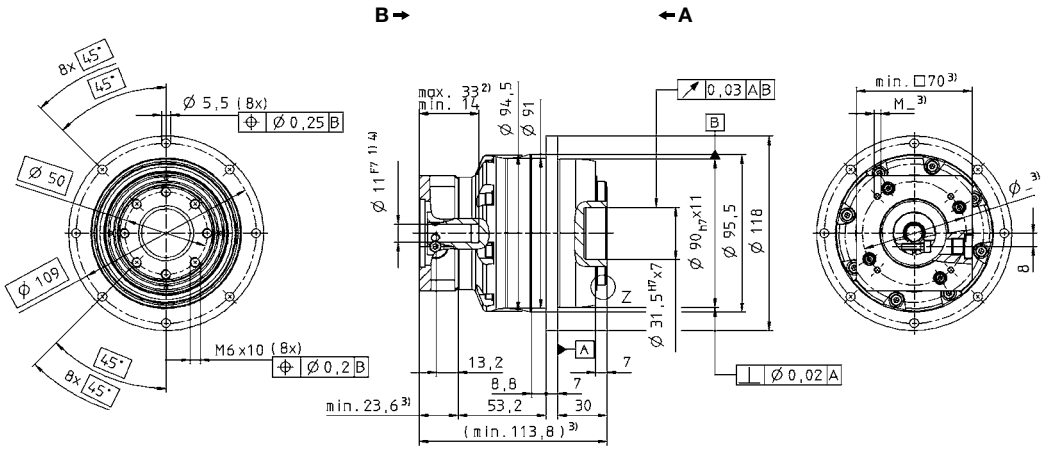
Reduced mass moments of inertia available on request.

[a] Other ratios available on request
[b] For higher ambient temperatures, please reduce input speed
[c] Valid for clamping hub diameter of 14 mm
[d] Refers to center of the output shaft or flange

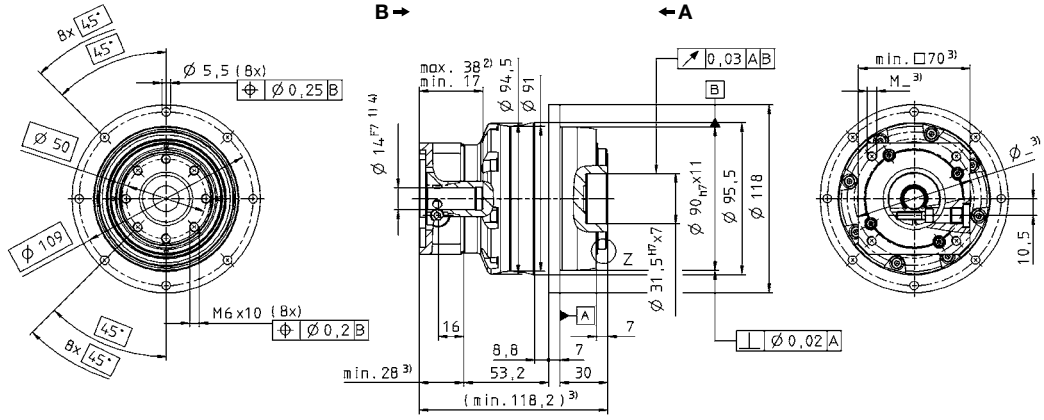
View A View B

Motor shaft diameter [mm]

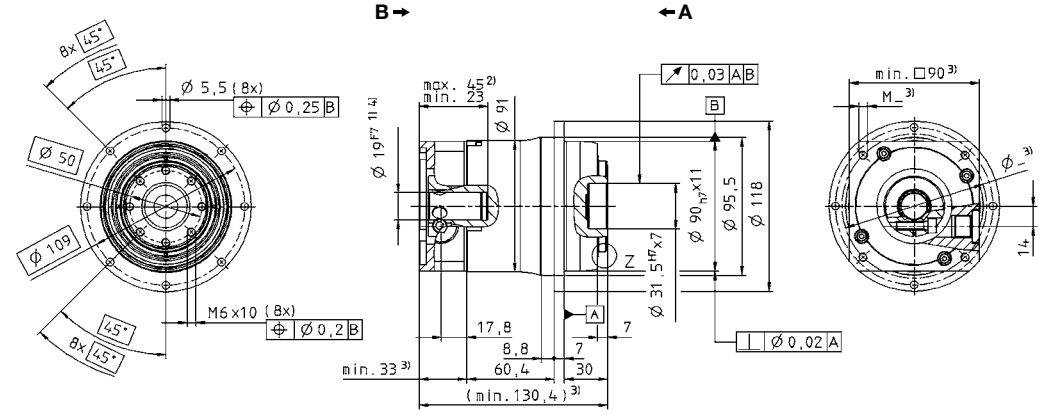
up to 11 [4] (B) clamping hub diameter

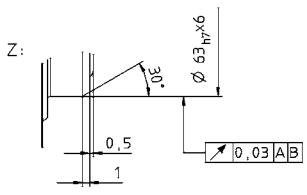


up to 14 [4] (C) clamping hub diameter



up to 19 [4] (E) clamping hub diameter





Non-tolerated dimensions ±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 with a minimum thickness of 1 mm.

CAD data is available under www.wittenstein-alpha.com

Motor mounting according to operating manual

					1-stage			
Ratio [a]			*i*		**4**	**5**	**7**	**10**
cymex®-optimized acceleration torque (please contact us regarding the design)			T_{2Bcym}	Nm	390	420	350	275
				in.lb	3452	3717	3098	2434
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B}	Nm	350	380	330	265
				in.lb	3098	3363	2921	2345
Nominal output torque (with n_{1N})			T_{2N}	Nm	170	170	170	120
				in.lb	1505	1505	1505	1062
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not}	Nm	625	625	625	625
				in.lb	5531	5531	5531	5531
Nominal input speed (with T_{2N} and 20 °C ambient temperature) [b]			n_{1N}	rpm	2300	2500	2500	2500
Max. input speed			n_{1Max}	rpm	4500	4500	4500	4500
Mean no load running torque (with n_1=3000 rpm and 20 °C gearhead temperature) [c]			T_{012}	Nm	3.3	2.7	2.0	1.4
				in.lb	29.2	23.9	17.7	12.4
Max. torsional backlash			j_t	arcmin	Standard ≤ 3 / Reduced ≤ 1			
Torsional rigidity [c]			C_{t21}	Nm/ arcmin	80	86	76	62
				in.lb/ arcmin	708	761	673	549
Tilting rigidity			C_{2K}	Nm/ arcmin	550			
				in.lb/ arcmin	4868			
Max. axial force [d]			F_{2AMax}	N	4150			
				lb_f	934			
Max. tilting moment			M_{2KMax}	Nm	440			
				in.lb	3894			
Efficiency at full load			η	%	97			
Service life (For calculation, see the Chapter "Information")			L_h	h	> 20000			
Weight incl. standard adapter plate			*m*	kg	6.5			
				lb_m	14.4			
Operating noise (with *i*=10 and n_1=3000 rpm no load)			L_{PA}	dB(A)	≤ 64			
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 65			
Moment of inertia (relates to the drive)	E	19	J_1	kgcm²	2.59	2.11	1.69	1.45
				10^{-3} in.lb.s²	2.29	1.87	1.50	1.28
Clamping hub diameter [mm]	G	24	J_1	kgcm²	3.28	2.80	2.38	2.14
				10^{-3} in.lb.s²	2.90	2.48	2.11	1.89
	H	28	J_1	kgcm²	2.89	2.41	1.99	1.75
				10^{-3} in.lb.s²	2.56	2.13	1.76	1.55
	K	38	J_1	kgcm²	10.3	9.87	9.45	9.21
				10^{-3} in.lb.s²	9.11	8.73	8.36	8.15

Reduced mass moments of inertia available on request.

[a] Other ratios available on request
[b] For higher ambient temperatures, please reduce input speed
[c] Valid for clamping hub diameter of 24 and 28 mm
[d] Refers to center of the output shaft or flange

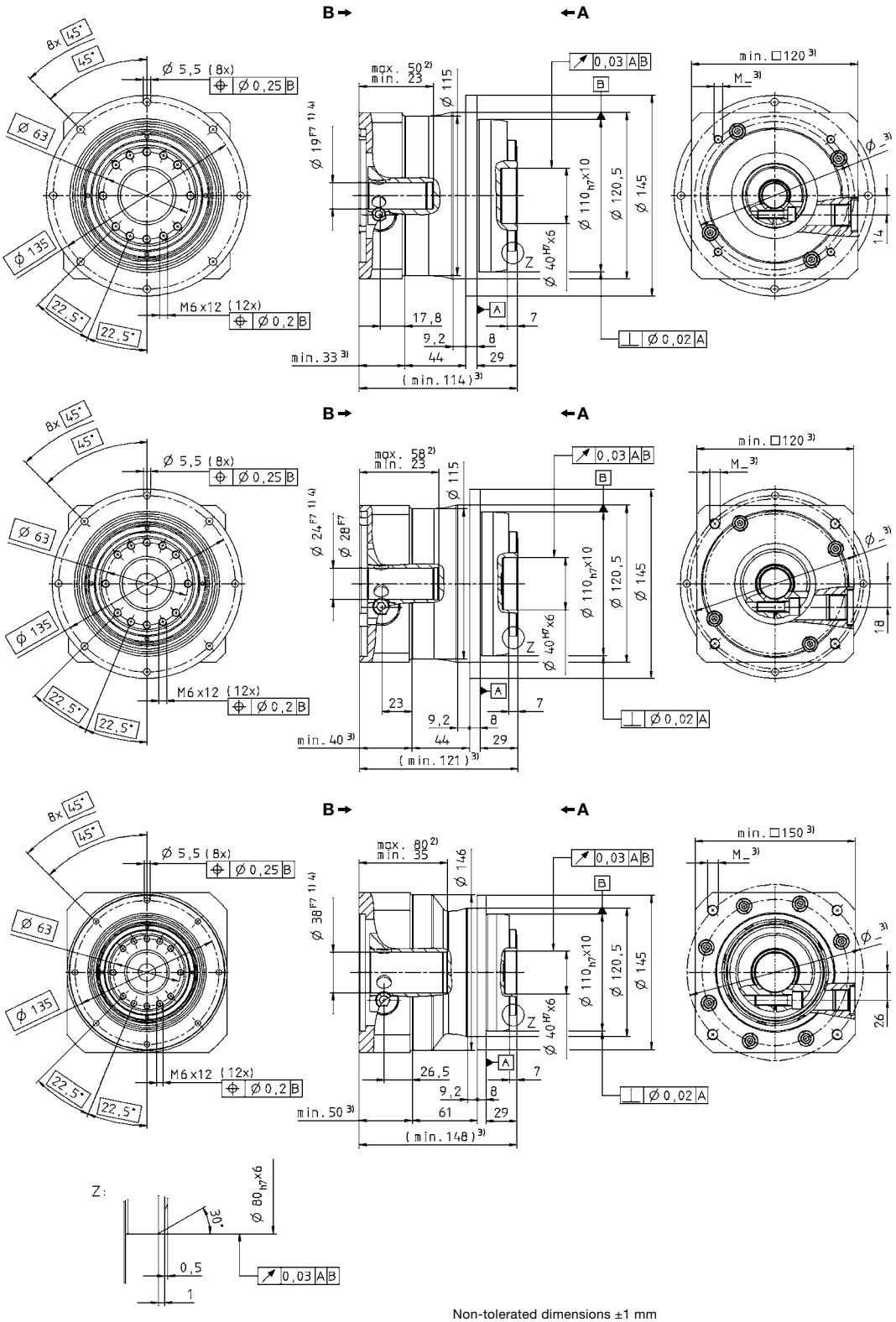
View A View B

Motor shaft diameter [mm]

up to 19 [4] (E) clamping hub diameter

up to 24/28 [4] (G/H) clamping hub diameter

up to 38 [4] (K) clamping hub diameter



Non-tolerated dimensions ±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 with a minimum thickness of 1 mm.

CAD data is available under www.wittenstein-alpha.com

Motor mounting according to operating manual

					2-stage												
Ratio [a]			i		**16**	**20**	**21**	**25**	**28**	**31**	**35**	**40**	**50**	**61**	**70**	**91**	**100**
cymex®-optimized acceleration torque (please contact us regarding the design)			T_{2Bcym}	Nm	390	390	–	420	390	–	420	390	420	–	350	–	275
				in.lb	3452	3452	–	3717	3452	–	3717	3452	3717	–	3098	–	2434
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B}	Nm	350	350	300	380	350	300	380	350	380	280	330	250	265
				in.lb	3098	3098	2655	3363	3098	2655	3363	3098	3363	2478	2921	2213	2345
Nominal output torque (with n_{1N})			T_{2N}	Nm	200	210	170	200	210	190	220	200	220	170	200	100	120
				in.lb	1770	1859	1505	1770	1859	1682	1947	1770	1947	1505	1770	885	1062
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not}	Nm	625	625	625	625	625	625	625	625	625	625	625	625	625
				in.lb	5531	5531	5531	5531	5531	5531	5531	5531	5531	5531	5531	5531	5531
Nominal input speed (with T_{2N} and 20 °C ambient temperature) [b]			n_{1N}	rpm	2800	2800	2800	2800	2800	2800	2800	2800	3100	3500	3500	4200	4200
Max. input speed			n_{1Max}	rpm	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000
Mean no load running torque (with n_1 = 3000 rpm and 20 °C gearhead temperature) [c]			T_{012}	Nm	1.8	1.5	1.4	1.4	1.1	1.1	1.0	0.8	0.8	0.7	0.7	0.6	0.6
				in.lb	15.9	13.3	12.4	12.4	9.7	9.7	8.9	7.1	7.1	6.2	6.2	5.3	5.3
Max. torsional backlash			j_t	arcmin	Standard ≤ 3 / Reduced ≤ 1												
Torsional rigidity [c]			C_{t21}	Nm/ arcmin	81	81	70	83	80	54	82	76	80	61	71	55	60
				in.lb/ arcmin	717	717	620	735	708	478	726	673	708	540	628	487	531
Tilting rigidity			C_{2K}	Nm/ arcmin	550												
				in.lb/ arcmin	4867												
Max. axial force [d]			F_{2AMax}	N	4150												
				lb_f	934												
Max. tilting moment			M_{2KMax}	Nm	440												
				in.lb	3894												
Efficiency at full load			η	%	94												
Service life (For calculation, see the Chapter "Information")			L_h	h	> 20000												
Weight incl. standard adapter plate			m	kg	6.7												
				lb_m	14.8												
Operating noise (with i=100 and n_1 = 3000 rpm no load)			L_{PA}	dB(A)	≤ 60												
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 65												
Moment of inertia (relates to the drive)	C	14	J_1	kgcm²	0.66	0.55	0.60	0.53	0.44	0.55	0.43	0.38	0.38	0.39	0.37	0.38	0.37
				10^{-3} in.lb.s²	0.59	0.49	0.51	0.47	0.39	0.49	0.38	0.34	0.33	0.35	0.33	0.34	0.33
Clamping hub diameter [mm]	E	19	J_1	kgcm²	0.83	0.71	0.77	0.69	0.61	0.72	0.60	0.55	0.54	0.55	0.54	0.54	0.54
				10^{-3} in.lb.s²	0.73	0.63	0.68	0.61	0.54	0.64	0.53	0.49	0.48	0.4	0.48	0.48	0.48
	G	24	J_1	kgcm²	2.20	2.08	2.14	2.06	1.98	2.09	1.97	1.92	1.92	1.92	1.91	1.92	1.91
				10^{-3} in.lb.s²	1.95	1.84	1.89	1.82	1.75	1.85	1.74	1.70	1.70	1.70	1.69	1.70	1.69

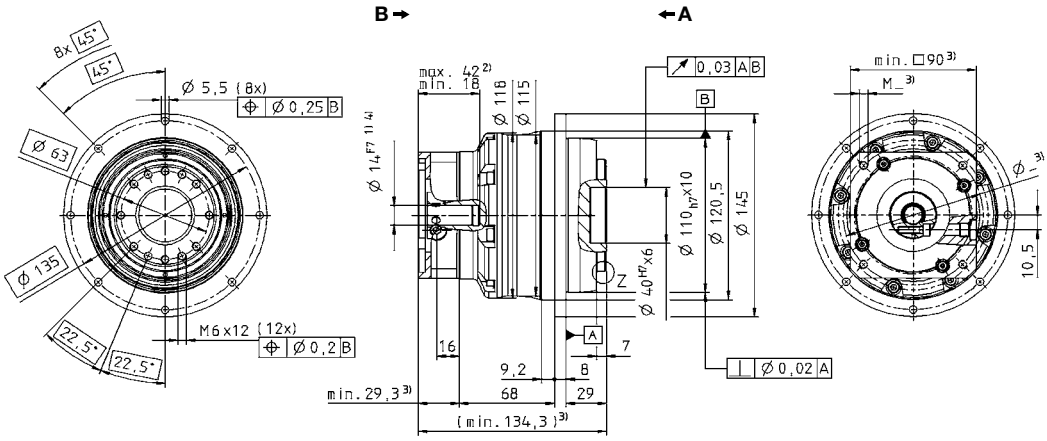
Reduced mass moments of inertia available on request.

[a] Other ratios available on request
[b] For higher ambient temperatures, please reduce input speed
[c] Valid for clamping hub diameter of 19 mm
[d] Refers to center of the output shaft or flange

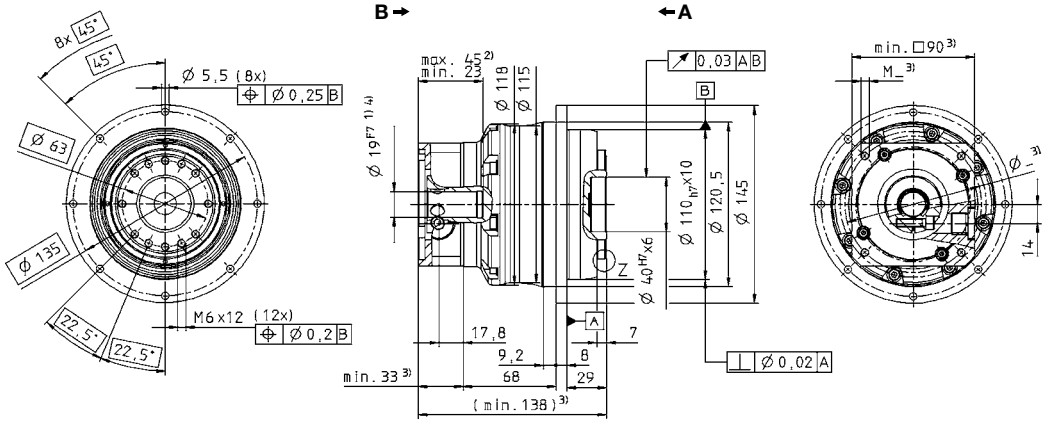
View A View B

Motor shaft diameter [mm]

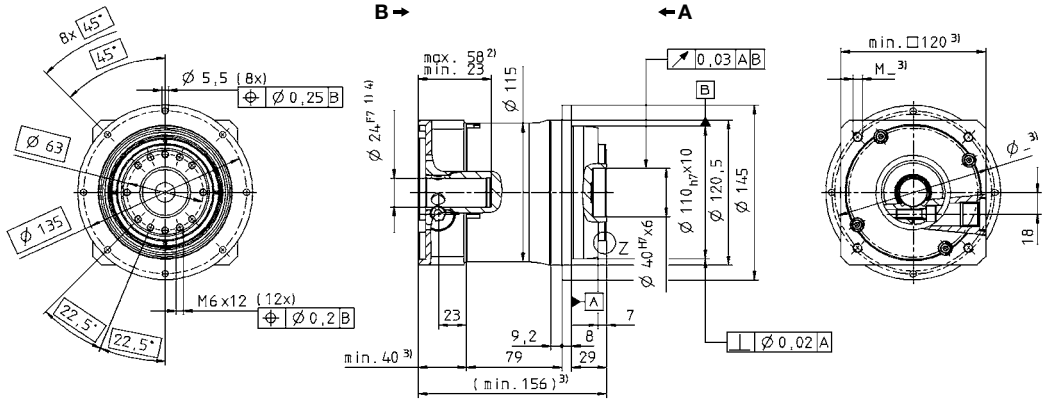
up to 14 [4] (C) clamping hub diameter

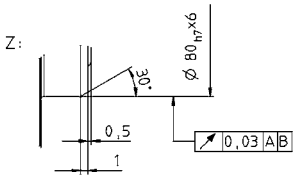


up to 19 [4] (E) clamping hub diameter



up to 24 [4] (G) clamping hub diameter





Non-tolerated dimensions ±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 with a minimum thickness of 1 mm.

CAD data is available under www.wittenstein-alpha.com

Motor mounting according to operating manual

					1-stage			
Ratio [a]			*i*		**4**	**5**	**7**	**10**
cymex®-optimized acceleration torque (please contact us regarding the design)			T_{2Bcym}	Nm	750	800	–	600
				in.lb	6638	7080	–	5310
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B}	Nm	700	700	700	540
				in.lb	6195	6195	6195	4779
Nominal output torque (with n_{1N})			T_{2N}	Nm	370	370	370	240
				in.lb	3275	3275	3275	2124
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not}	Nm	1250	1250	1250	1250
				in.lb	11063	11063	11063	11063
Nominal input speed (with T_{2N} and 20 °C ambient temperature) [b]			n_{1N}	rpm	1900	2000	2500	2500
Max. input speed			n_{1Max}	rpm	4000	4000	4000	4000
Mean no load running torque (with n_1=3000 rpm and 20 °C gearhead temperature) [c]			T_{012}	Nm	8.1	6.6	4.8	3.5
				in.lb	71.7	58.4	42.5	31.0
Max. torsional backlash			j_t	arcmin	Standard ≤ 3 / Reduced ≤ 1			
Torsional rigidity [c]			C_{t21}	Nm/ arcmin	190	187	159	123
				in.lb/ arcmin	1682	1655	1407	1089
Tilting rigidity			C_{2K}	Nm/ arcmin	560			
				in.lb/ arcmin	4956			
Max. axial force [d]			F_{2AMax}	N	6130			
				lb_f	1379			
Max. tilting moment			M_{2KMax}	Nm	1335			
				in.lb	11815			
Efficiency at full load			η	%	97			
Service life (For calculation, see the Chapter "Information")			L_h	h	> 20000			
Weight incl. standard adapter plate			*m*	kg	14.0			
				lb_m	30.9			
Operating noise (with *i*=10 and n_1=3000 rpm no load)			L_{PA}	dB(A)	≤ 65			
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 65			
Moment of inertia (relates to the drive)	G	24	J_1	kgcm²	9.47	7.85	6.39	5.54
				10^{-3} in.lb.s²	8.38	6.95	5.66	4.90
Clamping hub diameter [mm]	I	32	J_1	kgcm²	12.6	11.0	9.55	8.71
				10^{-3} in.lb.s²	11.1	9.74	8.45	7.70
	K	38	J_1	kgcm²	13.7	12.1	10.6	9.78
				10^{-3} in.lb.s²	12.1	10.7	9.38	8.65
	M	48	J_1	kgcm²	28.3	26.7	25.3	24.4
				10^{-3} in.lb.s²	25.0	23.6	22.4	21.6

Reduced mass moments of inertia available on request.

[a] Other ratios available on request
[b] For higher ambient temperatures, please reduce input speed
[c] Valid for clamping hub diameter of 32 and 38 mm
[d] Refers to center of the output shaft or flange

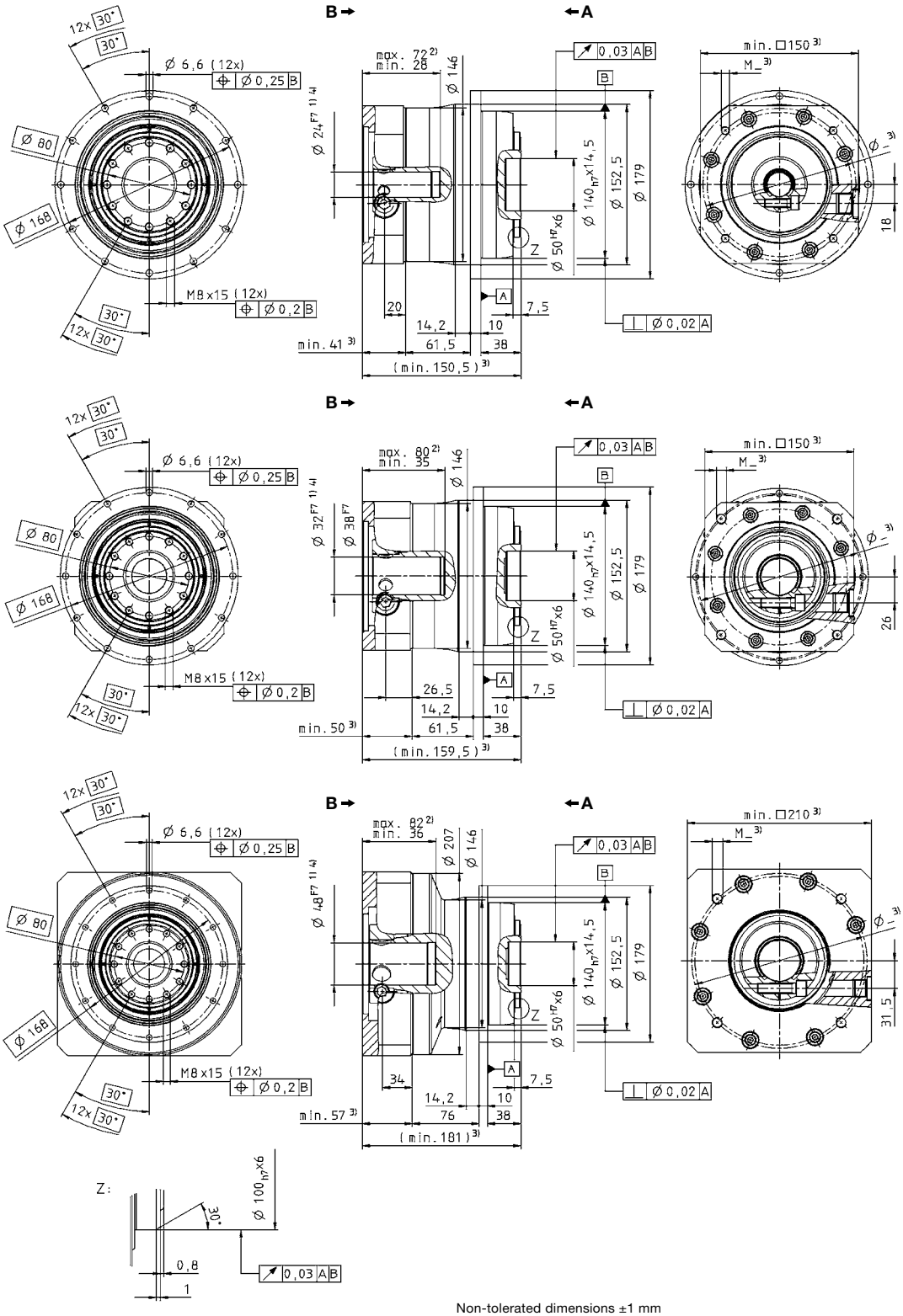
View A View B

Motor shaft diameter [mm]

up to 24 [4] (G) clamping hub diameter

up to 32/38 [4] (I/K) clamping hub diameter

up to 48 [4] (M) clamping hub diameter



Non-tolerated dimensions ±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 with a minimum thickness of 1 mm.

CAD data is available under www.wittenstein-alpha.com

Motor mounting according to operating manual

					2-stage													
Ratio [a]			*i*		**16**	**20**	**21**	**25**	**28**	**31**	**35**	**40**	**50**	**61**	**70**	**91**	**100**
cymex®-optimized acceleration torque (please contact us regarding the design)			T_{2Bcym}	Nm	800	800	–	800	800	–	800	800	800	–	–	–	600
				in.lb	7080	7080	–	7080	7080	–	7080	7080	7080	–	–	–	5310
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B}	Nm	750	750	600	750	750	620	750	750	750	550	700	500	540
				in.lb	6638	6638	5310	6638	6638	5487	6638	6638	6638	4868	6195	4425	4779
Nominal output torque (with n_{1N})			T_{2N}	Nm	400	400	350	400	400	400	400	400	400	350	400	220	240
				in.lb	3540	3540	3098	3540	3540	3540	3540	3540	3540	3098	3540	1947	2124
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not}	Nm	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250
				in.lb	11063	11063	11063	11063	11063	11063	11063	11063	11063	11063	11063	11063	11063
Nominal input speed (with T_{2N} and 20 °C ambient temperature) [b]			n_{1N}	rpm	2900	2900	2900	2900	2900	2900	2900	2900	3200	3200	3200	3900	3900
Max. input speed			n_{1Max}	rpm	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000
Mean no load running torque (with n_1=3000 rpm and 20 °C gearhead temperature) [c]			T_{012}	Nm	4.2	3.4	3.3	3.1	2.5	2.4	2.3	1.8	1.7	1.5	1.5	1.4	1.3
				in.lb	37.2	30.1	29.2	27.4	22.1	21.2	20.4	15.9	15.1	13.3	13.3	12.4	11.5
Max. torsional backlash			j_t	arcmin	Standard ≤ 3 / Reduced ≤ 1												
Torsional rigidity [c]			C_{t21}	Nm/ arcmin	180	185	145	180	180	130	175	175	175	123	145	100	115
				in.lb/ arcmin	1593	1637	1283	1593	1593	1151	1549	1549	1549	1089	1283	885	1018
Tilting rigidity			C_{2K}	Nm/ arcmin	560												
				in.lb/ arcmin	4956												
Max. axial force [d]			F_{2AMax}	N	6130												
				lb_f	1379												
Max. tilting moment			M_{2KMax}	Nm	1335												
				in.lb	11815												
Efficiency at full load			η	%	94												
Service life (For calculation, see the Chapter "Information")			L_h	h	> 20000												
Weight incl. standard adapter plate			*m*	kg	14.1												
				lb_m	31.2												
Operating noise (with *i*=100 and n_1=3000 rpm no load)			L_{PA}	dB(A)	≤ 63												
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 65												
Moment of inertia (relates to the drive)	E	19	J_1	kgcm²	2.53	2.07	2.30	2.01	1.67	2.12	1.64	1.44	1.42	1.46	1.41	1.43	1.40
				10^{-3} in.lb.s²	2.24	1.83	2.04	1.78	1.48	1.88	1.45	1.27	1.26	1.29	1.25	1.27	1.24
Clamping hub diameter [mm]	G	24	J_1	kgcm²	3.22	2.77	2.99	2.70	2.36	2.81	2.33	2.13	2.12	2.15	2.10	2.12	2.09
				10^{-3} in.lb.s²	2.85	2.45	2.65	2.39	2.09	2.49	2.06	1.89	1.88	1.90	1.86	1.88	1.85
	K	38	J_1	kgcm²	10.3	9.83	10.1	9.77	9.43	9.88	9.40	9.20	9.18	9.22	9.17	9.19	9.16
				10^{-3} in.lb.s²	9.11	8.70	8.94	8.64	8.35	8.74	8.32	8.14	8.12	8.16	8.12	8.13	8.11

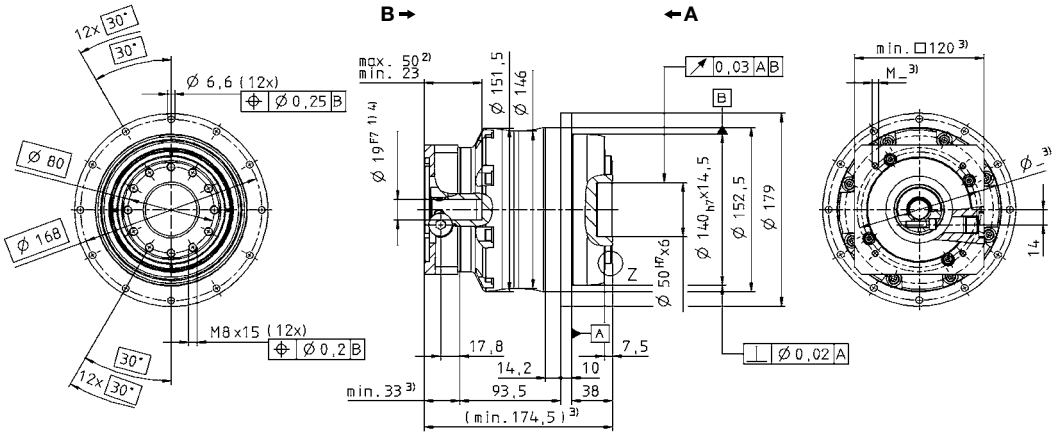
Reduced mass moments of inertia available on request.

[a] Other ratios available on request
[b] For higher ambient temperatures, please reduce input speed
[c] Valid for clamping hub diameter of 24 mm
[d] Refers to center of the output shaft or flange

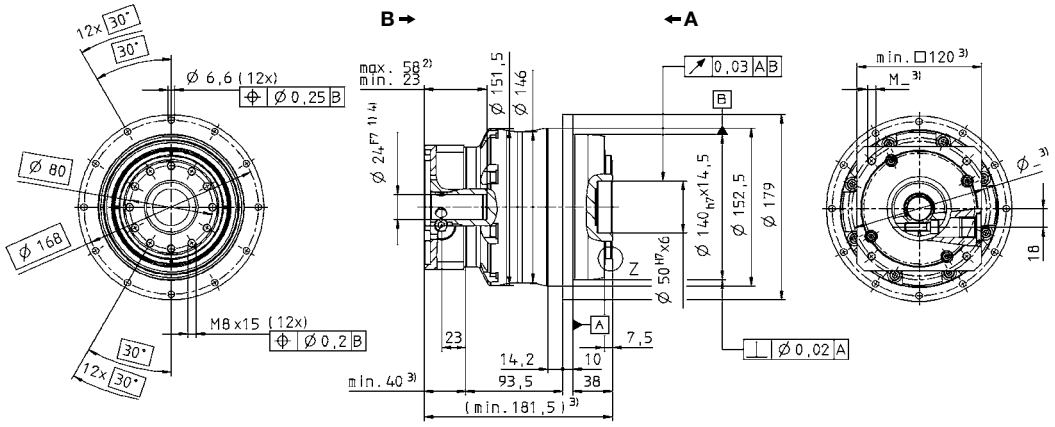
View A View B

Motor shaft diameter [mm]

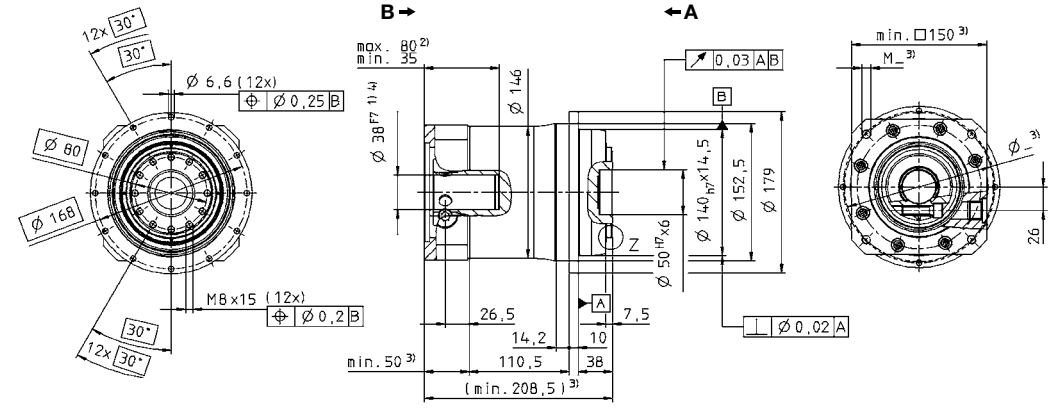
up to 19 [4] (E) clamping hub diameter

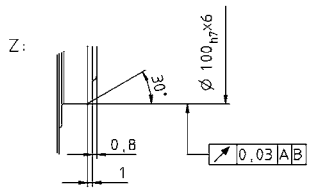


up to 24 [4] (G) clamping hub diameter



up to 38 [4] (K) clamping hub diameter





Non-tolerated dimensions ±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 with a minimum thickness of 1 mm.

CAD data is available under www.wittenstein-alpha.com

Motor mounting according to operating manual

					1-stage			
Ratio [a]			i		**4**	**5**	**7**	**10**
cymex®-optimized acceleration torque (please contact us regarding the design)			T_{2Bcym}	Nm	1900	2000	1900	1500
				in.lb	16815	17700	16815	13275
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B}	Nm	1600	1600	1600	1400
				in.lb	14160	14160	14160	12390
Nominal output torque (with n_{1N})			T_{2N}	Nm	700	750	750	750
				in.lb	6195	6638	6638	6638
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not}	Nm	2750	2750	2750	2750
				in.lb	24338	24338	24338	24338
Nominal input speed (with T_{2N} and 20 °C ambient temperature) [b]			n_{1N}	rpm	1400	1500	2000	2000
Max. input speed			n_{1Max}	rpm	3500	3500	3500	3500
Mean no load running torque (with n_1 = 3000 rpm and 20 °C gearhead temperature) [c]			T_{012}	Nm	15.6	12.7	9.4	7.0
				in.lb	138.1	112.4	83.2	62.0
Max. torsional backlash			j_t	arcmin	Standard ≤ 3 / Reduced ≤ 1			
Torsional rigidity [c]			C_{t21}	Nm/ arcmin	610	610	550	445
				in.lb/ arcmin	5399	5399	4868	3938
Tilting rigidity			C_{2K}	Nm/ arcmin	1452			
				in.lb/ arcmin	12850			
Max. axial force [d]			F_{2AMax}	N	10050			
				lb_f	2261			
Max. tilting moment			M_{2KMax}	Nm	3280			
				in.lb	29028			
Efficiency at full load			η	%	97			
Service life (For calculation, see the Chapter "Information")			L_h	h	> 20000			
Weight incl. standard adapter plate			m	kg	30.0			
				lb_m	66			
Operating noise (with i=10 and n_1 = 3000 rpm no load)			L_{PA}	dB(A)	≤ 66			
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 65			
Moment of inertia (relates to the drive)	K	38	J_1	kgcm²	44.5	34.6	25.5	20.6
				10^{-3} in.lb.s²	39.4	30.6	22.6	18.2
Clamping hub diameter [mm]	M	48	J_1	kgcm²	51.8	41.9	32.9	28.0
				10^{-3} in.lb.s²	45.8	37.1	29.1	24.8

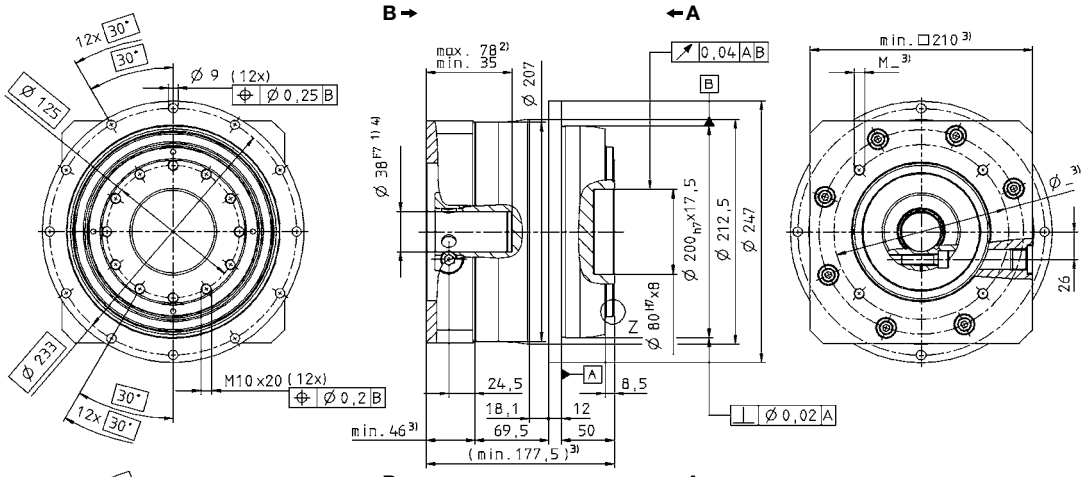
Reduced mass moments of inertia available on request.

[a] Other ratios available on request
[b] For higher ambient temperatures, please reduce input speed
[c] Valid for clamping hub diameter of 48 mm
[d] Refers to center of the output shaft or flange

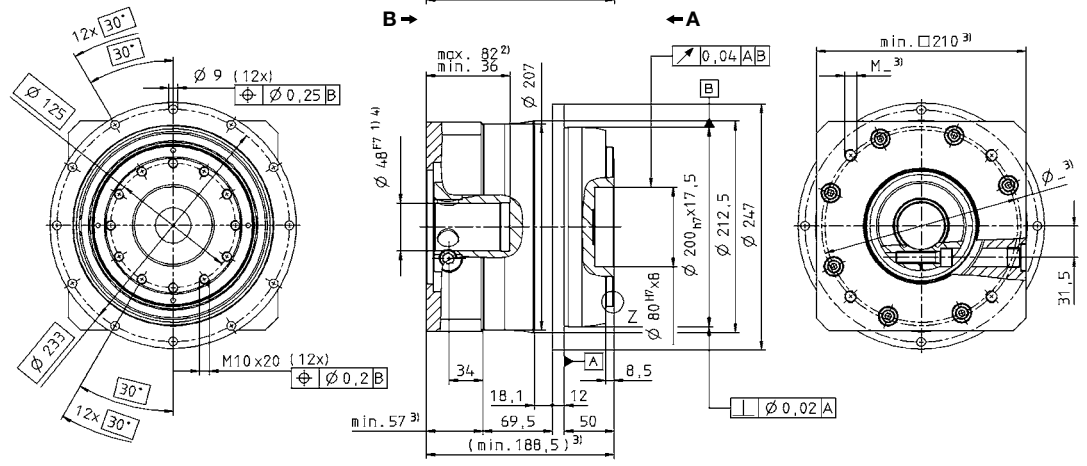
View A View B

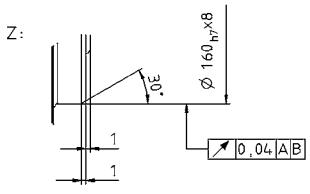
Motor shaft diameter [mm]

up to 38 [4] (K) clamping hub diameter



up to 48 [4] (M) clamping hub diameter





Non-tolerated dimensions ±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 with a minimum thickness of 1 mm.

CAD data is available under www.wittenstein-alpha.com

Motor mounting according to operating manual

					2-stage													
Ratio [a]			*i*		**16**	**20**	**21**	**25**	**28**	**31**	**35**	**40**	**50**	**61**	**70**	**91**	**100**
cymex®-optimized acceleration torque (please contact us regarding the design)			T_{2Bcym}	Nm	2000	2000	–	2000	2000	–	2000	1800	1800	–	1800	–	1500
				in.lb	17700	17700	–	17700	17700	–	17700	15930	15930	–	15930	–	13275
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B}	Nm	1600	1600	1400	1600	1600	1600	1600	1600	1600	1400	1600	1300	1400
				in.lb	14160	14160	12390	14160	14160	14160	14160	14160	14160	12390	14160	11505	12390
Nominal output torque (with n_{1N})			T_{2N}	Nm	980	980	850	1050	1050	1250	1250	850	1050	1100	900	700	800
				in.lb	8673	8673	7523	9293	9293	11063	11063	7523	9293	9735	7965	6195	7080
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not}	Nm	2750	2750	2750	2750	2750	2750	2750	2750	2750	2750	2750	2750	2750
				in.lb	24338	24338	24338	24338	24338	24338	24338	24338	24338	24338	24338	24338	24338
Nominal input speed (with T_{2N} and 20 °C ambient temperature) [b]			n_{1N}	rpm	2500	2500	2500	2500	2500	2500	2500	2500	2900	3200	3200	3400	3400
Max. input speed [c]			n_{1Max}	rpm	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500
Mean no load running torque (with n_1=3000 rpm and 20 °C gearhead temperature) [c]			T_{012}	Nm	6.9	5.6	5.5	5.0	4.1	3.9	3.7	3.0	2.7	2.5	2.4	2.2	2.2
				in.lb	61.1	49.6	48.7	44.3	36.3	34.5	32.7	26.6	23.9	22.1	21.2	19.5	19.5
Max. torsional backlash			j_t	arcmin	Standard ≤ 3 / Reduced ≤ 1												
Torsional rigidity [c]			C_{t21}	Nm/ arcmin	585	580	465	570	560	440	560	520	525	415	480	360	395
				in.lb/ arcmin	5177	5133	4115	5045	4956	3894	4956	4602	4646	3673	4248	3186	3496
Tilting rigidity			C_{2K}	Nm/ arcmin	1452												
				in.lb/ arcmin	12850												
Max. axial force [d]			F_{2AMax}	N	10050												
				lb_f	2261												
Max. tilting moment			M_{2KMax}	Nm	3280												
				in.lb	29028												
Efficiency at full load			η	%	94												
Service life (For calculation, see the Chapter "Information")			L_h	h	> 20000												
Weight incl. standard adapter plate			*m*	kg	34.0												
				lb_m	75.1												
Operating noise (with *i*=100 and n_1=3000 rpm no load)			L_{PA}	dB(A)	≤ 66												
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 65												
Moment of inertia (relates to the drive)	G	24	J_1	kgcm²	8.51	8.21	8.98	7.82	6.57	8.09	6.37	5.63	5.54	5.63	5.44	5.50	5.39
				10^{-3} in.lb.s²	7.53	7.27	7.95	6.92	5.81	7.16	5.64	4.99	4.90	4.99	4.82	4.87	4.77
Clamping hub diameter [mm]	I	32	J_1	kgcm²	11.7	11.4	12.1	11.0	9.73	11.3	9.54	8.80	8.70	8.79	8.61	8.67	8.56
				10^{-3} in.lb.s²	10.3	10.1	10.7	9.72	8.61	9.96	8.44	7.78	7.70	7.78	7.62	7.67	7.57
	K	38	J_1	kgcm²	12.7	12.5	13.2	12.1	10.8	12.3	10.6	9.87	9.77	9.87	9.68	9.74	9.63
				10^{-3} in.lb.s²	11.3	11.0	11.7	10.7	9.6	10.9	9.39	8.73	8.65	8.73	8.56	8.62	8.52
	M	48	J_1	kgcm²	27.4	27.1	27.8	26.7	25.4	26.9	25.3	24.5	24.4	24.5	24.3	24.4	24.3
				10^{-3} in.lb.s²	24.2	24.0	24.6	23.6	22.5	23.8	22.3	21.7	21.6	21.7	21.5	21.6	21.5

Reduced mass moments of inertia available on request.

[a] Other ratios available on request
[b] For higher ambient temperatures, please reduce input speed
[c] Valid for clamping hub diameter of 32 and 38 mm
[d] Refers to center of the output shaft or flange

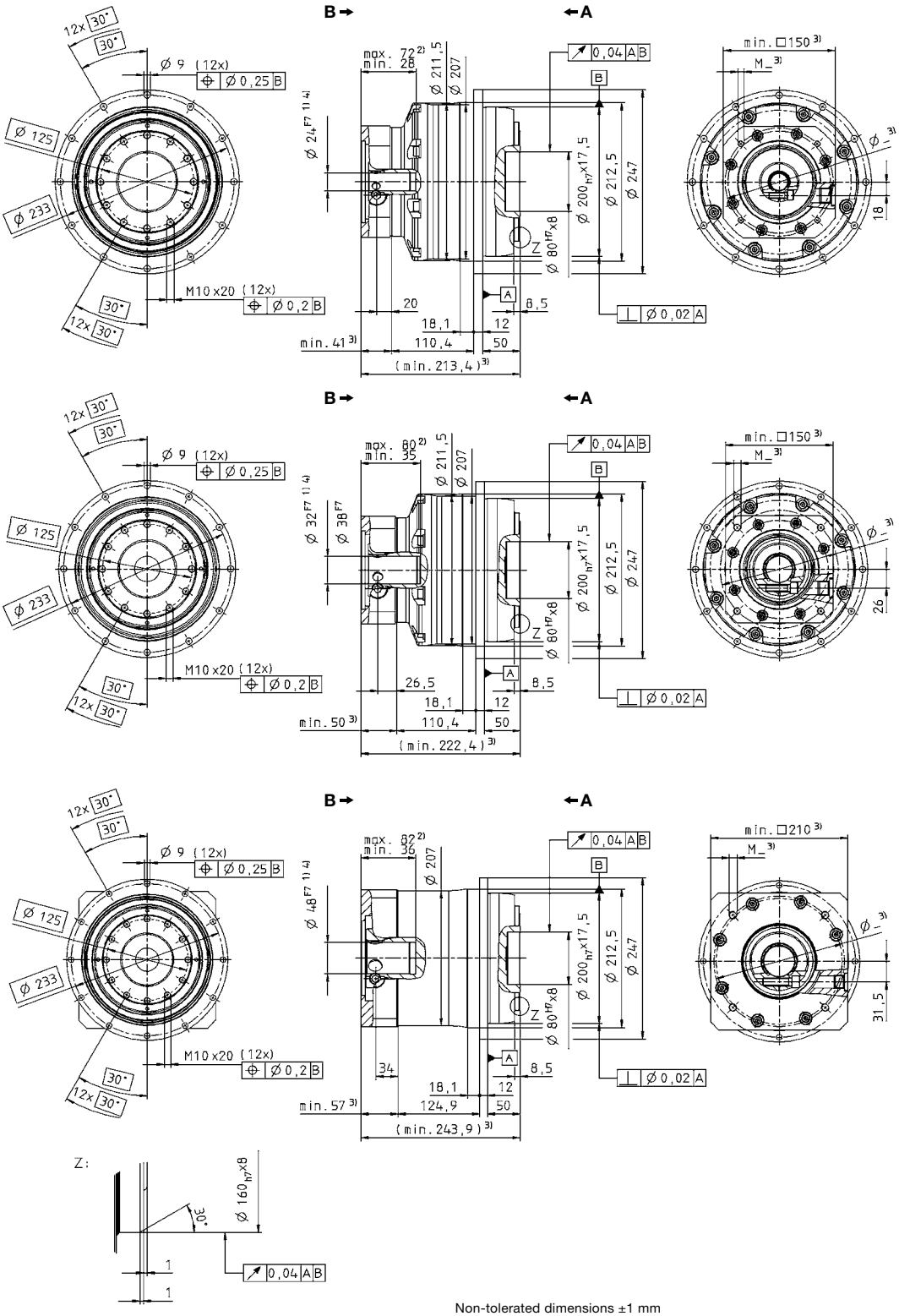
View A View B

Motor shaft diameter [mm]

up to 24 [4] (G) clamping hub diameter

up to 32/38 [4] (I/K) clamping hub diameter

up to 48 [4] (M) clamping hub diameter



Non-tolerated dimensions ±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 with a minimum thickness of 1 mm.

CAD data is available under www.wittenstein-alpha.com

Motor mounting according to operating manual

				1-stage			2-stage									
Ratio [a]			***i***	**5**	**7**	**10**	**20**	**21**	**25**	**31**	**35**	**50**	**61**	**70**	**91**	**100**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B} Nm	3500	3300	1900	3500	3400	3500	3500	3500	3000	2800	3300	2800	2800
			in.lb	30975	29205	16815	30975	30090	30975	30975	30975	26550	24780	29205	24780	24780
Nominal output torque (with n_{1N})			T_{2N} Nm	2200	1800	1000	2300	2100	2400	2200	2500	1900	1600	1800	1600	1600
			in.lb	19470	15930	8850	20355	18585	21240	19470	22125	16815	14160	15930	14160	14160
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not} Nm	8750	8750	8750	8750	8750	8750	8750	8750	8750	8750	8750	8750	8750
			in.lb	77438	77438	77438	77438	77438	77438	77438	77438	77438	77438	77438	77438	77438
Nominal input speed (with T_{2N} and 20 °C ambient temperature) [b]			n_{1N} rpm	1000	1400	1700	2000	2000	2000	2000	2000	2300	2400	2400	2500	2500
Max. input speed			n_{1Max} rpm	2500	2500	2500	3500	3500	3500	3500	3500	3500	3500	3500	3500	3500
Mean no load running torque (with n_1=2000 rpm and 20 °C gearhead temperature)			T_{012} Nm	23	17	11	10	9,5	9,0	7,0	6,0	5,0	4,0	4,0	3,5	3,5
			in.lb	204	150	97	89	84	80	62	53	44	35	35	31	31
Max. torsional backlash			j_t arcmin	Standard ≤ 3 / Reduced ≤ 1			Standard ≤ 3 / Reduced ≤ 2									
Torsional rigidity			C_{t21} Nm/ arcmin	1000	900	700	850	800	950	750	900	800	700	800	600	650
			in.lb/ arcmin	8850	7965	6195	7523	7080	9408	6638	7965	7080	6195	7080	5310	5753
Tilting rigidity			C_{2K} Nm/ arcmin	5560												
			in.lb/ arcmin	49206												
Max. axial force [c]			F_{2AMax} N	33000												
			lb_f	7425												
Max. tilting moment			M_{2KMax} Nm	3900			5900									
			in.lb	34515			52215									
Efficiency at full load			η %	95			93									
Service life (For calculation, see the Chapter "Information")			L_h h	> 20000												
Weight incl. standard adapter plate			*m* kg	60			58.5									
			lb_m	132.6			129.3									
Operating noise (with *i*=10 and n_1=2000 rpm without load)			L_{PA} dB(A)	≤ 64												
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 65												
Moment of inertia (relates to the drive)	M	48	J_1 kgcm²	–	–	–	27.5	27.0	25.9	25.6	22.4	21.5	21.4	21.3	21.2	21.2
			10^{-3} in.lb.s²				24.3	23.9	22.9	22.7	19.8	19.0	18.9	18.9	18.8	18.8
Clamping hub diameter [mm]	N	55	J_1 kgcm²	82.6	61.2	49.5	–	–	–	–	–	–	–	–	–	–
			10^{-3} in.lb.s²	73.1	54.2	43.8										

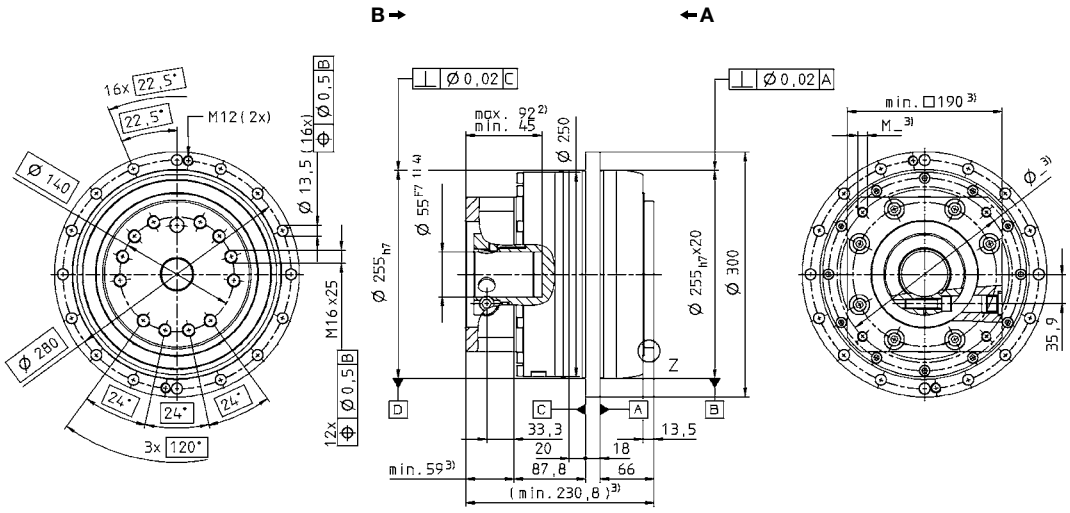
Reduced mass moments of inertia available on request.

[a] Other ratios available on request
[b] For higher ambient temperatures, please reduce input speed
[c] Refers to center of the output shaft or flange

View A View B

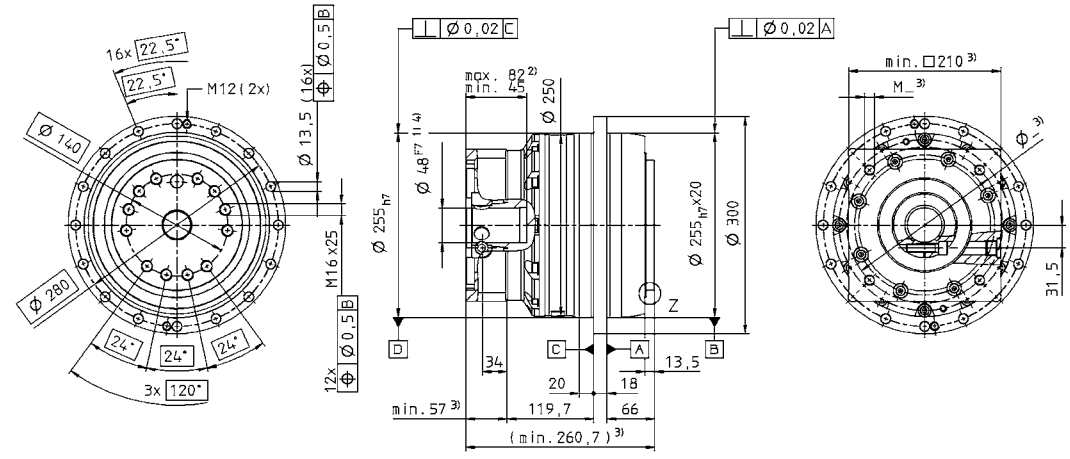
Motor shaft diameter [mm]

1-stage:

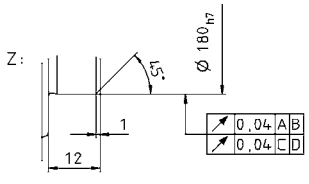


up to 55 4) (N) clamping hub diameter

2-stage:



up to 48 4) (M) clamping hub diameter



Non-tolerated dimensions ±1,5 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 with a minimum thickness of 1 mm.

CAD data is available under www.wittenstein-alpha.com

Motor mounting according to operating manual

				1-stage			2-stage									
Ratio [a]			i	**5**	**7**	**10**	**20**	**21**	**25**	**31**	**35**	**50**	**61**	**70**	**91**	**100**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B} Nm	6000	5000	3400	6000	5000	6000	6000	6000	4500	4800	5000	4800	4800
			in.lb	53100	44250	30090	53100	44250	53100	53100	53100	39825	42480	44250	42480	42480
Nominal output torque (with n_{1N})			T_{2N} Nm	3250	2800	1700	3350	3200	3800	3700	3800	2900	2900	2800	2900	2900
			in.lb	28763	24780	15045	29648	28320	33630	32745	33630	25665	25665	24780	25665	25665
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not} Nm	15000	15000	15000	15000	15000	15000	15000	15000	15000	15000	15000	15000	15000
			in.lb	132750	132750	132750	132750	132750	132750	132750	132750	132750	132750	132750	132750	132750
Nominal input speed (with T_{2N} and 20 °C ambient temperature) [b]			n_{1N} rpm	900	1300	1500	1500	1500	1500	1500	1500	2000	2100	2100	2200	2200
Max. input speed			n_{1Max} rpm	2500	2500	2500	3500	3500	3500	3500	3500	3500	3500	3500	3500	3500
Mean no load running torque (with n_1=2000 rpm and 20 °C gearhead temperature)			T_{012} Nm	30	22	14	13	12	10	8,0	7,0	6,0	5,0	5,0	4,5	4,5
			in.lb	266	195	124	115	106	89	71	62	53	44	44	40	40
Max. torsional backlash			j_t arcmin	Standard ≤ 3 / Reduced ≤ 1			Standard ≤ 3 / Reduced ≤ 2									
Torsional rigidity			C_{t21} Nm/ arcmin	1450	1300	1100	1400	1200	1450	1200	1400	1300	1100	1250	950	1050
			in.lb/ arcmin	12833	11505	9735	12390	10620	12833	10620	12390	11505	9735	11063	8401	9293
Tilting rigidity			C_{2K} Nm/ arcmin	9480												
			in.lb/ arcmin	83898												
Max. axial force [c]			F_{2AMax} N	50000												
			lb_f	11250												
Max. tilting moment			M_{2KMax} Nm	5500			8800									
			in.lb	48675			77880									
Efficiency at full load			η %	95			93									
Service life (For calculation, see the Chapter "Information")			L_h h	> 20000												
Weight incl. standard adapter plate			m kg	82			77.5									
			lb_m	181.2			171.3									
Operating noise (with i=10 and n_1=2000 rpm no load)			L_{PA} dB(A)	≤ 66												
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 65												
Moment of inertia (relates to the drive)	M	48	J_1 kgcm²	–	–	–	32.3	37.6	31.1	32.8	25.1	23.2	23.6	23.2	23.0	22.7
			10^{-3} in.lb.s²				28.6	33.3	27.5	29.0	22.2	20.5	20.9	20.5	20.4	20.1
Clamping hub diameter [mm]	O	60	J_1 kgcm²	175.5	137.0	115.8	–	–	–	–	–	–	–	–	–	–
			10^{-3} in.lb.s²	155.3	121.2	102.5										

Reduced mass moments of inertia available on request.

[a] Other ratios available on request

[b] For higher ambient temperatures, please reduce input speed

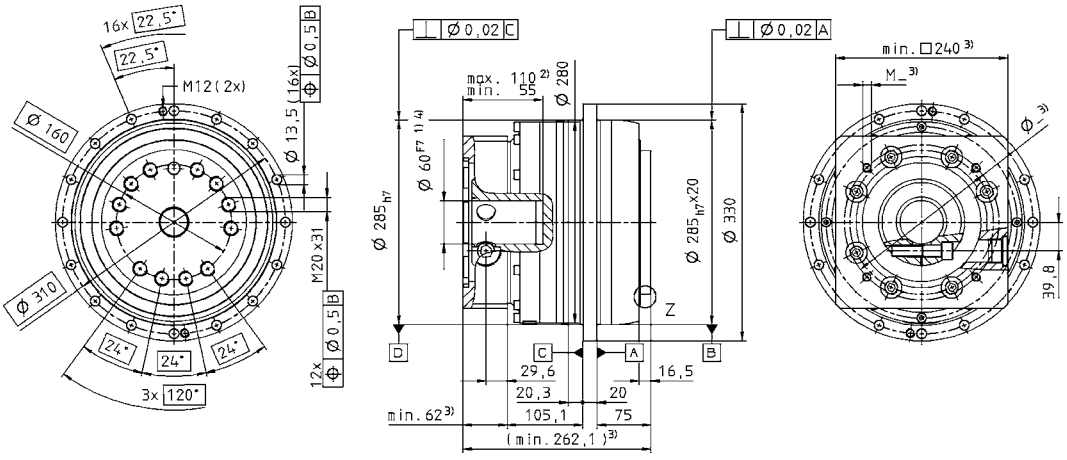
[c] Refers to center of the output shaft or flange

View A | View B

Motor shaft diameter [mm]

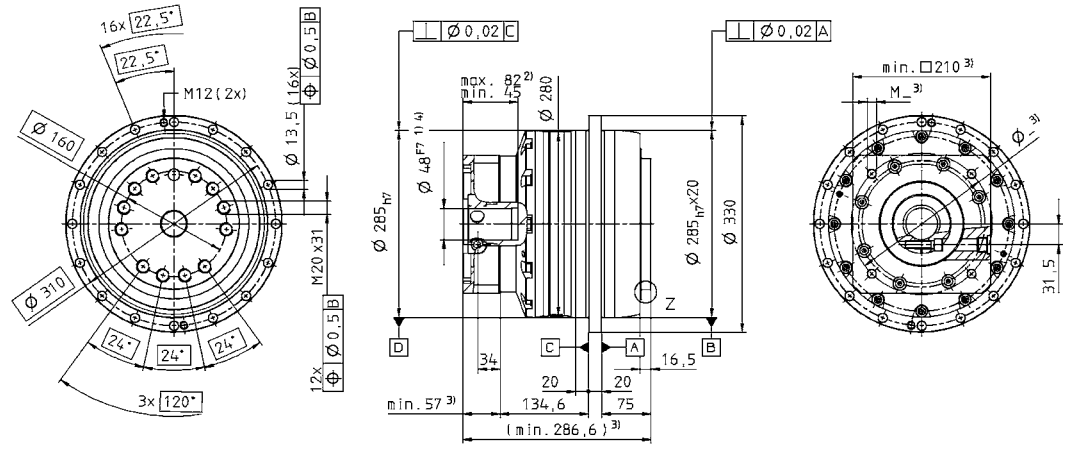
1-stage:

up to 60 [4] (O) clamping hub diameter



2-stage:

up to 48 [4] (M) clamping hub diameter



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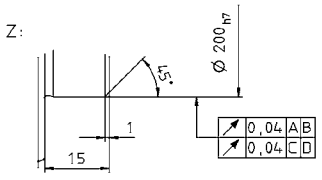


Non-tolerated dimensions ±1,5 mm

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 with a minimum thickness of 1 mm.

CAD data is available under www.wittenstein-alpha.com

Motor mounting according to operating manual

					2-stage				3-stage			
Ratio [a]			i		**22**	**27.5**	**38.5**	**55**	**88**	**110**	**154**	**220**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B}	Nm	230	230	230	230	230	230	230	230
				in.lb	2036	2036	2036	2036	2036	2036	2036	2036
Nominal output torque (with n_{1N})			T_{2N}	Nm	150	150	180	110	180	180	180	180
				in.lb	1328	1328	1593	974	1593	1593	1593	1593
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not}	Nm	525	525	525	525	525	525	525	525
				in.lb	4646	4646	4646	4646	4646	4646	4646	4646
Nominal input speed (with T_{2N} and 20 °C ambient temperature) [b]			n_{1N}	rpm	4000	4000	4000	4000	4500	4500	4500	4500
Max. input speed			n_{1Max}	rpm	6000	6000	6000	6000	6000	6000	6000	6000
Mean no load running torque (with n_1=3000 rpm and 20 °C gearhead temperature) [c]			T_{012}	Nm	0.60	0.50	0.45	0.35	0.35	0.35	0.30	0.30
				in.lb	5.30	4.40	4.00	3.10	3.10	3.10	2.70	2.70
Max. torsional backlash			j_t	arcmin	≤ 1				≤ 1			
Torsional rigidity [c]			C_{t21}	Nm/ arcmin	43	43	43	42	42	42	42	42
				in.lb/ arcmin	381	381	381	372	372	372	372	372
Tilting rigidity			C_{2K}	Nm/ arcmin	225				225			
				in.lb/ arcmin	1991				1991			
Max. axial force [d]			F_{2AMax}	N	2150				2150			
				lb_f	484				484			
Max. tilting moment			M_{2KMax}	Nm	400				400			
				in.lb	3540				3540			
Efficiency at full load			η	%	94				92			
Service life (For calculation, see the Chapter "Information")			L_h	h	> 20000				> 20000			
Weight incl. standard adapter plate			m	kg	3.2				3.6			
				lb_m	7.1				8.0			
Operating noise (with n_1=3000 rpm no load)			L_{PA}	dB(A)	≤ 60				≤ 60			
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 65							
Moment of inertia (relates to the drive)	C	14	J_1	kgcm²	0.21	0.18	0.16	0.14	0.16	0.15	0.14	0.13
				10^{-3} in.lb.s²	0.19	0.16	0.14	0.12	0.14	0.13	0.12	0.12
Clamping hub diameter [mm]	E	19	J_1	kgcm²	0.52	0.50	0.47	0.46	–	–	–	–
				10^{-3} in.lb.s²	0.46	0.44	0.42	0.41				

Reduced mass moments of inertia available on request.

[a] Other ratios available on request
[b] For higher ambient temperatures, please reduce input speed
[c] Valid for clamping hub diameter of 14 mm
[d] Refers to center of the output shaft or flange

View A View B

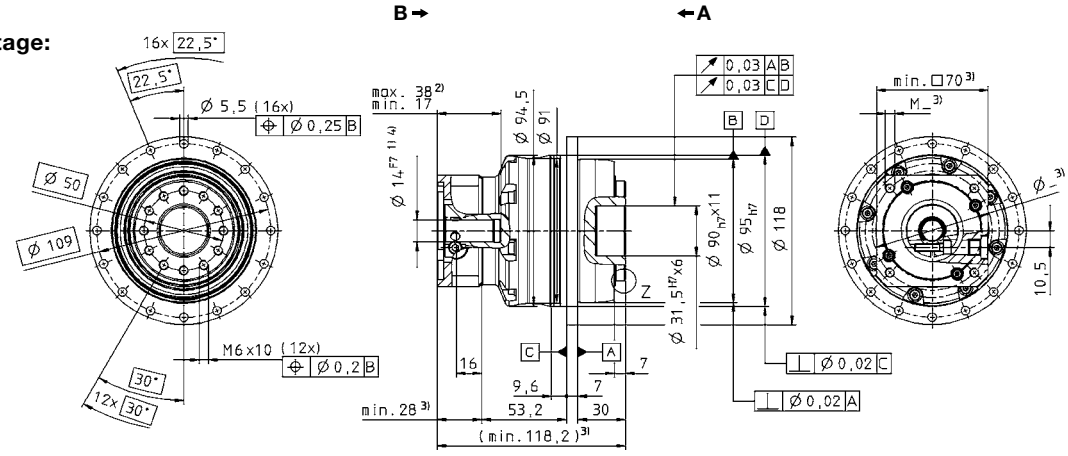
Motor shaft diameter [mm]

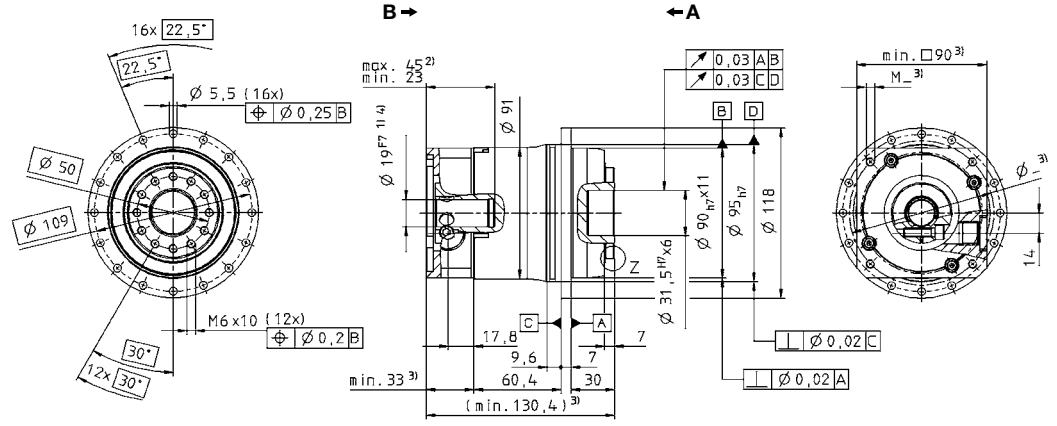
up to 14 4) (C) clamping hub diameter

up to 19 4) (E) clamping hub diameter

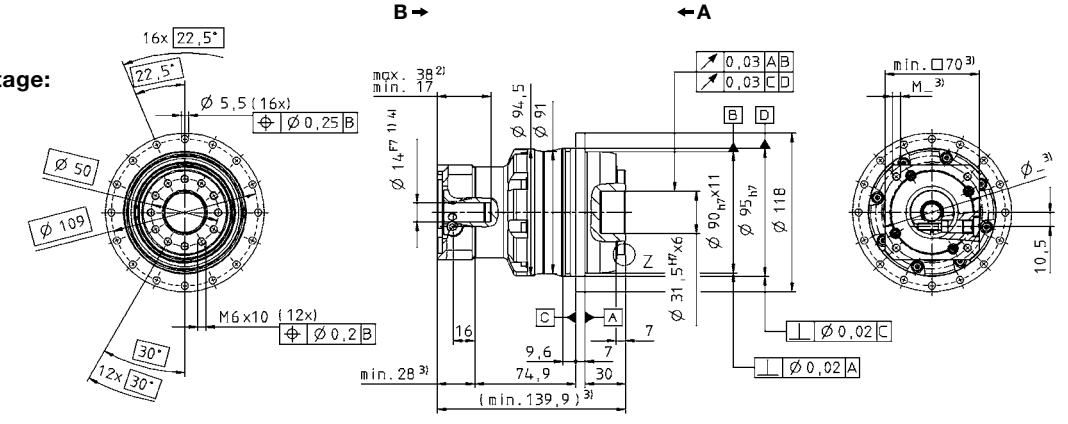
up to 14 4) (C) clamping hub diameter

2-stage:





3-stage:



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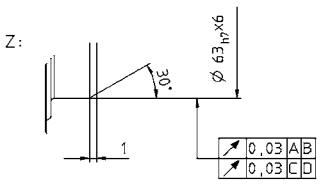


Non-tolerated dimensions ±1 mm

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 with a minimum thickness of 1 mm.

CAD data is available under www.wittenstein-alpha.com

Motor mounting according to operating manual

					2-stage				3-stage				
Ratio [a]			i		**22**	**27.5**	**38.5**	**55**	**66**	**88**	**110**	**154**	**220**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B}	Nm	530	530	530	530	480	480	480	480	480
				in.lb	4691	4691	4691	4691	4248	4248	4248	4248	4248
Nominal output torque (with n_{1N})			T_{2N}	Nm	320	350	375	375	260	260	260	260	260
				in.lb	2832	3098	3319	3319	2301	2301	2301	2301	2301
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not}	Nm	1200	1200	1200	1200	1200	1200	1200	1200	1200
				in.lb	10620	10620	10620	10620	10620	10620	10620	10620	10620
Nominal input speed (with T_{2N} and 20 °C ambient temperature) [b]			n_{1N}	rpm	3500	3500	3500	3500	4000	4000	4000	4000	4000
Max. input speed			n_{1Max}	rpm	6000	6000	6000	6000	6000	6000	6000	6000	6000
Mean no load running torque (with n_1=3000 rpm and 20 °C gearhead temperature) [c]			T_{012}	Nm	1.1	1.0	0.8	0.6	0.7	0.7	0.6	0.4	0.4
				in.lb	9.7	8.9	7.1	5.3	6.2	6.2	5.3	3.5	3.5
Max. torsional backlash			j_t	arcmin	≤ 1				≤ 1				
Torsional rigidity [c]			C_{t21}	Nm/ arcmin	105	105	105	100	95	95	95	95	95
				in.lb/ arcmin	929	929	929	885	841	841	841	841	841
Tilting rigidity			C_{2K}	Nm/ arcmin	550				550				
				in.lb/ arcmin	4868				4868				
Max. axial force [d]			F_{2AMax}	N	4150				4150				
				lb_f	934				934				
Max. tilting moment			M_{2KMax}	Nm	550				550				
				in.lb	4868				4868				
Efficiency at full load			η	%	94				92				
Service life (For calculation, see the Chapter "Information")			L_h	h	> 20000				> 20000				
Weight incl. standard adapter plate			m	kg	5.6				6.1				
				lb_m	12.4				13.5				
Operating noise (with n_1=3000 rpm no load)			L_{PA}	dB(A)	≤ 62				≤ 62				
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 65								
Moment of inertia (relates to the drive)	E	19	J_1	kgcm²	0.87	0.70	0.60	0.55	0.63	0.56	0.53	0.51	0.50
				10^{-3} in.lb.s²	0.77	0.62	0.53	0.49	0.56	0.50	0.47	0.45	0.44
Clamping hub diameter [mm]	G	24	J_1	kgcm²	2.39	2.22	2.12	2.07	–	–	–	–	–
				10^{-3} in.lb.s²	2.12	1.96	1.88	1.83					

Reduced mass moments of inertia available on request.

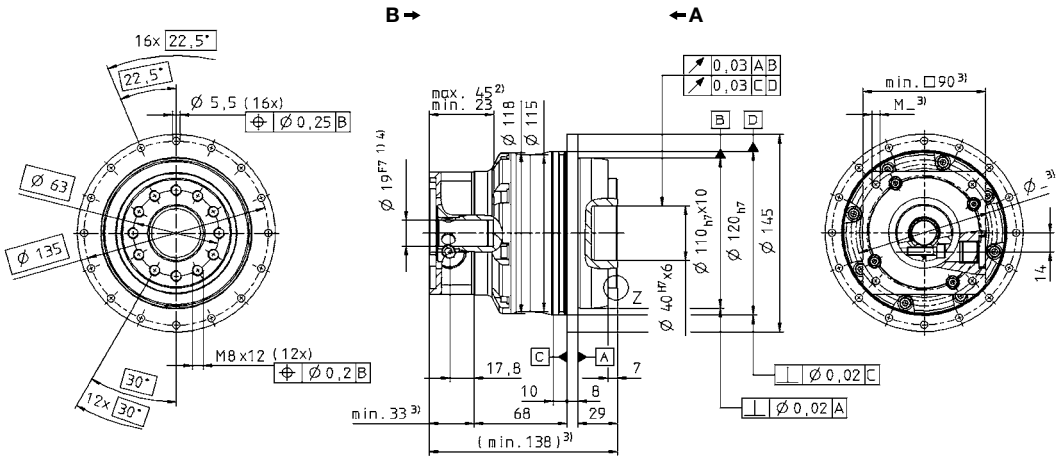
[a] Other ratios available on request
[b] For higher ambient temperatures, please reduce input speed
[c] Valid for clamping hub diameter of 19 mm
[d] Refers to center of the output shaft or flange

View A View B

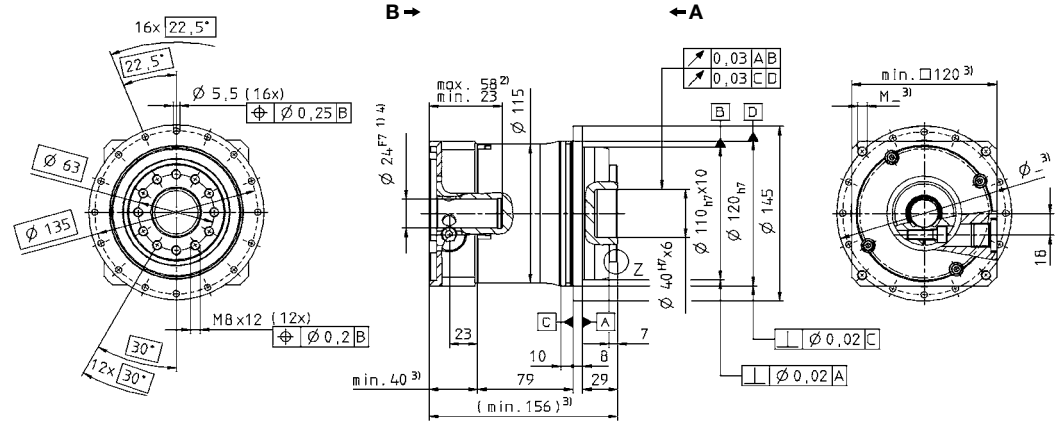
Motor shaft diameter [mm]

2-stage:

up to 19 [4] (E) clamping hub diameter

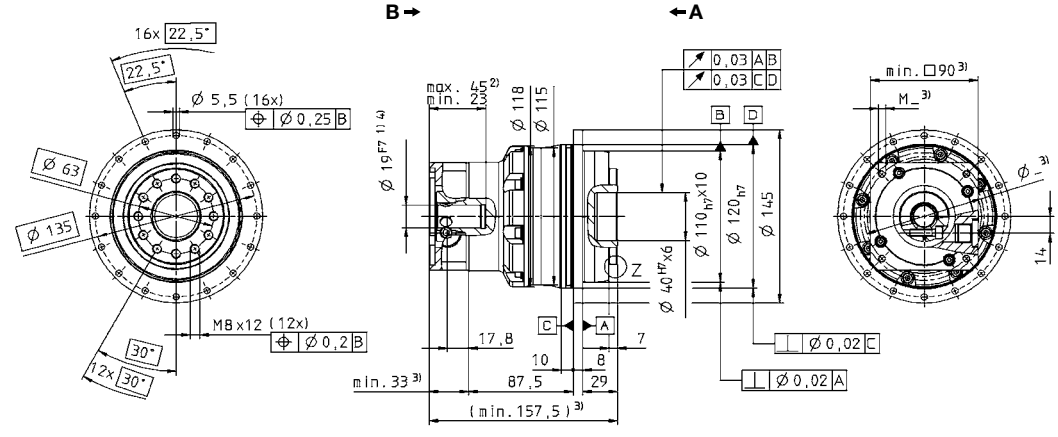


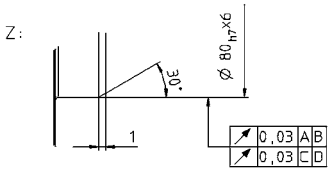
up to 24 [4] (G) clamping hub diameter



3-stage:

up to 19 [4] (E) clamping hub diameter





Non-tolerated dimensions ±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 with a minimum thickness of 1 mm.

CAD data is available under www.wittenstein-alpha.com

Motor mounting according to operating manual

					2-stage				3-stage				
Ratio [a]			i		**22**	**27.5**	**38.5**	**55**	**66**	**88**	**110**	**154**	**220**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B}	Nm	950	950	950	950	950	950	950	950	950
				in.lb	8408	8408	8408	8408	8408	8408	8408	8408	8408
Nominal output torque (with n_{1N})			T_{2N}	Nm	575	600	650	675	675	675	675	675	675
				in.lb	5089	5310	5753	5974	5974	5974	5974	5974	5974
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not}	Nm	2375	2375	2375	2375	2375	2375	2375	2375	2375
				in.lb	21019	21019	21019	21019	21019	21019	21019	21019	21019
Nominal input speed (with T_{2N} and 20 °C ambient temperature) [b]			n_{1N}	rpm	3000	3000	3000	3000	3500	3500	3500	3500	3500
Max. input speed			n_{1Max}	rpm	5000	5000	5000	5000	5000	5000	5000	5000	5000
Mean no load running torque (with n_1=3000 rpm and 20 °C gearhead temperature) [c]			T_{012}	Nm	3.7	2.9	2.0	1.7	2.0	1.6	1.4	0.9	0.7
				in.lb	32.7	25.7	17.7	15.0	17.7	14.2	12.4	8.0	6.2
Max. torsional backlash			j_t	arcmin	≤ 1				≤ 1				
Torsional rigidity [c]			C_{t21}	Nm/ arcmin	220	220	220	220	205	205	205	205	205
				in.lb/ arcmin	1947	1947	1947	1947	1814	1814	1814	1814	1814
Tilting rigidity			C_{2K}	Nm/ arcmin	560				560				
				in.lb/ arcmin	4956				4956				
Max. axial force [d]			F_{2AMax}	N	6130				6130				
				lb_f	1379				1379				
Max. tilting moment			M_{2KMax}	Nm	1335				1335				
				in.lb	11815				11815				
Efficiency at full load			η	%	94				92				
Service life (For calculation, see the Chapter "Information")			L_h	h	> 20000				> 20000				
Weight incl. standard adapter plate			m	kg	12.5				13.4				
				lb_m	27.6				29.6				
Operating noise (with n_1=3000 rpm no load)			L_{PA}	dB(A)	≤ 64				≤ 64				
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 65								
Moment of inertia (relates to the drive)	G	24	J_1	$kgcm^2$	3.76	3.32	3.01	2.82	2.61	2.42	2.22	2.12	2.07
				10^{-3} in.lb.s²	3.33	2.94	2.66	2.50	2.31	2.14	1.96	1.88	1.83
Clamping hub diameter [mm]	K	38	J_1	$kgcm^2$	10.7	10.3	9.92	9.73	–	–	–	–	–
				10^{-3} in.lb.s²	9.47	9.11	8.78	8.61					

Reduced mass moments of inertia available on request.

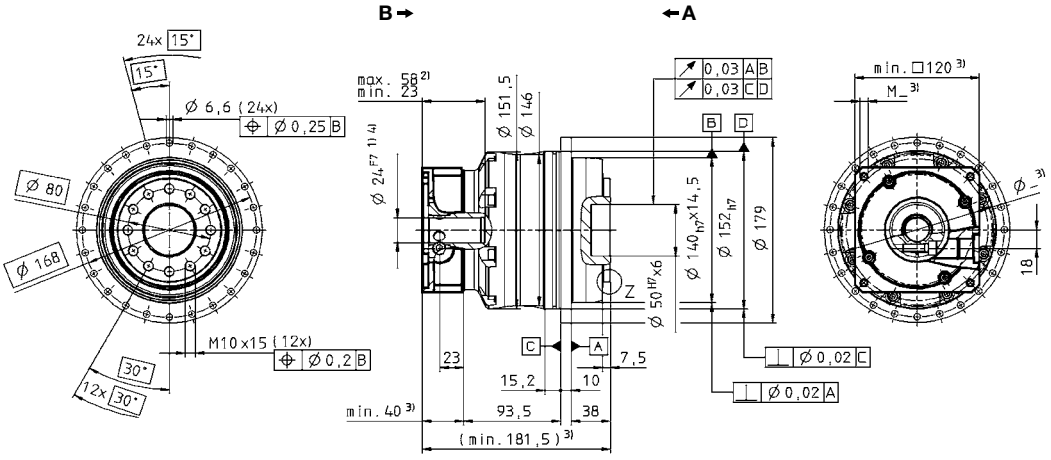
[a] Other ratios available on request
[b] For higher ambient temperatures, please reduce input speed
[c] Valid for clamping hub diameter of 24 mm
[d] Refers to center of the output shaft or flange

View A View B

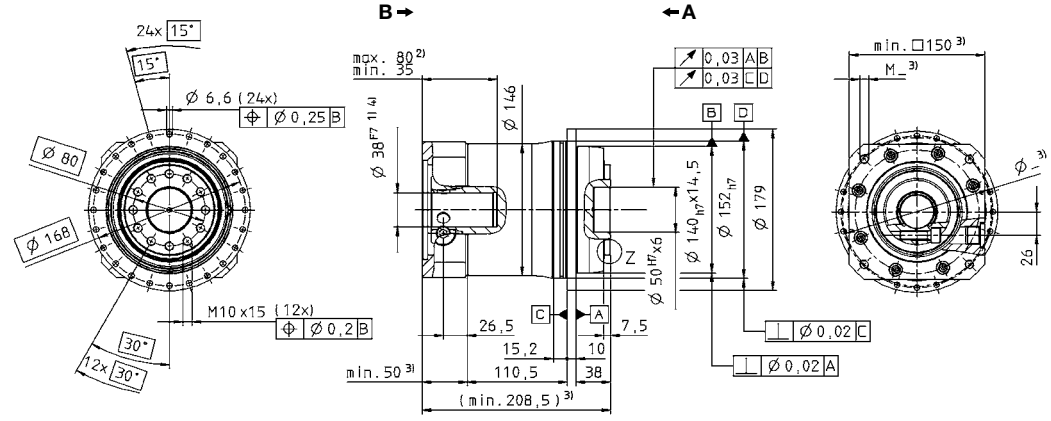
Motor shaft diameter [mm]

2-stage:

up to 24 [4] (G) clamping hub diameter

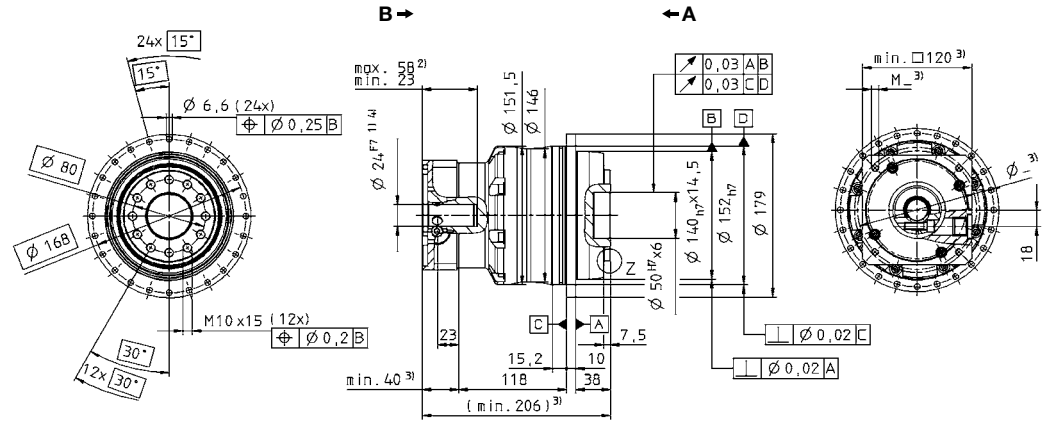


up to 38 [4] (K) clamping hub diameter

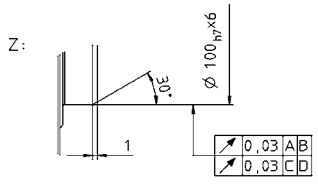


3-stage:

up to 24 [4] (G) clamping hub diameter



Z:



Non-tolerated dimensions ±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 with a minimum thickness of 1 mm.

CAD data is available under www.wittenstein-alpha.com

Motor mounting according to operating manual

				2-stage				3-stage				
Ratio [a]			***i***	**22**	**27.5**	**38.5**	**55**	**66**	**88**	**110**	**154**	**220**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B} Nm	3100	3100	3100	2000	2600	2600	2600	2600	2600
			in.lb	27435	27435	27435	17700	23010	23010	23010	23010	23010
Nominal output torque (with n_{1N})			T_{2N} Nm	1570	1600	1650	1400	1600	1750	1750	1750	1750
			in.lb	13895	14160	14603	12390	14160	15488	15488	15488	15488
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not} Nm	6500	6500	6500	6500	6500	6500	6500	6500	6500
			in.lb	57525	57525	57525	57525	57525	57525	57525	57525	57525
Nominal input speed (with T_{2N} and 20 °C ambient temperature) [b]			n_{1N} rpm	2500	2500	2500	2500	3000	3000	3000	3000	3000
Max. input speed			n_{1Max} rpm	4500	4500	4500	4500	4500	4500	4500	4500	4500
Mean no load running torque (with n_1=3000 rpm and 20 °C gearhead temperature) [c]			T_{012} Nm	8.0	5.5	4.5	4.0	5.0	4.0	3.5	2.0	1.8
			in.lb	70.8	48.7	39.8	35.4	44.3	35.4	31.0	17.7	15.9
Max. torsional backlash			j_t arcmin	≤ 1				≤ 1				
Torsional rigidity [c]			C_{t21} Nm/ arcmin	730	725	715	670	650	650	650	650	650
			in.lb/ arcmin	6461	6416	6328	5930	5753	5753	5753	5753	5753
Tilting rigidity			C_{2K} Nm/ arcmin	1452				1452				
			in.lb/ arcmin	12850				12850				
Max. axial force [d]			F_{2AMax} N	10050				10050				
			lb_f	2261				2261				
Max. tilting moment			M_{2KMax} Nm	3280				3280				
			in.lb	29028				29028				
Efficiency at full load			η %	94				92				
Service life (For calculation, see the Chapter "Information")			L_h h	> 20000				> 20000				
Weight incl. standard adapter plate			*m* kg	33.1				35.4				
			lb_m	73.2				78.2				
Operating noise (with n_1=3000 rpm no load)			L_{PA} dB(A)	≤ 66				≤ 66				
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 65								
Moment of inertia (relates to the drive)	K	38	J_1 kgcm²	16.6	15.2	13.9	13.1	13.8	10.2	9.77	9.47	9.16
			10^{-3} in.lb.s²	14.7	13.5	12.3	11.6	12.2	9.03	8.65	8.38	8.11
Clamping hub diameter [mm]	M	48	J_1 kgcm²	31.4	29.9	28.7	28.0	–	–	–	–	–
			10^{-3} in.lb.s²	27.8	26.5	25.4	24.8					

Reduced mass moments of inertia available on request.

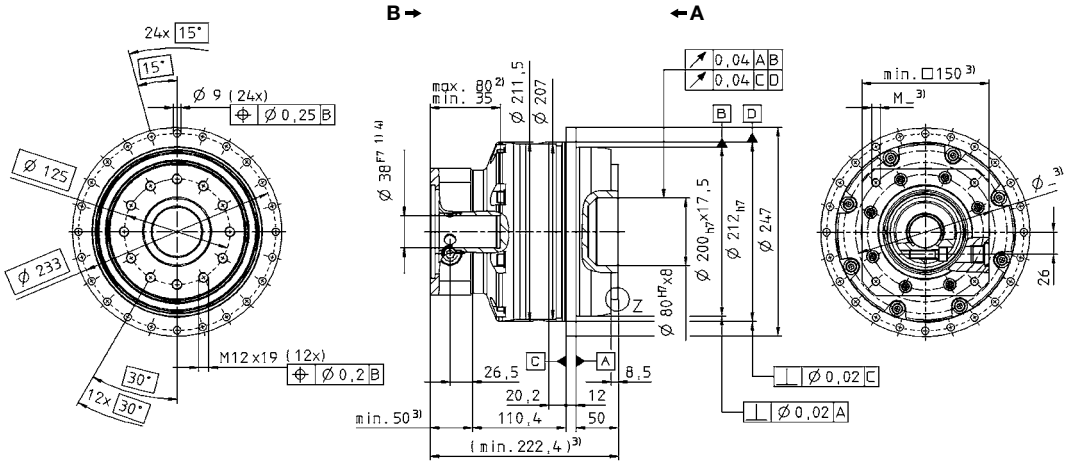
[a] Other ratios available on request
[b] For higher ambient temperatures, please reduce input speed
[c] Valid for clamping hub diameter of 38 mm
[d] Refers to center of the output shaft or flange

View A View B

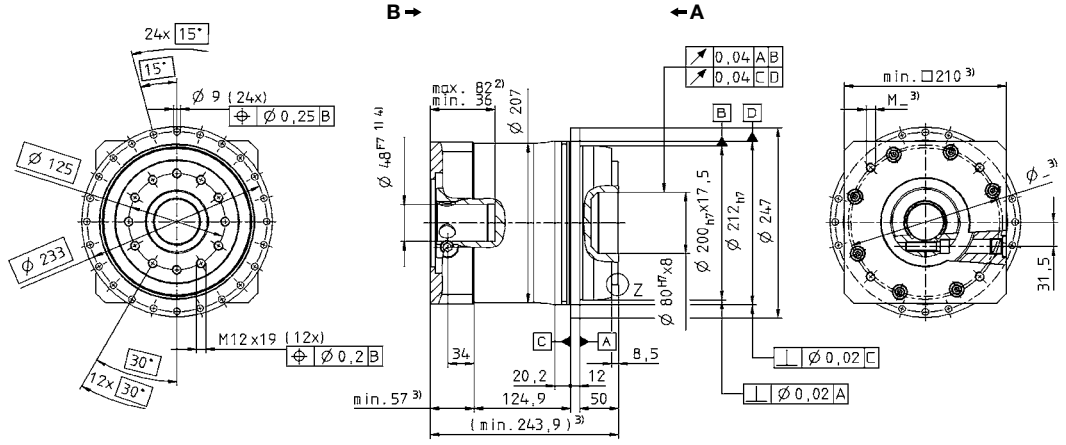
Motor shaft diameter [mm]

2-stage:

up to 38 [4] (K) clamping hub diameter

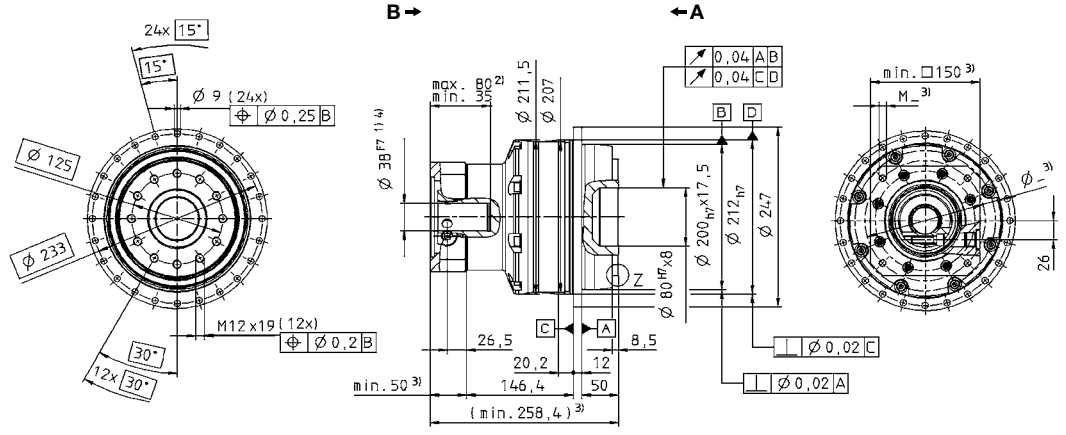


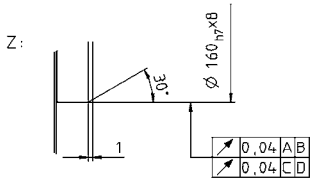
up to 48 [4] (M) clamping hub diameter



3-stage:

up to 38 [4] (K) clamping hub diameter





Non-tolerated dimensions ±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 with a minimum thickness of 1 mm.

CAD data is available under www.wittenstein-alpha.com

Motor mounting according to operating manual

TP+ 300 MA HIGH TORQUE

					1-stage	2-stage				3-stage				
Ratio [a]				*i*	**5.5**	**22**	**27.5**	**38.5**	**55**	**66**	**88**	**110**	**154**	**220**
Max. acceleration torque (max. 1000 cycles per hour)				T_{2B}	Nm	4600	5500	5500	5500	3900	5500	5500	5500	5500	5500
					in.lb	40714	48679	48679	48679	34518	48679	48679	48679	48679	48679
Nominal output torque (with n_{1N})				T_{2N}	Nm	2200	3500	3500	3500	2500	3500	3500	3500	3500	3500
					in.lb	19472	30978	30978	30978	22127	30978	30978	30978	30978	30978
Emergency stop torque (permitted 1000 times during the service life of the gearhead)				T_{2NOt}	Nm	8750	13250	13250	13250	13250	13250	13250	13250	13250	13250
					in.lb	77445	117273	117273	117273	117273	117273	117273	117273	117273	117273
Nominal input speed (with T_{2N} and 20 °C ambient temperature) [b]				n_{1N}	rpm	1000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Max. input speed				n_{1Max}	rpm	2500	3500	3500	3500	3500	3500	3500	3500	3500	3500
Mean no load running torque (with n_1=2000 rpm and 20 °C gearhead temperature)				T_{012}	Nm	22	12	10	9,0	7,0	6,5	4,5	4,0	3,0	2,0
					in.lb	195	106	89	80	62	58	40	35	27	18
Max. torsional backlash				j_t	arcmin	Standard ≤ 2 / Reduced ≤ 1	Standard ≤ 3 / Reduced ≤ 1.5								
Torsional rigidity				C_{t21}	Nm/ arcmin	1400	1200	1200	1200	1200	1200	1200	1200	1200	1200
					in.lb/ arcmin	12391	10621	10621	10621	10621	10621	10621	10621	10621	10621
Tilting rigidity				C_{2K}	Nm/ arcmin	5560									
					in.lb/ arcmin	49210									
Max. axial force [c]				F_{2AMax}	N	33000									
					lb_f	7425									
Max. tilting moment				M_{2KMax}	Nm	3900	6500								
					in.lb	34518	57530								
Efficiency at full load				η	%	95	93								
Service life (For calculation. see "Technical Basics")				L_h	h	> 20000									
Weight incl. standard adapter plate				*m*	kg	55	64				67				
					lb_m	121.25	141.1				147.7				
Operating noise (with n_1=2000 rpm no load)				L_{PA}	dB(A)	≤ 68	≤ 67				≤ 66				
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 65									
Moment of inertia (relates to the drive)	K	38		J_1	kgcm²	–	–	–	–	–	16.6	12.9	11.6	10.3	9.50
					in.lb.s²						0.0147	0.0114	0.0103	0.0091	0.0084
Clamping hub diameter [mm]	M	48		J_1	kgcm²	–	30.8	27.6	24.9	23.0	–	–	–	–	–
					in.lb.s²		0.0273	0.0244	0.0220	0.0204					
	N	55		J_1	kgcm²	129	–	–	–	–	–	–	–	–	–
					in.lb.s²	0.1142									

Reduced mass moments of inertia available on request.

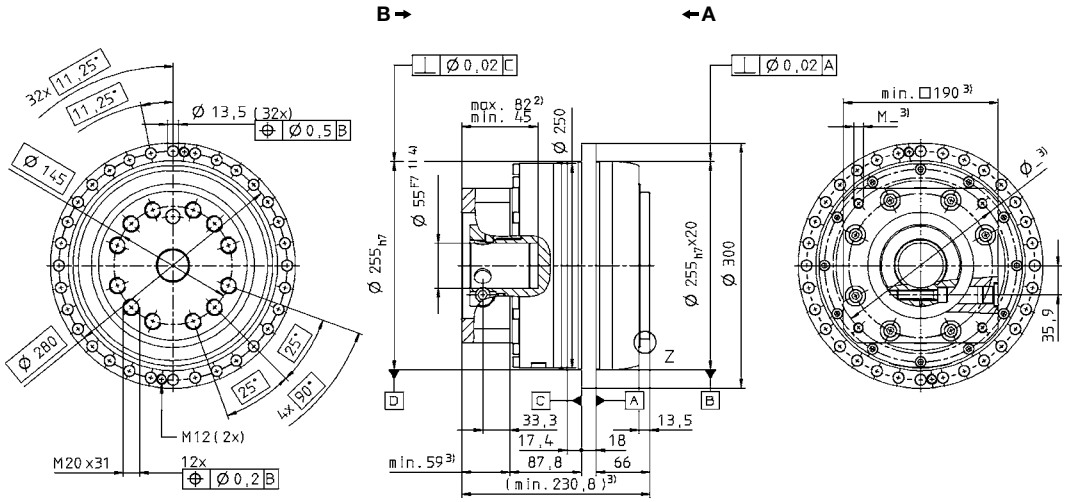
[a] Other ratios available on request
[b] For higher ambient temperatures, please reduce input speed
[c] Refers to center of the output shaft or flange

View A View B

Motor shaft diameter [mm]

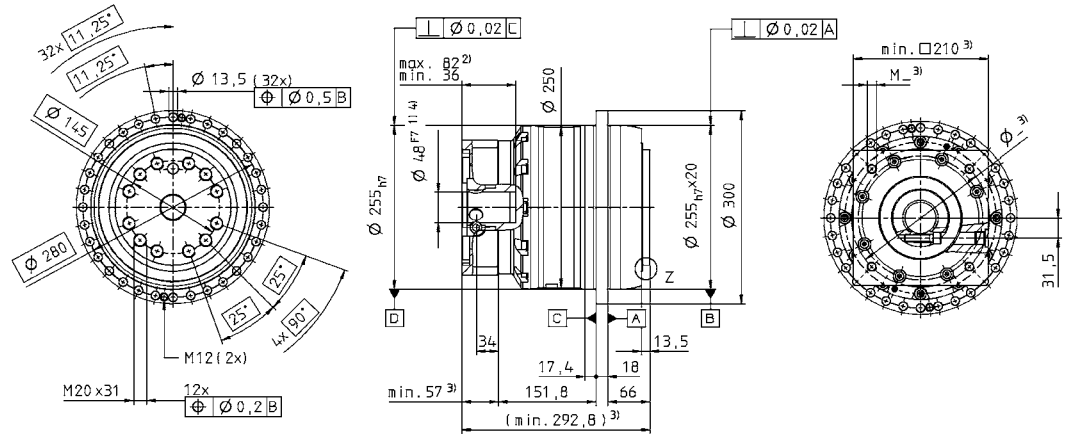
1-stage:

up to 55 [4] (N) clamping hub diameter



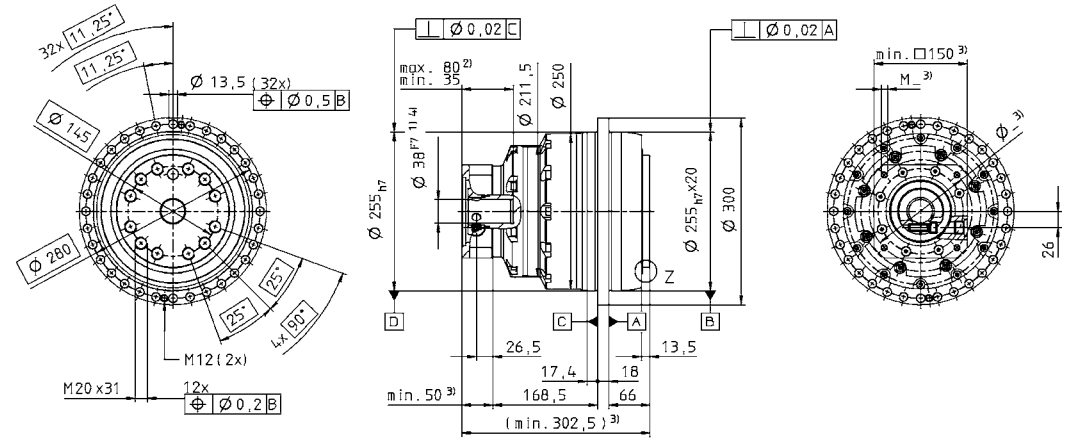
2-stage:

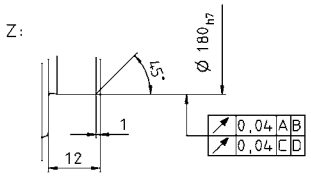
up to 48 [4] (M) clamping hub diameter



3-stage:

up to 38 [4] (K) clamping hub diameter





Non-tolerated dimensions ±1,5 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 with a minimum thickness of 1 mm.

CAD data is available under www.wittenstein-alpha.com

Motor mounting according to operating manual

				1-stage	2-stage				3-stage				
Ratio [a]			*i*	**5.5**	**22**	**27.5**	**38.5**	**55**	**66**	**88**	**110**	**154**	**220**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B} Nm	8000	10000	10000	10000	7200	10000	10000	10000	10000	10000
			T_{2B} in.lb	70806	88508	88508	88508	63726	88508	88508	88508	88508	88508
Nominal output torque (with n_{1N})			T_{2N} Nm	3500	6000	4600	4600	4700	6000	6000	6000	6000	6000
			T_{2N} in.lb	30978	53105	40714	40714	41599	53105	53105	53105	53105	53105
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2NOt} Nm	15000	25000	25000	25000	25000	25000	25000	25000	25000	25000
			T_{2NOt} in.lb	132762	221270	221270	221270	221270	221270	221270	221270	221270	221270
Nominal input speed (with T_{2N} and 20 °C ambient temperature) [b]			n_{1N} rpm	900	1500	1500	1500	1500	1500	1500	1500	1500	1500
Max. input speed			n_{1Max} rpm	2500	3500	3500	3500	3500	3500	3500	3500	3500	3500
Mean no load running torque (with n_1=2000 rpm and 20 °C gearhead temperature)			T_{012} Nm	28	18	14	12	9.0	8.5	6.5	6.0	5.0	4.0
			T_{012} in.lb	248	159.3	124	106	80	75	58	53	44	35
Max. torsional backlash			j_t arcmin	Standard ≤ 2 / Reduced ≤ 1	Standard ≤ 3 / Reduced ≤ 1.5								
Torsional rigidity			C_{t21} Nm/ arcmin	1650	2000	2000	1950	1900	1800	1800	1800	1800	1800
			C_{t21} in.lb/ arcmin	14603	17700	17700	17258	16815	15930	15930	15930	15930	15930
Tilting rigidity			C_{2K} Nm/ arcmin	9480									
			C_{2K} in.lb/ arcmin	83906									
Max. axial force [c]			F_{2AMax} N	50000									
			F_{2AMax} lb_f	11250									
Max. tilting moment			M_{2KMax} Nm	6600	9500								
			M_{2KMax} in.lb	58415	84083								
Efficiency at full load			η %	95	93								
Service life (For calculation, see "Technical Basics")			L_h h	> 20000									
Weight incl. standard adapter plate			*m* kg	80					89				
			m lb_m	176.4					196.2				
Operating noise (with n_1=2000 rpm no load)			L_{PA} dB(A)	≤ 68					≤ 67				
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 65									
Moment of inertia (relates to the drive)	M	48	J_1 kgcm²	–	43.8	36.9	30.5	27.0	32.7	28.3	26.7	25.2	24.4
			J_1 in.lb.s²		0.0388	0.0327	0.0270	0.0239	0.0289	0.0250	0.0236	0.0223	0.0216
Clamping hub diameter [mm]	O	60	J_1 kgcm²	175	–	–	–	–	–	–	–	–	–
			J_1 in.lb.s²	0.1549									

Reduced mass moments of inertia available on request.

[a] Other ratios available on request

[b] For higher ambient temperatures, please reduce input speed

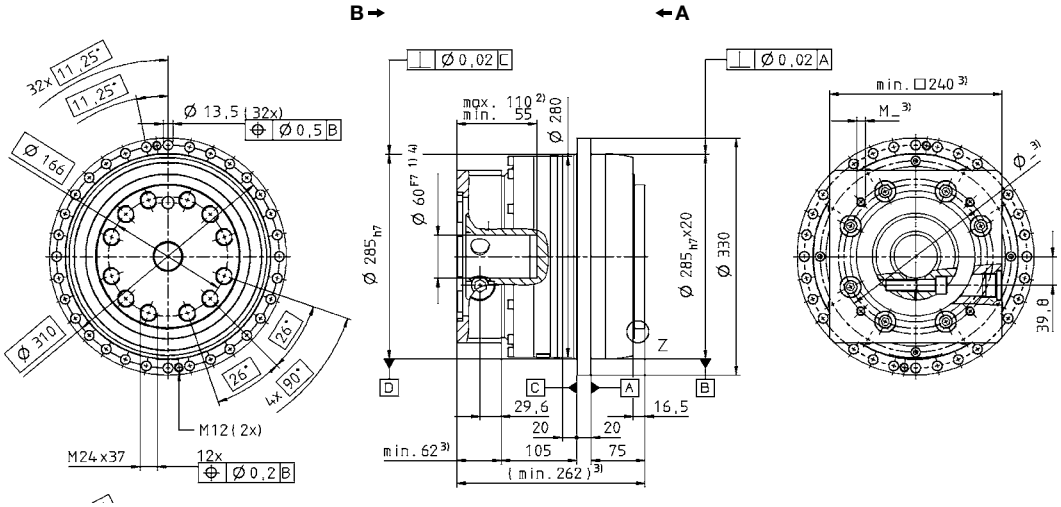
[c] Refers to center of the output shaft or flange

View A View B

Motor shaft diameter [mm]

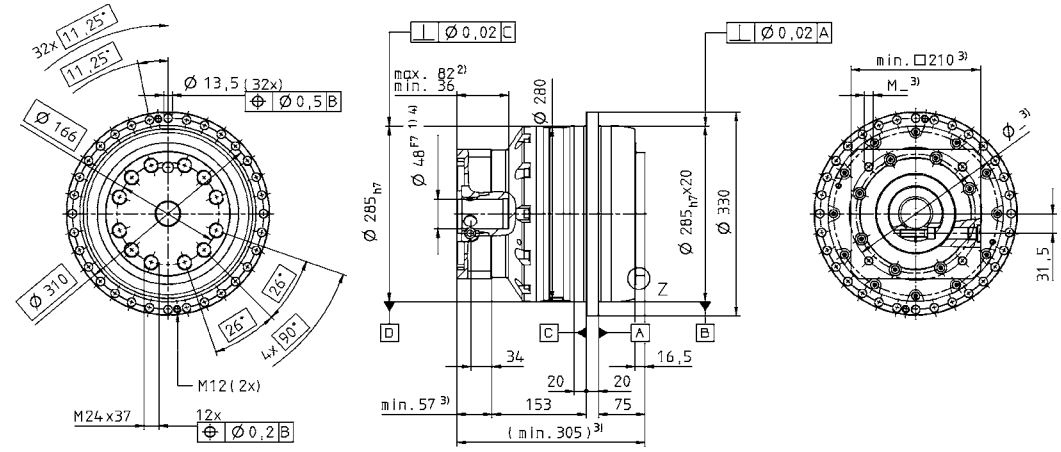
1-stage:

up to 60 [4] (O) clamping hub diameter



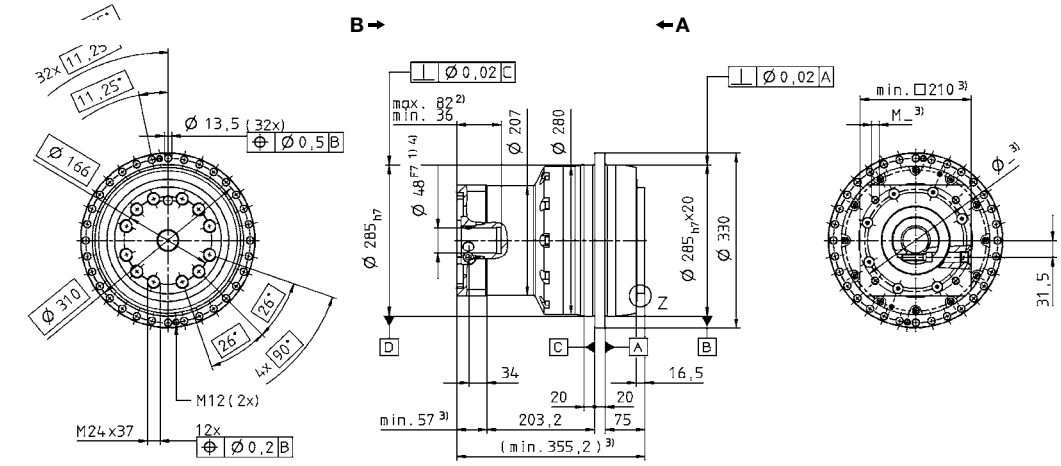
2-stage:

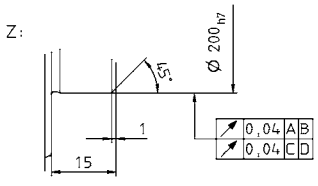
up to 48 [4] (M) clamping hub diameter



3-stage:

up to 48 [4] (M) clamping hub diameter





Non-tolerated dimensions ±1,5 mm

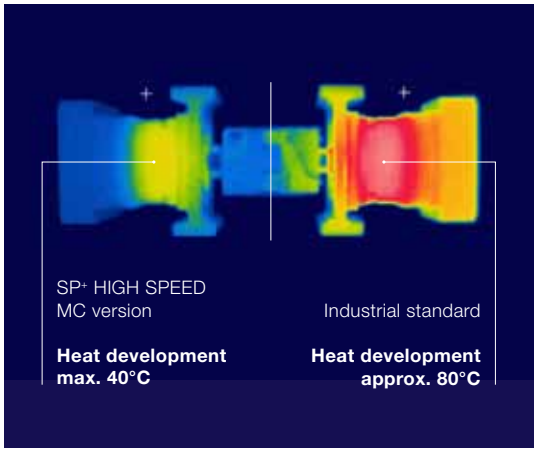
1) Check motor shaft fit.
2) Min./Max. permissible motor shaft length. Longer motor shafts are adaptable, please contact us.
3) The dimensions depend on the motor.
4) Smaller motor shaft diameter is compensated by a bushing with a minimum thickness of 1 mm.

CAD data is available under www.wittenstein-alpha.com

Motor mounting according to operating manual

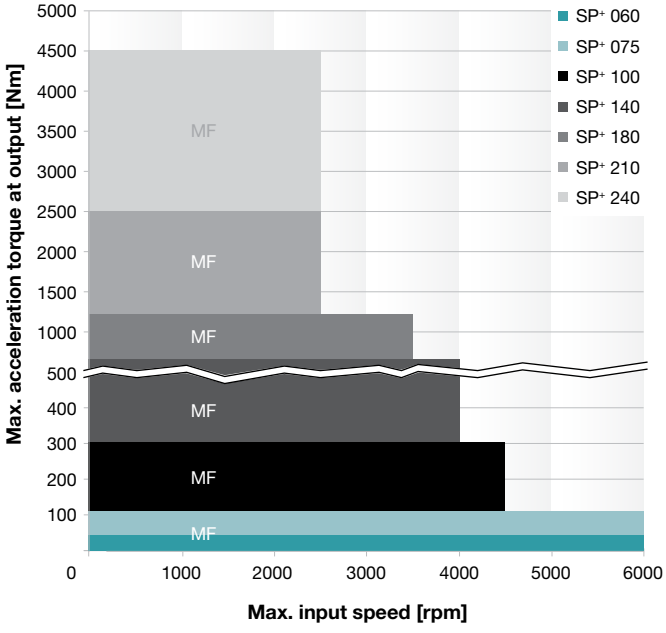
SP+/SP+ HIGH SPEED –
The classic all-rounder among planetary gearheads

The standard version is ideally suited for high positioning accuracy and highly dynamic cyclic operation.
Das SP+ HIGH SPEED is particularly well suited for applications with maximum speeds during continuous operation.

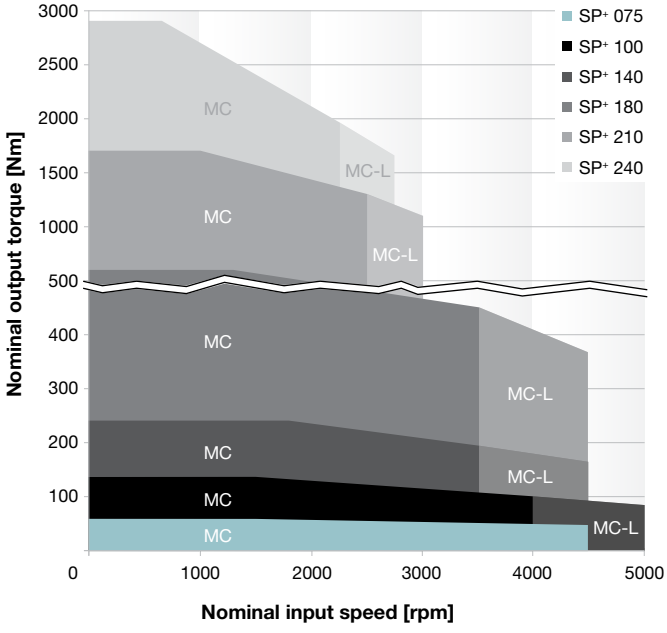


Quick size selection

SP+ MF (example for i = 4)
For applications in cyclic operation (ED ≤ 60%)



SP+ HIGH SPEED MC/MC-L (example for i = 4)
For applications in continuous operation (ED ≥ 60%)



Versions and Applications

SP+
MF version
(standard version)

- Cyclic applications (ED ≤ 60%)
- Reverse operation
- Highly dynamic applications
- High positioning accuracy

SP+ HIGH SPEED
MC version
(HIGH SPEED version)

- Applications in continuous operation (ED ≥ 60%)
- High nominal speeds
- Temperature-sensitive applications

SP+ HIGH SPEED
MC/L version
(friction-optimized version)

- Applications in continuous operation (ED ≥ 60%)
- Very high nominal speeds
- Highly temperature-sensitive applications
- Very low no-load running torque

Comparison

		Cyclic operation	Continuous operation	Continuous operation
Features		**SP+ MF version** from page 68	**SP+ HIGH SPEED MC version** from page 92	**SP+ HIGH SPEED MC/L version** from page 96
Ratios [c]		3 -100	3 -100	3 -100
Torsional backlash [arcmin] [c]	Standard	≤ 3	≤ 4	≤ 4
	Reduced	≤ 1	≤ 2	≤ 2
Output type				
Smooth output shaft		•	•	•
Keywayed output shaft		•	•	•
Output shaft with involute gearing		•	•	•
Mounted shaft Connected via shrink disc		•	•	•
System output with pinion		•	•	
Input type				
Motor mounted version		•	•	•
Input shaft		•		
Type				
ATEX [a]		•	•	
Food-grade lubrication [a] [b]		•	•	•
Corrosion resistant [a] [b]		•	•	
Optimized mass moment of inertia [a]		•		
Accessories				
Coupling		•	•	•
Rack		•	•	
Pinion		•	•	
Shrink disc		•	•	•
torqXis sensor flange		•	•	•
Intermediate plate for cooling connection		•	•	•

[a] Power reduction: technical data available upon request [b] Please contact WITTENSTEIN alpha [c] In relation to reference sizes

				1-stage				
Ratio [a]			***i***	**3**	**4**	**5**	**7**	**10**
cymex®-optimized acceleration torque (please contact us regarding the design)			T_{2Bcym} Nm	–	58	60	54	–
			T_{2Bcym} in.lb		513	531	478	
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B} Nm	30	42	42	42	32
			T_{2B} in.lb	266	372	372	372	283
Nominal output torque (with n_{1N})			T_{2N} Nm	17	26	26	26	17
			T_{2N} in.lb	150	230	230	230	150
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not} Nm	80	100	100	100	80
			T_{2Not} in.lb	708	885	885	885	708
Nominal input speed (with T_{2N} and 20°C ambient temperature) [b]			n_{1N} rpm	3300	3300	3300	4000	4000
Max. input speed			n_{1max} rpm	6000	6000	6000	6000	6000
Mean no load running torque (with n_1=3000 rpm and 20°C gearhead temperature) [c]			T_{012} Nm	0.9	0.7	0.6	0.4	0.3
			T_{012} in.lb	8.0	6.2	5.3	3.5	2.7
Max. torsional backlash			j_t arcmin	Standard ≤ 4 / Reduced ≤ 2				
Torsional rigidity			C_{t21} Nm/ arcmin	4.5				
			C_{t21} in.lb/ arcmin	40				
Max. axial force [d]			F_{2AMax} N	2400				
			F_{2AMax} lb_f	540				
Max. radial force [d]			F_{2RMax} N	2800				
			F_{2RMax} lb_f	630				
Max. tilting torque			M_{2KMax} Nm	152				
			M_{2KMax} in.lb	1345				
Efficiency at full load			η %	97				
Service life (For calculation, see the Chapter “Information”)			L_h h	> 20000				
Weight incl. standard adapter plate			*m* kg	1.9				
			m lb_m	4.2				
Operating noise (with *i*=10 and n_1=3000 rpm no load)			L_{PA} dB(A)	≤ 58				
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 65				
Moment of inertia (relates to the drive)	B	11	J_1 kgcm²	0.21	0.15	0.12	0.10	0.09
			J_1 10^{-3} in.lb.s²	0.18	0.13	0.11	0.09	0.08
Clamping hub diameter [mm]	C	14	J_1 kgcm²	0.28	0.22	0.20	0.18	0.17
			J_1 10^{-3} in.lb.s²	0.25	0.20	0.17	0.16	0.15
	E	19	J_1 kgcm²	0.61	0.55	0.52	0.50	0.49
			J_1 10^{-3} in.lb.s²	0.54	0.48	0.46	0.44	0.43

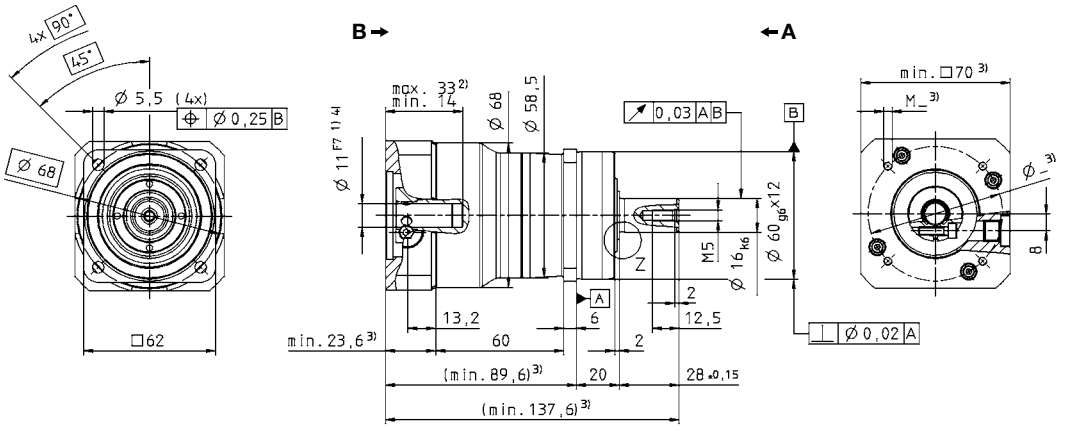
Reduced mass moments of inertia available on request.

[a] Other ratios available on request
[b] For higher ambient temperatures, please reduce input speed
[c] Valid for clamping hub diameter of 14 mm
[d] Refers to center of the output shaft or flange

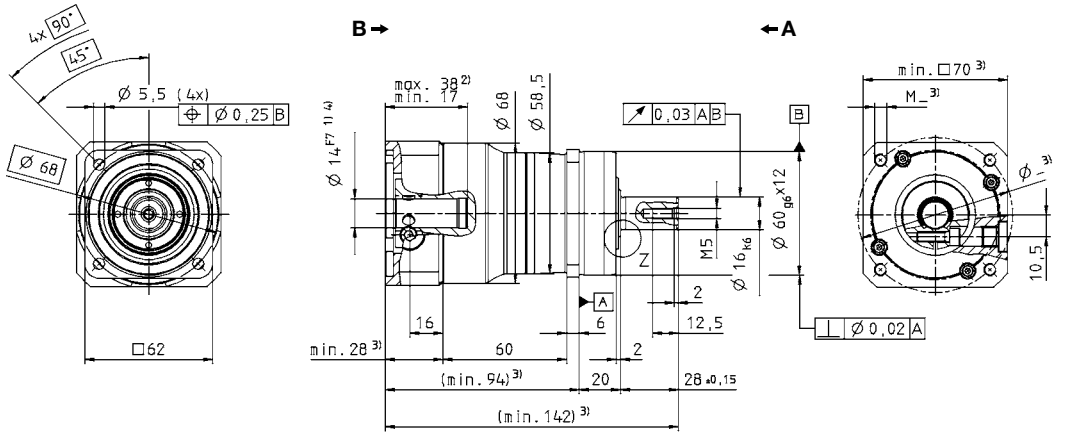
View A View B

Motor shaft diameter [mm]

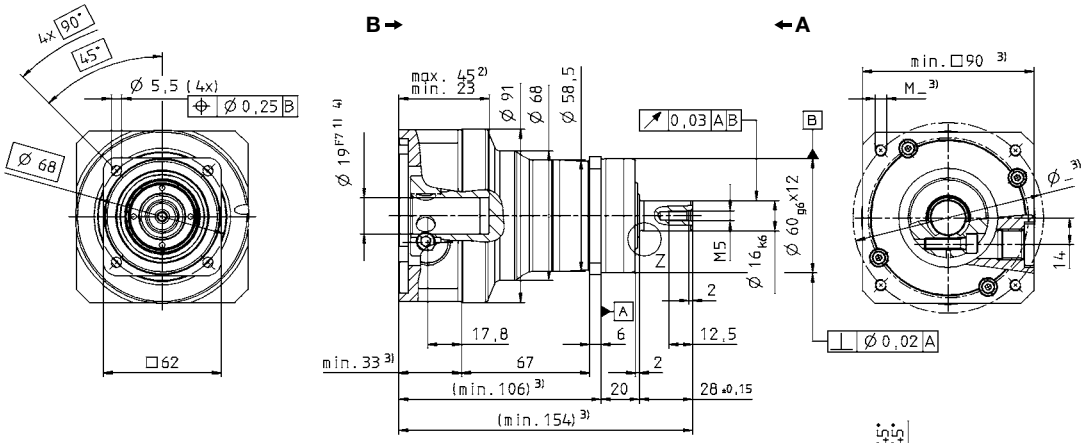
up to 11 [4] (B) clamping hub diameter

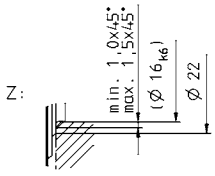


up to 14 [4] (C) clamping hub diameter)



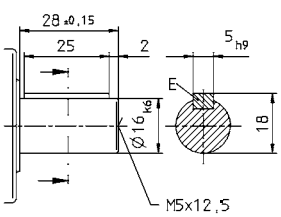
up to 19 [4] (E) clamping hub diameter



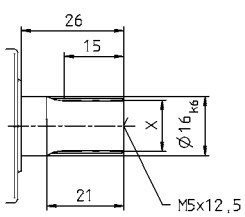


Alternatives: Output shaft variants

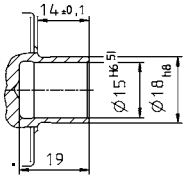
Keywayed output shaft in mm
E = key as per DIN 6885, sheet 1, form A



Involute gearing DIN 5480 in mm
X = W 16 x 0.8 x 30 x 18 x 6m, DIN 5480



Shaft mounted
Mounted via shrink disc



Non-tolerated dimensions ± 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 with a minimum thickness of 1 mm.
5) Tolerance h6 for mounted shaft.

CAD data is available under www.wittenstein-alpha.com

Motor mounting according to operating manual

				2-stage								
Ratio [a]			***i***	**16**	**20**	**25**	**28**	**35**	**40**	**50**	**70**	**100**
cymex®-optimized acceleration torque (please contact us regarding the design)			T_{2Bcym} Nm	58	58	60	58	60	58	60	54	–
			T_{2Bcym} in.lb	513	513	531	513	531	513	531	478	–
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B} Nm	42	42	42	42	42	42	42	42	32
			T_{2B} in.lb	372	372	372	372	372	372	372	372	283
Nominal output torque (with n_{1N})			T_{2N} Nm	26	26	26	26	26	26	26	26	17
			T_{2N} in.lb	230	230	230	230	230	230	230	230	150
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not} Nm	100	100	100	100	100	100	100	100	80
			T_{2Not} in.lb	885	885	885	885	885	885	885	885	708
Nominal input speed (with T_{2N} and 20°C ambient temperature) [b]			n_{1N} rpm	4400	4400	4400	4400	4400	4400	4800	5500	5500
Max. input speed			n_{1max} rpm	6000	6000	6000	6000	6000	6000	6000	6000	6000
Mean no load running torque (with n_1 = 3000 rpm and 20°C gearhead temperature) [c]			T_{012} Nm	0.5	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.2
			T_{012} in.lb	4.4	3.5	3.5	2.7	2.7	2.7	2.7	2.7	1.8
Max. torsional backlash			j_t arcmin	Standard ≤ 6 / Reduced ≤ 4								
Torsional rigidity			C_{t21} Nm/ arcmin	4.5								
			C_{t21} in.lb/ arcmin	40								
Max. axial force [d]			F_{2AMax} N	2400								
			F_{2AMax} lb_f	540								
Max. radial force [d]			F_{2RMax} N	2800								
			F_{2RMax} lb_f	630								
Max. tilting moment			M_{2KMax} Nm	152								
			M_{2KMax} in.lb	1345								
Efficiency at full load			η %	94								
Service life (For calculation, see the Chapter “Information”)			L_h h	> 20000								
Weight incl. standard adapter plate			*m* kg	2.0								
			m lb_m	4.4								
Operating noise (with *i*=100 and n_1 = 3000 rpm no load)			L_{PA} dB(A)	≤ 58								
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 65								
Moment of inertia (relates to the drive)	B	11	J_1 kgcm²	0.077	0.069	0.068	0.061	0.061	0.057	0.057	0.056	0.056
			J_1 10^{-3} in.lb.s²	0.068	0.061	0.060	0.054	0.054	0.050	0.050	0.050	0.050
Clamping hub diameter [mm]	C	14	J_1 kgcm²	0.17	0.16	0.16	0.16	0.16	0.15	0.15	0.15	0.15
			J_1 10^{-3} in.lb.s²	0.15	0.15	0.14	0.14	0.14	0.14	0.13	0.13	0.13

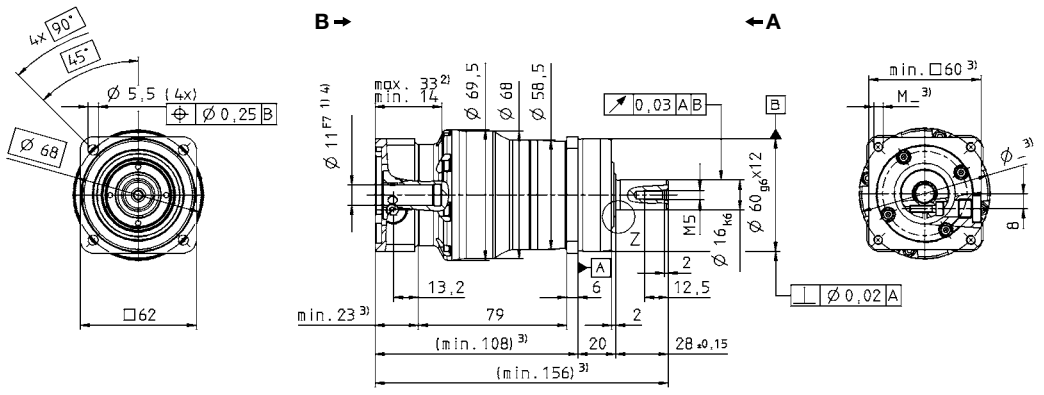
Reduced mass moments of inertia available on request.

[a] Other ratios available on request
[b] For higher ambient temperatures, please reduce input speed
[c] Valid for clamping hub diameter of 11 mm
[d] Refers to center of the output shaft or flange

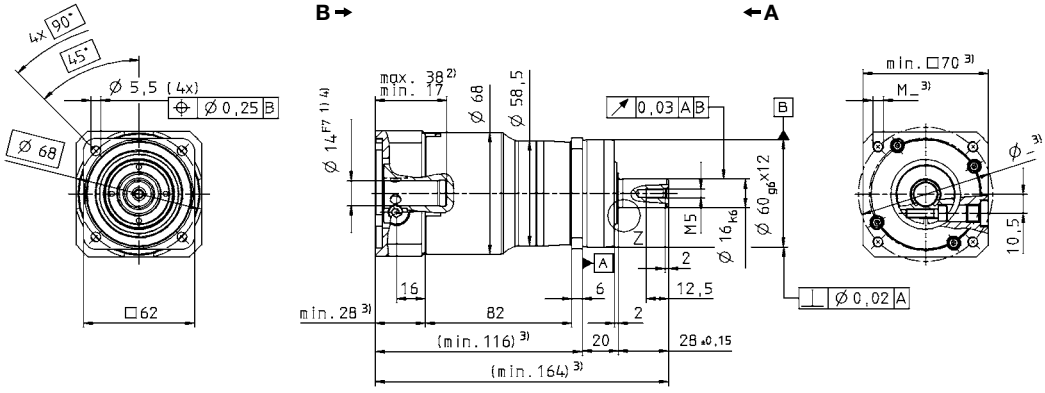
View A View B

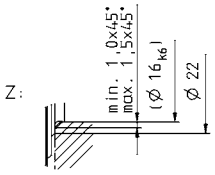
Motor shaft diameter [mm]

up to 11 [4] (B) clamping hub diameter



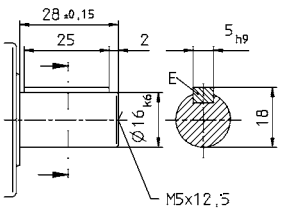
up to 14 [4] (C) clamping hub diameter



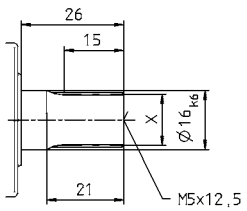


Alternatives: Output shaft variants

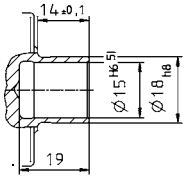
Keywayed output shaft in mm
E = key as per DIN 6885, sheet 1, form A



Involute gearing DIN 5480 in mm
X = W 16 x 0.8 x 30 x 18 x 6m, DIN 5480



Shaft mounted
Mounted via shrink disc



Non-tolerated dimensions ± 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 with a minimum thickness of 1 mm.
5) Tolerance h6 for mounted shaft.

CAD data is available under www.wittenstein-alpha.com

Motor mounting according to operating manual

					1-stage				
Ratio [a]			***i***		**3**	**4**	**5**	**7**	**10**
cymex®-optimized acceleration torque (please contact us regarding the design)			T_{2Bcym}	Nm	–	142	160	142	100
				in.lb	–	1254	1416	1254	883
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B}	Nm	85	110	110	110	95
				in.lb	752	974	974	974	841
Nominal output torque (with n_{1N})			T_{2N}	Nm	47	75	75	75	52
				in.lb	416	664	664	664	460
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not}	Nm	200	250	250	250	200
				in.lb	1770	2213	2213	2213	1770
Nominal input speed (with T_{2N} and 20°C ambient temperature) [b]			n_{1N}	rpm	2900	2900	2900	3100	3100
Max. input speed			n_{1Max}	rpm	6000	6000	6000	6000	6000
Mean no load running torque (with n_1=3000 rpm and 20°C gearhead temperature) [c]			T_{012}	Nm	1.8	1.4	1.1	0.8	0.6
				in.lb	15.9	12.4	9.7	7.1	5.3
Max. torsional backlash			j_t	arcmin	Standard ≤ 4 / Reduced ≤ 2				
Torsional rigidity			C_{t21}	Nm/ arcmin	10				
				in.lb/ arcmin	89				
Max. axial force [d]			F_{2AMax}	N	3350				
				lb_f	754				
Max. radial force [d]			F_{2RMax}	N	4200				
				lb_f	945				
Max. tilting moment			M_{2KMax}	Nm	236				
				in.lb	2089				
Efficiency at full load			η	%	97				
Service life (For calculation, see the Chapter “Information”)			L_h	h	> 20000				
Weight incl. standardadapter plate			*m*	kg	3.9				
				lb_m	8.6				
Operating noise (with *i*=10 and n_1=3000 rpm no load)			L_{PA}	dB(A)	≤ 59				
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 65				
Moment of inertia (relates to the drive)	C	14	J_1	$kgcm^2$	0.86	0.61	0.51	0.42	0.38
				10^{-3} in.lb.s²	0.76	0.54	0.46	0.37	0.33
Clamping hub diameter [mm]	E	19	J_1	$kgcm^2$	1.03	0.78	0.68	0.59	0.54
				10^{-3} in.lb.s²	0.91	0.69	0.60	0.52	0.48
	G	24	J_1	$kgcm^2$	2.40	2.15	2.05	1.96	1.91
				10^{-3} in.lb.s²	2.12	1.90	1.81	1.73	1.69

Reduced mass moments of inertia available on request.

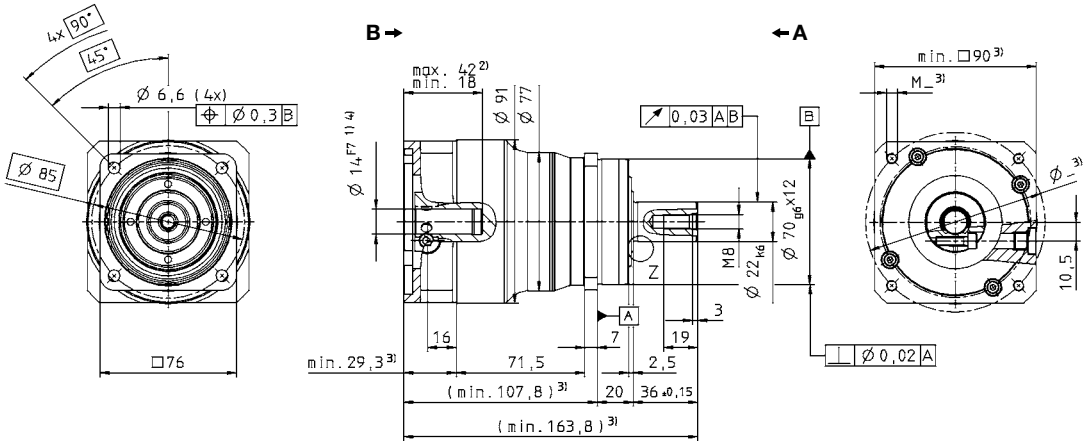
[a] Other ratios available on request
[b] For higher ambient temperatures, please reduce input speed
[c] Valid for clamping hub diameter of 19 mm
[d] Refers to centre of the output shaft or flange

View A

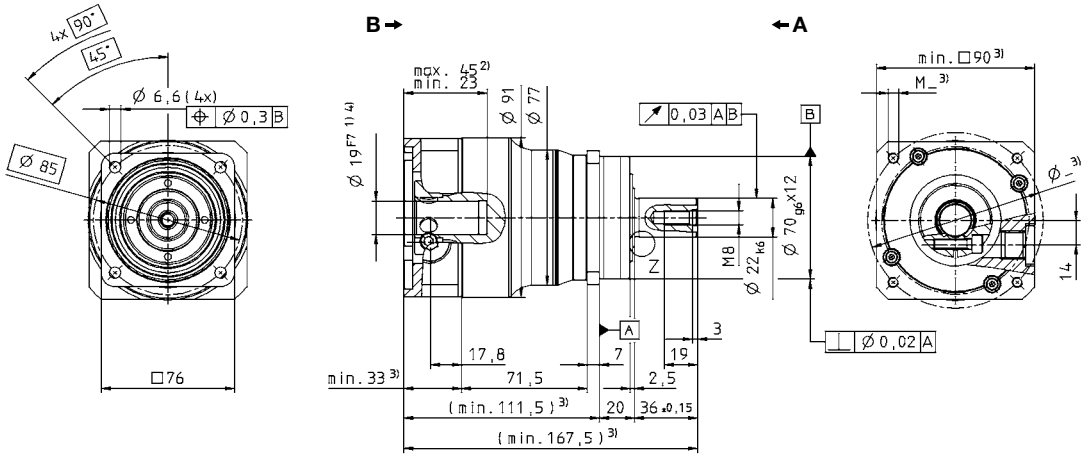
View B

Motor shaft diameter [mm]

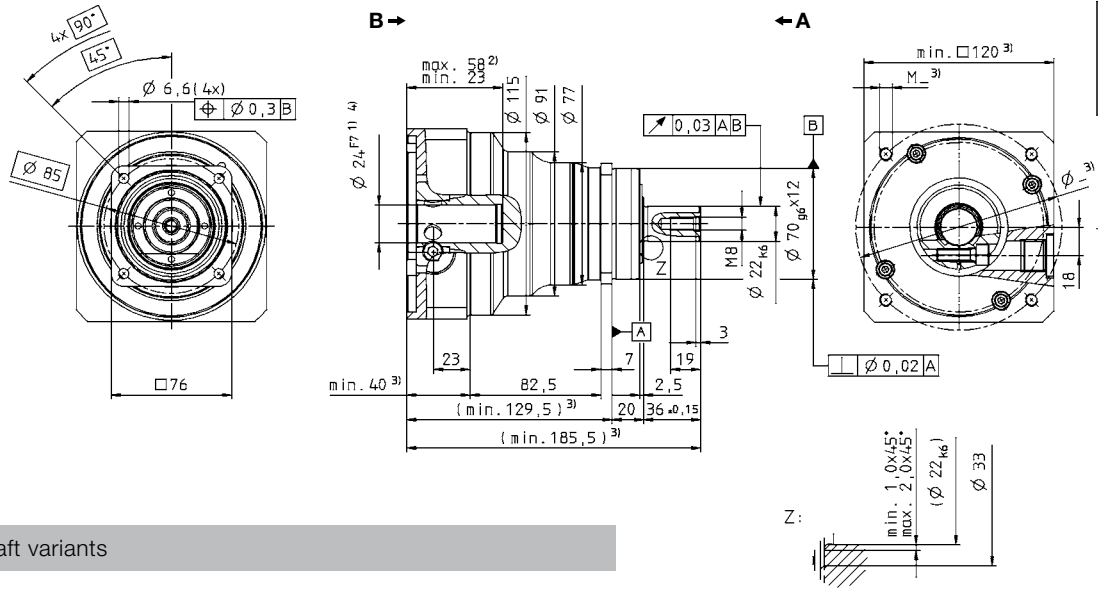
up to 14 [4] (C) clamping hub diameter



up to 19 [4] (E) clamping hub diameter



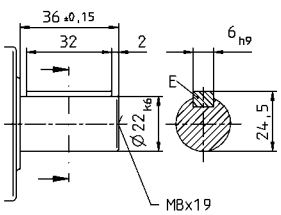
up to 24 [4] (G) clamping hub diameter



Alternatives: Output shaft variants

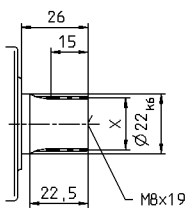
Keywayed output shaft in mm

E = key as per DIN 6885, sheet 1, form A



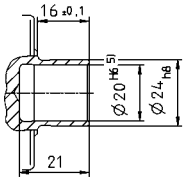
Involute gearing DIN 5480 in mm

X = W 22 x 1.25 x 30 x 16 x 6m, DIN 5480



Shaft mounted

Mounted via shrink disc



Non-tolerated dimensions ± 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 with a minimum thickness of 1 mm.
5) Tolerance h6 for mounted shaft.

CAD data is available under www.wittenstein-alpha.com

Motor mounting according to operating manual

				2-stage								
Ratio [a]			***i***	**16**	**20**	**25**	**28**	**35**	**40**	**50**	**70**	**100**
cymex®-optimized acceleration torque (please contact us regarding the design)			T_{2Bcym} Nm	142	142	160	142	160	135	160	142	100
			in.lb	1254	1254	1416	1254	1416	1195	1416	1254	883
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B} Nm	110	110	110	110	110	110	110	110	90
			in.lb	974	974	974	974	974	974	974	974	797
Nominal output torque (with n_{1N})			T_{2N} Nm	75	75	75	75	75	75	75	75	52
			in.lb	664	664	664	664	664	664	664	664	460
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not} Nm	250	250	250	250	250	250	250	250	200
			in.lb	2213	2213	2213	2213	2213	2213	2213	2213	1770
Nominal input speed (with T_{2N} and 20°C ambient temperature) [b]			n_{1N} rpm	3500	3500	3500	3500	3500	3500	3800	4500	4500
Max. input speed			n_{1Max} rpm	6000	6000	6000	6000	6000	6000	6000	6000	6000
Mean no load running torque (with n_1 = 3000 rpm and 20°C gearhead temperature) [c]			T_{012} Nm	0.8	0.6	0.6	0.5	0.4	0.4	0.3	0.3	0.3
			in.lb	4.4	3.5	3.5	2.7	2.7	1.8	1.8	1.8	1.8
Max. torsional backlash			j_t arcmin	Standard ≤ 6 / Reduced ≤ 4								
Torsional rigidity			C_{t21} Nm/ arcmin	10								
			in.lb/ arcmin	89								
Max. axial force [d]			F_{2AMax} N	3350								
			lb_f	754								
Max. radial force [d]			F_{2RMax} N	4200								
			lb_f	945								
Max. tilting moment			M_{2KMax} Nm	236								
			in.lb	2089								
Efficiency at full load			η %	94								
Service life (For calculation, see the Chapter "Information")			L_h h	> 20000								
Weight incl. standard adapter plate			*m* kg	3.6								
			lb_m	8.0								
Operating noise (with *i*=100 and n_1 = 3000 rpm no load)			L_{PA} dB(A)	≤ 59								
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 65								
Moment of inertia (relates to the drive)	B	11	J_1 kgcm²	0.16	0.13	0.13	0.10	0.10	0.091	0.090	0.089	0.089
			10^{-3} in.lb.s²	0.14	0.11	0.11	0.092	0.090	0.081	0.080	0.079	0.079
Clamping hub diameter [mm]	C	14	J_1 kgcm²	0.23	0.20	0.20	0.18	0.18	0.17	0.16	0.16	0.16
			10^{-3} in.lb.s²	0.20	0.18	0.18	0.16	0.16	0.15	0.15	0.14	0.14
	E	19	J_1 kgcm²	0.55	0.53	0.52	0.50	0.50	0.49	0.49	0.49	0.49
			10^{-3} in.lb.s²	0.49	0.47	0.46	0.44	0.44	0.43	0.43	0.43	0.43

Reduced mass moments of inertia available on request.

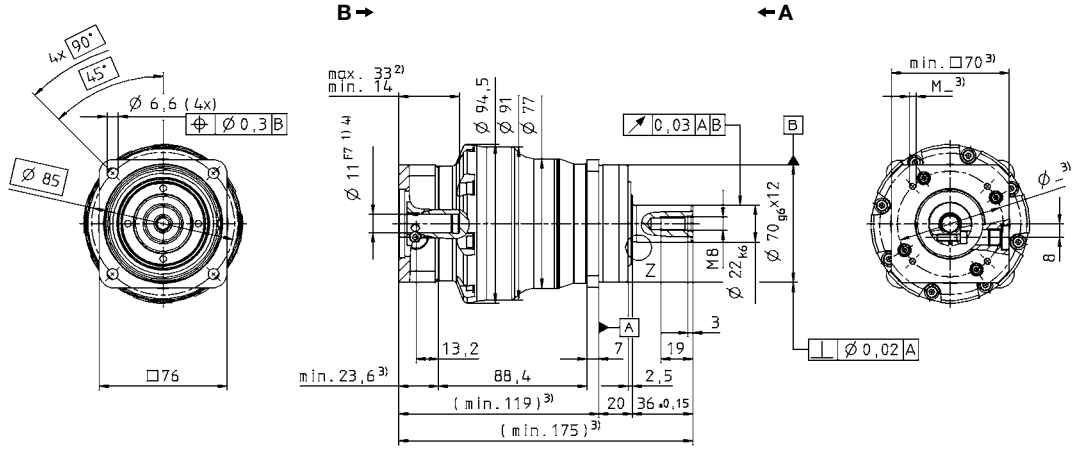
[a] Other ratios available on request
[b] For higher ambient temperatures, please reduce input speed
[c] Valid for clamping hub diameter of 14 mm
[d] Refers to centre of the output shaft or flange

View A

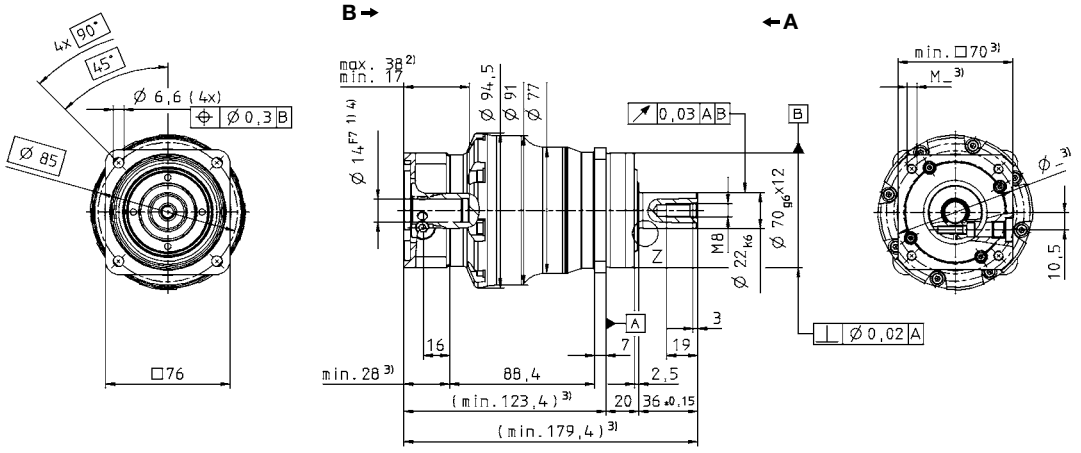
View B

Motor shaft diameter [mm]

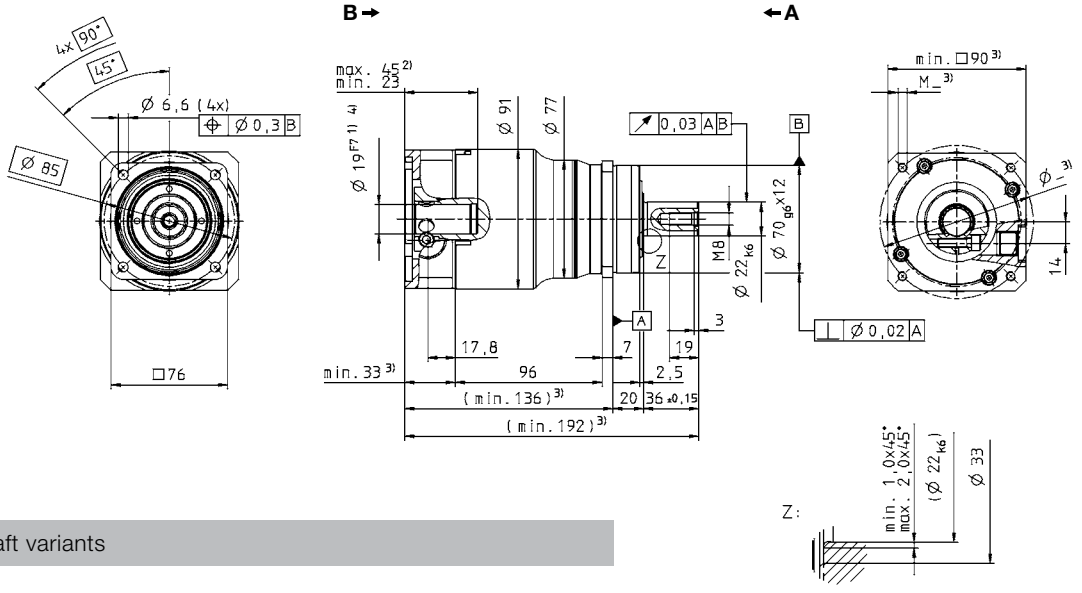
up to 11 [4] (B) clamping hub diameter



up to 14 [4] (C) clamping hub diameter

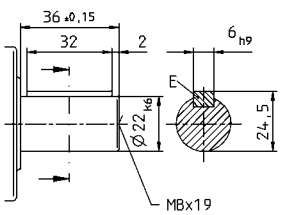


up to 19 [4] (E) clamping hub diameter

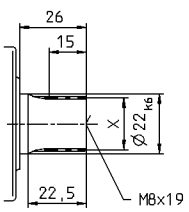


Alternatives: Output shaft variants

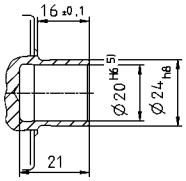
Keywayed output shaft in mm
E = key as per DIN 6885, sheet 1, form A



Involute gearing DIN 5480 in mm
X = W 22 x 1.25 x 30 x 16 x 6m, DIN 5480



Shaft mounted
Mounted via shrink disc



Non-tolerated dimensions ± 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 with a minimum thickness of 1 mm.
5) Tolerance h6 for mounted shaft.

CAD data is available under www.wittenstein-alpha.com

Motor mounting according to operating manual

					1-stage			
Ratio [a]			***i***		**3**	**4**	**5**	**7**	**10**
cymex®-optimized acceleration torque (please contact us regarding the design)			T_{2Bcym}	Nm	–	370	400	330	260
				in.lb	–	3275	3540	2921	2301
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B}	Nm	235	315	315	315	235
				in.lb	2080	2788	2788	2788	2080
Nominal output torque (with n_{1N})			T_{2N}	Nm	120	180	175	170	120
				in.lb	1062	1593	1549	1505	1062
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not}	Nm	500	625	625	625	500
				in.lb	4425	5531	5531	5531	4425
Nominal input speed (with T_{2N} and 20°C ambient temperature) [b]			n_{1N}	rpm	2500	2500	2500	2800	2800
Max. input speed			n_{1Max}	rpm	4500	4500	4500	4500	4500
Mean no load running torque (with n_1 = 3000 rpm and 20°C gearhead temperature) [c]			T_{012}	Nm	3.5	2.7	2.4	1.6	1.4
				in.lb	31.0	23.9	21.2	14.2	12.4
Max. torsional backlash			j_t	arcmin	Standard ≤ 3 / Reduced ≤ 1				
Torsional rigidity			C_{t21}	Nm/ arcmin	31				
				in.lb/ arcmin	274				
Max. axial force [d]			F_{2AMax}	N	5650				
				lb_f	1271				
Max. radial force [d]			F_{2RMax}	N	6600				
				lb_f	1485				
Max. tilting moment			M_{2KMax}	Nm	487				
				in.lb	4310				
Efficiency at full load			η	%	97				
Service life (For calculation, see the Chapter "Information")			L_h	h	> 20000				
Weight incl. standard adapter plate			*m*	kg	7.7				
				lb_m	17.0				
Operating noise (with *i*=10 and n_1 = 3000 rpm no load)			L_{PA}	dB(A)	≤ 64				
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 65				
Moment of inertia (relates to the drive)	E	19	J_1	$kgcm^2$	3.29	2.35	1.92	1.60	1.38
				10^{-3} in.lb.s²	2.91	2.08	1.70	1.42	1.22
Clamping hub diameter [mm]	G	24	J_1	$kgcm^2$	3.99	3.04	2.61	2.29	2.07
				10^{-3} in.lb.s²	3.53	2.69	2.31	2.03	1.83
	H	28	J_1	$kgcm^2$	3.59	2.65	2.22	1.90	1.68
				10^{-3} in.lb.s²	3.18	2.35	1.97	1.68	1.49
	K	38	J_1	$kgcm^2$	11.1	10.1	9.68	9.36	9.14
				10^{-3} in.lb.s²	9.78	8.95	8.57	8.28	8.09

Reduced mass moments of inertia available on request.

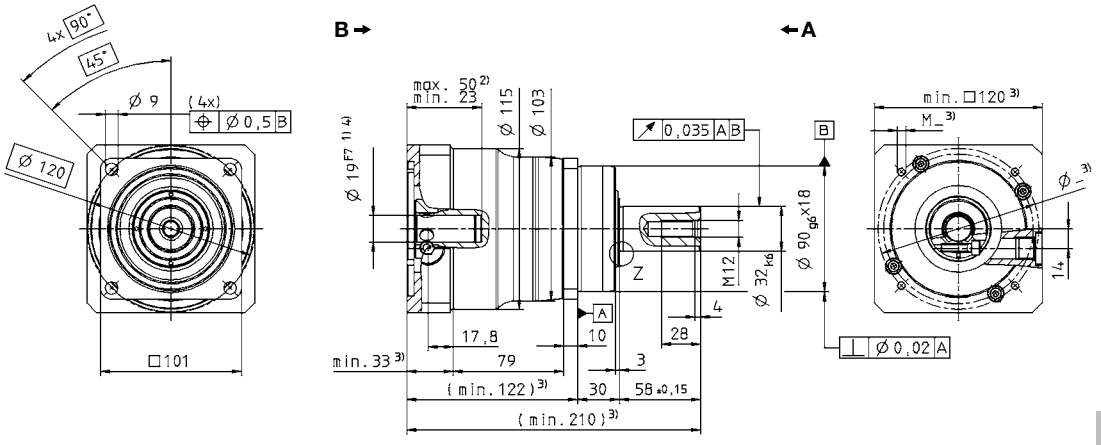
[a] Other ratios available on request
[b] For higher ambient temperatures, please reduce input speed
[c] Valid for clamping hub diameter of 24 mm
[d] Refers to centre of the output shaft or flange

Motor shaft diameter [mm]

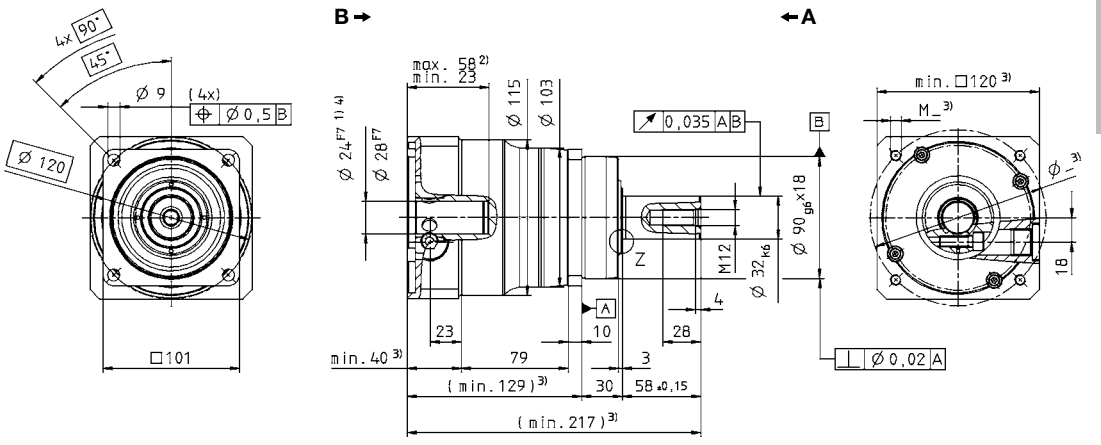
View A

View B

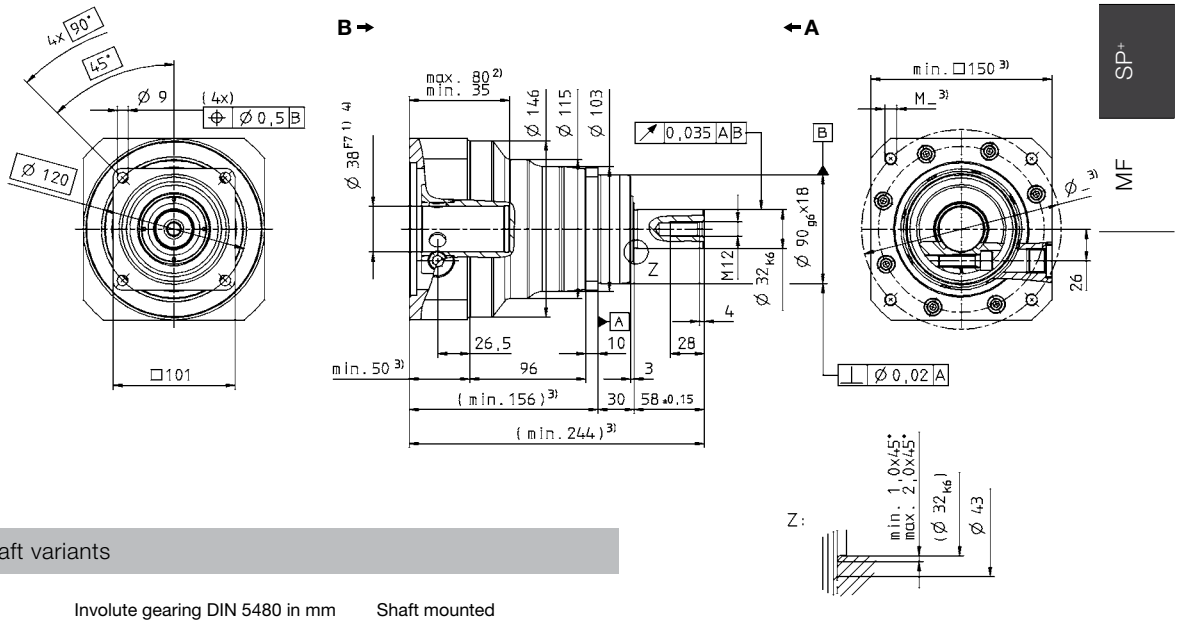
up to 19 [4] (E) clamping hub diameter



up to 24/28 [4] (G/H) clamping hub diameter



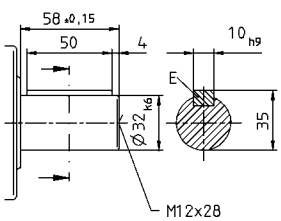
up to 38 [4] (K) clamping hub diameter



Alternatives: Output shaft variants

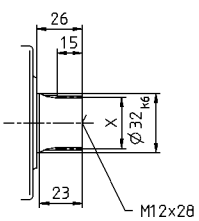
Keywayed output shaft in mm

E = key as per DIN 6885, sheet 1, form A



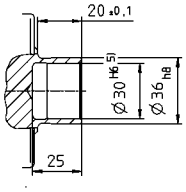
Involute gearing DIN 5480 in mm

X = W 32 x 1.25 x 30 x 24 x 6m, DIN 5480



Shaft mounted

Mounted via shrink disc



Non-tolerated dimensions ± 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 with a minimum thickness of 1 mm.
5) Tolerance h6 for mounted shaft.

CAD data is available under www.wittenstein-alpha.com

Motor mounting according to operating manual

					2-stage								
Ratio [a]			i		**16**	**20**	**25**	**28**	**35**	**40**	**50**	**70**	**100**
cymex®-optimized acceleration torque (please contact us regarding the design)			T_{2Bcym}	Nm	370	370	400	370	400	370	400	330	260
				in.lb	3275	3275	3540	3275	3540	3275	3540	2921	2301
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B}	Nm	315	315	315	315	315	315	315	315	235
				in.lb	2788	2788	2788	2788	2788	2788	2788	2788	2080
Nominal output torque (with n_{1N})			T_{2N}	Nm	180	180	175	180	175	180	175	170	120
				in.lb	1593	1593	1549	1593	1549	1593	1549	1505	1062
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not}	Nm	625	625	625	625	625	625	625	625	500
				in.lb	5531	5531	5531	5531	5531	5531	5531	5531	4425
Nominal input speed (with T_{2N} and 20°C ambient temperature) [b]			n_{1N}	rpm	3100	3100	3100	3100	3100	3100	3500	4200	4200
Max. input speed			n_{1Max}	rpm	6000	6000	6000	6000	6000	6000	6000	6000	6000
Mean no load running torque (with n_1 = 3000 rpm and 20°C gearhead temperature) [c]			T_{012}	Nm	1.5	1.2	1.1	0.9	0.8	0.7	0.6	0.5	0.5
				in.lb	13.3	10.6	9.7	8.8	7.1	6.2	5.3	4.4	4.4
Max. torsional backlash			j_t	arcmin	Standard ≤ 5 / Reduced ≤ 3								
Torsional rigidity			C_{t21}	Nm/ arcmin	31								
				in.lb/ arcmin	274								
Max. axial force [d]			F_{2AMax}	N	5650								
				lb_f	1271								
Max. radial force [d]			F_{2RMax}	N	6600								
				lb_f	1485								
Max. tilting moment			M_{2KMax}	Nm	487								
				in.lb	4310								
Efficiency at full load			η	%	94								
Service life (For calculation, see the Chapter "Information")			L_h	h	> 20000								
Weight incl. standardadapter plate			m	kg	7.9								
				lb_m	17.5								
Operating noise (with i=100 and n_1 = 3000 rpm no load)			L_{PA}	dB(A)	≤ 60								
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 65								
Moment of inertia (relates to the drive)	C	14	J_1	kgcm²	0.64	0.54	0.52	0.43	0.43	0.38	0.38	0.37	0.37
				10^{-3} in.lb.s²	0.57	0.47	0.46	0.38	0.38	0.34	0.33	0.33	0.33
Clamping hub diameter [mm]	E	19	J_1	kgcm²	0.81	0.70	0.69	0.60	0.59	0.55	0.54	0.54	0.54
				10^{-3} in.lb.s²	0.72	0.62	0.61	0.53	0.52	0.48	0.48	0.48	0.47
	G	24	J_1	kgcm²	2.18	2.07	2.05	1.97	1.96	1.92	1.91	1.91	1.91
				10^{-3} in.lb.s²	1.93	1.83	1.82	1.74	1.74	1.70	1.69	1.69	1.69
	H	28	J_1	kgcm²	1,98	1,90	1,88	1,81	1,80	1,76	1,75	1,75	1,75
				10^{-3} in.lb.s²	1,75	1,68	1,66	1,60	1,59	1,56	1,55	1,55	1,55

Reduced mass moments of inertia available on request.

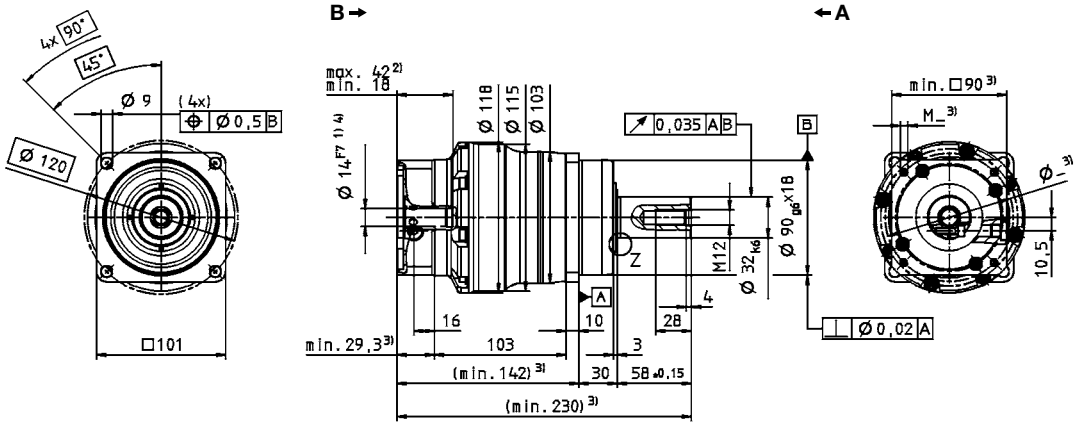
[a] Other ratios available on request
[b] For higher ambient temperatures, please reduce input speed
[c] Valid for clamping hub diameter of 19 mm
[d] Refers to centre of the output shaft or flange

View A

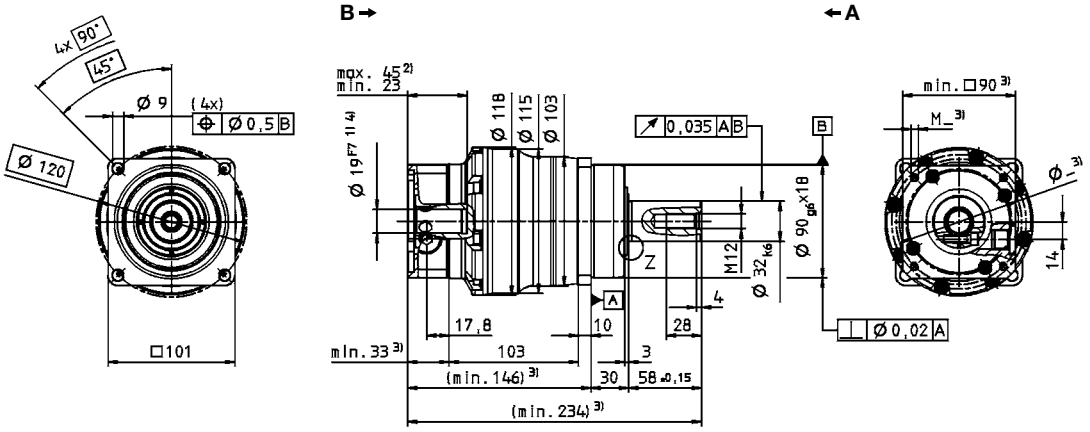
View B

Motor shaft diameter [mm]

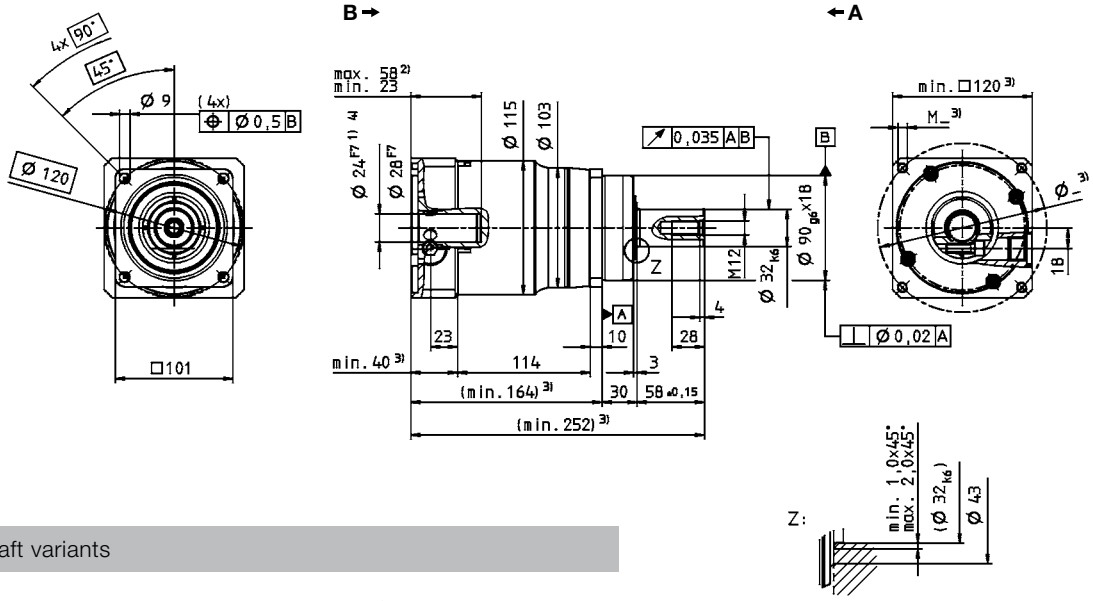
up to 14 [4] (C) clamping hub diameter



up to 19 [4] (E) clamping hub diameter

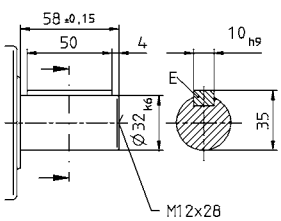


up to 24/28 [4] (G/H) clamping hub diameter

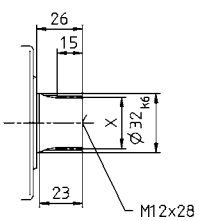


Alternatives: Output shaft variants

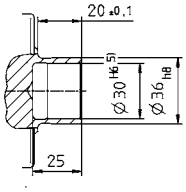
Keywayed output shaft in mm
E = key as per DIN 6885, sheet 1, form A



Involute gearing DIN 5480 in mm
X = W 32 x 1.25 x 30 x 24 x 6m, DIN 5480



Shaft mounted
Mounted via shrink disc



Non-tolerated dimensions ± 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 with a minimum thickness of 1 mm.
5) Tolerance h6 for mounted shaft.

CAD data is available under www.wittenstein-alpha.com

Motor mounting according to operating manual

					1-stage				
Ratio [a]			***i***		**3**	**4**	**5**	**7**	**10**
cymex®-optimized acceleration torque (please contact us regarding the design)			T_{2Bcym}	Nm	–	710	755	680	560
				in.lb	–	6284	6682	6018	4956
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B}	Nm	390	660	660	660	530
				in.lb	3451.5	5841	5841	5841	4691
Nominal output torque (with n_{1N})			T_{2N}	Nm	200	360	360	360	220
				in.lb	1770	3186	3186	3186	1947
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not}	Nm	1000	1250	1250	1250	1000
				in.lb	8850	11063	11063	11063	8850
Nominal input speed (with T_{2N} and 20°C ambient temperature) [b]			n_{1N}	rpm	2100	2100	2100	2600	2600
Max. input speed			n_{1Max}	rpm	4000	4000	4000	4000	4000
Mean no load running torque (with n_1 = 3000 rpm and 20°C gearhead temperature) [c]			T_{012}	Nm	7.6	5.8	4.7	3.4	2.5
				in.lb	67	51	42	30	22
Max. torsional backlash			j_t	arcmin	Standard ≤ 3 / Reduced ≤ 1				
Torsional rigidity			C_{t21}	Nm/ arcmin	53				
				in.lb/ arcmin	469				
Max. axial force [d]			F_{2AMax}	N	9870				
				lb_f	2221				
Max. radial force [d]			F_{2RMax}	N	9900				
				lb_f	2228				
Max. tilting moment			M_{2KMax}	Nm	952				
				in.lb	8425				
Efficiency at full load			η	%	97				
Service life (For calculation, see the Chapter "Information")			L_h	h	> 20000				
Weight incl. standard adapter plate			*m*	kg	17.2				
				lb_m	38.0				
Operating noise (with *i*=10 and n_1 = 3000 rpm no load)			L_{PA}	dB(A)	≤ 65				
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 65				
Moment of inertia (relates to the drive)	G	24	J_1	$kgcm^2$	10.7	7.82	6.79	5.84	5.28
				10^{-3} in.lb.s²	9.45	6.92	6.01	5.17	4.67
Clamping hub diameter [mm]	I	32	J_1	$kgcm^2$	13.8	11.0	9.95	9.01	8.44
				10^{-3} in.lb.s²	12.3	9.72	8.81	7.97	7.47
	K	38	J_1	$kgcm^2$	14.9	12.1	11.0	10.1	9.51
				10^{-3} in.lb.s²	13.2	10.7	9.76	8.92	8.42
	M	48	J_1	$kgcm^2$	29.5	26.7	25.6	24.7	24.2
				10^{-3} in.lb.s²	26.1	23.6	22.7	21.9	21.4

Reduced mass moments of inertia available on request.

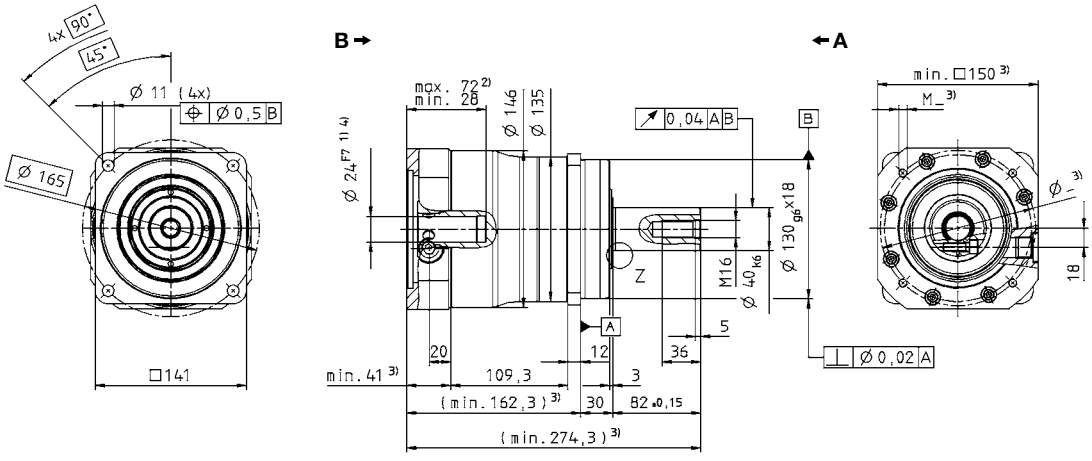
[a] Other ratios available on request
[b] For higher ambient temperatures, please reduce input speed
[c] Valid for clamping hub diameter of 38 mm
[d] Refers to center of the output shaft or flange

Motor shaft diameter [mm]

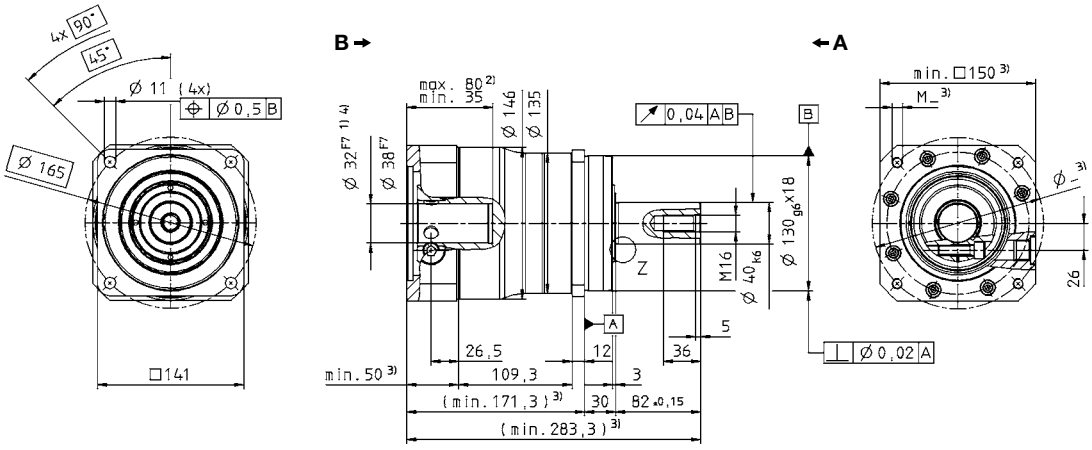
View A

View B

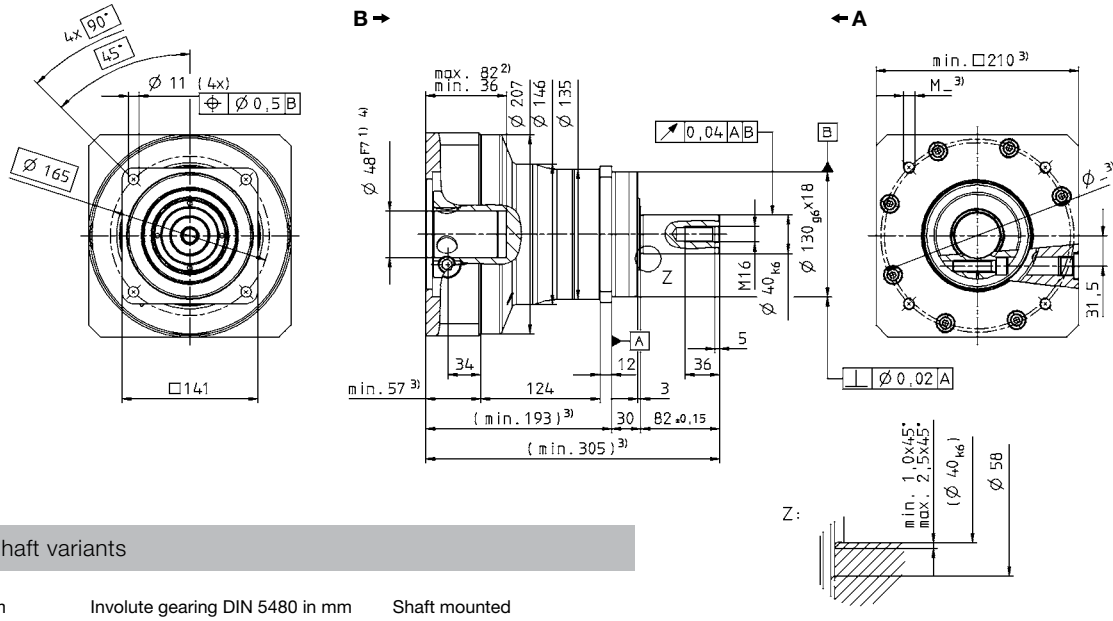
up to 24 [4] (G) clamping hub diameter



up to 32/38 [4] (I/K) clamping hub diameter



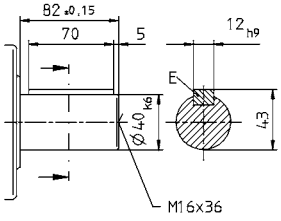
up to 48 [4] (M) clamping hub diameter



Alternatives: Output shaft variants

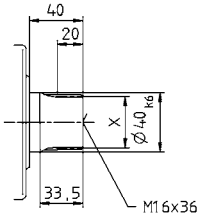
Keywayed output shaft in mm

E = key as per DIN 6885, sheet 1, form A



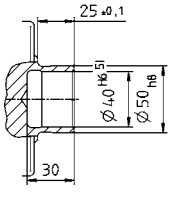
Involute gearing DIN 5480 in mm

X = W 40 x 2 x 30 x 18 x 6m, DIN 5480



Shaft mounted

Mounted via shrink disc



Non-tolerated dimensions ± 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 with a minimum thickness of 1 mm.
5) Tolerance h6 for mounted shaft.

CAD data is available under www.wittenstein-alpha.com

Motor mounting according to operating manual

					2-stage								
Ratio [a]			*i*		**16**	**20**	**25**	**28**	**35**	**40**	**50**	**70**	**100**
cymex®-optimized acceleration torque (please contact us regarding the design)			T_{2Bcym}	Nm	710	710	755	710	755	710	755	680	560
				in.lb	6284	6284	6682	6284	6682	6284	6682	6018	4956
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B}	Nm	660	660	660	660	660	660	660	660	530
				in.lb	5841	5841	5841	5841	5841	5841	5841	5841	4691
Nominal output torque (with n_{1N})			T_{2N}	Nm	360	360	360	360	360	360	360	360	220
				in.lb	3186	3186	3186	3186	3186	3186	3186	3186	1947
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not}	Nm	1250	1250	1250	1250	1250	1250	1250	1250	1000
				in.lb	11063	11063	11063	11063	11063	11063	11063	11063	8850
Nominal input speed (with T_{2N} and 20°C ambient temperature) [b]			n_{1N}	rpm	2900	2900	2900	2900	2900	2900	3200	3200	3900
Max. input speed [c]			n_{1Max}	rpm	5000	5000	5000	5000	5000	5000	5000	5000	5000
Mean no load running torque (with n_1 = 3000 rpm and 20°C gearhead temperature) [c]			T_{012}	Nm	3.3	2.7	2.4	1.9	1.8	1.4	1.3	1.2	1.1
				in.lb	29.2	23.9	21.2	16.9	15.9	12.4	11.5	10.6	9.7
Max. torsional backlash			j_t	arcmin	Standard ≤ 5 / Reduced ≤ 3								
Torsional rigidity			C_{t21}	Nm/ arcmin	53								
				in.lb/ arcmin	469								
Max. axial force [d]			F_{2AMax}	N	9870								
				lb_f	2221								
Max. radial force [d]			F_{2RMax}	N	9900								
				lb_f	2228								
Max. tilting moment			M_{2KMax}	Nm	952								
				in.lb	8425								
Efficiency at full load			η	%	94								
Service life (For calculation, see the Chapter "Information")			L_h	h	> 20000								
Weight incl. standard adapter plate			*m*	kg	17								
				lb_m	37.6								
Operating noise (with *i*=100 and n_1 = 3000 rpm no load)			L_{PA}	dB(A)	≤ 63								
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 65								
Moment of inertia (relates to the drive)	E	19	J_1	kgcm²	2.50	2.01	1.97	1.65	1.63	1.40	1.39	1.38	1.38
				10^{-3} in.lb.s²	2.21	1.78	1.75	1.46	1.44	1.24	1.23	1.22	1.22
Clamping hub diameter [mm]	G	24	J_1	kgcm²	3.19	2.71	2.67	2.34	2.32	2.10	2.08	2.08	2.07
				10^{-3} in.lb.s²	2.82	2.40	2.36	2.07	2.05	1.85	1.85	1.84	1.83
	K	38	J_1	kgcm²	10.3	9.77	9.73	9.41	9.39	9.16	9.15	9.14	9.14
				10^{-3} in.lb.s²	9.07	8.65	8.61	8.33	8.31	8.11	8.10	8.09	8.09

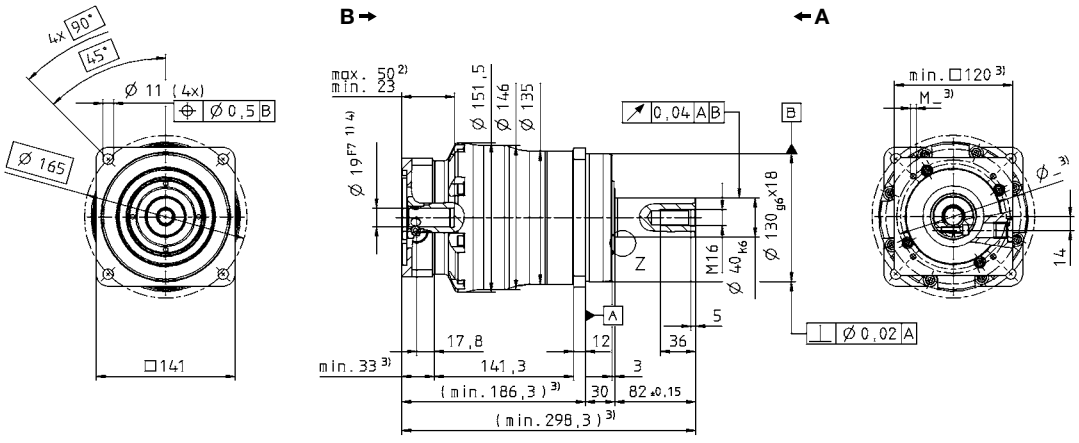
Reduced mass moments of inertia available on request.

[a] Other ratios available on request
[b] For higher ambient temperatures, please reduce input speed
[c] Valid for clamping hub diameter of 24 mm
[d] Refers to center of the output shaft or flange

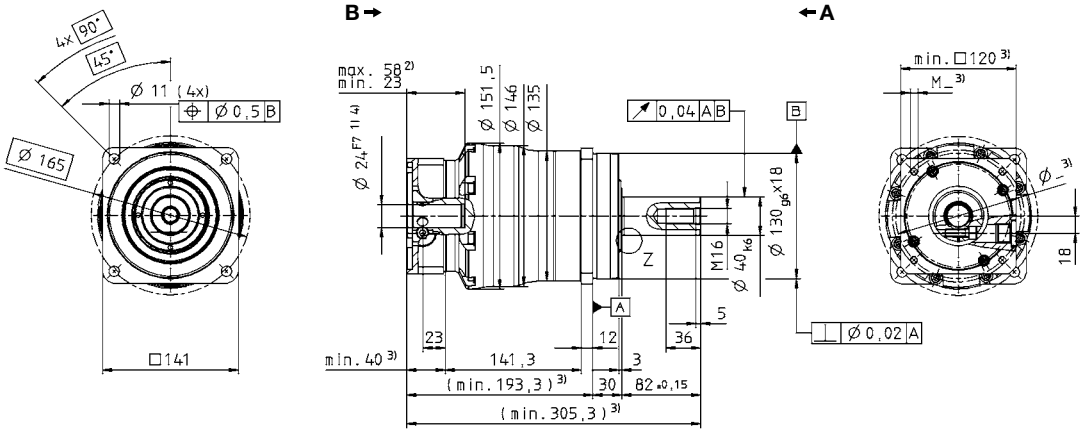
View A View B

Motor shaft diameter [mm]

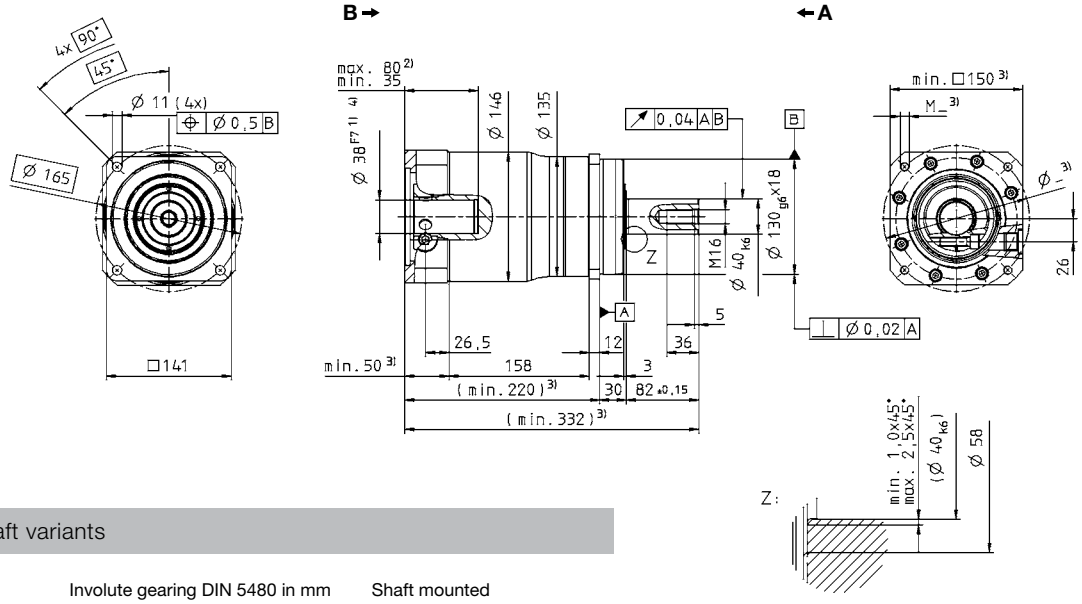
up to 19 [4] (E) clamping hub diameter



up to 24 [4] (G) clamping hub diameter

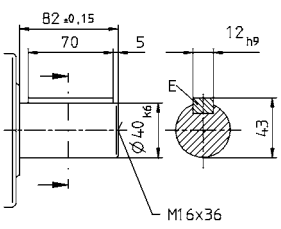


up to 38 [4] (K) clamping hub diameter

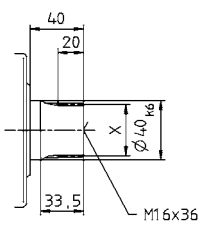


Alternatives: Output shaft variants

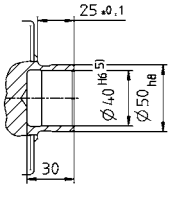
Keywayed output shaft in mm
E = key as per DIN 6885, sheet 1, form A



Involute gearing DIN 5480 in mm
X = W 40 x 2 x 30 x 18 x 6m, DIN 5480



Shaft mounted
Mounted via shrink disc



Non-tolerated dimensions ± 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 with a minimum thickness of 1 mm.
5) Tolerance h6 for mounted shaft.

CAD data is available under www.wittenstein-alpha.com

Motor mounting according to operating manual

				1-stage				
Ratio [a]			***i***	**3**	**4**	**5**	**7**	**10**
cymex®-optimized acceleration torque (please contact us regarding the design)			T_{2Bcym} Nm	–	1785	1890	1785	1400
			in.lb	–	15797	16727	15797	12390
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B} Nm	970	1210	1210	1210	970
			in.lb	8585	10709	10709	10709	8585
Nominal output torque (with n_{1N})			T_{2N} Nm	530	750	750	750	750
			in.lb	4691	6638	6638	6638	6638
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not} Nm	2200	2750	2750	2750	2200
			in.lb	19470	24338	24338	24338	29470
Nominal input speed (with T_{2N} and 20°C ambient temperature) [b]			n_{1N} rpm	1500	1500	1500	2300	2300
Max. input speed			n_{1Max} rpm	3500	3500	3500	3500	3500
Mean no load running torque (with n_1 = 3000 rpm and 20°C gearhead temperature) [c]			T_{012} Nm	14.0	11.0	9.0	6.8	5.0
			in.lb	123.9	97.4	79.7	60.2	44.3
Max. torsional backlash			j_t arcmin	Standard ≤ 3 / Reduced ≤ 1				
Torsional rigidity			C_{t21} Nm/ arcmin	175				
			in.lb/ arcmin	1549				
Max. axial force [d]			F_{2AMax} N	14150				
			lb_f	3184				
Max. radial force [d]			F_{2RMax} N	15400				
			lb_f	3465				
Max. tilting moment			M_{2KMax} Nm	1600				
			in.lb	14160				
Efficiency at full load			η %	97				
Service life (For calculation, see the Chapter "Information")			L_h h	> 20000				
Weight incl. standard adapter plate			*m* kg	34				
			lb_m	75.1				
Operating noise (with *i*=10 and n_1 = 3000 rpm no load)			L_{PA} dB(A)	≤ 66				
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 65				
Moment of inertia (relates to the drive)	K	38	J_1 kgcm²	50.8	33.9	27.9	22.2	19.2
			10^{-3} in.lb.s²	45.0	30.0	24.7	19.7	17.0
Clamping hub diameter [mm]	M	48	J_1 kgcm²	58.2	41.2	35.3	29.6	26.5
			10^{-3} in.lb.s²	51.5	36.5	31.2	26.2	23.5

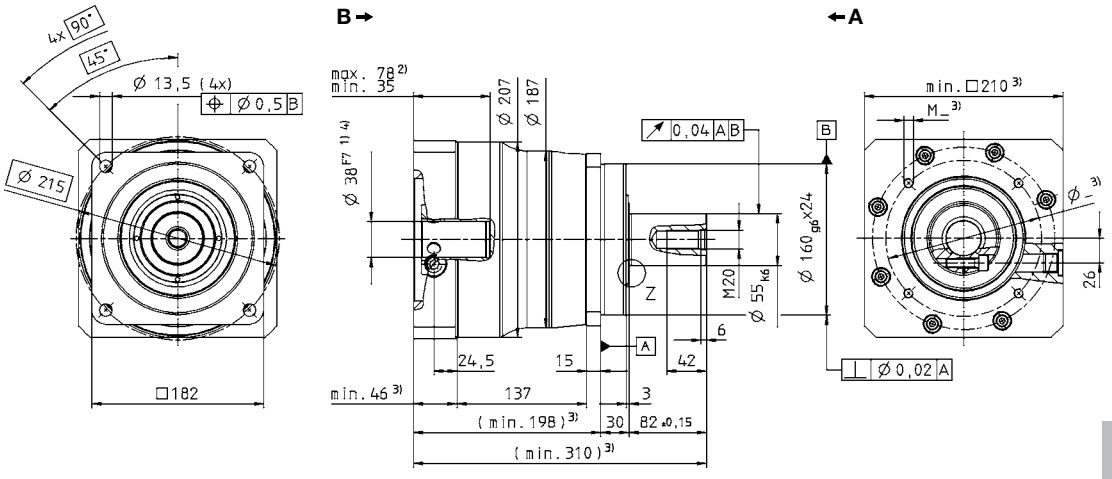
Reduced mass moments of inertia available on request.

[a] Other ratios available on request
[b] For higher ambient temperatures, please reduce input speed
[c] Valid for clamping hub diameter of 48 mm
[d] Refers to center of the output shaft or flange

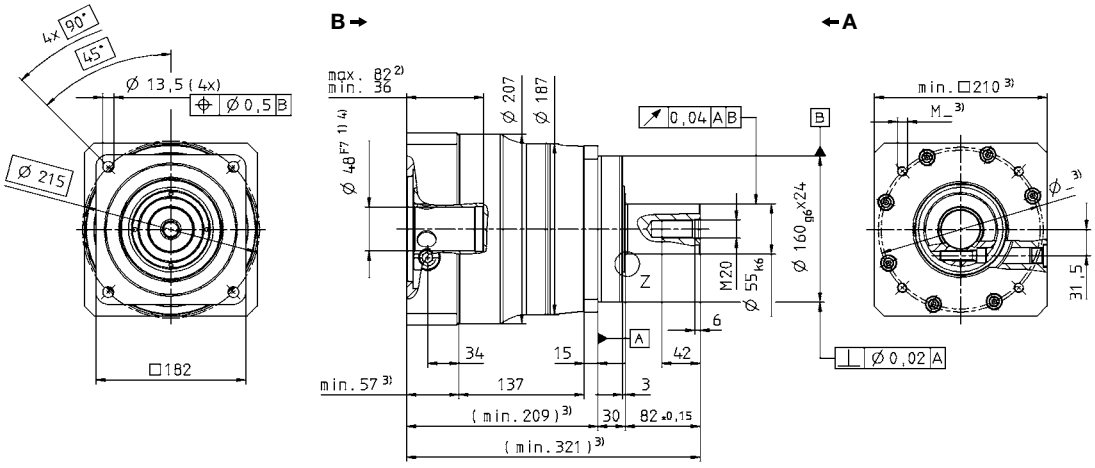
View A View B

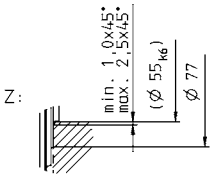
Motor shaft diameter [mm]

up to 38 [4] (K) clamping hub diameter



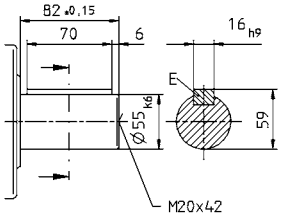
up to 48 [4] (M) clamping hub diameter



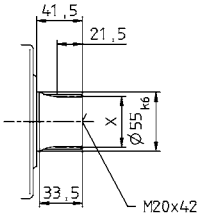


Alternatives: Output shaft variants

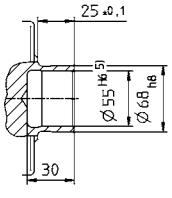
Keywayed output shaft in mm
E = key as per DIN 6885, sheet 1, form A



Involute gearing DIN 5480 in mm
X = W 55 x 2 x 30 x 26 x 6m, DIN 5480



Shaft mounted
Mounted via shrink disc



Non-tolerated dimensions ± 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 with a minimum thickness of 1 mm.
5) Tolerance h6 for mounted shaft.

CAD data is available under www.wittenstein-alpha.com

Motor mounting according to operating manual

					2-stage								
Ratio [a]			i		**16**	**20**	**25**	**28**	**35**	**40**	**50**	**70**	**100**
cymex®-optimized acceleration torque (please contact us regarding the design)			T_{2Bcym}	Nm	1785	1785	1890	1785	1890	1785	1800	1785	1400
				in.lb	15797	15797	16727	15797	16727	15797	15930	15797	12390
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B}	Nm	1210	1210	1210	1210	1210	1210	1210	1210	970
				in.lb	10709	10709	10709	10709	10709	10709	10709	10709	8585
Nominal output torque (with n_{1N})			T_{2N}	Nm	750	750	750	750	750	750	750	750	750
				in.lb	6638	6638	6638	6638	6638	6638	6637	6638	6638
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not}	Nm	2750	2750	2750	2750	2750	2750	2750	2750	2200
				in.lb	24338	24338	24338	24338	24338	24338	24338	24338	19470
Nominal input speed (with T_{2N} and 20°C ambient temperature) [b]			n_{1N}	rpm	2700	2700	2700	2700	2700	2700	2900	3200	3400
Max. input speed [c]			n_{1Max}	rpm	4500	4500	4500	4500	4500	4000	4500	4500	4500
Mean no load running torque (with n_1 = 3000 rpm and 20°C gearhead temperature) [c]			T_{012}	Nm	5.3	4.3	3.9	3.1	2.8	2.3	2.1	1.9	1.7
				in.lb	46,9	38,1	34,5	27,4	24,8	20,4	18,6	16,8	15,0
Max. torsional backlash			j_t	arcmin	Standard ≤ 5 / Reduced ≤ 3								
Torsional rigidity			C_{t21}	Nm/ arcmin	175								
				in.lb/ arcmin	1549								
Max. axial force [d]			F_{2AMax}	N	14150								
				lb_f	3184								
Max. radial force [d]			F_{2RMax}	N	15400								
				lb_f	3465								
Max. tilting moment			M_{2KMax}	Nm	1600								
				in.lb	14160								
Efficiency at full load			η	%	94								
Service life (For calculation, see the Chapter "Information")			L_h	h	> 20000								
Weight incl. standard adapter plate			m	kg	36.4								
				lb_m	80.4								
Operating noise (with i=100 and n_1 = 3000 rpm no load)			L_{PA}	dB(A)	≤ 66								
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 65								
Moment of inertia (relates to the drive)	G	24	J_1	kgcm²	9.27	7.72	7.48	6.32	6.20	5.51	5.45	5.39	5.36
				10^{-3} in.lb.s²	8.20	6.83	6.62	5.59	5.49	4.88	4.82	4.77	4.74
Clamping hub diameter [mm]	I	32	J_1	kgcm²	12.4	10.9	10.6	9.48	9.36	8.67	8.61	8.55	8.52
				10^{-3} in.lb.s²	11.0	9.63	9.42	8.39	8.28	7.67	7.62	7.57	7.54
	K	38	J_1	kgcm²	13.5	12.0	11.7	10.6	10.4	9.74	9.68	9.63	9.60
				10^{-3} in.lb.s²	12.0	10.6	10.4	9.34	9.23	8.62	8.57	8.52	8.49
	M	48	J_1	kgcm²	28.1	26.6	26.3	25.2	25.1	24.4	24.3	24.3	24.3
				10^{-3} in.lb.s²	24.9	23.5	23.3	22.3	22.2	21.6	21.5	21.5	21.5

Reduced mass moments of inertia available on request.

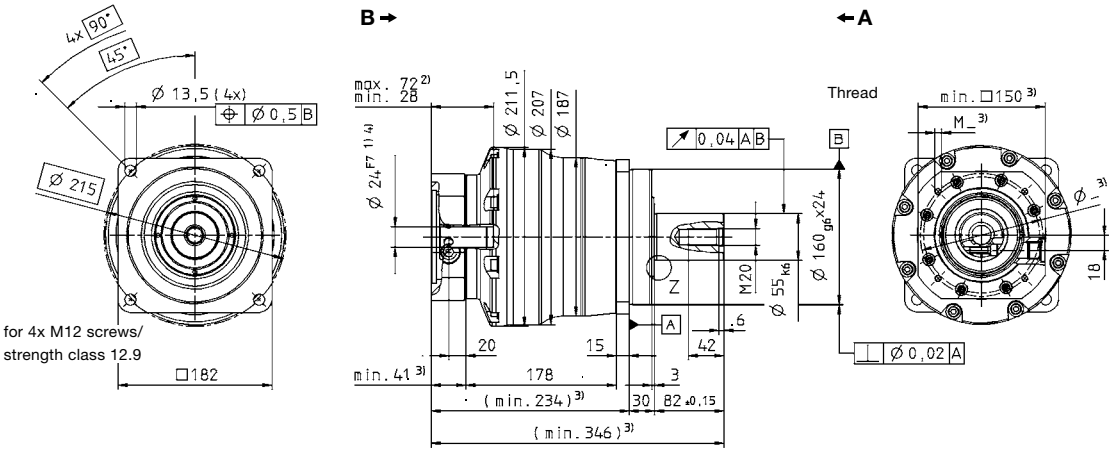
[a] Other ratios available on request
[b] For higher ambient temperatures, please reduce input speed
[c] Valid for clamping hub diameter of 38 mm
[d] Refers to center of the output shaft or flange

View A

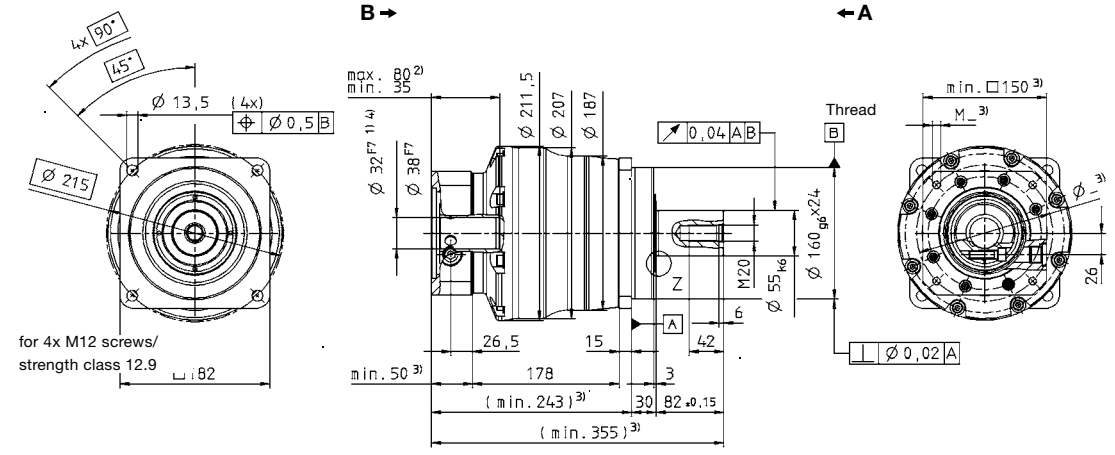
View B

Motor shaft diameter [mm]

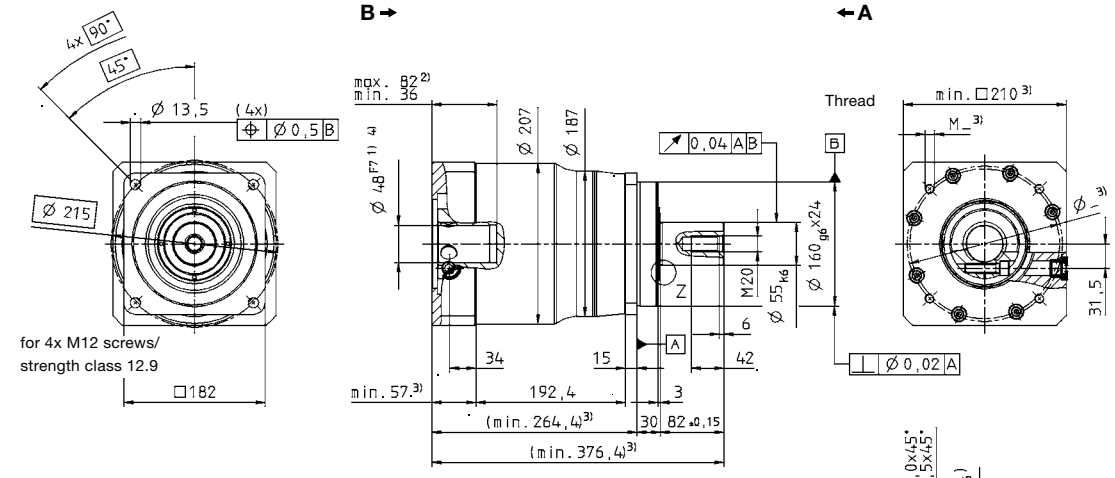
up to 24 [4] (G) clamping hub diameter

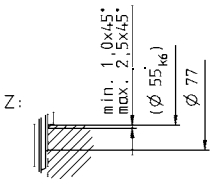


up to 32/38 [4] (I/K) clamping hub diameter



up to 48 [4] (M) clamping hub diameter

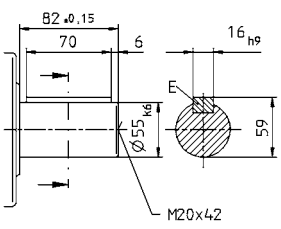




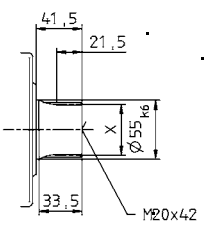
Z: Detail

Alternatives: Output shaft variants

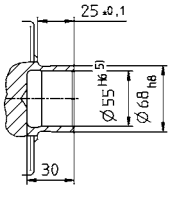
Keywayed output shaft in mm
E = key as per DIN 6885, sheet 1, form A



Involute gearing DIN 5480 in mm
X = W 55 x 2 x 30 x 26 x 6m, DIN 5480



Shaft mounted
Mounted via shrink disc



Connecting part

Non-tolerated dimensions ± 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 with a minimum thickness of 1 mm.
5) Tolerance h6 for mounted shaft.

CAD data is available under www.wittenstein-alpha.com

Motor mounting according to operating manual

				1-stage					2-stage								
Ratio [a]			*i*	**3**	**4**	**5**	**7**	**10**	**16**	**20**	**25**	**28**	**35**	**40**	**50**	**70**	**100**
cymex®-optimized acceleration torque (please contact us regarding the design)			T_{2Bcym} Nm	- Please contact us -													
			T_{2Bcym} in.lb														
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B} Nm	1600	2500	2500	2400	1900	2400	2500	2500	2400	2400	2400	2400	2400	1900
			T_{2B} in.lb	14160	22125	22125	21240	16815	21240	22125	22125	21240	21240	21240	21240	21240	16815
Nominal output torque (with n_{1N})			T_{2N} Nm	1100	1500	1500	1400	1000	1500	1500	1500	1500	1500	1500	1500	1400	1000
			T_{2N} in.lb	9735	13275	13275	12390	8850	13275	13275	13275	13275	13275	13275	13275	12390	8850
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not} Nm	5000	5200	5200	5200	5000	5200	5200	5200	5200	5200	5200	5200	5200	5000
			T_{2Not} in.lb	44250	46020	46020	46020	44250	46020	46020	46020	46020	46020	46020	46020	46020	44250
Nominal input speed (with T_{2N} and 20°C ambient temperature) [b]			n_{1N} rpm	1200	1200	1500	1700	2000	2500	2500	2500	2500	2500	2500	2500	3000	3000
Max. input speed			n_{1Max} rpm	2500	2500	2500	2500	2500	3500	3500	3500	3500	3500	3500	3500	3500	3500
Mean no load running torque (with n_1 = 2000 rpm and 20°C gearhead temperature)			T_{012} Nm	32	22	17	11	7,0	7,0	6,0	5,5	4,5	4,0	3,5	3,5	3,5	3,0
			T_{012} in.lb	283	195	151	97	62	62	53	49	40	35	31	31	31	27
Max. torsional backlash			j_t arcmin	Standard ≤ 3 / Reduced ≤ 1					Standard ≤ 5 / Reduced ≤ 3								
Torsional rigidity			C_{t21} Nm/ arcmin	400					400								
			C_{t21} in.lb/ arcmin	3540					3540								
Max. axial force [c]			F_{2AMax} N	30000					30000								
			F_{2AMax} lb_f	6750					6750								
Max. radial force [c]			F_{2RMax} N	21000					21000								
			F_{2RMax} lb_f	4725					4725								
Max. tilting moment			M_{2KMax} Nm	3100					3100								
			M_{2KMax} in.lb	27435					2744								
Efficiency at full load			η %	97					94								
Service life (For calculation, see the Chapter "Information")			L_h h	> 20000					> 20000								
Weight incl. standard adapter plate			*m* kg	56					53								
			m lb_m	124					117								
Operating noise (with *i*=10 and n_1 = 3000 rpm no load)			L_{PA} dB(A)	≤ 64													
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 65													
Moment of inertia (relates to the drive)	M	48	J_1 kgcm²	-	-	-	-	-	34.5	31.5	30.8	30.0	29.7	28.5	28.3	28.1	28.0
			J_1 10^{-3} in.lb.s²						30.5	27.9	27.3	26.6	26.3	25.2	25.0	24.9	24.8
Clamping hub diameter (mm)	N	55	J_1 kgcm²	139.0	94.3	76.9	61.5	53.1	-	-	-	-	-	-	-	-	-
			J_1 10^{-3} in.lb.s²	118.2	80.2	65.4	52.3	45.1									

Reduced mass moments of inertia available on request.

[a] Other ratios available on request
[b] For higher ambient temperatures, please reduce input speed
[c] Refers to center of the output shaft or flange

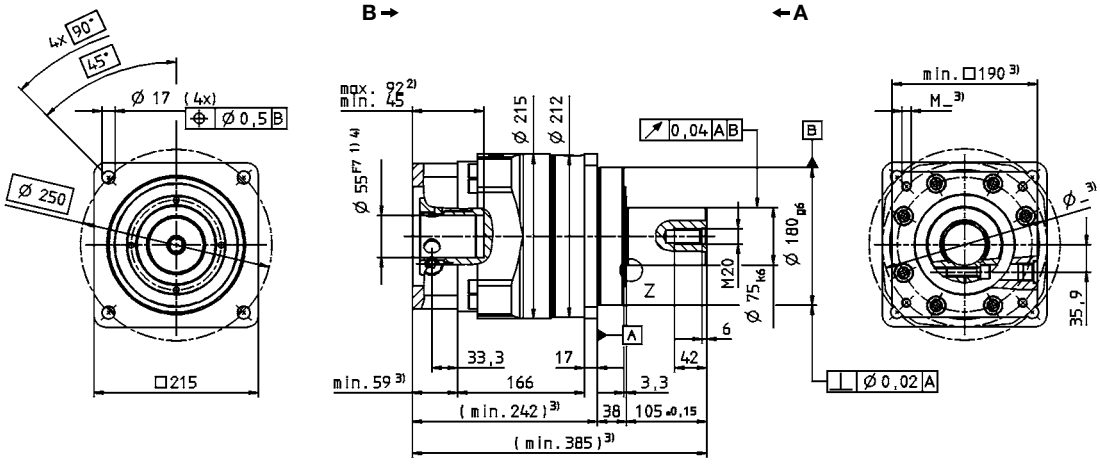
View A | View B

Motor shaft diameter [mm]

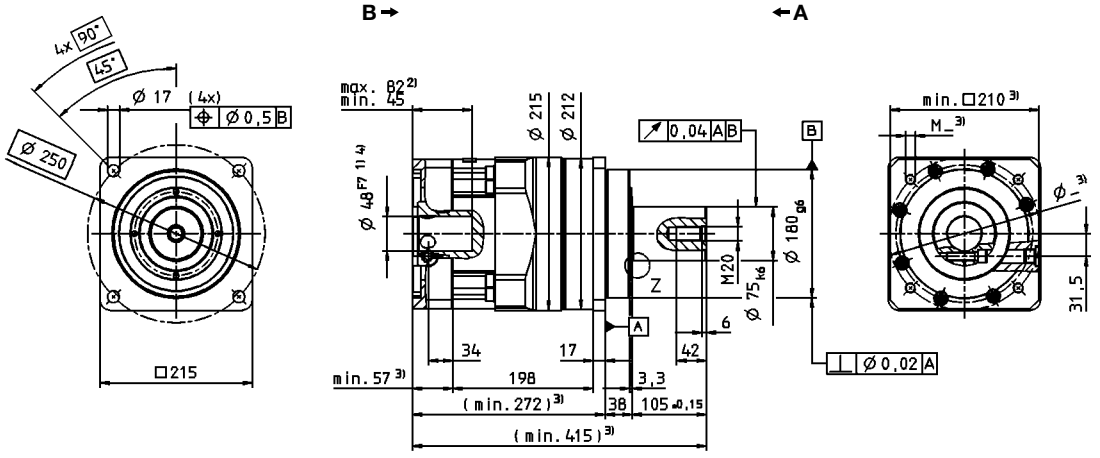
up to 55 [4] (N) clamping hub diameter

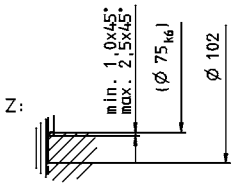
up to 48 [4] (M) clamping hub diameter

1-stage:



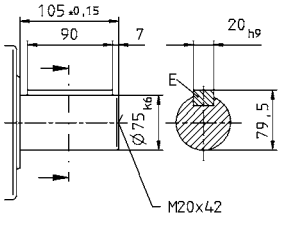
2-stage:



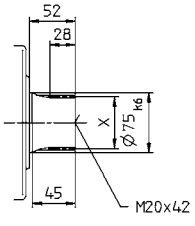


Alternatives: Output shaft variants

Keywayed output shaft in mm
E = key as per DIN 6885, sheet 1, form A



Involute gearing DIN 5480 in mm
X = W 70 x 2 x 30 x 34 x 6m, DIN 5480



Non-tolerated dimensions ± 1.5 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 with a minimum thickness of 1 mm.

CAD data is available under www.wittenstein-alpha.com

Motor mounting according to operating manual

					1-stage					2-stage								
Ratio [a]			i		**3**	**4**	**5**	**7**	**10**	**16**	**20**	**25**	**28**	**35**	**40**	**50**	**70**	**100**
cymex®-optimized acceleration torque (please contact us regarding the design)			T_{2Bcym}	Nm	- Please contact us -													
				in.lb														
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B}	Nm	2750	4500	4500	4300	3400	4500	4500	4500	4500	4500	4000	4300	4300	3400
				in.lb	24338	39825	39825	38055	30090	39825	39825	39825	39825	39825	35400	38055	38055	30090
Nominal output torque (with n_{1N})			T_{2N}	Nm	1500	2500	2500	2300	1700	2500	2500	2500	2500	2500	2500	2500	2300	1700
				in.lb	13275	22125	22125	20355	15045	22125	22125	22125	22125	22125	22125	22125	20355	15045
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not}	Nm	6800	8500	8500	8500	6800	8500	8500	8500	8500	8500	8500	8500	8500	6800
				in.lb	60180	75225	75225	75225	60180	75225	75225	75225	75225	75225	75225	75225	75225	60180
Nominal input speed (with T_{2N} and 20°C ambient temperature) [b]			n_{1N}	rpm	1000	1000	1200	1500	1700	2300	2500	2500	2500	2500	2500	2500	2800	2800
Max. input speed			n_{1Max}	rpm	2500	2500	2500	2500	2500	3500	3500	3500	3500	3500	3500	3500	3500	3500
Mean no load running torque (with n_1 = 2000 rpm and 20°C gearhead temperature)			T_{012}	Nm	45	35	26	16	11	11	9,0	8,0	7,0	6,0	5,0	4,5	4,0	4,0
				in.lb	398	310	230	142	97	97	80	71	62	53	44	40	35	35
Max. torsional backlash			j_t	arcmin	Standard ≤ 3 / Reduced ≤ 1					Standard ≤ 5 / Reduced ≤ 3								
Torsional rigidity			C_{t21}	Nm/ arcmin	550					550								
				in.lb/ arcmin	4868					4868								
Max. axial force [c]			F_{2AMax}	N	33000					33000								
				lb_f	7425					7425								
Max. radial force [c]			F_{2RMax}	N	30000					30000								
				lb_f	6750					6750								
Max. tilting moment			M_{2KMax}	Nm	5000					5000								
				in.lb	44250					44250								
Efficiency at full load			η	%	97					94								
Service life (For calculation, see the Chapter "Information")			L_h	h	> 20000					> 20000								
Weight incl. standard adapter plate			m	kg	77					76								
				lb_m	170					168								
Operating noise (with i=10 and n_1 = 3000 rpm no load)			L_{PA}	dB(A)	≤ 66													
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 65													
Moment of inertia (relates to the drive)	M	48	J_1	kgcm²	-	-	-	-	-	39.2	34.6	33.2	30.5	29.7	28.2	27.9	27.6	27.5
				10^{-3} in.lb.s²						34.7	30.6	29.4	27.0	26.3	25.0	24.7	24.4	24.3
Clamping hub diameter [mm]	O	60	J_1	kgcm²	260.2	198.2	163.0	138,3	124,7	-	-	-	-	-	-	-	-	-
				10^{-3} in.lb.s²	230.3	175.4	144.3	122,4	110,4									

Reduced mass moments of inertia available on request.

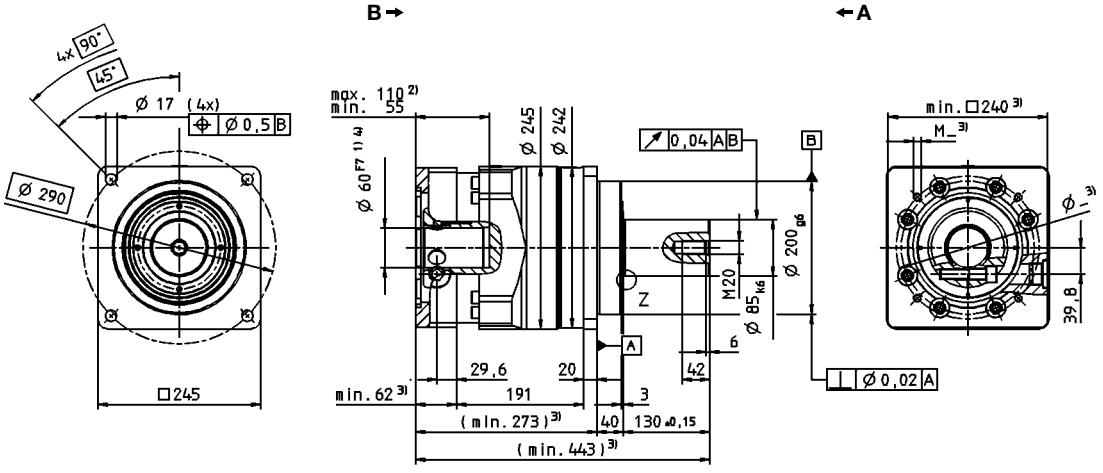
[a] Other ratios available on request
[b] For higher ambient temperatures, please reduce input speed
[c] Refers to center of the output shaft or flange

View A | View B

Motor shaft diameter [mm]

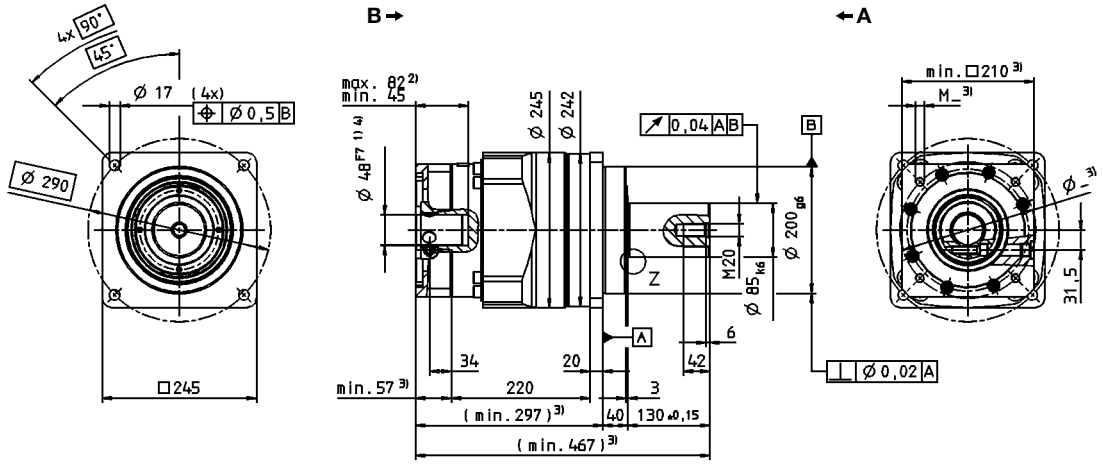
up to 60 [4] (O) clamping hub diameter

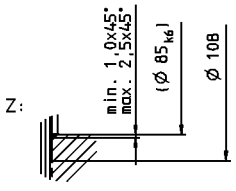
1-stage:



up to 48 [4] (M) clamping hub diameter

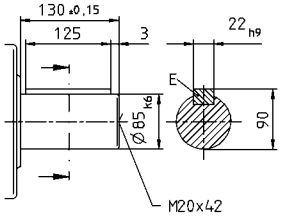
2-stage:



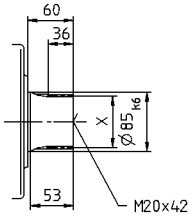


Alternatives: Output shaft variants

Keywayed output shaft in mm
E = key as per DIN 6885, sheet 1, form A



Involute gearing DIN 5480 in mm
X = W 80 x 2 x 30 x 38 x 6m, DIN 5480



Non-tolerated dimensions ± 1.5 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 with a minimum thickness of 1 mm.

CAD data is available under www.wittenstein-alpha.com

Motor mounting according to operating manual

				1-stage				
Ratio [a]			***i***	**3**	**4**	**5**	**7**	**10**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B} Nm	68	90	90	90	70
			T_{2B} in.lb	602	797	797	797	620
cymex®-optimized nominal torque (please contact us regarding the design)			T_{2Ncym} Nm	–	60	60	60	35
			T_{2Ncym} in.lb	–	531	531	531	310
Nominal output torque (with n_{1N})			T_{2N} Nm	28	48	48	48	30
			T_{2N} in.lb	248	425	425	425	266
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not} Nm	200	250	250	250	200
			T_{2Not} in.lb	1770	2213	2213	2213	1770
Nominal input speed (with T_{2N} and 20°C ambient temperature) [b]			n_{1N} rpm	4500	4500	4500	4500	4500
Max. input speed			n_{1Max} rpm	6000	6000	6000	6000	6000
Mean no load running torque (with n_1=3000 rpm and 20°C gearhead temperature) [c]			T_{012} Nm	1.4	1.1	0.9	0.6	0.5
			T_{012} in.lb	12.4	9.7	8.0	5.3	4.4
Max. torsional backlash			j_t arcmin	Standard ≤ 6 / Reduced ≤ 4				
Torsional rigidity			C_{t21} Nm/ arcmin	10				
			C_{t21} in.lb/ arcmin	89				
Max. axial force [d]			F_{2AMax} N	3350				
			F_{2AMax} lb_f	754				
Max. radial force [d]			F_{2RMax} N	4200				
			F_{2RMax} lb_f	945				
Max. tilting moment			M_{2KMax} Nm	236				
			M_{2KMax} in.lb	2089				
Efficiency at full load			η %	98.5				
Service life (For calculation, see the Chapter “Information”)			L_h h	> 30000				
Weight incl. standardadapter plate			*m* kg	3.9				
			m lb_m	8.6				
Operating noise (with *i*=10 and n_1=3000 rpm no load)			L_{PA} dB(A)	≤ 59				
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 65				
Moment of inertia (relates to the drive)	E	19	J_1 kgcm²	1.03	0.78	0.68	0.59	0.54
			J_1 10^{-3} in.lb.s²	0.91	0.69	0.60	0.52	0.48
Clamping hub diameter [mm]	G	24	J_1 kgcm²	2.40	2.15	2.05	1.96	1.91
			J_1 10^{-3} in.lb.s²	2.12	1.90	1.81	1.73	1.69

Reduced mass moments of inertia available on request.

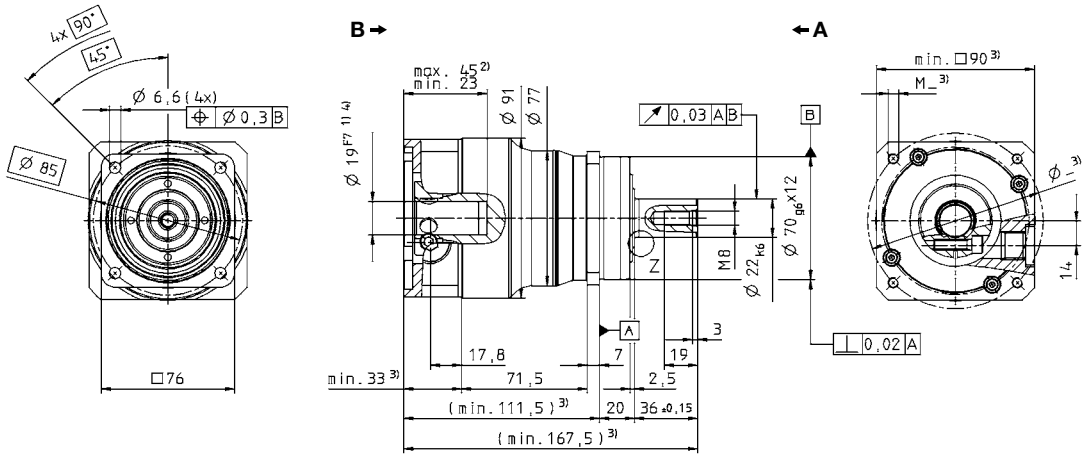
[a] Other ratios available on request
[b] For higher ambient temperatures, please reduce input speed
[c] Valid for clamping hub diameter of 19 mm
[d] Refers to centre of the output shaft or flange

View A

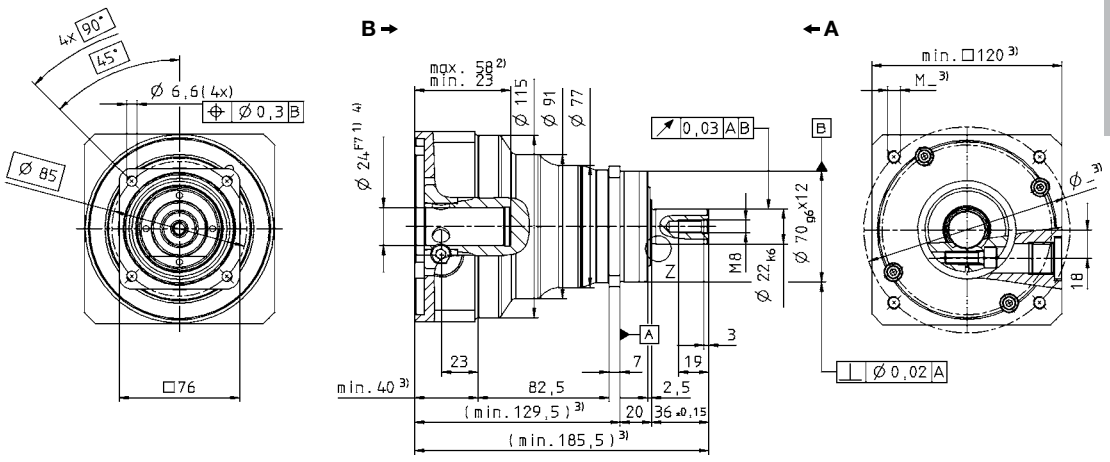
View B

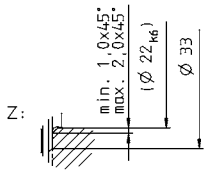
Motor shaft diameter [mm]

up to 19 [4] (E) clamping hub diameter



up to 24 [4] (G) clamping hub diameter





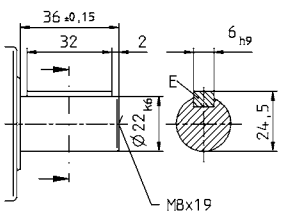
Planetary gearheads **High End**

SP+

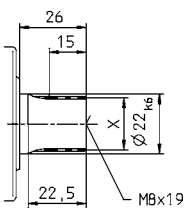
MC

Alternatives: Output shaft variants

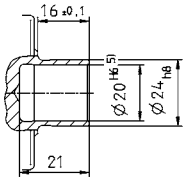
Keywayed output shaft in mm
E = key as per DIN 6885, sheet 1, form A



Involute gearing DIN 5480 in mm
X = W 22 x 1.25 x 30 x 16 x 6m, DIN 5480



Shaft mounted
Mounted via shrink disc



Non-tolerated dimensions ± 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 with a minimum thickness of 1 mm.
5) Tolerance h6 for mounted shaft.

CAD data is available under www.wittenstein-alpha.com

Motor mounting according to operating manual

				2-stage								
Ratio [a]			***i***	**16**	**20**	**25**	**28**	**35**	**40**	**50**	**70**	**100**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B} Nm	90	90	90	90	90	90	90	90	70
			T_{2B} in.lb	797	797	797	797	797	797	797	797	620
cymex®-optimized nominal torque (please contact us regarding the design)			T_{2Ncym} Nm	–	–	–	–	–	60	–	–	35
			T_{2Ncym} in.lb						531			310
Nominal output torque (with n_{1N})			T_{2N} Nm	60	60	60	60	60	55	60	60	30
			T_{2N} in.lb	531	531	531	531	531	487	531	531	266
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not} Nm	250	250	250	250	250	250	250	250	200
			T_{2Not} in.lb	2213	2213	2213	2213	2213	2213	2213	2213	1770
Nominal input speed (with T_{2N} and 20°C ambient temperature) [b]			n_{1N} rpm	4500	4500	4500	4500	4500	4500	4500	4500	4500
Max. input speed			n_{1Max} rpm	6000	6000	6000	6000	6000	6000	6000	6000	6000
Mean no load running torque (with n_1 = 3000 rpm and 20°C gearhead temperature) [c]			T_{012} Nm	0.5	0.4	0.4	0.3	0.3	0.2	0.2	0.2	0.2
			T_{012} in.lb	4.4	3.5	3.5	2.7	2.7	1.8	1.8	1.8	1.8
Max. torsional backlash			j_t arcmin	Standard ≤ 8 / Reduced ≤ 6								
Torsional rigidity			C_{t21} Nm/ arcmin	10								
			C_{t21} in.lb/ arcmin	89								
Max. axial force [d]			F_{2AMax} N	3350								
			F_{2AMax} lb_f	754								
Max. radial force [d]			F_{2RMax} N	4200								
			F_{2RMax} lb_f	945								
Max. tilting moment			M_{2KMax} Nm	236								
			M_{2KMax} in.lb	2089								
Efficiency at full load			η %	96,5								
Service life (For calculation, see the Chapter "Information")			L_h h	> 30000								
Weight incl. standard adapter plate			*m* kg	3,6								
			m lb_m	8.0								
Operating noise (with *i*=100 and n_1 = 3000 rpm no load)			L_{PA} dB(A)	≤ 59								
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 65								
Moment of inertia (relates to the drive)	C	14	J_1 kgcm²	0.23	0.20	0.20	0.18	0.18	0.16	0.16	0.16	0.16
			J_1 10^{-3} in.lb.s²	0.20	0.18	0.18	0.16	0.16	0.15	0.15	0.14	0.14
Clamping hub diameter [mm]	E	19	J_1 kgcm²	0.55	0.53	0.52	0.50	0.50	0.49	0.49	0.49	0.49
			J_1 10^{-3} in.lb.s²	0.49	0.47	0.46	0.45	0.44	0.43	0.43	0.43	0.43

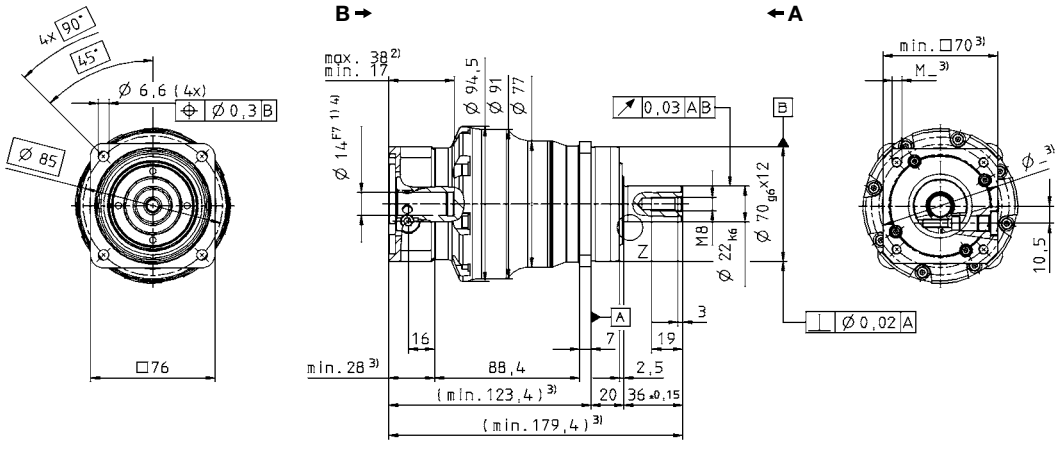
Reduced mass moments of inertia available on request.

[a] Other ratios available on request
[b] For higher ambient temperatures, please reduce input speed
[c] Valid for clamping hub diameter of 14 mm
[d] Refers to centre of the output shaft or flange

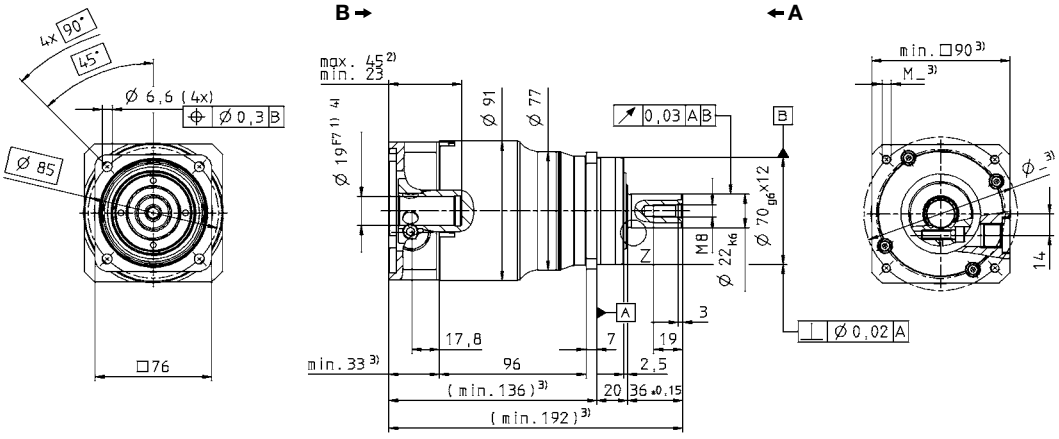
View A View B

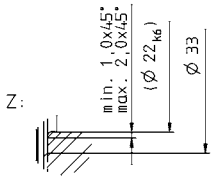
Motor shaft diameter [mm]

up to 14 [4] (C) clamping hub diameter



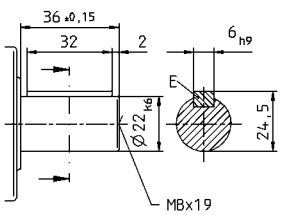
up to 19 [4] (E) clamping hub diameter



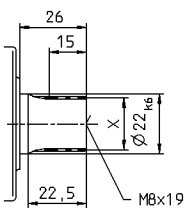


Alternatives: Output shaft variants

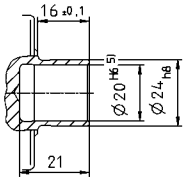
Keywayed output shaft in mm
E = key as per DIN 6885, sheet 1, form A



Involute gearing DIN 5480 in mm
X = W 22 x 1.25 x 30 x 16 x 6m, DIN 5480



Shaft mounted
Mounted via shrink disc



Non-tolerated dimensions ± 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 with a minimum thickness of 1 mm.
5) Tolerance h6 for mounted shaft.

CAD data is available under www.wittenstein-alpha.com

Motor mounting according to operating manual

				Standard version MC					Friction optimized version L				
Ratio [a]			***i***	**3**	**4**	**5**	**7**	**10**	**3**	**4**	**5**	**7**	**10**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B} Nm	180	240	240	240	180	180	240	240	240	180
			T_{2B} in.lb	1593	2124	2124	2124	1593	1593	2124	2124	2124	1593
cymex®-optimized nominal torque (please contact us regarding the design)			T_{2Ncym} Nm	95	135	135	135	90	95	135	135	135	90
			T_{2Ncym} in.lb	841	1195	1195	1195	797	841	1195	1195	1195	797
Nominal output torque (with n_{1N})			T_{2N} Nm	70	100	105	105	80	70	100	105	105	80
			T_{2N} in.lb	620	885	929	929	708	620	885	929	929	708
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not} Nm	500	625	625	625	500	500	625	625	625	500
			T_{2Not} in.lb	4425	5531	5531	5531	4425	4425	5531	5531	5531	4425
Nominal input speed (with T_{2N} and 20°C ambient temperature) [b]			n_{1N} rpm	3500	4000	4500	4500	4500	3500	4000	4500	4500	4500
cymex® optimized speed (please contact us regarding the design)			n_{1Ncym} rpm	–	–	–	–	–	4500	5000	5000	5000	5000
Max. input speed			n_{1Max} rpm	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000
Mean no load running torque (with n_1=3000 rpm and 20°C gearhead temperature) [c]			T_{012} Nm	2.4	2.1	1.8	1.1	0.8	0.7	–	–	–	–
			T_{012} in.lb	21.2	18.6	15.9	9.74	7.08	6.2	–	–	–	–
Max. torsional backlash			j_t arcmin	Standard ≤ 4 / Reduced ≤ 2									
Torsional rigidity			C_{t21} Nm/ arcmin	31									
			C_{t21} in.lb/ arcmin	274									
Max. axial force [d]			F_{2AMax} N	5650					–				
			F_{2AMax} lb_f	1271					–				
Max. radial force [d]			F_{2RMax} N	6600					1000				
			F_{2RMax} lb_f	1485					225				
Max. tilting moment			M_{2KMax} Nm	487					72				
			M_{2KMax} in.lb	4310					637				
Efficiency at full load			η %	98.5					99				
Service life (For calculation, see the Chapter "Information")			L_h h	> 30000									
Weight incl. standard adapter plate			m kg	7.7									
			m lb_m	17.0									
Operating noise (with i=10 and n_1=3000 rpm no load)			L_{PA} dB(A)	≤ 64									
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 65					IP 52				
Moment of inertia (relates to the drive)	G	24	J_1 kgcm²	3.99	3.04	2.61	2.29	2.07	3.99	3.04	2.61	2.29	2.07
			J_1 10^{-3} in.lb.s²	3.53	2.69	2.31	2.03	1.83	3.53	2.69	2.31	2.03	1.83
Clamping hub diameter [mm]	K	38	J_1 kgcm²	11.1	10.1	9.68	9.36	9.14	11.1	10.1	9.68	9.36	9.14
			J_1 10^{-3} in.lb.s²	9.78	8.95	8.57	8.28	8.09	9.78	8.95	8.57	8.28	8.09

Reduced mass moments of inertia available on request.

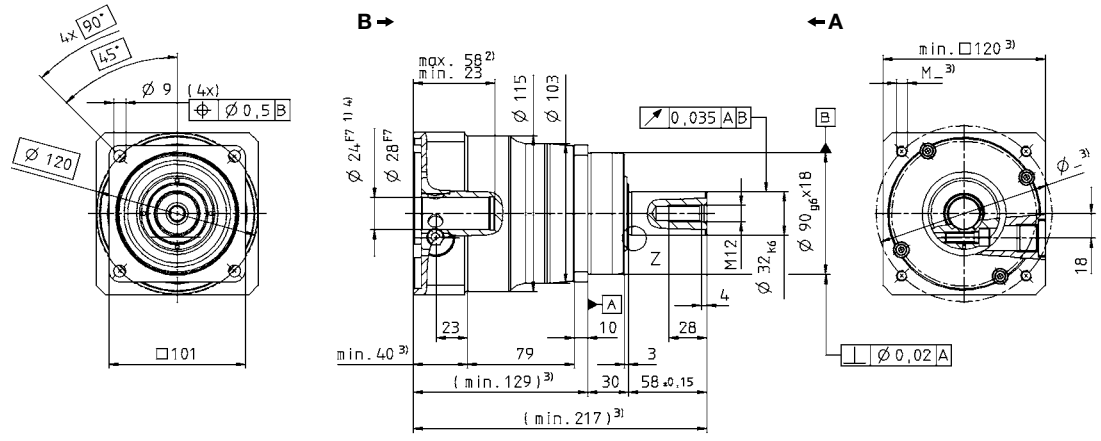
[a] Other ratios available on request
[b] For higher ambient temperatures, please reduce input speed
[c] Valid for clamping hub diameter of 24 mm
[d] Refers to centre of the output shaft or flange

View A

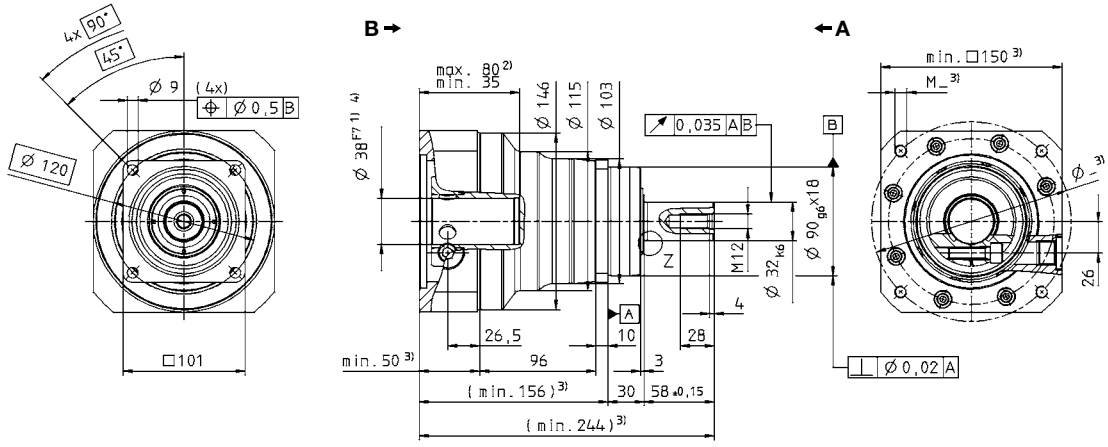
View B

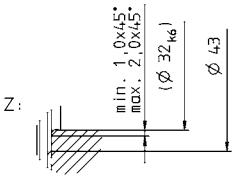
Motor shaft diameter [mm]

up to 24 [4] (G) clamping hub diameter



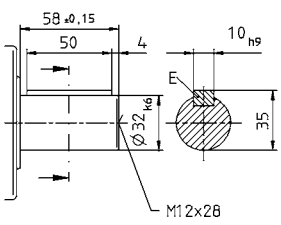
up to 38 [4] (K) clamping hub diameter



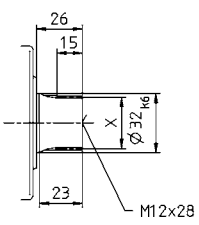


Alternatives: Output shaft variants

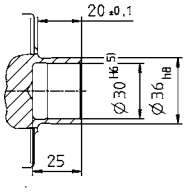
Keywayed output shaft in mm
E = key as per DIN 6885, sheet 1, form A



Involute gearing DIN 5480 in mm
X = W 32 x 1.25 x 30 x 24 x 6m, DIN 5480



Shaft mounted
Mounted via shrink disc



Non-tolerated dimensions ± 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 with a minimum thickness of 1 mm.
5) Tolerance h6 for mounted shaft.

CAD data is available under www.wittenstein-alpha.com

Motor mounting according to operating manual

SP+ 100 MC HIGH SPEED 2-stage

				2-stage								
Ratio [a]			***i***	**16**	**20**	**25**	**28**	**35**	**40**	**50**	**70**	**100**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B} Nm	240	240	240	240	240	240	240	240	180
			T_{2B} in.lb	2124	2124	2124	2124	2124	2124	2124	2124	1593
cymex®-optimized nominal torque (please contact us regarding the design)			T_{2Ncym} Nm	–	–	–	–	–	–	–	–	90
			T_{2Ncym} in.lb									797
Nominal output torque (with n_{1N})			T_{2N} Nm	140	140	140	140	140	140	140	135	80
			T_{2N} in.lb	1239	1239	1239	1239	1239	1239	1239	1195	708
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not} Nm	625	625	625	625	625	625	625	625	500
			T_{2Not} in.lb	5531	5531	5531	5531	5531	5531	5531	5531	4425
Nominal input speed (with T_{2N} and 20°C ambient temperature) [b]			n_{1N} rpm	4500	4500	4500	4500	4500	4500	4500	4500	4500
Max. input speed			n_{1Max} rpm	6000	6000	6000	6000	6000	6000	6000	6000	6000
Mean no load running torque (with n_1 = 3000 rpm and 20°C gearhead temperature) [c]			T_{012} Nm	0.8	0.7	0.6	0.5	0.4	0.4	0.3	0.3	0.3
			T_{012} in.lb	7.1	6.2	5.3	4.4	3.5	3.5	2.7	2.7	2.7
Max. torsional backlash			j_t arcmin	Standard ≤ 6 / Reduced ≤ 4								
Torsional rigidity			C_{t21} Nm/ arcmin	31								
			C_{t21} in.lb/ arcmin	274								
Max. axial force [d]			F_{2AMax} N	5650								
			F_{2AMax} lb_f	1271								
Max. radial force [d]			F_{2RMax} N	6600								
			F_{2RMax} lb_f	1485								
Max. tilting moment			M_{2KMax} Nm	487								
			M_{2KMax} in.lb	4310								
Efficiency at full load			η %	96.5								
Service life (For calculation, see the Chapter "Information")			L_h h	> 30000								
Weight incl. standardadapter plate			*m* kg	7.9								
			m lb_m	17.5								
Operating noise (with *i*=100 and n_1 = 3000 rpm no load)			L_{PA} dB(A)	≤ 60								
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 65								
Moment of inertia (relates to the drive)	E	19	J_1 kgcm²	0.81	0.70	0.69	0.60	0.59	0.55	0.54	0.54	0.54
			J_1 10^{-3} in.lb.s²	0.72	0.62	0.61	0.53	0.52	0.48	0.48	0.48	0.47
Clamping hub diameter [mm]	G	24	J_1 kgcm²	2.18	2.07	2.05	1.97	1.96	1.92	1.91	1.91	1.91
			J_1 10^{-3} in.lb.s²	1.93	1.83	1.82	1.74	1.74	1.70	1.69	1.69	1.69

Reduced mass moments of inertia available on request.

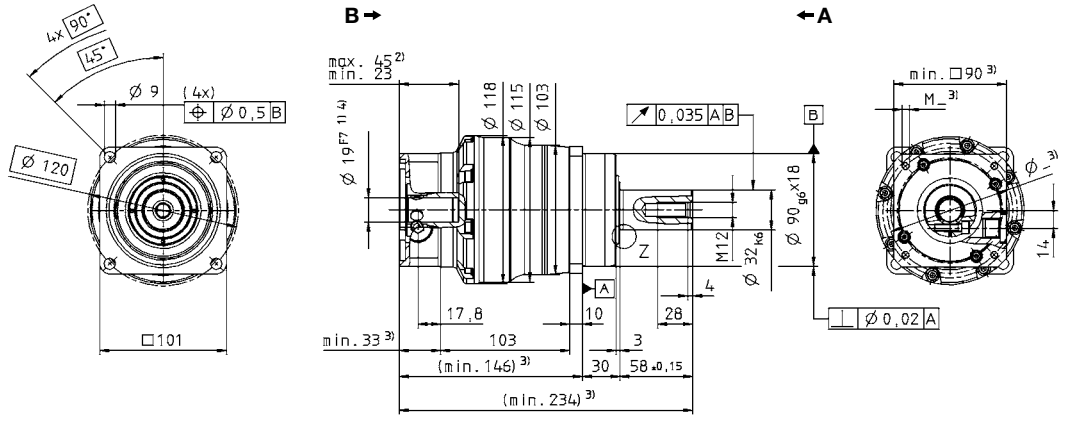
[a] Other ratios available on request
[b] For higher ambient temperatures, please reduce input speed
[c] Valid for clamping hub diameter of 19 mm
[d] Refers to centre of the output shaft or flange

View A

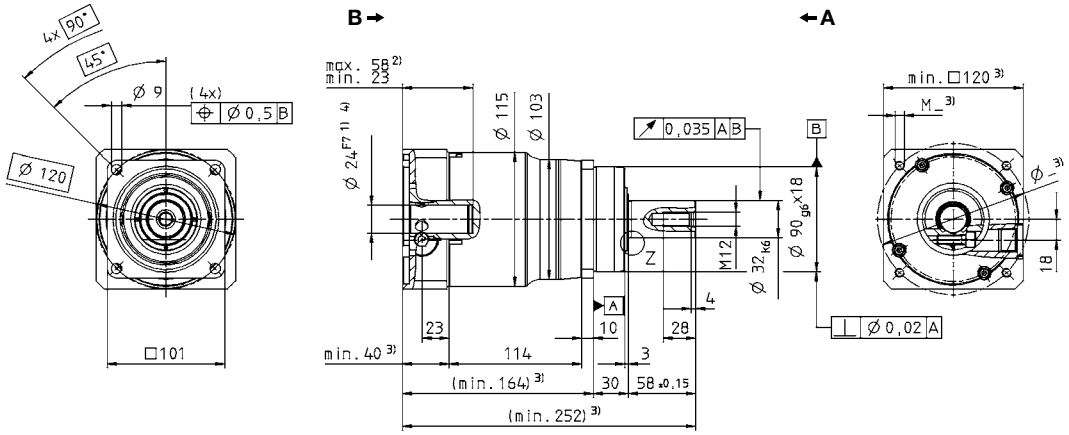
View B

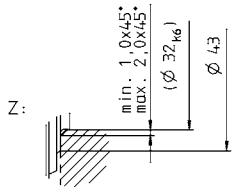
Motor shaft diameter [mm]

up to 19 [4] (E) clamping hub diameter



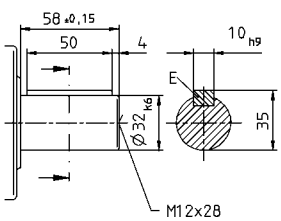
up to 24 [4] (G) clamping hub diameter



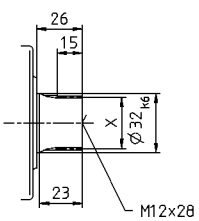


Alternatives: Output shaft variants

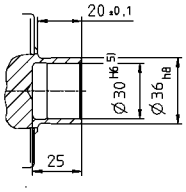
Keywayed output shaft in mm
E = key as per DIN 6885, sheet 1, form A



Involute gearing DIN 5480 in mm
X = W 32 x 1.25 x 30 x 24 x 6m, DIN 5480



Shaft mounted
Mounted via shrink disc



Non-tolerated dimensions ± 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 with a minimum thickness of 1 mm.
5) Tolerance h6 for mounted shaft.

CAD data is available under www.wittenstein-alpha.com

Motor mounting according to operating manual

			Standard version MC					Friction optimized version L				
Ratio [a]	i		**3**	**4**	**5**	**7**	**10**	**3**	**4**	**5**	**7**	**10**
Max. acceleration torque (max. 1000 cycles per hour)	T_{2B}	Nm	310	480	480	480	380	310	480	480	480	380
		in.lb	2744	4248	4248	4248	3363	2744	4248	4248	4248	3363
cymex®-optimized nominal torque (please contact us regarding the design)	T_{2Ncym}	Nm	150	240	240	270	180	150	240	240	270	180
		in.lb	1328	2124	2124	2390	1593	2744	4248	4248	4248	3363
Nominal output torque (with n_{1N})	T_{2N}	Nm	130	195	205	210	160	130	195	205	210	160
		in.lb	1151	1726	1814	1859	1416	1151	1726	1814	1859	1416
Emergency stop torque (permitted 1000 times during the service life of the gearhead)	T_{2Not}	Nm	1000	1250	1250	1250	1000	1000	1250	1250	1250	1000
		in.lb	8850	11063	11063	11063	8850	8850	11063	11063	11063	8850
Nominal input speed (with T_{2N} and 20°C ambient temperature) [b]	n_{1N}	rpm	3000	3500	4500	4500	4500	3000	3500	4500	4500	4500
cymex® optimized speed (please contact us regarding the design)	n_{1Ncym}	rpm	–	–	–	–	–	4000	4500	5000	5000	5000
Max. input speed	n_{1Max}	rpm	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000
Mean no load running torque (with n_1=3000 rpm and 20°C gearhead temperature) [c]	T_{012}	Nm	5.1	3.9	3.1	2.3	1.6	1.0	–	–	–	–
		in.lb	45.1	34.5	27.4	20.4	14.2	8.9	–	–	–	–
Max. torsional backlash	j_t	arcmin	Standard ≤ 4 / Reduced ≤ 2									
Torsional rigidity	C_{t21}	Nm/ arcmin	53									
		in.lb/ arcmin	469									
Max. axial force [d]	F_{2AMax}	N	9870					–				
		lb_f	2221					–				
Max. radial force [d]	F_{2RMax}	N	9900					1200				
		lb_f	2228					270				
Max. tilting moment	M_{2KMax}	Nm	952					110				
		in.lb	8425					974				
Efficiency at full load	η	%	98.5					99				
Service life (For calculation, see the Chapter "Information")	L_h	h	> 30000									
Weight incl. standard adapter plate	m	kg	17.2									
		lb_m	38									
Operating noise (with i=10 and n_1=3000 rpm no load)	L_{PA}	dB(A)	≤ 65									
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 65					IP 52				
Moment of inertia (relates to the drive)	K 38	J_1	kgcm²	14.9	12.1	11.0	10.1	9.51	14.9	12.1	11.0	10.1	9.51
			10^{-3} in.lb.s²	13.2	10.7	9.8	8.9	8.4	13.2	10.7	9.8	8.9	8.4
Clamping hub diameter [mm]	M 48	J_1	kgcm²	29.5	26.7	25.6	24.7	24.2	29.5	26.7	25.6	24.7	24.2
			10^{-3} in.lb.s²	26.1	23.6	22.7	21.9	21.4	26.1	23.6	22.7	21.9	21.4

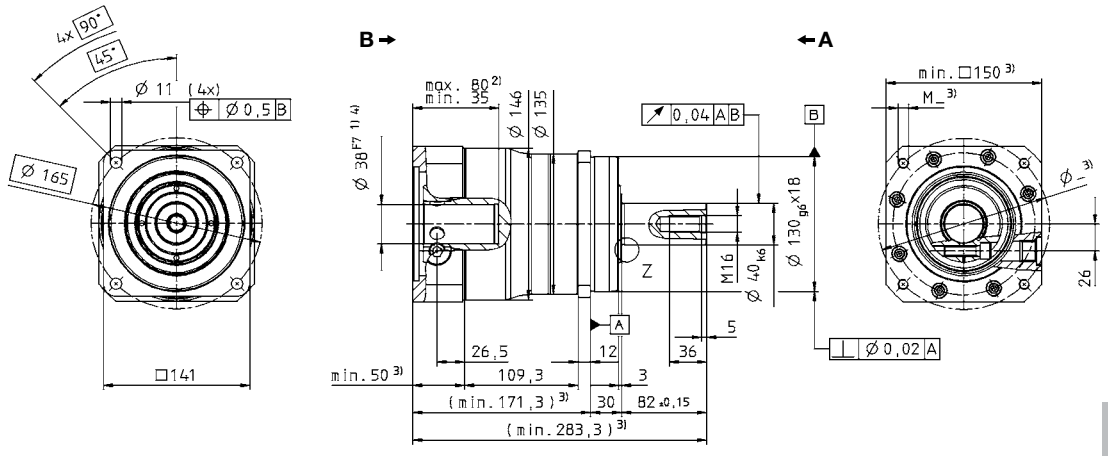
Reduced mass moments of inertia available on request.

[a] Other ratios available on request
[b] For higher ambient temperatures, please reduce input speed
[c] Valid for clamping hub diameter of 38 mm
[d] Refers to center of the output shaft or flange

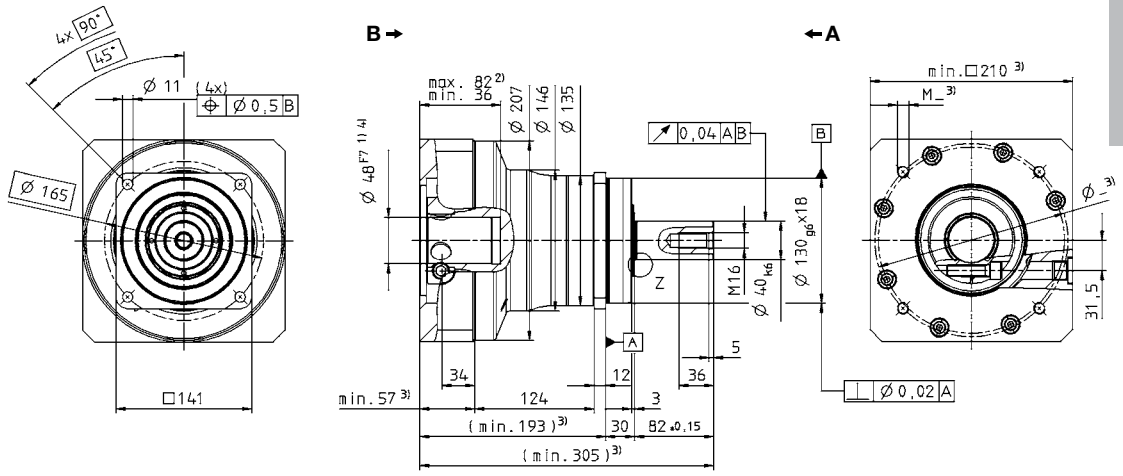
View A View B

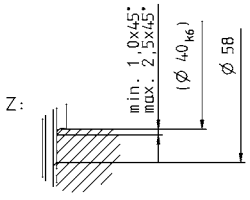
Motor shaft diameter [mm]

up to 38 [4] (K) clamping hub diameter



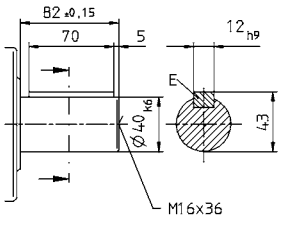
up to 48 [4] (M) clamping hub diameter



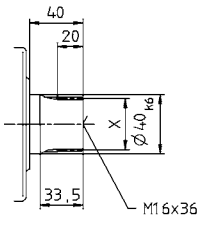


Alternatives: Output shaft variants

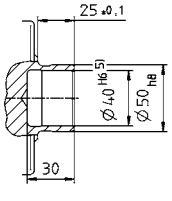
Keywayed output shaft in mm
E = key as per DIN 6885, sheet 1, form A



Involute gearing DIN 5480 in mm
X = W 40 x 2 x 30 x 18 x 6m, DIN 5480



Shaft mounted
Mounted via shrink disc



Non-tolerated dimensions ± 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 with a minimum thickness of 1 mm.
5) Tolerance h6 for mounted shaft.

CAD data is available under www.wittenstein-alpha.com

Motor mounting according to operating manual

				2-stage								
Ratio [a]			***i***	**16**	**20**	**25**	**28**	**35**	**40**	**50**	**70**	**100**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B} Nm	480	480	480	480	480	480	480	480	380
			T_{2B} in.lb	4248	4248	4248	4248	4248	4248	4248	4248	3363
cymex®-optimized nominal torque (please contact us regarding the design)			T_{2Ncym} Nm	290	290	290	–	–	–	–	–	–
			T_{2Ncym} in.lb	2567	2567	2567						
Nominal output torque (with n_{1N})			T_{2N} Nm	260	280	280	290	290	290	290	260	180
			T_{2N} in.lb	2301	2478	2478	2567	2567	2567	2567	2301	1593
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not} Nm	1250	1250	1250	1250	1250	1250	1250	1250	1000
			T_{2Not} in.lb	11063	11063	11063	11063	11063	11063	11063	11063	8850
Nominal input speed (with T_{2N} and 20°C ambient temperature) [b]			n_{1N} rpm	4500	4500	4500	4500	4500	4500	4500	4500	4500
Max. input speed			n_{1Max} rpm	6000	6000	6000	6000	6000	6000	6000	6000	6000
Mean no load running torque (with n_1 = 3000 rpm and 20°C gearhead temperature) [c]			T_{012} Nm	1.6	1.3	1.2	1.0	0.9	0.7	0.6	0.5	0.5
			T_{012} in.lb	14.2	11.5	10.6	8.9	8.0	6.2	5.3	4.4	4.4
Max. torsional backlash			j_t arcmin	Standard ≤ 6 / Reduced ≤ 4								
Torsional rigidity			C_{t21} Nm/ arcmin	53								
			C_{t21} in.lb/ arcmin	469								
Max. axial force [d]			F_{2AMax} N	9870								
			F_{2AMax} lb_f	2221								
Max. radial force [d]			F_{2RMax} N	9900								
			F_{2RMax} lb_f	2228								
Max. tilting moment			M_{2KMax} Nm	952								
			M_{2KMax} in.lb	8425								
Efficiency at full load			η %	96.5								
Service life (For calculation, see the Chapter "Information")			L_h h	> 30000								
Weight incl. standard adapter plate			*m* kg	17								
			m lb_m	38								
Operating noise (with *i*=100 and n_1 = 3000 rpm no load)			L_{PA} dB(A)	≤ 63								
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 65								
Moment of inertia (relates to the drive)	G	24	J_1 kgcm²	3.19	2.71	2.67	2.34	2.32	2.10	2.08	2.08	2.07
			J_1 10^{-3} in.lb.s²	2.82	2.40	2.36	2.07	2.05	1.85	1.85	1.84	1.83
Clamping hub diameter [mm]	K	38	J_1 kgcm²	10.3	9.77	9.73	9.41	9.39	9.16	9.15	9.14	9.14
			J_1 10^{-3} in.lb.s²	9.07	8.65	8.61	8.33	8.31	8.11	8.10	8.09	8.09

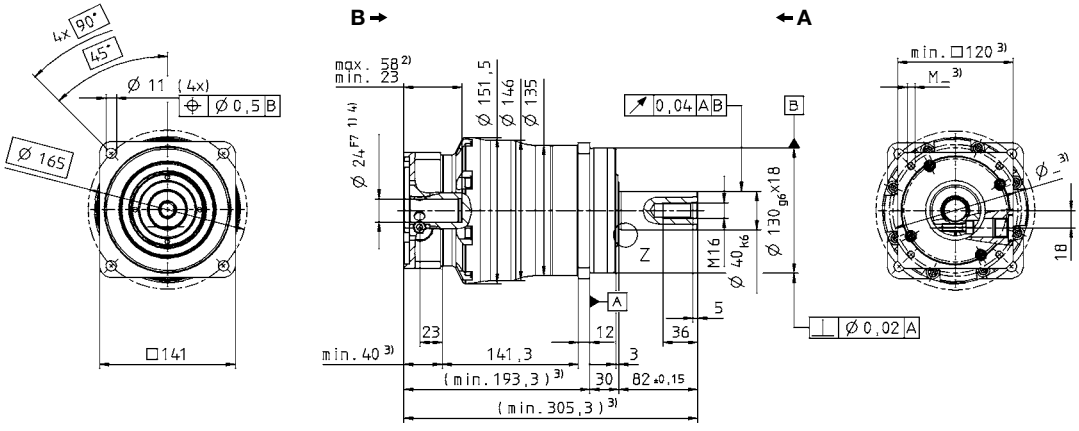
Reduced mass moments of inertia available on request.

[a] Other ratios available on request
[b] For higher ambient temperatures, please reduce input speed
[c] Valid for clamping hub diameter of 24 mm
[d] Refers to center of the output shaft or flange

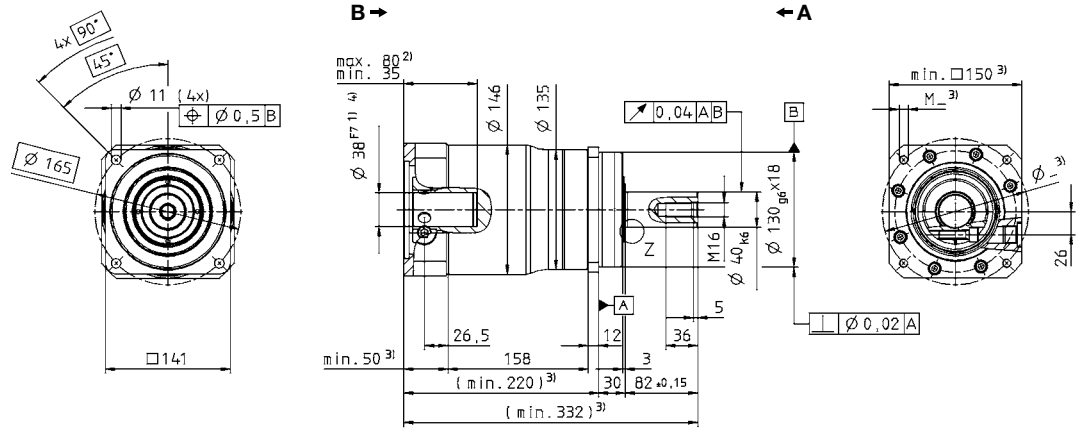
View A View B

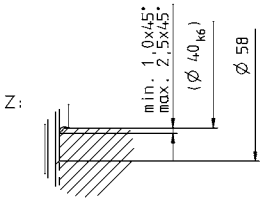
Motor shaft diameter [mm]

up to 24 [4] (G) clamping hub diameter



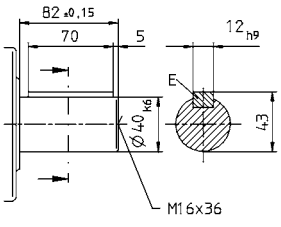
up to 38 [4] (K) clamping hub diameter



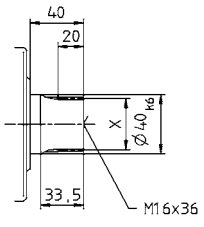


Alternatives: Output shaft variants

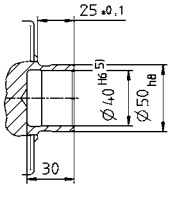
Keywayed output shaft in mm
E = key as per DIN 6885, sheet 1, form A



Involute gearing DIN 5480 in mm
X = W 40 x 2 x 30 x 18 x 6m, DIN 5480



Shaft mounted
Mounted via shrink disc



Non-tolerated dimensions ± 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 with a minimum thickness of 1 mm.
5) Tolerance h6 for mounted shaft.

CAD data is available under www.wittenstein-alpha.com

Motor mounting according to operating manual

			Standard version MC					Friction optimized version L				
Ratio [a]	***i***		**3**	**4**	**5**	**7**	**10**	**3**	**4**	**5**	**7**	**10**
Max. acceleration torque (max. 1000 cycles per hour)	T_{2B}	Nm	700	880	880	880	700	700	880	880	880	700
		in.lb	6195	7788	7788	7788	6195	6195	7788	7788	7788	6195
cymex®-optimized nominal torque (please contact us regarding the design)	T_{2Ncym}	Nm	350	600	600	600	540	350	600	600	600	540
		in.lb	3098	5310	5310	5310	4779	3098	5310	5310	5310	3098
Nominal output torque (with n_{1N})	T_{2N}	Nm	290	450	440	450	400	290	450	450	450	400
		in.lb	2567	3983	3894	3983	3540	2567	3983	3983	3983	3540
Emergency stop torque (permitted 1000 times during the service life of the gearhead)	T_{2Not}	Nm	2200	2750	2750	2750	2200	2200	2750	2750	2750	2200
		in.lb	19470	24338	24338	24338	19470	19470	24338	24338	24338	19470
Nominal input speed (with T_{2N} and 20°C ambient temperature) [b]	n_{1N}	rpm	3000	3500	4500	4500	4500	3000	3500	4500	4500	4500
cymex® optimized speed (please contact us regarding the design)	n_{1Ncym}	rpm	–	–	–	–	–	4000	4500	5000	5000	5000
Max. input speed	n_{1Max}	rpm	4500	6000	6000	6000	6000	4500	6000	6000	6000	6000
Mean no load running torque (with n_1=3000 rpm and 20°C gearhead temperature) [c]	T_{012}	Nm	10.2	7.7	6.2	4.5	3.2	3.0	–	–	–	–
		in.lb	90.3	68.1	54.9	39.8	28.3	26.6	–	–	–	–
Max. torsional backlash	j_t	arcmin	Standard ≤ 4 / Reduced ≤ 2									
Torsional rigidity	C_{t21}	Nm/ arcmin	175									
		in.lb/ arcmin	1549									
Max. axial force [d]	F_{2AMax}	N	14150					–				
		lb_f	3184					–				
Max. radial force [d]	F_{2RMax}	N	15400					2000				
		lb_f	3465					450				
Max. tilting moment	M_{2KMax}	Nm	1600					208				
		in.lb	14160					1841				
Efficiency at full load	η	%	98.5					99				
Service life (For calculation, see the Chapter "Information")	L_h	h	> 30000									
Weight incl. standard adapter plate	*m*	kg	34									
		lb_m	75									
Operating noise (with *i*=10 and n_1=3000 rpm no load)	L_{PA}	dB(A)	≤ 66									
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 65					IP 52				
Moment of inertia (relates to the drive) **M** **48** Clamping hub diameter [mm]	J_1	kgcm²	58.5	41.6	35.6	30.0	26.9	58.5	41.6	35.6	30.0	26.9
		10^{-3} in.lb.s²	51.8	36.8	31.5	26.6	23.8	51.8	36.8	31.5	26.6	23.8

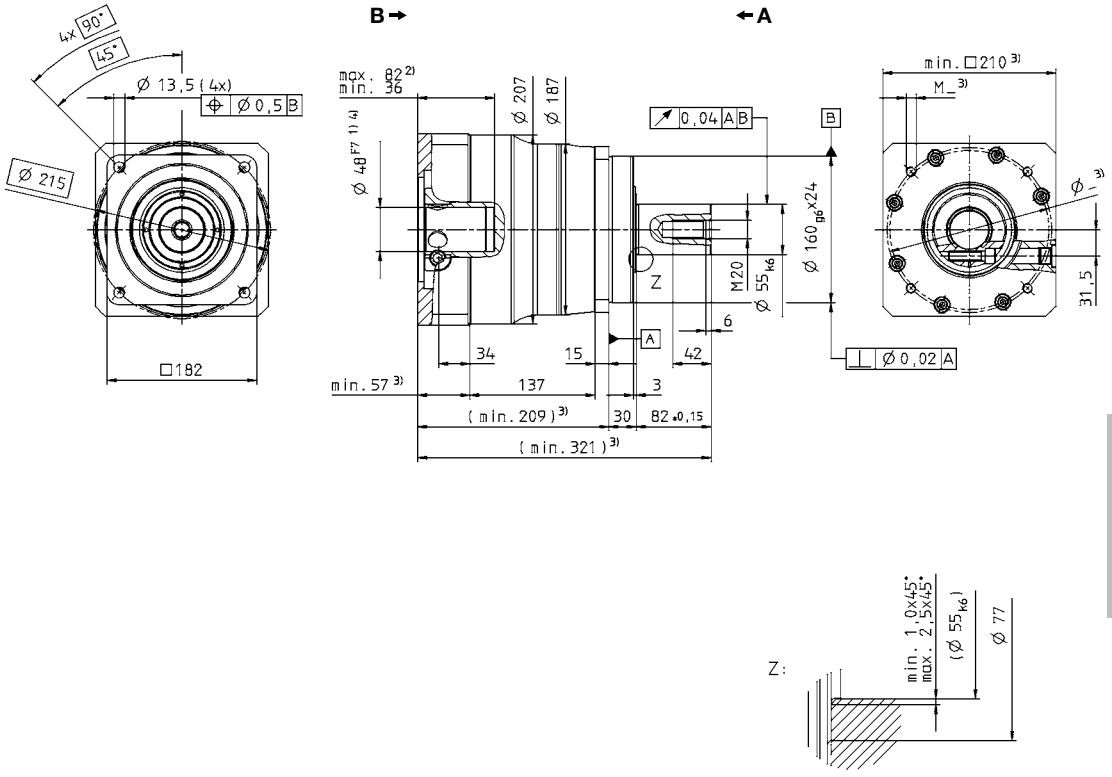
Reduced mass moments of inertia available on request.

[a] Other ratios available on request
[b] For higher ambient temperatures, please reduce input speed
[c] Valid for clamping hub diameter of 48 mm
[d] Refers to center of the output shaft or flange

View A View B

Motor shaft diameter [mm]

up to 48 [4] (M) clamping hub diameter



Planetary gearheads **High End**

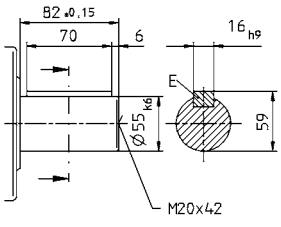
SP+

MC

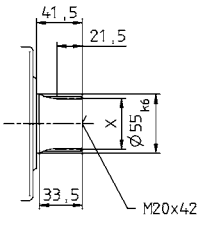
MC-L

Alternatives: Output shaft variants

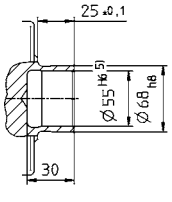
Keywayed output shaft in mm
E = key as per DIN 6885, sheet 1, form A



Involute gearing DIN 5480 in mm
X = W 55 x 2 x 30 x 26 x 6m, DIN 5480



Shaft mounted
Mounted via shrink disc



Non-tolerated dimensions ± 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 with a minimum thickness of 1 mm.
5) Tolerance h6 for mounted shaft.

CAD data is available under www.wittenstein-alpha.com

Motor mounting according to operating manual

				2-stage								
Ratio [a]			*i*	**16**	**20**	**25**	**28**	**35**	**40**	**50**	**70**	**100**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B} Nm	880	880	880	880	880	880	880	880	700
			T_{2B} in.lb	7788	7788	7788	7788	7788	7788	7788	7788	6195
cymex®-optimized nominal torque (please contact us regarding the design)			T_{2Ncym} Nm	–	–	–	–	–	–	–	–	–
			T_{2Ncym} in.lb									
Nominal output torque (with n_{1N})			T_{2N} Nm	600	600	600	600	600	600	600	600	600
			T_{2N} in.lb	5310	5310	5310	5310	5310	5310	5310	5310	5310
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not} Nm	2750	2750	2750	2750	2750	2750	2750	2750	2200
			T_{2Not} in.lb	24338	24338	24338	24338	24338	24338	24338	24338	19470
Nominal input speed (with T_{2N} and 20°C ambient temperature) [b]			n_{1N} rpm	4500	4500	4500	4500	4500	4500	4500	4500	4500
Max. input speed			n_{1Max} rpm	6000	6000	6000	6000	6000	6000	6000	6000	6000
Mean no load running torque (with n_1 = 3000 rpm and 20°C gearhead temperature) [c]			T_{012} Nm	3.2	2.6	2.3	1.9	1.7	1.4	1.2	1.0	0.9
			T_{012} in.lb	28.3	23.0	20.4	16.8	15.0	12.4	10.6	8.9	8.0
Max. torsional backlash			j_t arcmin	Standard ≤ 6 / Reduced ≤ 4								
Torsional rigidity			C_{t21} Nm/ arcmin	175								
			C_{t21} in.lb/ arcmin	149								
Max. axial force [d]			F_{2AMax} N	14150								
			F_{2AMax} lb_f	3184								
Max. radial force [d]			F_{2RMax} N	15400								
			F_{2RMax} lb_f	3465								
Max. tilting moment			M_{2KMax} Nm	1600								
			M_{2KMax} in.lb	14160								
Efficiency at full load			η %	96.5								
Service life (For calculation, see the Chapter "Information")			L_h h	> 30000								
Weight incl. standard adapter plate			*m* kg	36								
			m lb_m	80								
Operating noise (with *i*=100 and n_1 = 3000 rpm no load)			L_{PA} dB(A)	≤ 66								
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 65								
Moment of inertia (relates to the drive)	K	38	J_1 $kgcm^2$	13.5	12.0	11.7	10.6	10.4	9.74	9.68	9.63	9.60
Clamping hub diameter [mm]			J_1 10^{-3} in.lb.s²	12.0	10.6	10.4	9.34	9.23	8.62	8.57	8.52	8.49

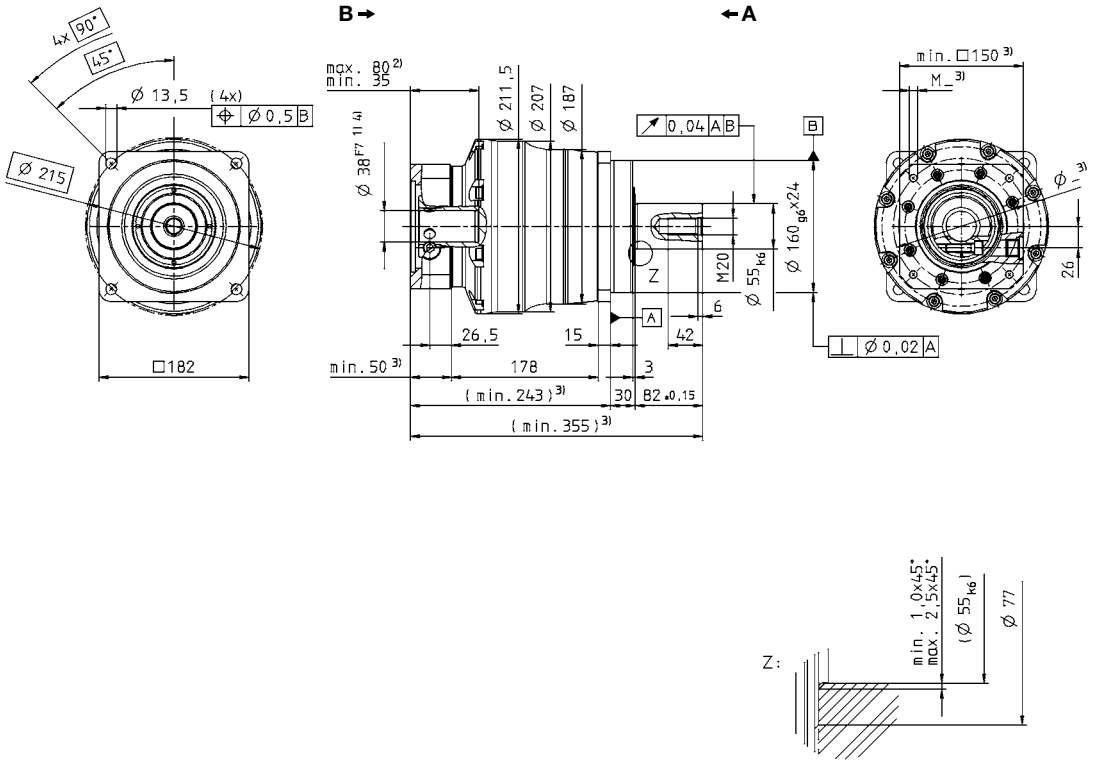
Reduced mass moments of inertia available on request.

[a] Other ratios available on request
[b] For higher ambient temperatures, please reduce input speed
[c] Valid for clamping hub diameter of 38 mm
[d] Refers to center of the output shaft or flange

View A View B

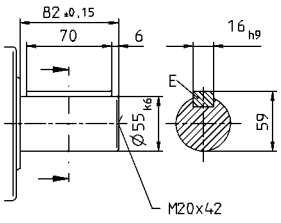
Motor shaft diameter [mm]

up to 38 [4] (K) clamping hub diameter

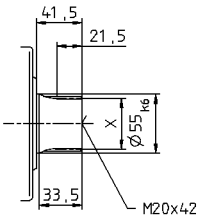


Alternatives: Output shaft variants

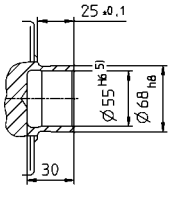
Keywayed output shaft in mm
E = key as per DIN 6885, sheet 1, form A



Involute gearing DIN 5480 in mm
X = W 55 x 2 x 30 x 26 x 6m, DIN 5480



Shaft mounted
Mounted via shrink disc



Non-tolerated dimensions ± 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 with a minimum thickness of 1 mm.
5) Tolerance h6 for mounted shaft.

CAD data is available under www.wittenstein-alpha.com

Motor mounting according to operating manual

			Standard version MC					Friction optimized version L				
Ratio [a]	***i***		**3**	**4**	**5**	**7**	**10**	**3**	**4**	**5**	**7**	**10**
Max. acceleration torque (max. 1000 cycles per hour)	T_{2B}	Nm	1200	2000	2000	1700	1200	1200	2000	2000	1700	1200
		in.lb	10620	17700	17700	15045	10620	10620	17700	17700	15045	10620
cymex®-optimized nominal torque (please contact us regarding the design)	T_{2Ncym}	Nm	- Please contact us -									
		in.lb										
Nominal output torque (with n_{1N})	T_{2N}	Nm	900	1300	1150	1000	800	900	1300	1150	1000	800
		in.lb	7965	11505	10178	8850	7080	7965	11505	10178	8850	7080
Emergency stop torque (permitted 1000 times during the service life of the gearhead)	T_{2Not}	Nm	5000	5200	5200	5200	5000	5000	5200	5200	5200	5000
		in.lb	44250	46020	46020	46020	44250	44250	46020	46020	46020	44250
Nominal input speed (with T_{2N} and 20°C ambient temperature) [b]	n_{1N}	rpm	2250	2500	3500	3500	3500	2250	2500	3500	3500	3500
cymex® optimized speed (please contact us regarding the design)	n_{1Ncym}	rpm	–	–	–	–	–	2750	3000	4000	4000	4000
Max. input speed	n_{1Max}	rpm	3400	6000	6000	6000	6000	6000	6000	6000	6000	6000
Mean no load running torque (with n_1=3000 rpm and 20°C gearhead temperature) [c]	T_{012}	Nm	13.0	9.0	6.5	4.0	2.5	5.5	4.9	4.6	4.0	3.4
		in.lb	115.1	79.7	57.5	35.4	22.1	49	43	41	35	30
Max. torsional backlash	j_t	arcmin	Standard ≤ 4 / Reduced ≤ 2									
Torsional rigidity	C_{t21}	Nm/ arcmin	400									
		in.lb/ arcmin	3540									
Max. axial force [d]	F_{2AMax}	N	30000					8000				
		lb_f	6750					1800				
Max. radial force [d]	F_{2RMax}	N	21000					2500				
		lb_f	4725					563				
Max. tilting moment	M_{2KMax}	Nm	3100					310				
		in.lb	27435					2744				
Efficiency at full load	η	%	98.5					99.0				
Service life (For calculation, see the Chapter "Information")	L_h	h	> 30000									
Weight incl. standard adapter plate	*m*	kg	56									
		lb_m	124									
Operating noise (with *i*=10 and n_1=3000 rpm no load)	L_{PA}	dB(A)	< 64									
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 65					IP 52				
Moment of inertia (relates to the drive) N 55 Clamping hub diameter [mm]	J_1	$kgcm^2$	139.0	94.3	76.9	61.5	53.1	139.0	94.3	76.9	61.5	53.1
		10^{-3} in.lb.s²	123.0	83.5	68.1	54.4	47.0	123.0	83.5	68.1	54.4	47.0

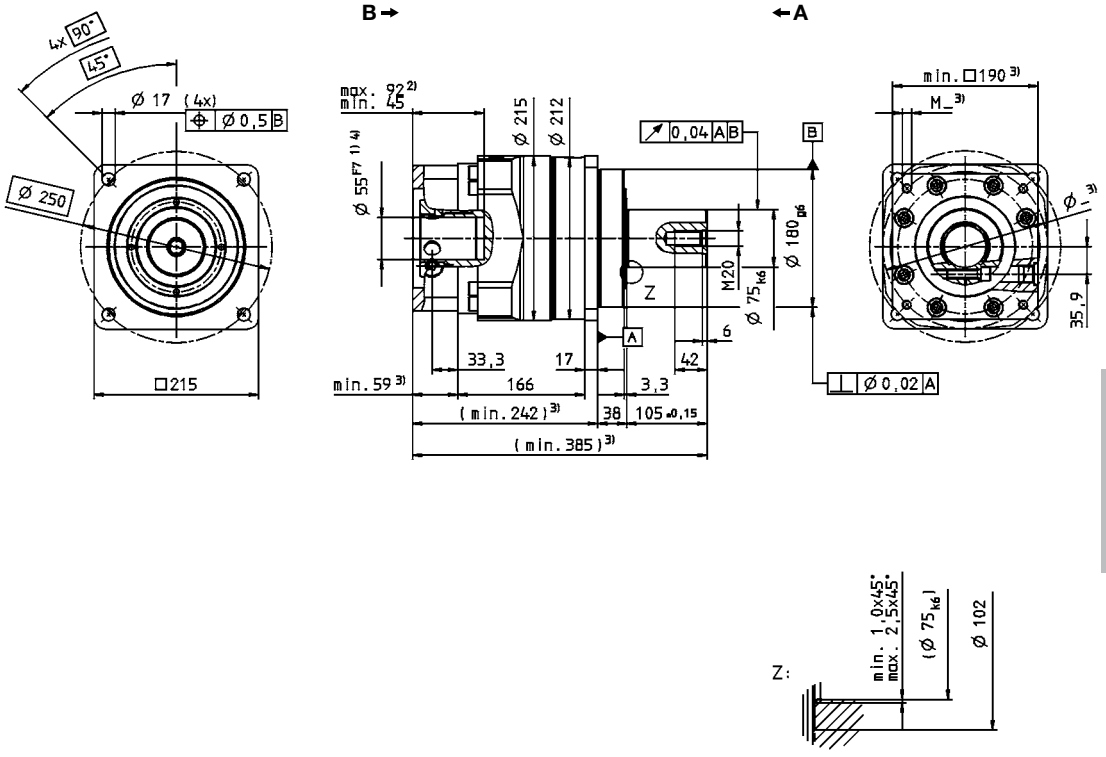
Reduced mass moments of inertia available on request.

[a] Other ratios available on request
[b] For higher ambient temperatures, please reduce input speed
[c] Valid for clamping hub diameter of 55 mm
[d] Refers to center of the output shaft or flange

View A View B

Motor shaft diameter [mm]

up to 55 [4] (N) clamping hub diameter



Planetary gearheads **High End**

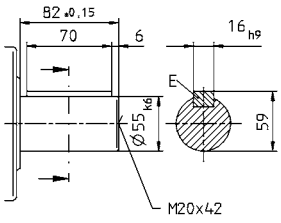
SP+

MC

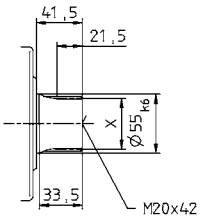
MC-L

Alternatives: Output shaft variants

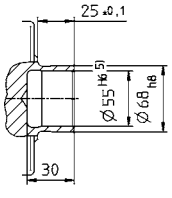
Keywayed output shaft in mm
E = key as per DIN 6885, sheet 1, form A



Involute gearing DIN 5480 in mm
X = W 55 x 2 x 30 x 26 x 6m, DIN 5480



Shaft mounted
Mounted via shrink disc



Non-tolerated dimensions ± 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 with a minimum thickness of 1 mm.
5) Tolerance h6 for mounted shaft.

CAD data is available under www.wittenstein-alpha.com

Motor mounting according to operating manual

				2-stage								
Ratio [a]	i			**16**	**20**	**25**	**28**	**35**	**40**	**50**	**70**	**100**
Max. acceleration torque (max. 1000 cycles per hour)	T_{2B}		Nm	1680	1800	2000	1680	1920	1040	1300	1700	1200
			in.lb	14868	15930	17700	14868	16992	9204	11505	15045	10620
cymex®-optimized nominal torque (please contact us regarding the design)	T_{2Ncym}		Nm	- Please contact us -								
			in.lb									
Nominal output torque (with n_{1N})	T_{2N}		Nm	840	780	975	780	975	800	1000	1000	800
			in.lb	7434	6903	8629	6903	8629	7080	8850	8850	7080
Emergency stop torque (permitted 1000 times during the service life of the gearhead)	T_{2Not}		Nm	5200	5200	5200	5200	5200	5200	5200	5200	5000
			in.lb	46020	46020	46020	46020	46020	46020	46020	46020	44250
Nominal input speed (with T_{2N} and 20°C ambient temperature) [b]	n_{1N}		rpm	3500	4500	4500	4500	4500	4500	4500	4500	4500
Max. input speed	n_{1Max}		rpm	6000	6000	6000	6000	6000	6000	6000	6000	6000
Mean no load running torque (with n_1 = 2000 rpm and 20°C gearhead temperature)	T_{012}		Nm	3.0	2,5	2,5	2,0	2,0	1,5	1,5	1,5	1,5
			in.lb	27	22	22	18	18	13	13	13	13
Max. torsional backlash	j_t		arcmin	Standard ≤ 4 / Reduced ≤ 2								
Torsional rigidity	C_{t21}		Nm/ arcmin	400								
			in.lb/ arcmin	3540								
Max. axial force [c]	F_{2AMax}		N	30000								
			lb_f	6750								
Max. radial force [c]	F_{2RMax}		N	21000								
			lb_f	4725								
Max. tilting moment	M_{2KMax}		Nm	3100								
			in.lb	27435								
Efficiency at full load	η		%	96.5								
Service life (For calculation, see the Chapter "Information")	L_h		h	> 30000								
Weight incl. standard adapter plate	m		kg	53								
			lb_m	117								
Operating noise (with i=10 and n_1 = 2000 rpm no load)	L_{PA}		dB(A)									
Max. permitted housing temperature			°C									
			F									
Ambient temperature			°C	-15 to +40								
			F	32 to 194								
Lubrication				Lubricated for life								
Paint				Blue RAL 5002								
Direction of rotation				Motor and gearhead same direction								
Protection class												
Moment of inertia (relates to the drive)	J_1	M	48	kgcm²	34.5	31.5	30.8	30.0	29.7	28.5	28.3	28.1	28.0
Clamping hub diameter (mm)				10^{-3} in.lb.s²	30.5	27.9	27.3	26.6	26.3	25.2	25.0	24.9	24.8

Reduced mass moments of inertia available on request.

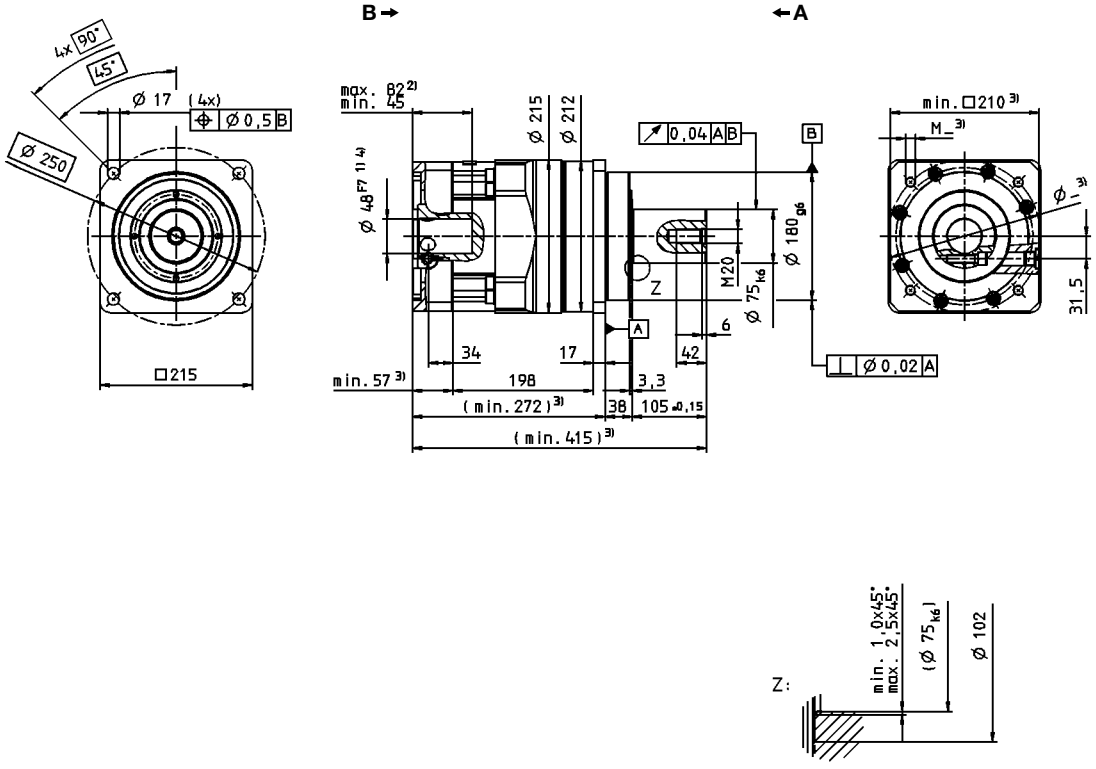
[a] Other ratios available on request
[b] For higher ambient temperatures, please reduce input speed
[c] Refers to center of the output shaft or flange

View A

View B

Motor shaft diameter [mm]

up to 48 [4] (M) clamping hub diameter



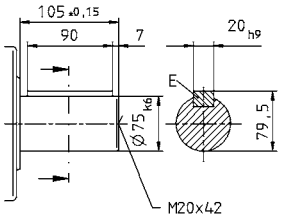
Planetary gearheads **High End**

SP+

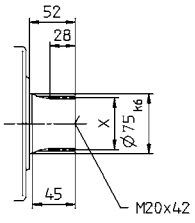
MC

Alternatives: Output shaft variants

Keywayed output shaft in mm
E = key as per DIN 6885, sheet 1, form A



Involute gearing DIN 5480 in mm
X = W 70 x 2 x 30 x 34 x 6m, DIN 5480



Non-tolerated dimensions ± 1.5 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 with a minimum thickness of 1 mm.

CAD data is available under www.wittenstein-alpha.com

Motor mounting according to operating manual

			Standard version MC					Friction optimized version L				
Ratio [a]	***i***		**3**	**4**	**5**	**7**	**10**	**3**	**4**	**5**	**7**	**10**
Max. acceleration torque (max. 1000 cycles per hour)	T_{2B}	Nm	1750	3500	3600	2700	1800	1750	3500	3600	2700	1800
		in.lb	15488	30975	31860	23895	15930	15488	30975	31860	23895	15930
cymex®-optimized nominal torque (please contact us regarding the design)	T_{2Ncym}	Nm	- Please contact us -									
		in.lb										
Nominal output torque (with n_{1N})	T_{2N}	Nm	1400	1960	1770	1500	1100	1400	1960	1770	1500	1100
		in.lb	12390	17346	15665	13275	9735	12390	17346	15665	13275	9735
Emergency stop torque (permitted 1000 times during the service life of the gearhead)	T_{2Not}	Nm	6800	8500	8500	8500	6800	6800	8500	8500	8500	6800
		in.lb	60180	75225	75225	75225	60180	60180	75225	75225	75225	60180
Nominal input speed (with T_{2N} and 20°C ambient temperature) [b]	n_{1N}	rpm	1750	2250	3000	3000	3000	1750	2250	3000	3000	3000
cymex® optimized speed (please contact us regarding the design)	n_{1Ncym}	rpm	–	–	–	–	–	2250	2750	3500	3500	3500
Max. input speed	n_{1Max}	rpm	3400	4000	5000	5000	5000	3400	5000	5000	5000	5000
Mean no load running torque (with n_1=3000 rpm and 20°C gearhead temperature) [c]	T_{012}	Nm	24	18	13	7.0	5.0	8.0	7.0	6.0	5.0	4.2
		in.lb	212	159	115	62	44	71	62	53	44	37
Max. torsional backlash	j_t	arcmin	Standard ≤ 4 / Reduced ≤ 2									
Torsional rigidity	C_{t21}	Nm/ arcmin	550									
		in.lb/ arcmin	4868									
Max. axial force [d]	F_{2AMax}	N	33000					10000				
		lb_f	7425					2250				
Max. radial force [d]	F_{2RMax}	N	30000					2000				
		lb_f	6750					450				
Max. tilting moment	M_{2KMax}	Nm	5000					280				
		in.lb	44250					2478				
Efficiency at full load	η	%	98.5					99				
Service life (For calculation, see the Chapter "Information")	L_h	h	> 30000									
Weight incl. standard adapter plate	*m*	kg	77									
		lb_m	170									
Operating noise (with *i*=10 and n_1=3000 rpm no load)	L_{PA}	dB(A)	≤ 66									
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 65					IP 52				
Moment of inertia (relates to the drive) **O** **60** Clamping hub diameter [mm]	J_1	kgcm²	260.2	198.2	163.0	138.3	124.7	260.2	198.2	163.0	84.4	70.8
		10^{-3} in.lb.s²	230.3	175.4	144.3	122.4	110.4	230.3	175.4	144.3	74.7	62.7

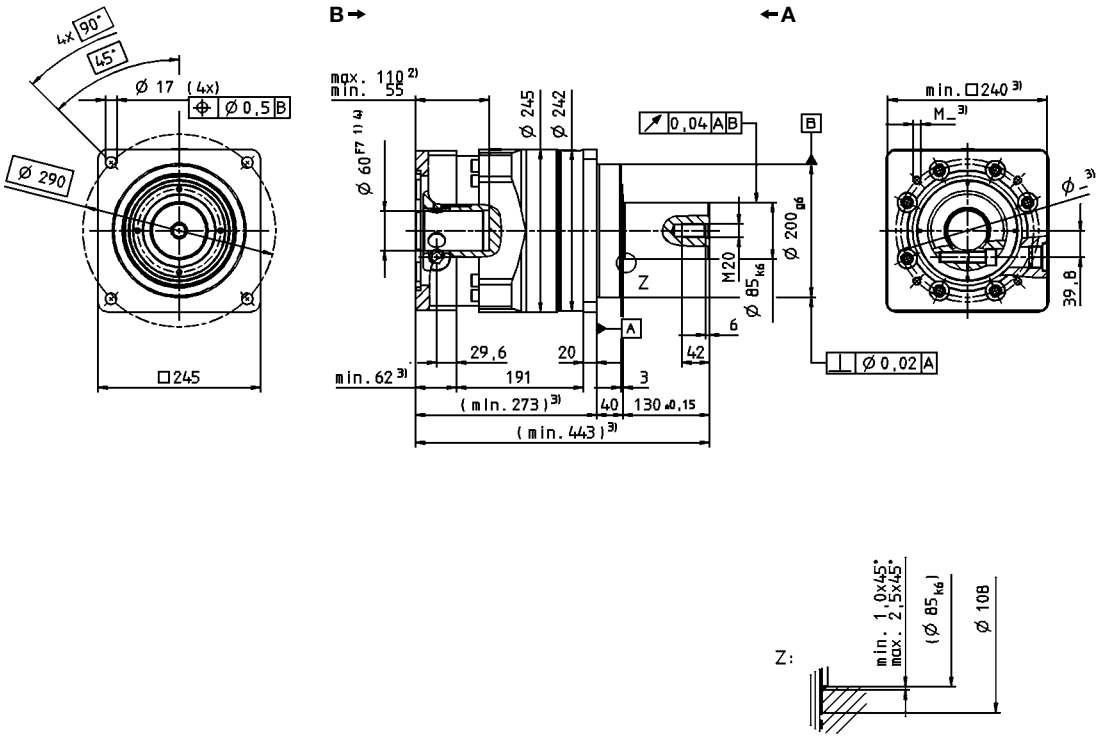
Reduced mass moments of inertia available on request.

[a] Other ratios available on request
[b] For higher ambient temperatures, please reduce input speed
[c] Valid for clamping hub diameter of 60 mm
[d] Refers to center of the output shaft or flange

View A View B

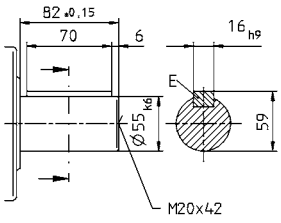
Motor shaft diameter [mm]

up to 60 [4] (O) clamping hub diameter

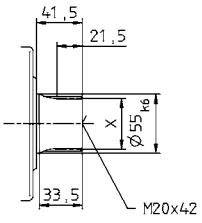


Alternatives: Output shaft variants

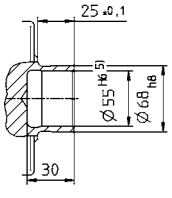
Keywayed output shaft in mm
E = key as per DIN 6885, sheet 1, form A



Involute gearing DIN 5480 in mm
X = W 55 x 2 x 30 x 26 x 6m, DIN 5480



Shaft mounted
Mounted via shrink disc



Non-tolerated dimensions ± 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 with a minimum thickness of 1 mm.
5) Tolerance h6 for mounted shaft.

CAD data is available under www.wittenstein-alpha.com

Motor mounting according to operating manual

				2-stage								
Ratio [a]	i			**16**	**20**	**25**	**28**	**35**	**40**	**50**	**70**	**100**
Max. acceleration torque (max. 1000 cycles per hour)	T_{2B}	Nm		3500	3500	3600	2900	3600	1680	2100	2700	1800
		in.lb		30975	30975	31860	25665	31860	14868	18585	23895	15930
cymex®-optimized nominal torque (please contact us regarding the design)	T_{2Ncym}	Nm		- Please contact us -								
		in.lb										
Nominal output torque (with n_{1N})	T_{2N}	Nm		1790	1770	1730	1840	1930	1300	1625	1500	1100
		in.lb		15842	15665	15311	16284	17081	11505	14381	13275	9735
Emergency stop torque (permitted 1000 times during the service life of the gearhead)	T_{2Not}	Nm		8500	8500	8500	8500	8500	8500	8500	8500	6800
		in.lb		75225	75225	75225	75225	75225	75225	75225	75225	60180
Nominal input speed (with T_{2N} and 20°C ambient temperature) [b]	n_{1N}	rpm		3500	4500	4500	4500	4500	4500	4500	4500	4500
Max. input speed	n_{1Max}	rpm		6000	6000	6000	6000	6000	6000	6000	6000	6000
Mean no load running torque (with n_1 = 2000 rpm and 20°C gearhead temperature)	T_{012}	Nm		5,0	4,5	4,0	3,5	3,0	2,5	2,5	2,5	2,0
		in.lb		44	40	35	31	27	22	22	22	18
Max. torsional backlash	j_t	arcmin		Standard ≤ 4 / Reduced ≤ 2								
Torsional rigidity	C_{t21}	Nm/ arcmin		550								
		in.lb/ arcmin		4868								
Max. axial force [c]	F_{2AMax}	N		33000								
		lb_f		7425								
Max. radial force [c]	F_{2RMax}	N		30000								
		lb_f		6750								
Max. tilting moment	M_{2KMax}	Nm		5000								
		in.lb		44250								
Efficiency at full load	η	%		96.5								
Service life (For calculation, see the Chapter “Information”)	L_h	h		> 30000								
Weight incl. standard adapter plate	m	kg		76								
		lb_m		168								
Operating noise (with i=10 and n_1 = 3000 rpm no load)	L_{PA}	dB(A)		≤ 66								
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 65								
Moment of inertia (relates to the drive) Clamping hub diameter [mm]	M	48	J_1	kgcm²	39.2	34.6	33.2	30.5	29.7	28.2	27.9	27.6	27.5
				10^{-3} in.lb.s²	34.7	30.6	29.4	27.0	26.3	25.0	24.7	24.4	24.3

Reduced mass moments of inertia available on request.

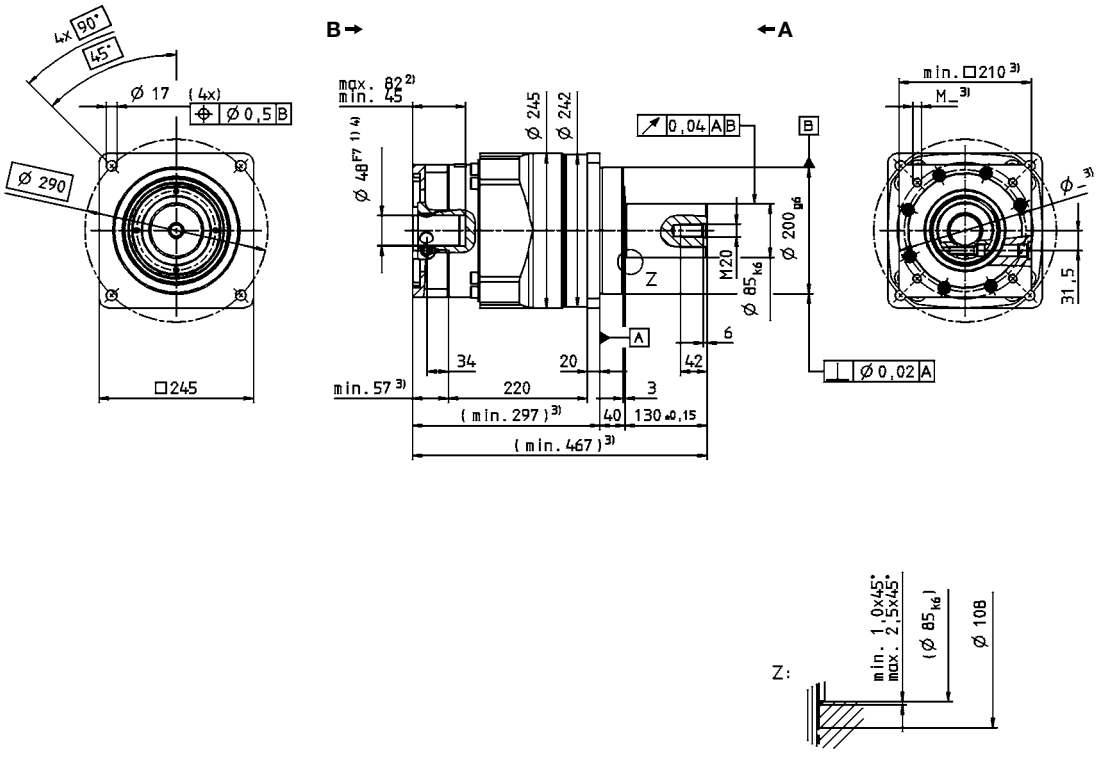
[a] Other ratios available on request
[b] For higher ambient temperatures, please reduce input speed
[c] Refers to center of the output shaft or flange

View A

View B

Motor shaft diameter [mm]

up to 48 [4] (M) clamping hub diameter



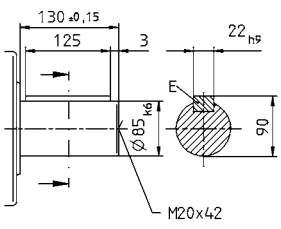
Planetary gearheads **High End**

SP+

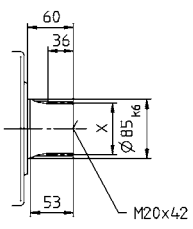
MC

Alternatives: Output shaft variants

Keywayed output shaft in mm
E = key as per DIN 6885, sheet 1, form A



Involute gearing DIN 5480 in mm
X = W 80 x 2 x 30 x 38 x 6m, DIN 5480



Non-tolerated dimensions ± 1.5 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 with a minimum thickness of 1 mm.

CAD data is available under www.wittenstein-alpha.com

Motor mounting according to operating manual

Low backlash planetary gearheads Economy

LP⁺ Generation 3
Innovation sets standards

The low-backlash LP⁺ Generation 3 planetary gearhead extends and completes the product portfolio.

- Up to 75% higher torques
- Noise level halved
- New ratios for optimum solutions
- Maximum quality and reliable availability

LPB⁺ Generation 3
Innovation sets standards

The low-backlash LPB⁺ Generation 3 planetary gearhead with flange output is the logical extension of the current product range. The Generation 3 offers:

- Compact and intelligent solutions for your drive
- Two-stage version for maximum ratio flexibility

Versatile installation

In whatever position you install your gearhead, it always contains the same quantity of grease.

The gearheads are so flexible, you can install them vertically, horizontally or with the output facing upwards or downwards.

Extended boundaries

Our Economy range includes some impressive new additions. In the 070, 090 and 120 sizes, our LP⁺/LPB⁺ Generation 3 gearheads feature up to 75% more torque, independent of the ratio!

alphira®
Simple precision

The alphira® gearhead combines proven gearing technology with the cost-effectiveness requirements in the economy servo sector.
Ideal for simple servo applications.

Available from our online shop www.shop.wittenstein.de in Germany, Austria and Switzerland

LP+/LPB+ Generation 3
· Torques increased by up to 75%
· Reduction in noise level
· New ratios available

The LPB+ Generation 3 is also available as a two-stage version!

Just in time

With our Economy range, this is not merely a slogan. With our Economy range products, we set new standards with regard to delivery times and delivery reliability.

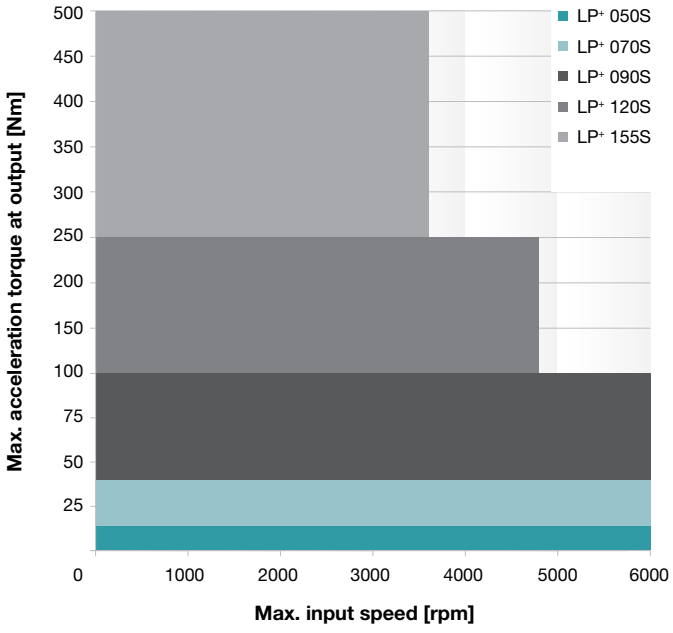
LP+/LPB+ Generation 3 – Innovation sets standards

LP+/LPB+ Generation 3
. Torques increased by up to 75%
. Reduction in noise level
. New ratios available
The LPB+ Generation 3 is also available as a two-stage version!

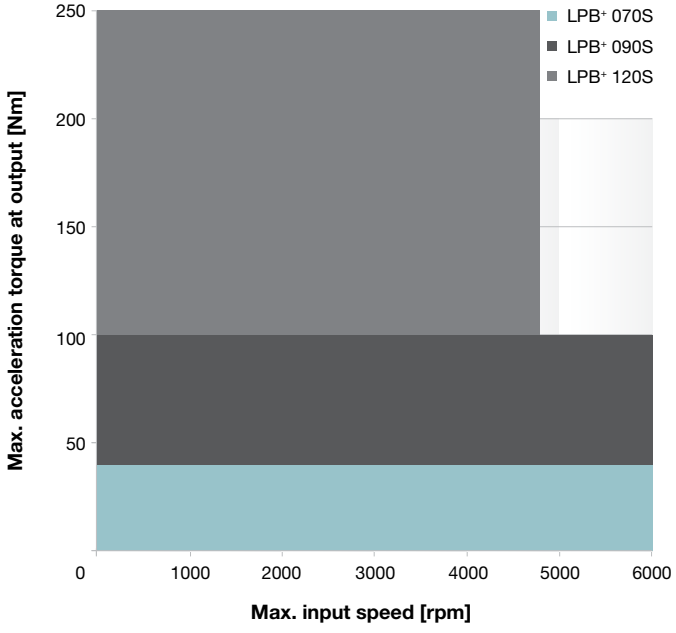
Low-backlash planetary gearheads with output shaft (LP+ Generation 3) or drive flange (LPB+ Generation 3). Optionally available with belt pulley for compact belt drive. The reliable and durable planetary gearhead combines the advantages of a proven gearhead concept with economic premium quality.

Quick size selection

LP+ Generation 3 (example for i = 5)
For applications in cyclic operation (ED ≥ 60%)



LPB+ Generation 3 (example for i = 5)
For applications in cyclic operation (ED ≥ 60%)



Versions and Applications

LP+ Generation 3

- Economical servo applications
- Cyclic and continuous operation
- High nominal speeds
- Economical positioning accuracy

LPB+ Generation 3

- Toothed belt applications
- Linear module
- Economical servo applications
- Dynamic belt applications

Comparison

Features		**LP+ Generation 3** from page 120	**LPB+ Generation 3** from page 130
Ratios [c]		3 – 100	3 – 100
Torsional backlash [arcmin] [c]	Standard	≤ 8	≤ 8
	Reduced	–	–
Output type			
Smooth output shaft		•	
Keywayed output shaft		•	
Output flange			•
Input type			
Motor mounted version		•	•
Type			
Food-grade lubrication [a] [b]		•	•
Accessories			
Coupling		•	
Rack		•	
Pinion		•	
Belt pulley			•
NEMA flange		•	

[a] Power reduction: technical data available upon request [b] Please contact WITTENSTEIN alpha [c] In relation to reference sizes

LP+ 050 MF 1/2-stage

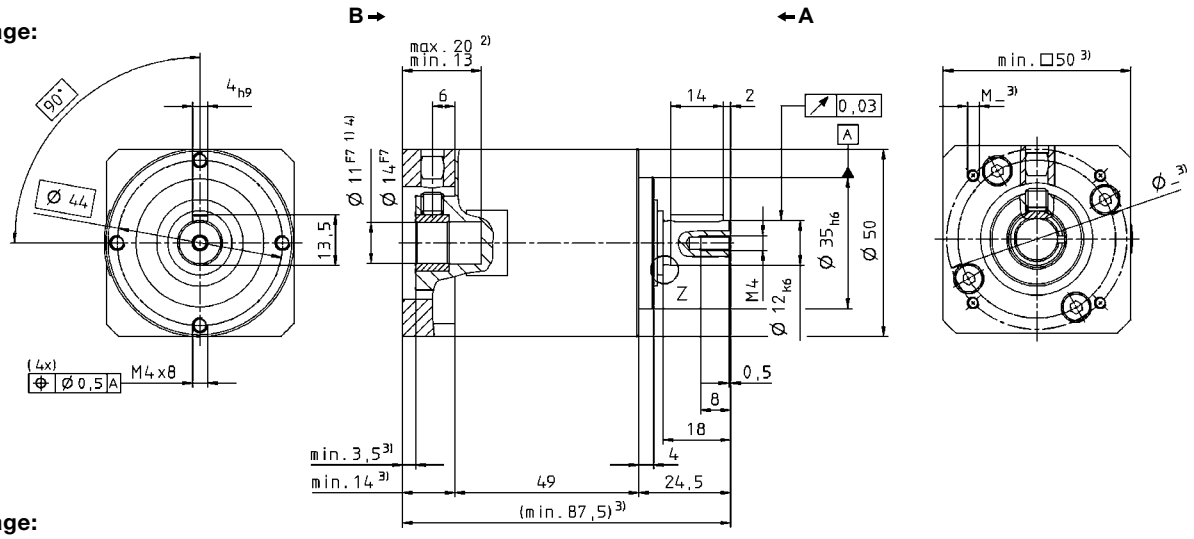
					1-stage				2-stage						
Ratio			i		**4**	**5**	**7**	**10**	**16**	**20**	**25**	**35**	**50**	**70**	**100**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B}	Nm	13	14	14	13	13	13	14	14	14	14	13
				in.lb	120	120	120	120	120	120	120	120	120	120	120
Nominal output torque (with n_{1N})			T_{2N}	Nm	6	6.5	6.5	6	6	6	6.5	6.5	6.5	6.5	6
				in.lb	53	58	58	53	53	53	58	58	58	58	53
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not}	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 (with T_{2N} and 20°C ambient temperature) [a]			n_{1N}	rpm	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000
Max. input speed			n_{1Max}	rpm	8000	8000	8000	8000	8000	8000	8000	8000	8000	8000	8000
Mean no load running torque (with n_1 = 3000 rpm and 20°C gearhead temperature)			T_{012}	Nm	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
				in.lb	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Max. torsional backlash			j_t	arcmin	≤ 10				≤ 13						
Torsional rigidity			C_{t21}	Nm/ arcmin	1.5	1.2	1.2	0.9	1.5	1.5	1.2	1.2	1.2	1.2	0.9
				in.lb/ arcmin	13	11	11	8	13	13	11	11	11	11	8
Max. axial force [b]			F_{2AMax}	N	700				700						
				lb_f	160				160						
Max. radial force [b]			F_{2RMax}	N	650				650						
				lb_f	150				150						
Efficiency at full load			η	%	97				95						
Service life (For calculation, see the Chapter "Information")			L_h	h	> 20000				> 20000						
Weight incl. standard adapter plate			m	kg	0.75				0.95						
				lb_m	1.7				2.1						
Operating noise for i=10 and n_1 = 3000 rpm without load			L_{PA}	dB(A)	≤ 62										
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 (relates to the drive)	B	11	J_1	$kgcm^2$	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
				10^{-3} in.lb.s²	0.05	0.04	0.04	0.04	0.05	0.04	0.04	0.04	0.04	0.04	0.04
Clamping hub diameter (mm)	C	14	J_1	$kgcm^2$	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
				10^{-3} in.lb.s²	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2

[a] For higher ambient temperatures, please reduce input speed

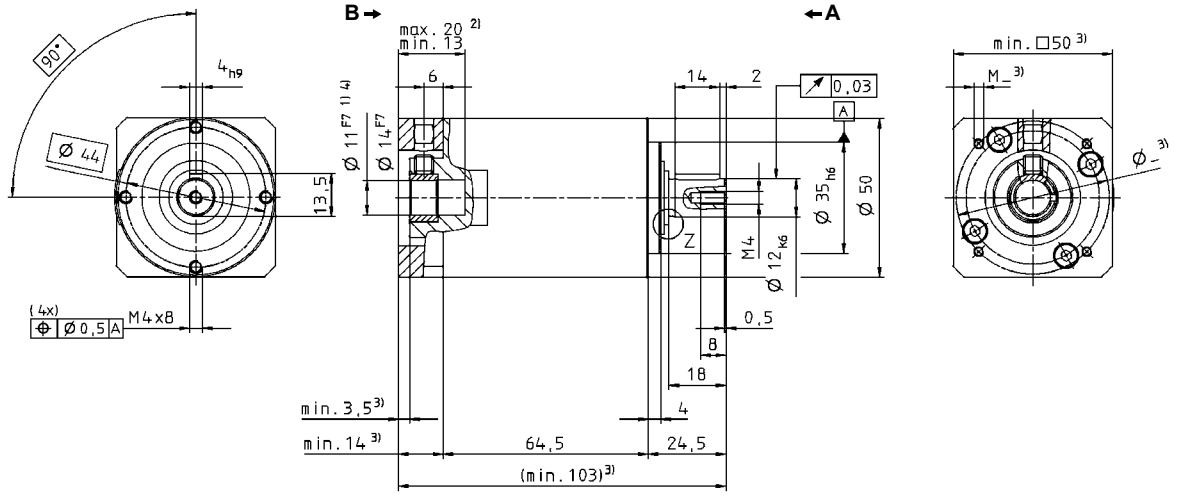
[b] Refers to center of the output shaft, if n_2 = 100 rpm

View A View B

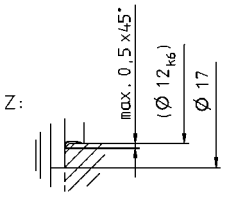
LP+ 1-stage:



LP+ 2-stage:



Z:



Non-tolerated dimensions ±1mm

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. Motor shaft diameters up to 14mm available – please contact WITTENSTEIN alpha

CAD data is available under www.wittenstein-alpha.com

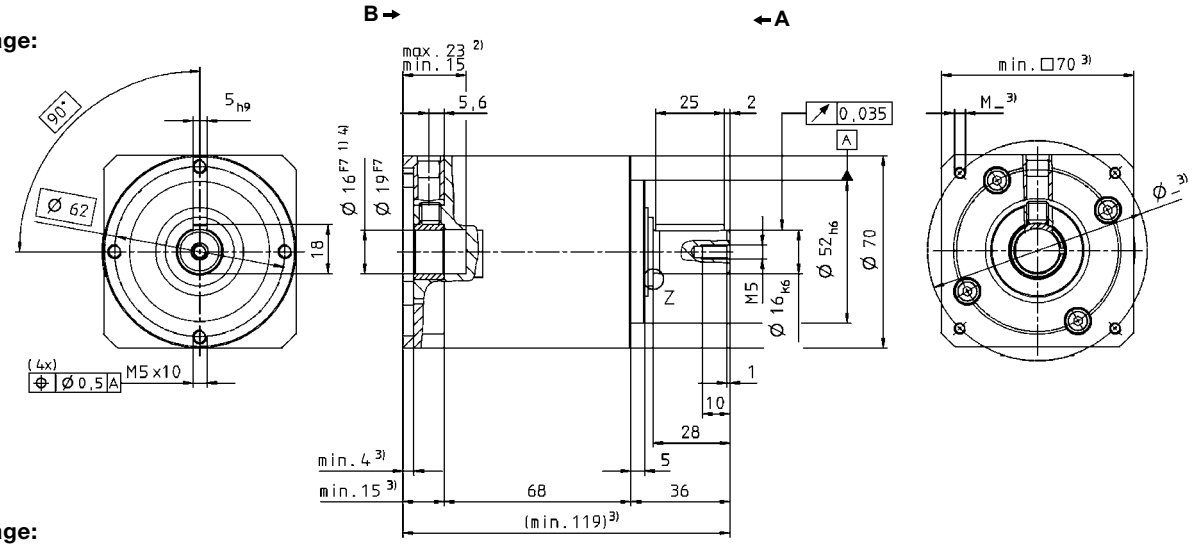
Motor mounting according to operating manual

					1-stage					2-stage									
Ratio [a]			i		**3**	**4**	**5**	**7**	**10**	**9**	**12**	**16**	**20**	**25**	**30**	**40**	**50**	**70**	**100**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B}	Nm	55	42	40	40	37	55	55	55	42	40	55	40	40	40	37
				in.lb	490	370	350	350	330	490	490	490	370	350	490	350	350	350	330
Nominal output torque (with n_{1N})			T_{2N}	Nm	29	22	21	21	19	29	29	29	22	21	29	21	21	21	19
				in.lb	260	190	190	190	170	260	260	260	190	190	260	190	190	190	170
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not}	Nm	65	75	75	75	75	75	75	75	75	75	75	75	75	75	75
				in.lb	580	660	660	660	660	660	660	660	660	660	660	660	660	660	660
Nominal input speed (with T_{2N} and 20°C ambient temperature) [b]			n_{1N}	rpm	3700	3700	3700	3700	3700	3700	3700	3700	3700	3700	3700	3700	3700	3700	3700
Max. input speed			n_{1Max}	rpm	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000
Mean no load running torque (with n_1 =3000 rpm and 20°C gearhead temperature)			T_{012}	Nm	0.3	0.3	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
				in.lb	2.7	2.2	1.8	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	0.9
Max. torsional backlash			j_t	arcmin	≤ 8					≤ 10									
Torsional rigidity			C_{t21}	Nm/ arcmin	4	4	3.3	3.3	2.8	4.0	4.0	4.0	4.0	4.0	4.0	3.3	3.3	3.3	2.8
				in.lb/ arcmin	35	35	29	29	25	35	35	35	35	35	35	29	29	29	25
Max. axial force [c]			F_{2AMax}	N	1550					1550									
				lb_f	349					349									
Max. radial force [c]			F_{2RMax}	N	1450					1450									
				lb_f	326					326									
Efficiency at full load			η	%	97					95									
Service life (For calculation, see the Chapter "Information")			L_h	h	> 20000					> 20000									
Weight incl. standard adapter plate			m	kg	2.0					2.4									
				lb_m	4.4					5.3									
Operating noise for i=10 and n_1 = 3000 rpm without load			L_{PA}	dB(A)	≤ 64														
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 (relates to the drive)	D	16	J_1	kgcm²	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
				10^{-3} in.lb.s²	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Clamping hub diameter (mm)	E	19	J_1	kgcm²	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
				10^{-3} in.lb.s²	0.5	0.5	0.5	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.4	0.5	0.4	0.4	0.4

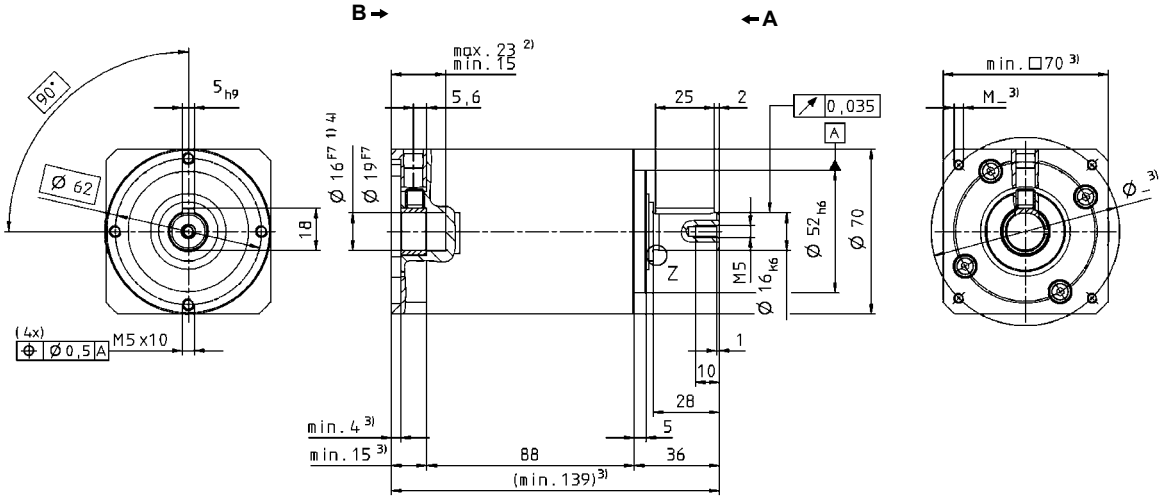
[a] Other ratios are available on request: i = 15, 21, 28 and 35.
[b] For higher ambient temperatures, please reduce input speed
[c] Refers to center of the output shaft, if n_2 = 100 rpm

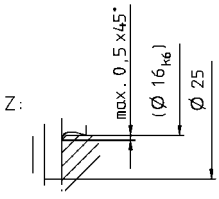
View A View B

LP+ 1-stage:



LP+ 2-stage:





Non-tolerated dimensions ±1mm

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. Motor shaft diameters up to 19mm available – please contact WITTENSTEIN alpha

CAD data is available under www.wittenstein-alpha.com

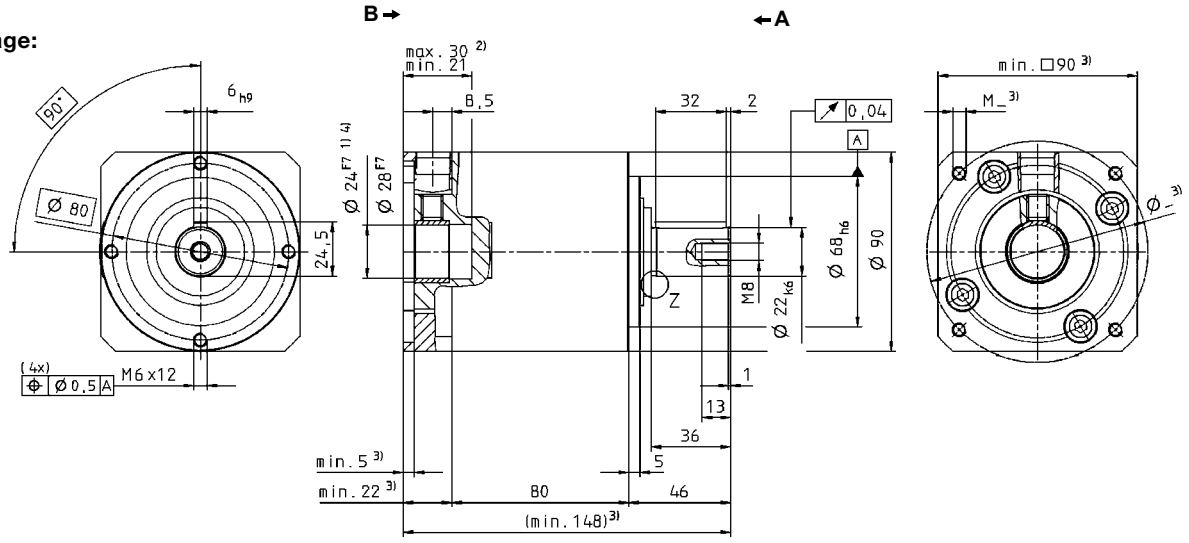
Motor mounting according to operating manual

				1-stage					2-stage									
Ratio [a]			*i*	**3**	**4**	**5**	**7**	**10**	**9**	**12**	**16**	**20**	**25**	**30**	**40**	**50**	**70**	**100**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B} Nm	125	115	100	100	90	125	125	115	115	100	125	115	100	100	90
			T_{2B} in.lb	1110	1020	890	890	800	1110	1110	1020	1020	890	1110	1020	890	890	800
Nominal output torque (with n_{1N})			T_{2N} Nm	63	58	50	50	45	63	63	58	58	50	63	58	50	50	45
			T_{2N} in.lb	560	510	440	440	400	560	560	510	510	440	560	510	440	440	400
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not} Nm	185	190	190	190	190	190	190	190	190	190	190	190	190	190	190
			T_{2Not} in.lb	1640	1680	1680	1680	1680	1680	1680	1680	1680	1680	1680	1680	1680	1680	1680
Nominal input speed (with T_{2N} and 20°C ambient temperature) [b]			n_{1N} rpm	3400	3400	3400	3400	3400	3400	3400	3400	3400	3400	3400	3400	3400	3400	3400
Max. input speed			n_{1Max} rpm	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000
Mean no load running torque (with n_1 = 3000 rpm and 20°C gearhead temperature)			T_{012} Nm	0.6	0.6	0.5	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
			T_{012} in.lb	5.3	4.9	4.4	3.5	3.4	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.2	2.2	2.2
Max. torsional backlash			j_t arcmin	≤ 8					≤ 10									
Torsional rigidity			C_{t21} Nm/ arcmin	12	12	9.5	9.5	8.5	12	12	12	12	9.5	9.5	12	9.5	9.5	8.5
			C_{t21} in.lb/ arcmin	106	106	84	84	75	106	106	106	106	84	84	106	84	84	75
Max. axial force [c]			F_{2AMax} N	1900					1900									
			F_{2AMax} lb_f	430					430									
Max. radial force [c]			F_{2RMax} N	2400					2400									
			F_{2RMax} lb_f	540					540									
Efficiency at full load			η %	97					95									
Service life (For calculation, see the Chapter "Information")			L_h h	> 20000					> 20000									
Weight incl. standard adapter plate			*m* kg	4.0					5.0									
			m lb_m	8.8					11									
Operating noise for i=10 and n_1 = 3000 rpm without load			L_{PA} dB(A)	≤66														
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 (relates to the drive)	G	24	J_1 kgcm²	1.8	1.6	1.6	1.5	1.4	1.5	1.5	1.6	1.6	1.5	1.5	1.4	1.4	1.4	1.4
			J_1 10^{-3} in.lb.s²	1.6	1.4	1.4	1.3	1.3	1.3	1.3	1.4	1.4	1.3	1.3	1.3	1.3	1.3	1.3
Clamping hub diameter (mm)	H	28	J_1 kgcm²	2.1	1.9	1.9	1.8	1.7	1.8	1.8	1.9	1.9	1.8	1.8	1.7	1.7	1.7	1.7
			J_1 10^{-3} in.lb.s²	1.9	1.7	1.6	1.6	1.5	1.6	1.6	1.6	1.6	1.6	1.6	1.5	1.5	1.5	1.5

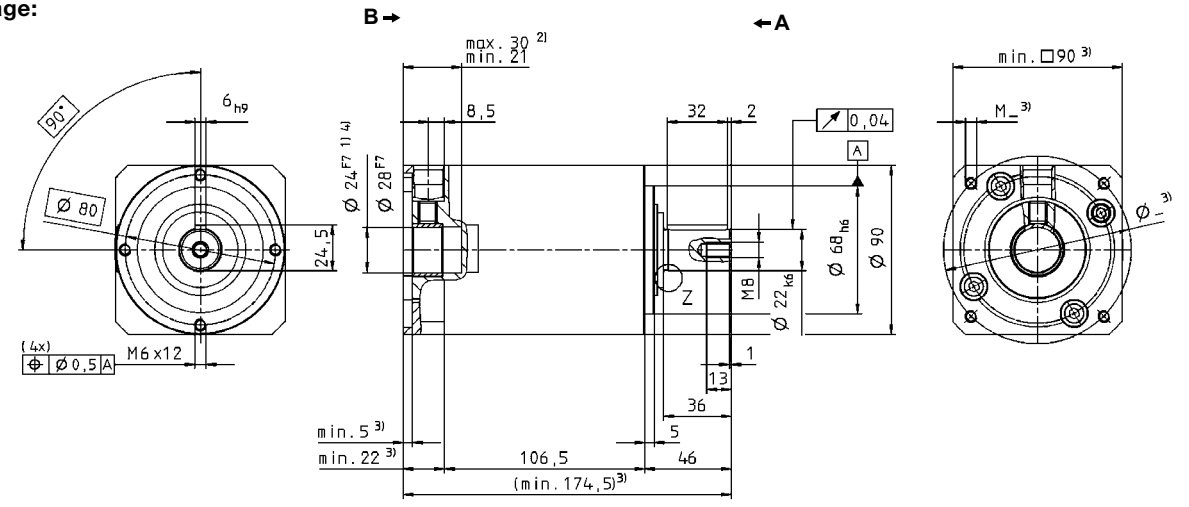
[a] Other ratios are available on request: i = 15, 21, 28 and 35.
[b] For higher ambient temperatures, please reduce input speed
[c] Refers to center of the output shaft, if n_2 = 100 rpm

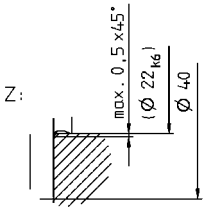
View A View B

LP⁺ 1-stage:



LP⁺ 2-stage:





Non-tolerated dimensions ±1mm

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. Motor shaft diameters up to 28mm available – please contact WITTENSTEIN alpha

CAD data is available under www.wittenstein-alpha.com

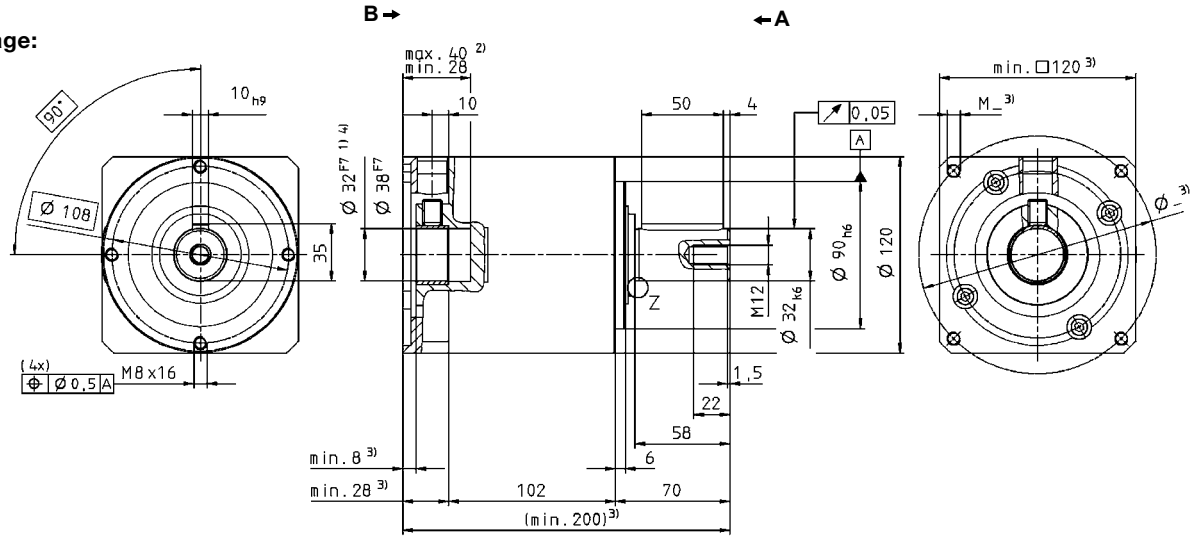
Motor mounting according to operating manual

					1-stage					2-stage									
Ratio [a]			*i*		**3**	**4**	**5**	**7**	**10**	**9**	**12**	**16**	**20**	**25**	**30**	**40**	**50**	**70**	**100**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B}	Nm	305	305	250	250	220	305	305	305	305	250	305	305	250	250	220
				in.lb	2700	2700	2210	2210	1950	2700	2700	2700	2700	2210	2700	2700	2210	2210	1950
Nominal output torque (with n_{1N})			T_{2N}	Nm	155	155	125	125	110	155	155	155	155	125	155	155	125	125	110
				in.lb	1370	1370	1110	1110	970	1370	1370	1370	1370	1110	1370	1370	1110	1110	970
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not}	Nm	400	480	480	480	480	480	480	480	480	480	480	480	480	480	480
				in.lb	3540	4250	4250	4250	4250	4250	4250	4250	4250	4250	4250	4250	4250	4250	4250
Nominal input speed (with T_{2N} and 20°C ambient temperature) [b]			n_{1N}	rpm	2600	2600	2600	2600	2600	2600	2600	2600	2600	2600	2600	2600	2600	2600	2600
Max. input speed			n_{1Max}	rpm	4800	4800	4800	4800	4800	4800	4800	4800	4800	4800	4800	4800	4800	4800	4800
Mean no load running torque (with n_1 =3000 rpm and 20°C gearhead temperature)			T_{012}	Nm	1.1	1.0	0.9	0.8	0.8	0.6	0.6	0.6	0.5	0.5	0.4	0.5	0.4	0.4	0.4
				in.lb	9.7	8.9	8.0	7.1	7.1	5.3	5.3	4.9	4.4	4.4	3.5	4.4	3.5	3.5	3.5
Max. torsional backlash			j_t	arcmin	≤ 8					≤ 10									
Torsional rigidity			C_{t21}	Nm/ arcmin	30	30	25	25	22	30	30	30	30	25	25	30	25	25	22
				in.lb/ arcmin	270	270	220	220	190	270	270	270	270	220	220	270	220	220	190
Max. axial force [c]			F_{2AMax}	N	4000					4000									
				lb_f	900					900									
Max. radial force [c]			F_{2RMax}	N	4600					4600									
				lb_f	1035					1035									
Efficiency at full load			η	%	97					95									
Service life (For calculation, see the Chapter "Information")			L_h	h	> 20000					> 20000									
Weight incl. standard adapter plate			*m*	kg	8.6					11.0									
				lb_m	19.0					24.3									
Operating noise for i=10 and n_1 = 3000 rpm without load			L_{PA}	dB(A)	≤ 68														
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 (relates to the drive)	I	32	J_1	$kgcm^2$	6.9	5.9	5.6	5.2	5.1	5.4	5.4	5.5	5.5	5.3	5.3	5.0	5.0	5.0	5.0
				10^{-3} in.lb.s²	6.1	5.3	4.9	4.6	4.5	4.7	4.7	4.9	4.9	4.7	4.7	4.4	4.4	4.4	4.4
Clamping hub diameter (mm)	K	38	J_1	$kgcm^2$	7.8	6.8	6.4	6.1	5.9	6.2	6.2	6.4	6.4	6.2	6.2	5.9	5.9	5.9	5.9
				10^{-3} in.lb.s²	6.9	6.0	5.7	5.4	5.2	5.5	5.5	5.7	5.7	5.5	5.5	5.2	5.2	5.2	5.2

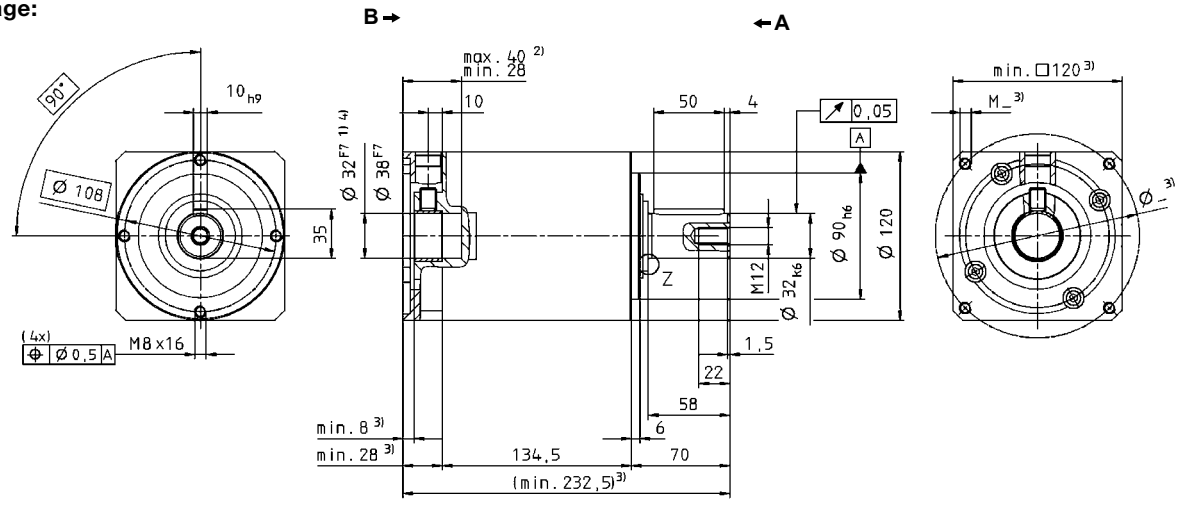
[a] Other ratios are available on request: i = 15, 21, 28 and 35.
[b] For higher ambient temperatures, please reduce input speed
[c] Refers to center of the output shaft, if n_2 = 100 rpm

View A View B

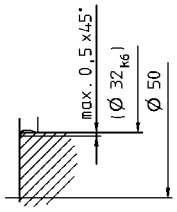
LP⁺ 1-stage:



LP⁺ 2-stage:



Z:



Non-tolerated dimensions ±1mm

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. Motor shaft diameters up to 38mm available – please contact WITTENSTEIN alpha

CAD data is available under www.wittenstein-alpha.com

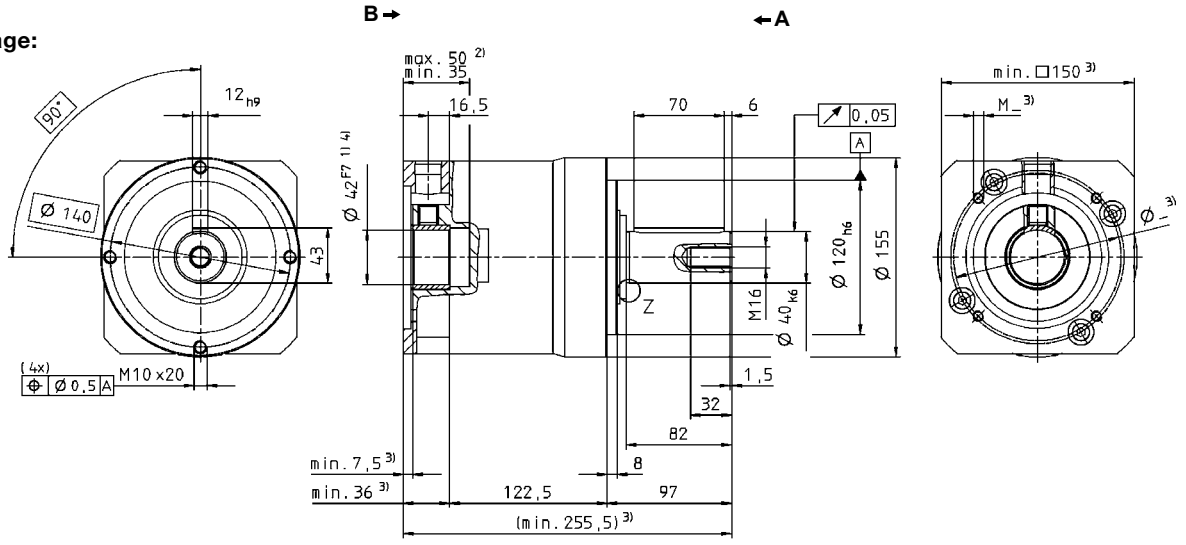
Motor mounting according to operating manual

					1-stage		2-stage		
Ratio			**i**		**5**	**10**	**25**	**50**	**100**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B}	Nm	500	400	500	500	400
				in.lb	4430	3540	4430	4430	3540
Nominal output torque (with n_{1N})			T_{2N}	Nm	350	200	350	350	200
				in.lb	3100	1770	3100	3100	1770
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not}	Nm	1000	1000	1000	1000	1000
				in.lb	8850	8850	8850	8850	8850
Nominal input speed (with T_{2N} and 20°C ambient temperature) [a]			n_{1N}	rpm	2000	2000	2000	2000	2000
Max. input speed			n_{1Max}	rpm	3600	3600	3600	3600	3600
Mean no load running torque (with n_1 = 3000 rpm and 20°C gearhead temperature)			T_{012}	Nm	2.8	2.5	1.0	0.8	0.7
				in.lb	25	22	8.9	7.1	6.2
Max. torsional backlash			j_t	arcmin	≤ 8		≤ 10		
Torsional rigidity			C_{t21}	Nm/ arcmin	55	44	55	55	44
				in.lb/ arcmin	490	390	490	490	390
Max. axial force [b]			F_{2AMax}	N	6000		6000		
				lb_f	1350		1350		
Max. radial force [b]			F_{2RMax}	N	7500		7500		
				lb_f	1690		1690		
Efficiency at full load			η	%	97		95		
Service life (For calculation, see the Chapter "Information")			L_h	h	> 20000		> 20000		
Weight incl. standard adapter plate			m	kg	17		21		
				lb_m	38		46		
Operating noise for i=10 and n_1 = 3000 rpm without load			L_{PA}	dB(A)	≤69				
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 (relates to the drive) Clamping hub diameter (mm)	L	42	J_1	$kgcm^2$	17	16	–	–	–
				10^{-3} in.lb.s²	15	14	–	–	–
	I	32	J_1	$kgcm^2$	–	–	5.4	5.0	5.0
				10^{-3} in.lb.s²	–	–	4.8	4.4	4.4
	K	38	J_1	$kgcm^2$	–	–	6.3	5.9	5.9
				10^{-3} in.lb.s²	–	–	5.5	5.2	5.2

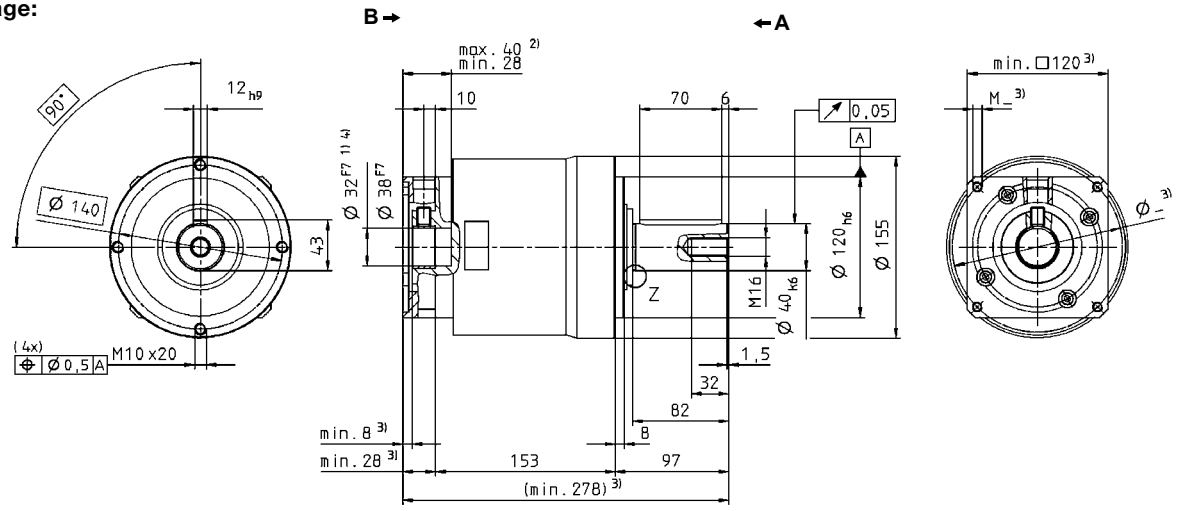
[a] For higher ambient temperatures, please reduce input speed
[b] Refers to center of the output shaft, if n_2 = 100 rpm

View A View B

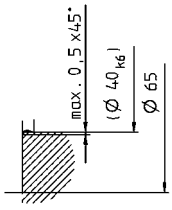
LP⁺ 1-stage:



LP⁺ 2-stage:



Z:



Non-tolerated dimensions ±1mm

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. LP⁺ 2-stage: Motor shaft diameters up to 38mm available – please contact WITTENSTEIN alpha

CAD data is available under www.wittenstein-alpha.com

Motor mounting according to operating manual

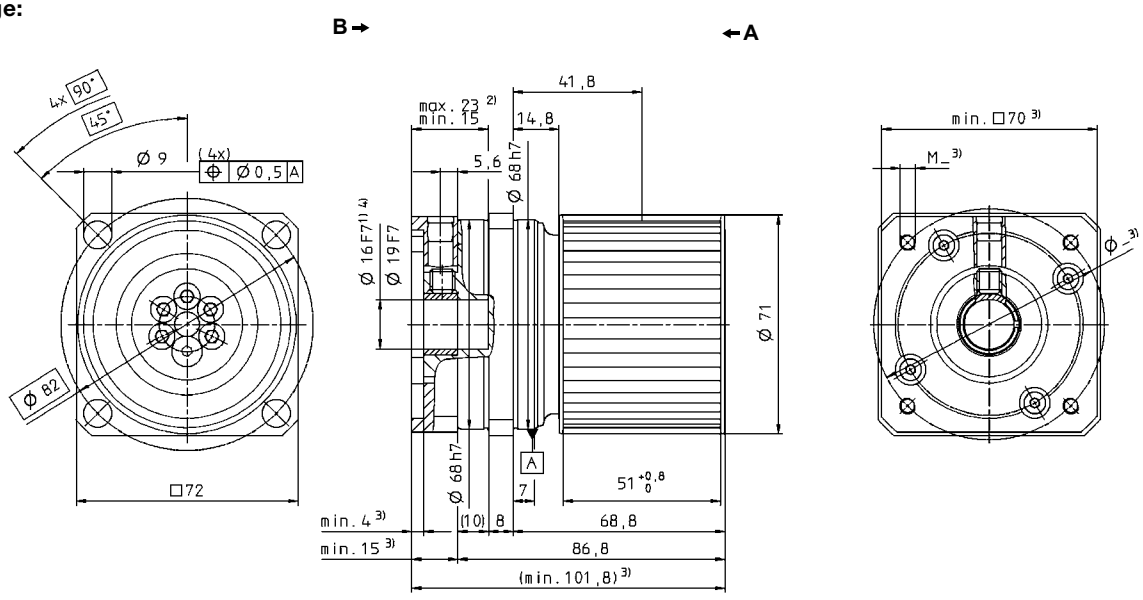
LPB+ 070 MF 1/2-stage

					1-stage					2-stage									
Ratio			i		**3**	**4**	**5**	**7**	**10**	**9**	**12**	**16**	**20**	**25**	**30**	**40**	**50**	**70**	**100**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B}	Nm	55	42	40	40	37	55	55	42	42	40	55	42	40	40	37
				in.lb	490	370	350	350	330	490	490	370	370	350	490	370	350	350	330
Nominal output torque (with n_{1N})			T_{2N}	Nm	29	22	21	21	19	29	29	22	22	21	29	22	21	21	19
				in.lb	260	190	190	190	170	260	260	190	190	190	260	190	190	190	170
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not}	Nm	65	75	75	75	75	75	75	75	75	75	75	75	75	75	75
				in.lb	580	660	660	660	660	660	660	660	660	660	660	660	660	660	660
Nominal input speed (with T_{2N} and 20°C ambient temperature) [a]			n_{1N}	rpm	3700	3700	3700	3700	3700	3700	3700	3700	3700	3700	3700	3700	3700	3700	3700
Max. input speed			n_{1Max}	rpm	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000
Mean no load running torque (with n_1 = 3000 rpm and 20°C gearhead temperature)			T_{012}	Nm	0.3	0.3	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
				in.lb	2.7	2.2	1.8	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	0.9
Max. torsional backlash			j_t	arcmin	≤ 8					≤ 10									
Torsional rigidity			C_{t21}	Nm/ arcmin	6.4	6.4	4.8	4.8	3.8	6.4	6.4	6.4	6.4	4.8	6.4	6.4	4.8	4.8	3.8
				in.lb/ arcmin	55	55	40	40	35	55	55	55	55	40	55	55	40	40	35
Max. axial force [b]			F_{2AMax}	N	1550					1550									
				lb_f	350					350									
Max. radial force [b]			F_{2RMax}	N	3000					3000									
				lb_f	680					680									
Efficiency at full load			η	%	97					95									
Service life (For calculation, see the Chapter "Information")			L_h	h	> 20000					> 20000									
Weight incl. standard adapter plate			m	kg	1.6					2									
				lb_m	3.5					4.4									
Operating noise for i=10 and n_1 = 3000 rpm without load			L_{PA}	dB(A)	≤64														
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 (relates to the drive)	D	16	J_1	kgcm²	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
				10^{-3} in.lb.s²	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Clamping hub diameter (mm)	E	19	J_1	kgcm²	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
				10^{-3} in.lb.s²	0.5	0.5	0.5	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.4

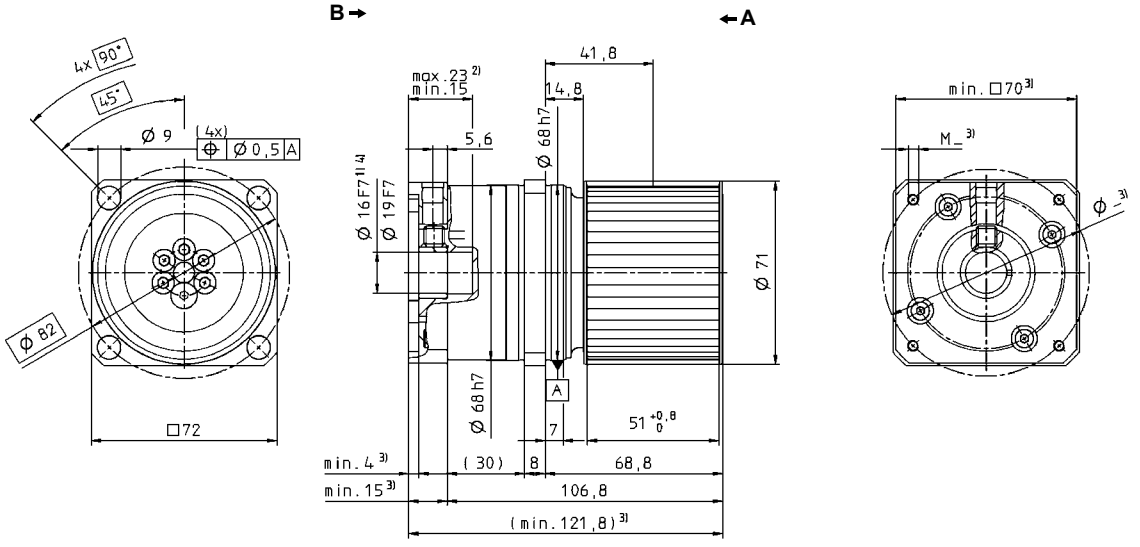
[a] For higher ambient temperatures, please reduce input speed
[b] Refers to center of the output shaft, if n_2 = 100 rpm
[c] With mounted PLPB+ belt pulley and 100 rpm
[d] Other ratios are available on request: i = 28.

View A View B

LPB⁺ 1-stage:



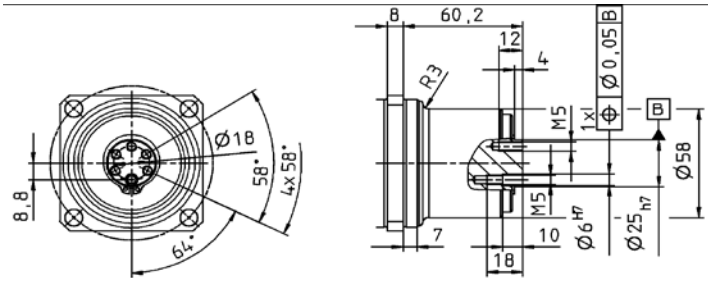
LPB⁺ 2-stage:



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

Belt Pulley PLPB+ 070 Profile AT5-0			
Pitch	*p*	mm	5
Number of teeth	*z*		43
Circumference	*z* * *p*	mm/rotation	215
Inertia	*J*	kgcm²	3.86
Mass	*m*	kg	0.48

Illustration: Output flange without belt pulley



Non-tolerated dimensions ±1mm

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. Motor shaft diameters up to 19mm available – please contact WITTENSTEIN alpha

CAD data is available under www.wittenstein-alpha.com

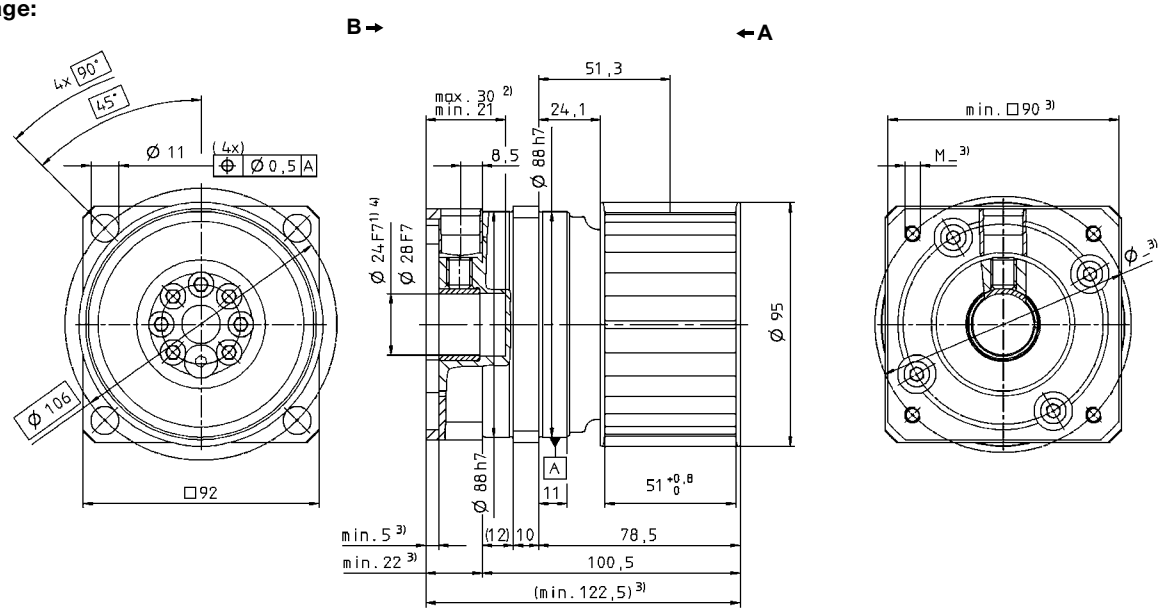
Motor mounting according to operating manual

					1-stage					2-stage									
Ratio			i		**3**	**4**	**5**	**7**	**10**	**9**	**12**	**16**	**20**	**25**	**30**	**40**	**50**	**70**	**100**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B}	Nm	125	115	100	100	90	125	125	115	115	100	125	115	100	100	90
				in.lb	1110	1020	890	890	800	1110	1110	1020	1020	890	1110	1020	890	890	800
Nominal output torque (with n_{1N})			T_{2N}	Nm	63	58	50	50	45	63	63	58	58	50	63	58	50	50	45
				in.lb	560	510	440	440	400	560	560	510	510	440	560	510	440	440	400
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not}	Nm	185	190	190	190	190	190	190	190	190	190	190	190	190	190	190
				in.lb	1640	1680	1680	1680	1680	1680	1680	1680	1680	1680	1680	1680	1680	1680	1680
Nominal input speed (with T_{2N} and 20°C ambient temperature) [a]			n_{1N}	rpm	3400	3400	3400	3400	3400	3400	3400	3400	3400	3400	3400	3400	3400	3400	3400
Max. input speed			n_{1Max}	rpm	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000
Mean no load running torque (with n_1 = 3000 rpm and 20°C gearhead temperature)			T_{012}	Nm	0.6	0.6	0.5	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
				in.lb	5.3	4.9	4.4	3.5	3.4	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.2	2.2	2.2
Max. torsional backlash			j_t	arcmin	≤ 8					≤ 10									
Torsional rigidity			C_{t21}	Nm/ arcmin	12	12	9.5	9.5	8.5	12	12	12	12	9.5	12	12	9.5	9.5	8.5
				in.lb/ arcmin	106	106	84	84	75	106	106	106	106	84	106	106	84	84	75
Max. axial force [b]			F_{2AMax}	N	1900					1900									
				lb_f	430					430									
Max. radial force [b]			F_{2RMax}	N	4300					4300									
				lb_f	970					970									
Efficiency at full load			η	%	97					95									
Service life (For calculation, see the Chapter "Information")			L_h	h	> 20000					> 20000									
Weight incl. standard adapter plate			m	kg	3.3					4.3									
				lb_m	7.3					10									
Operating noise for i=10 and n_1 = 3000 rpm without load			L_{PA}	dB(A)	≤ 66														
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 (relates to the drive)	G	16	J_1	kgcm²	1.8	1.6	1.5	1.5	1.4	1.5	1.5	1.6	1.6	1.5	1.5	1.4	1.4	1.4	1.4
				10^{-3} in.lb.s²	1.6	1.4	1.4	1.3	1.3	1.3	1.3	1.4	1.4	1.3	1.3	1.3	1.3	1.3	1.3
Clamping hub diameter (mm)	H	19	J_1	kgcm²	2	1.9	1.8	1.8	1.7	1.8	1.8	1.9	1.9	1.8	1.8	1.7	1.7	1.7	1.7
				10^{-3} in.lb.s²	1.9	1.7	1.6	1.6	1.5	1.6	1.6	1.6	1.6	1.6	1.6	1.5	1.5	1.5	1.5

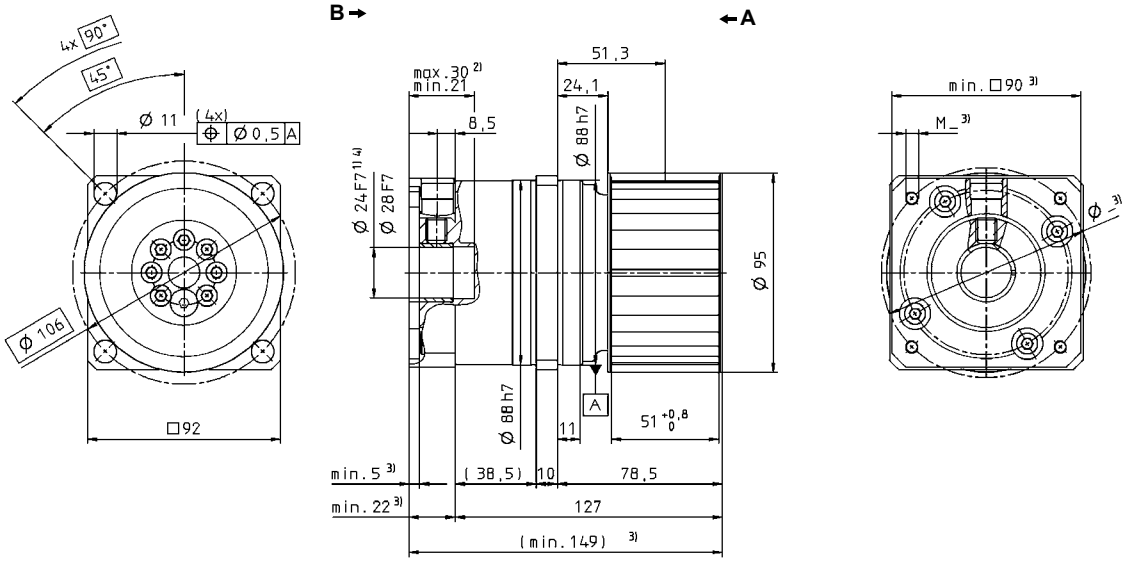
[a] For higher ambient temperatures, please reduce input speed
[b] Refers to center of the output shaft, if n_2 = 100 rpm
[c] With mounted PLPB+ belt pulley and 100 rpm
[d] Other ratios are available on request: i = 28.

View A View B

LPB⁺ 1-stage:

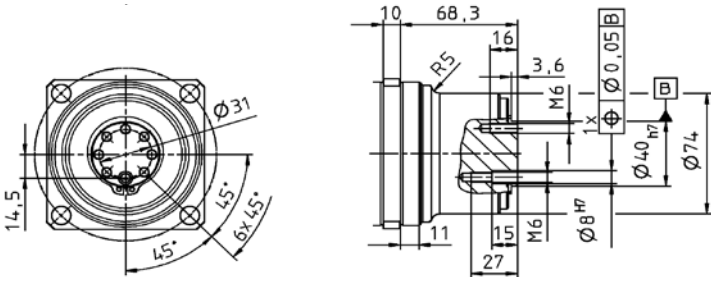


LPB⁺ 2-stage:



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* * *p*	mm/rotation	280
Inertia	*J*	kgcm²	10.95
Mass	*m*	kg	0.82

Non-tolerated dimensions ±1mm

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. Motor shaft diameters up to 28mm available – please contact WITTENSTEIN alpha

CAD data is available under www.wittenstein-alpha.com

Motor mounting according to operating manual

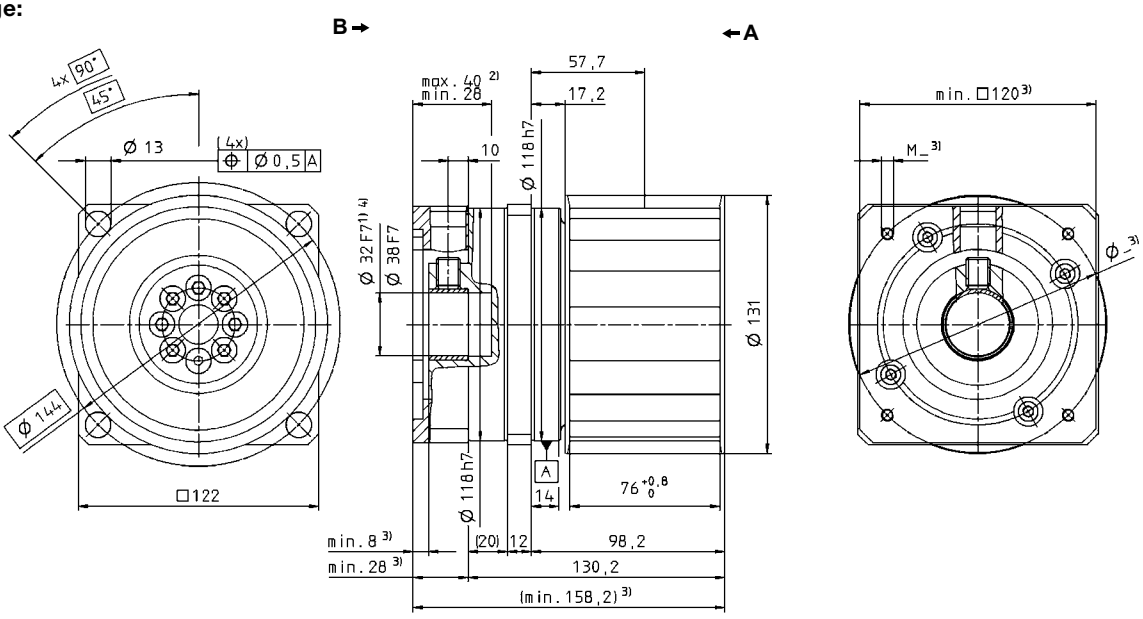
LPB+ 120 MF 1/2-stage

					1-stage					2-stage									
Ratio			***i***		**3**	**4**	**5**	**7**	**10**	**9**	**12**	**16**	**20**	**25**	**30**	**40**	**50**	**70**	**100**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B}	Nm	305	305	250	250	220	305	305	305	305	250	305	305	250	250	220
				in.lb	2700	2700	2210	2210	1950	2700	2700	2700	2700	2210	2700	2700	2210	2210	1950
Nominal output torque (with n_{1N})			T_{2N}	Nm	155	155	125	125	110	155	155	155	155	125	155	155	125	125	110
				in.lb	1370	1370	1110	1110	970	1370	1370	1370	1370	1110	1370	1370	1110	1110	970
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not}	Nm	400	480	480	480	480	480	480	480	480	480	480	480	480	480	480
				in.lb	3540	4250	4250	4250	4250	4250	4250	4250	4250	4250	4250	4250	4250	4250	4250
Nominal input speed (with T_{2N} and 20°C ambient temperature) [a]			n_{1N}	rpm	2600	2600	2600	2600	2600	2600	2600	2600	2600	2600	2600	2600	2600	2600	2600
Max. input speed			n_{1Max}	rpm	4800	4800	4800	4800	4800	4800	4800	4800	4800	4800	4800	4800	4800	4800	4800
Mean no load running torque (with n_1 = 3000 rpm and 20°C gearhead temperature)			T_{012}	Nm	1.1	1.0	0.9	0.8	0.8	0.6	0.6	0.6	0.5	0.5	0.4	0.5	0.4	0.4	0.4
				in.lb	9.7	8.9	8.0	7.1	7.1	5.3	5.3	4.9	4.4	4.4	3.5	4.4	3.5	3.5	3.5
Max. torsional backlash			j_t	arcmin	≤ 8					≤ 10									
Torsional rigidity			C_{t21}	Nm/ arcmin	47	47	36	36	30	47	47	47	47	36	47	47	36	36	30
				in.lb/ arcmin	420	420	320	320	270	420	420	420	420	320	420	420	320	320	270
Max. axial force [b]			F_{2AMax}	N	4000					4000									
				lb_f	900					900									
Max. radial force [b]			F_{2RMax}	N	9500					9500									
				lb_f	2140					2140									
Efficiency at full load			η	%	97					95									
Service life (For calculation, see the Chapter "Information")			L_h	h	> 20000					> 20000									
Weight incl. standard adapter plate			*m*	kg	7.3					9.7									
				lb_m	16					21									
Operating noise for i=10 and n_1 = 3000 rpm without load			L_{PA}	dB(A)	≤ 68														
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 (relates to the drive)	I	32	J_1	$kgcm^2$	6.8	5.9	5.6	5.2	5.1	5.4	5.4	5.5	5.5	5.3	5.3	5.0	5.0	5.0	5.0
				10^{-3} in.lb.s²	6.1	5.2	4.9	4.6	4.5	4.7	4.7	4.9	4.9	4.7	4.7	4.4	4.4	4.4	4.4
Clamping hub diameter (mm)	K	38	J_1	$kgcm^2$	7.7	6.8	6.4	6.1	5.9	6.2	6.2	6.4	6.4	6.2	6.2	5.9	5.9	5.9	5.9
				10^{-3} in.lb.s²	6.8	6.0	5.7	5.4	5.2	5.5	5.5	5.7	5.7	5.5	5.5	5.2	5.2	5.2	5.2

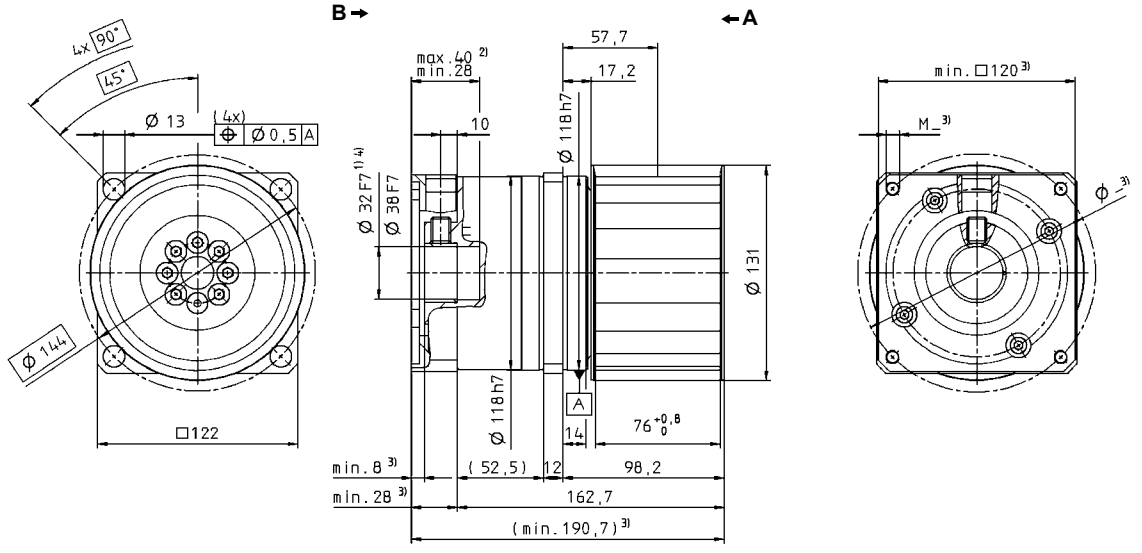
[a] For higher ambient temperatures, please reduce input speed
[b] Refers to center of the output shaft, if n_2 = 100 rpm
[c] With mounted PLPB+ belt pulley and 100 rpm
[d] Other ratios are available on request: i = 28.

View A View B

LPB⁺ 1-stage:

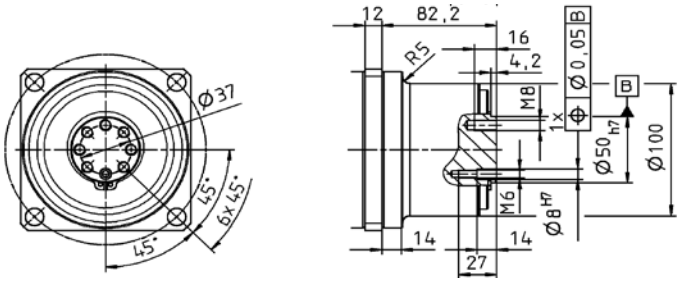


LPB⁺ 2-stage:



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* * *p*	mm/rotation	380
Inertia	*J*	kgcm²	50.62
Mass	*m*	kg	2.61

Non-tolerated dimensions ±1mm

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. Motor shaft diameters up to 38mm available – please contact WITTENSTEIN alpha

CAD data is available under www.wittenstein-alpha.com

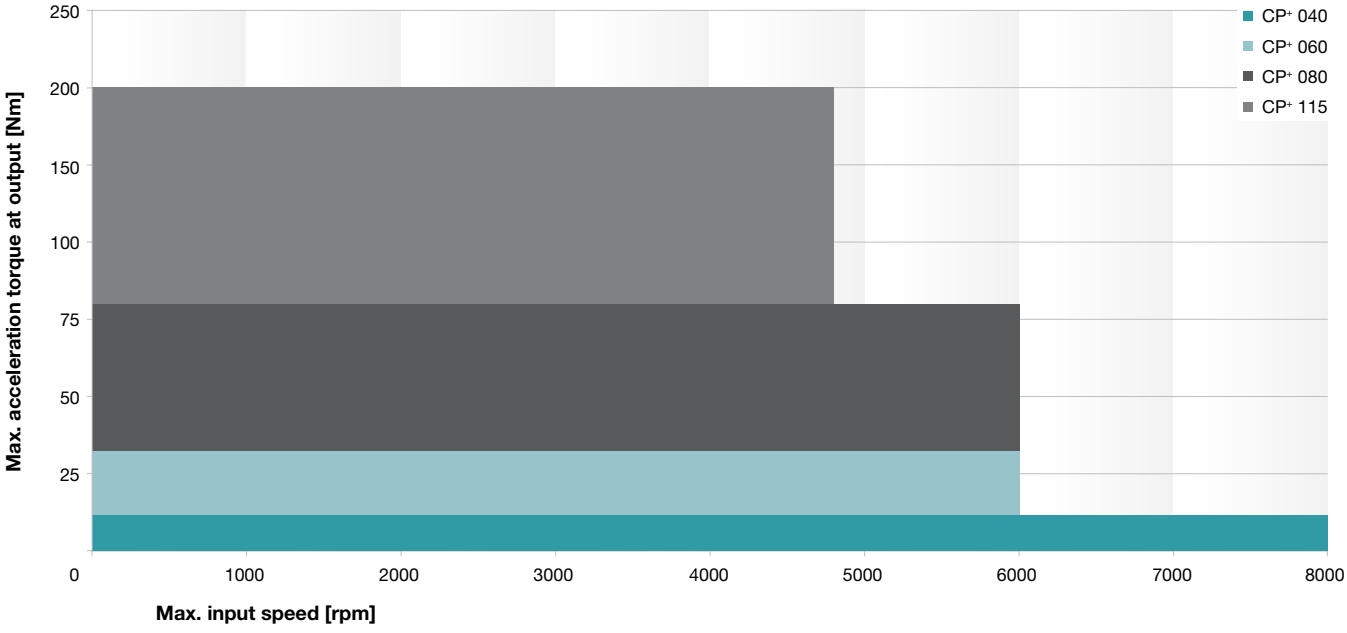
Motor mounting according to operating manual

alphira® – The basic class among planetary gearheads

The alphira® gearhead combines proven gearing technology with the cost-effectiveness requirements in the economy servo sector.
The result is a lightweight aluminum gearhead with a high power density and maximum reliability.

Quick size selection

alphira® (example for i = 5)
For applications in cyclic operation (ED ≥ 60%)



Versions and Applications

alphira®

- Economical servo applications
- Cyclic and continuous operation
- High nominal speeds
- Economical positioning accuracy

Comparison

Features		**alphira®** Catalog page 138
Ratios [c]		4 – 100
Torsional backlash [arcmin] [c]	Standard	≤ 20
	Reduced	–
Output type		
Keywayed output shaft		•
Input type		
Motor mounted version		•
Type		
Food-grade lubrication [a] [b]		•
Accessories		
Coupling		•
NEMA flange		•

[a] Power reduction: technical data available upon request [b] Please contact WITTENSTEIN alpha [c] In relation to reference sizes

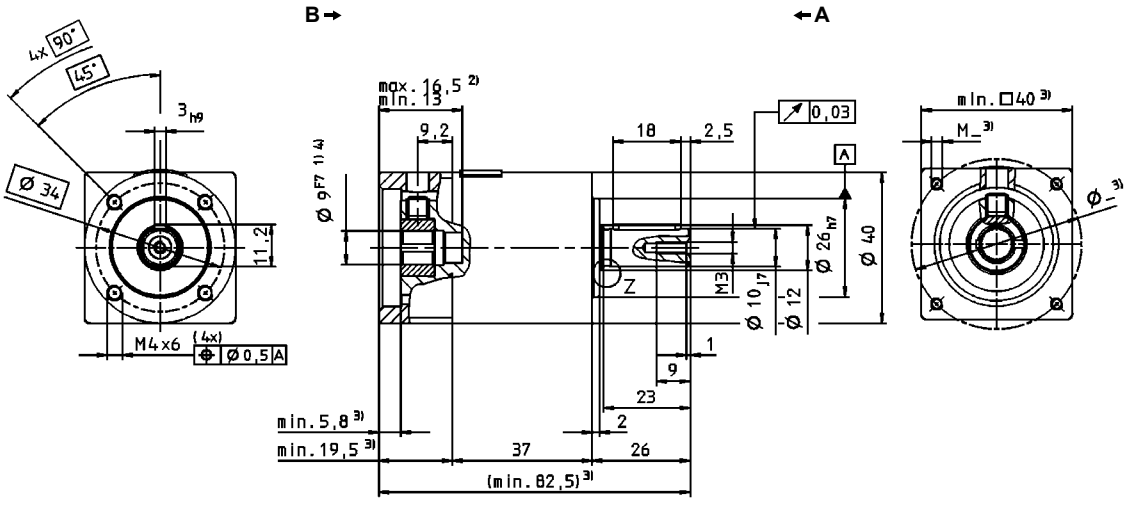
			1-stage				2-stage						
Ratio	***i***		**4**	**5**	**7**	**10**	**16**	**20**	**25**	**35**	**50**	**70**	**100**
Max. acceleration torque (max. 1000 cycles per hour)	T_{2B}	Nm	10.5	11.5	11.5	10.5	10.5	10.5	11.5	11.5	11.5	11.5	10.5
		in.lb	93	102	102	93	93	93	102	102	102	102	93
Nominal output torque (with n_{1N})	T_{2N}	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 (permitted 1000 times during the service life of the gearhead)	T_{2Not}	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 (with T_{2N} and 20°C ambient temperature) [a]	n_{1N}	rpm	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000
Max. input speed	n_{1Max}	rpm	8000	8000	8000	8000	8000	8000	8000	8000	8000	8000	8000
Mean no load running torque (with n_1 = 3000 rpm and 20°C gearhead temperature)	T_{012}	Nm	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
		in.lb	0.05	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44
Max. torsional backlash	j_t	arcmin	≤ 20				≤ 25						
Torsional rigidity	C_{t21}	Nm/ arcmin	0.58	0.58	0.58	0.52	0.58	0.58	0.58	0.58	0.58	0.58	0.52
		in.lb/ arcmin	5.1	5.1	5.1	4.6	5.1	5.1	5.1	5.1	5.1	5.1	4.6
Max. axial force [b]	F_{2AMax}	N	230				230						
		lb_f	51				51						
Max. radial force [b]	F_{2RMax}	N	200				200						
		lb_f	45				45						
Efficiency at full load	η	%	97				95						
Service life (For calculation, see the Chapter “Information”)	L_h	h	> 20000				> 20000						
Weight incl. standard adapter plate	m	kg	0.31				0.52						
		lb_m	0.69				1.15						
Operating noise (with n_1 = 3000 rpm no load)	L_{PA}	dB(A)	≤ 66										
Max. permitted housing temperature		°C	+90										
		F	194										
Ambient temperature		°C	-15 to +40										
		F	5 to 104										
Lubrication			Lubricated for life										
Paint			Aluminum										
Direction of rotation			Motor and gearhead same direction										
Protection class			IP 64										
Moment of inertia (relates to the drive)	J_1	$kgcm^2$	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
		10^{-3} in.lb.s²	0.036	0.036	0.036	0.036	0.036	0.036	0.036	0.036	0.036	0.036	0.036

[a] For higher ambient temperatures, please reduce input speed

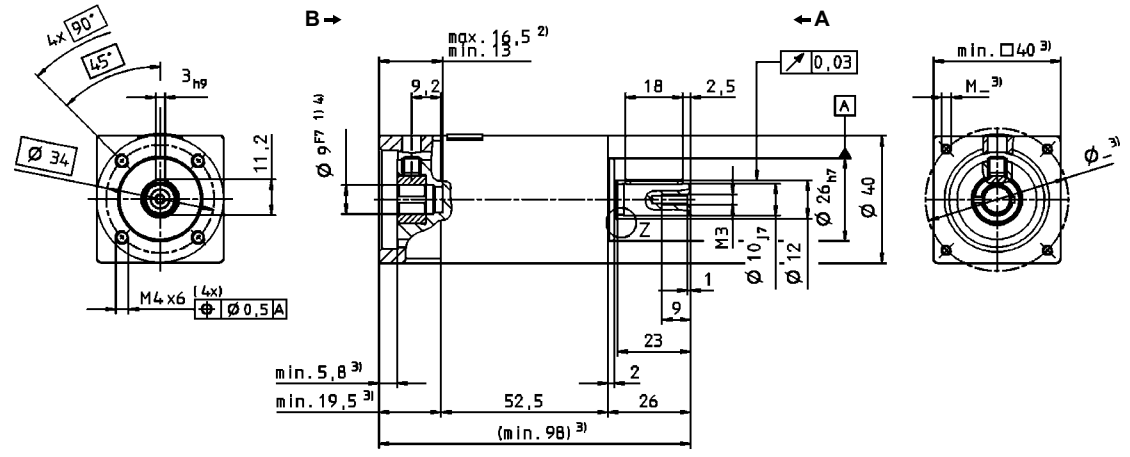
[b] Relates to center of the output shaft or flange, at 100 rpm

View A View B

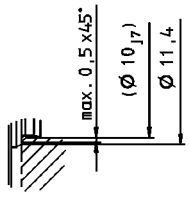
1-stage:



2-stage:



Z:



Non-tolerated dimensions ±1mm

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

Motor mounting according to operating manual

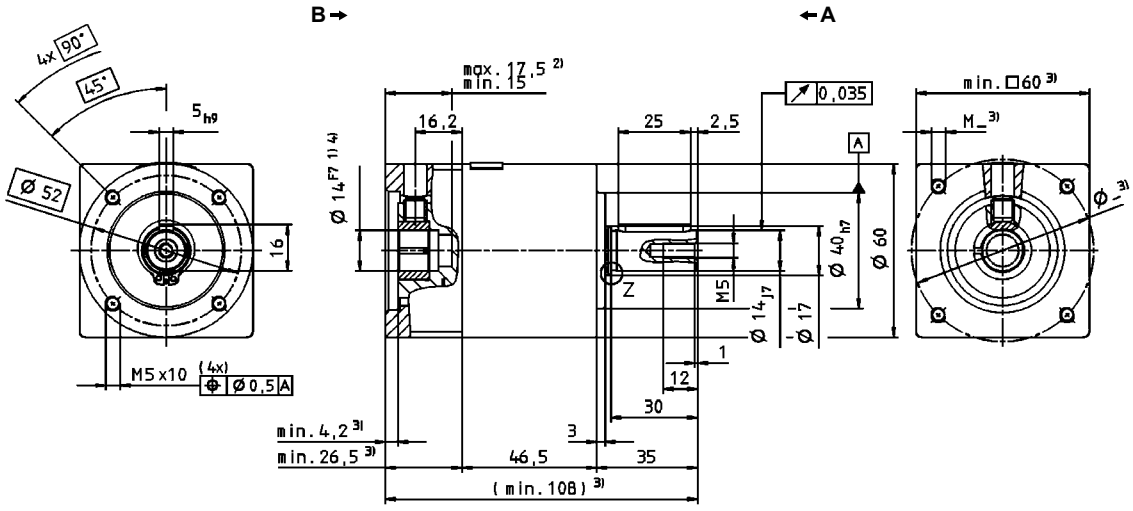
			1-stage				2-stage						
Ratio	***i***		**4**	**5**	**7**	**10**	**16**	**20**	**25**	**35**	**50**	**70**	**100**
Max. acceleration torque (max. 1000 cycles per hour)	T_{2B}	Nm	32	32	32	29	32	32	32	32	32	32	29
		in.lb	283	283	283	257	283	283	283	283	283	283	257
Nominal output torque (with n_{1N})	T_{2N}	Nm	16	16	16	15	16	16	16	16	16	16	15
		in.lb	142	142	142	133	142	142	142	142	142	142	133
Emergency stop torque (permitted 1000 times during the service life of the gearhead)	T_{2Not}	Nm	75	75	75	75	75	75	75	75	75	75	75
		in.lb	664	664	664	664	664	664	664	664	664	664	664
Nominal input speed (with T_{2N} and 20°C ambient temperature) [a]	n_{1N}	rpm	3700	3700	3700	3700	3700	3700	3700	3700	3700	3700	3700
Max. input speed	n_{1Max}	rpm	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000
Mean no load running torque (with n_1 = 3000 rpm and 20°C gearhead temperature)	T_{012}	Nm	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11
		in.lb	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Max. torsional backlash	j_t	arcmin	≤ 20				≤ 25						
Torsional rigidity	C_{t21}	Nm/ arcmin	2.1	2.1	2.1	1.9	2.1	2.1	2.1	2.1	2.1	2.1	1.9
		in.lb/ arcmin	19	19	19	17	19	19	19	19	19	19	17
Max. axial force [b]	F_{2AMax}	N	750				750						
		lb_f	169				169						
Max. radial force [b]	F_{2RMax}	N	650				650						
		lb_f	146				146						
Efficiency at full load	η	%	97				95						
Service life (For calculation, see the Chapter “Information”)	L_h	h	> 20000				> 20000						
Weight incl. standard adapter plate	m	kg	0.88				1.1						
		lb_m	1.9				2.4						
Operating noise (with n_1 = 3000 rpm no load)	L_{PA}	dB(A)	≤ 68										
Max. permitted housing temperature		°C	+90										
		F	194										
Ambient temperature		°C	-15 to +40										
		F	5 to 104										
Lubrication			Lubricated for life										
Paint			Aluminum										
Direction of rotation			Motor and gearhead same direction										
Protection class			IP 64										
Moment of inertia (relates to the drive)	J_1	$kgcm^2$	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17
		10^{-3} in.lb.s²	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15

[a] For higher ambient temperatures, please reduce input speed

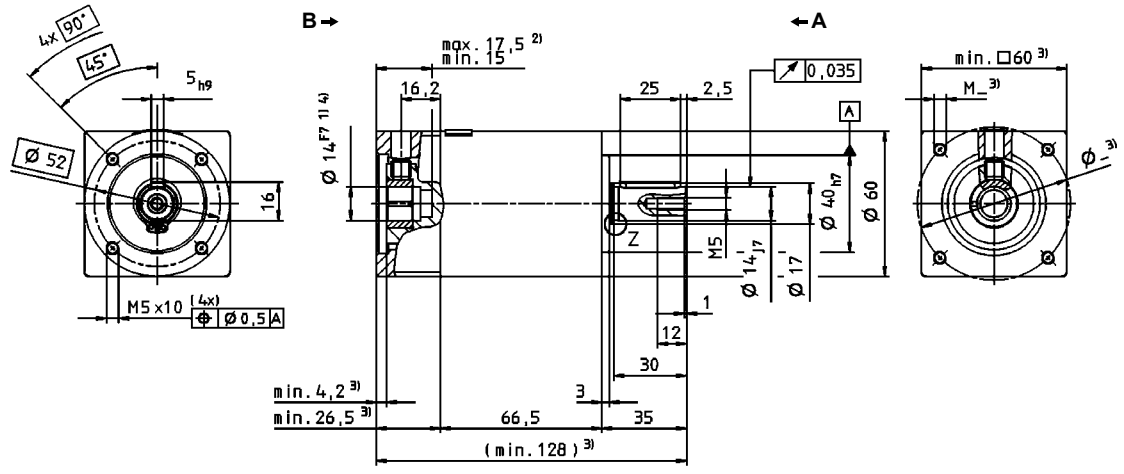
[b] Relates to center of the output shaft or flange, at 100 rpm

View A View B

1-stage:



2-stage:



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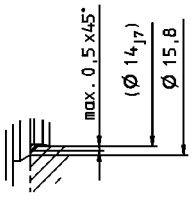


Non-tolerated dimensions ±1mm

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

Motor mounting according to operating manual

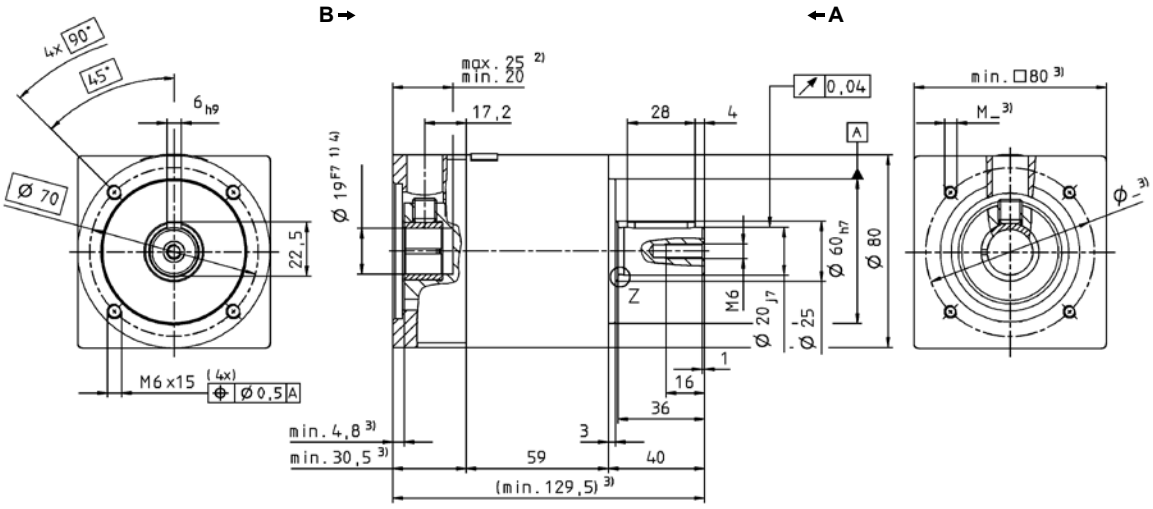
			1-stage				2-stage						
Ratio	***i***		**4**	**5**	**7**	**10**	**16**	**20**	**25**	**35**	**50**	**70**	**100**
Max. acceleration torque (max. 1000 cycles per hour)	T_{2B}	Nm	80	80	80	72	80	80	80	80	80	80	72
		in.lb	708	708	708	637	708	708	708	708	708	708	637
Nominal output torque (with n_{1N})	T_{2N}	Nm	40	40	40	35	40	40	40	40	40	40	35
		in.lb	354	354	354	310	354	354	354	354	354	354	310
Emergency stop torque (permitted 1000 times during the service life of the gearhead)	T_{2Not}	Nm	190	190	190	190	190	190	190	190	190	190	190
		in.lb	1682	1682	1682	1682	1682	1682	1682	1682	1682	1682	1682
Nominal input speed (with T_{2N} and 20°C ambient temperature) [a]	n_{1N}	rpm	3400	3400	3400	3400	3400	3400	3400	3400	3400	3400	3400
Max. input speed	n_{1Max}	rpm	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000
Mean no load running torque (with n_1 = 3000 rpm and 20°C gearhead temperature)	T_{012}	Nm	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28
		in.lb	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
Max. torsional backlash	j_t	arcmin	≤ 20				≤ 25						
Torsional rigidity	C_{t21}	Nm/ arcmin	6.1	6.1	6.1	5.5	6.1	6.1	6.1	6.1	6.1	6.1	5.5
		in.lb/ arcmin	54	54	54	49	54	54	54	54	54	54	49
Max. axial force [b]	F_{2AMax}	N	1600				1600						
		lb_f	360				360						
Max. radial force [b]	F_{2RMax}	N	1200				1200						
		lb_f	270				270						
Efficiency at full load	η	%	97				95						
Service life (For calculation, see the Chapter "Information")	L_h	h	> 20000				> 20000						
Weight incl. standard adapter plate	m	kg	2.1				2.8						
		lb_m	4.6				6.2						
Operating noise (with n_1 = 3000 rpm no load)	L_{PA}	dB(A)	≤ 70										
Max. permitted housing temperature		°C	+90										
		F	194										
Ambient temperature		°C	-15 to +40										
		F	5 to 104										
Lubrication			Lubricated for life										
Paint			Aluminum										
Direction of rotation			Motor and gearhead same direction										
Protection class			IP 64										
Moment of inertia (relates to the drive)	J_1	kgcm²	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54
		10^{-3} in.lb.s²	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48	0.48

[a] For higher ambient temperatures, please reduce input speed

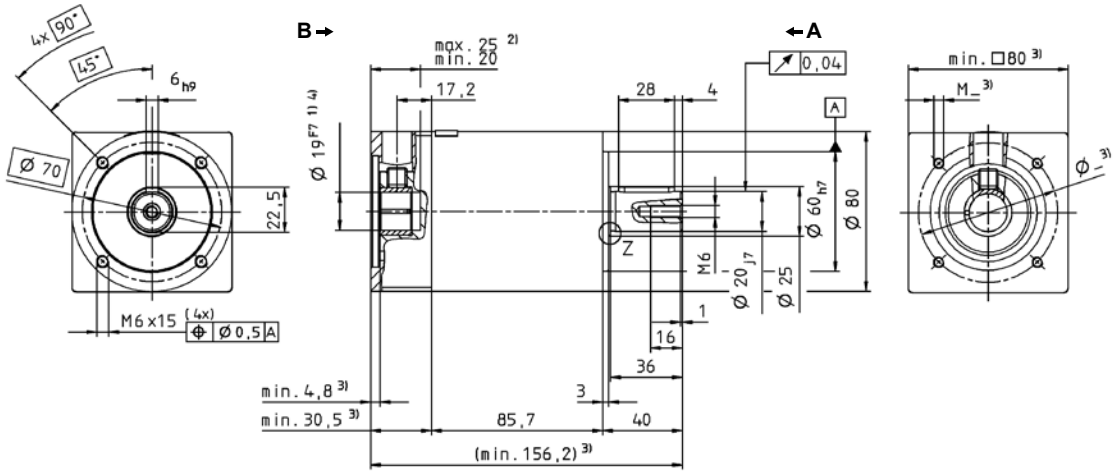
[b] Relates to center of the output shaft or flange, at 100 rpm

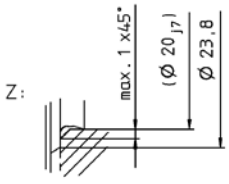
View A View B

1-stage:



2-stage:





Non-tolerated dimensions ±1mm

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

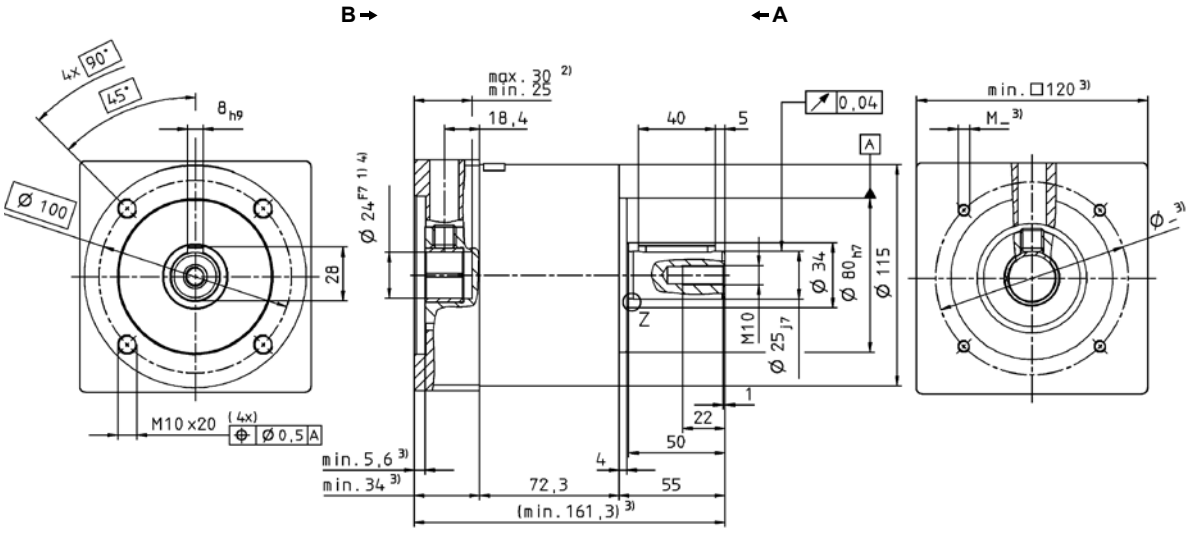
Motor mounting according to operating manual

			1-stage				2-stage						
Ratio	***i***		**4**	**5**	**7**	**10**	**16**	**20**	**25**	**35**	**50**	**70**	**100**
Max. acceleration torque (max. 1000 cycles per hour)	T_{2B}	Nm	200	200	200	180	200	200	200	200	200	200	180
		in.lb	1770	1770	1770	1593	1770	1770	1770	1770	1770	1770	1593
Nominal output torque (with n_{1N})	T_{2N}	Nm	100	100	100	90	100	100	100	100	100	100	90
		in.lb	885	885	885	797	885	885	885	885	885	885	797
Emergency stop torque (permitted 1000 times during the service life of the gearhead)	T_{2Not}	Nm	480	480	480	480	480	480	480	480	480	480	480
		in.lb	4248	4248	4248	4248	4248	4248	4248	4248	4248	4248	4248
Nominal input speed (with T_{2N} and 20°C ambient temperature) [a]	n_{1N}	rpm	2600	2600	2600	2600	2600	2600	2600	2600	2600	2600	2600
Max. input speed	n_{1Max}	rpm	4800	4800	4800	4800	4800	4800	4800	4800	4800	4800	4800
Mean no load running torque (with n_1 = 3000 rpm and 20°C gearhead temperature)	T_{012}	Nm	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
		in.lb	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4
Max. torsional backlash	j_t	arcmin	≤ 20				≤ 25						
Torsional rigidity	C_{t21}	Nm/ arcmin	16.5	16.5	16.5	14.5	16.5	16.5	16.5	16.5	16.5	16.5	14.5
		in.lb/ arcmin	146	146	146	128	146	146	146	146	146	146	128
Max. axial force [b]	F_{2AMax}	N	2100				2100						
		lb_f	472				472						
Max. radial force [b]	F_{2RMax}	N	1550				1550						
		lb_f	349				349						
Efficiency at full load	η	%	97				95						
Service life (For calculation, see the Chapter "Information")	L_h	h	> 20000				> 20000						
Weight incl. standard adapter plate	m	kg	5.2				6.9						
		lb_m	11.5				15.2						
Operating noise (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			Aluminum										
Direction of rotation			Motor and gearhead same direction										
Protection class			IP 64										
Moment of inertia (relates to the drive)	J_1	$kgcm^2$	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8
		10^{-3} in.lb.s²	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6

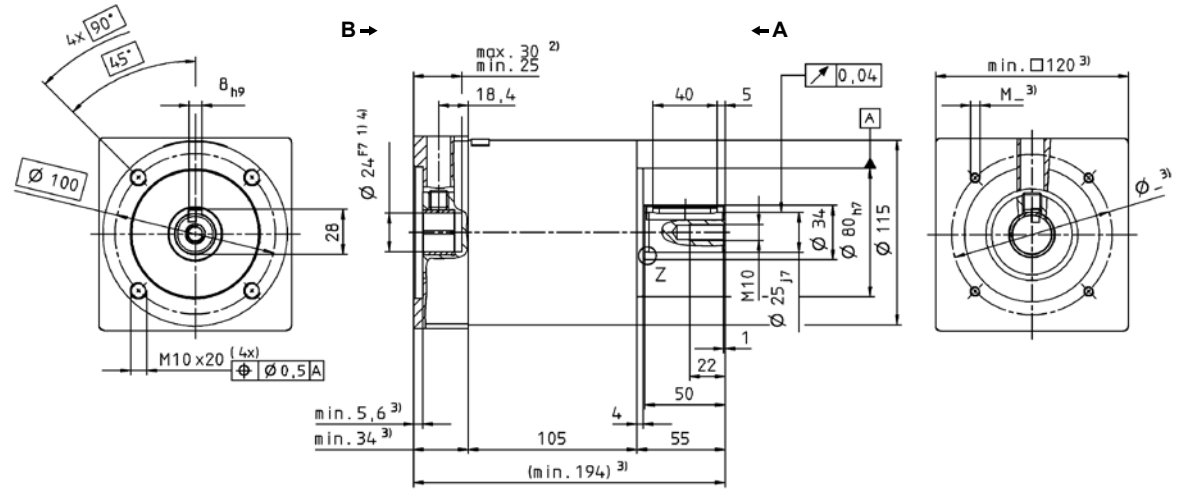
[a] For higher ambient temperatures, please reduce input speed

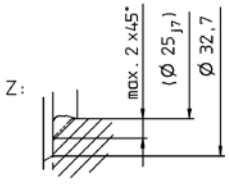
[b] Relates to center of the output shaft or flange, at 100 rpm

1-stage:



2-stage:





Non-tolerated dimensions ±1mm

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

Motor mounting according to operating manual

Servo right-angle gearheads High End

RPK+
The new high performance right-angle gearhead

The RPK+ sets standards in terms of power density, modularity and ease of installation – together with even greater design freedom.

TK+, TPK+ and TPK+ HIGH TORQUE
New right-angle precision as flange version

The successor to our versatile hypoid gearhead with TP+ compatible output flange and hollow shaft (TK+), with optional planetary stage (TPK+/TPK+ HIGH TORQUE).

SK+ and SPK+
New right-angle precision as classic shaft version

The successor to our versatile hypoid gearhead with SP+ compatible output shaft (SK+), with optional planetary stage (SPK+).

Power density ◄

Increased productivity

Do you need a machine that operates at maximum productivity? Your servo right-angle gearhead offers 200% more torque, 100% faster speeds than equivalent products and thus creates the perfect conditions for maximum manufacturing efficiency.

Simple and convenient

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

HG⁺
New hollow shaft precision

The successor to our versatile hypoid gearhead with hollow shaft on one/both sides.

V-Drive⁺
The plus stands for torque

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

Output type:
VDH⁺: Hollow shaft, smooth or keywayed
VDT⁺: Output flange, flanged hollow shaft
VDS⁺: Output shaft, smooth, keywayed, involute

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.

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.

RPK+ – The new high performance right-angle gearhead

Sets standards in terms of power density, modularity and easy installation.

The new standard, also available as a right-angle version

The new RPK+ combines the advantages of the RP+ high performance planetary gearhead with state-of-the-art hypoid gearing. The new interface to the application simplifies installation and ensures maximum power density.

The RPK+ impresses with maximum power density

- If your drive requires maximum performance
- If you value world-class engineering
- If you require an even more compact system

Performance data for right-angle version

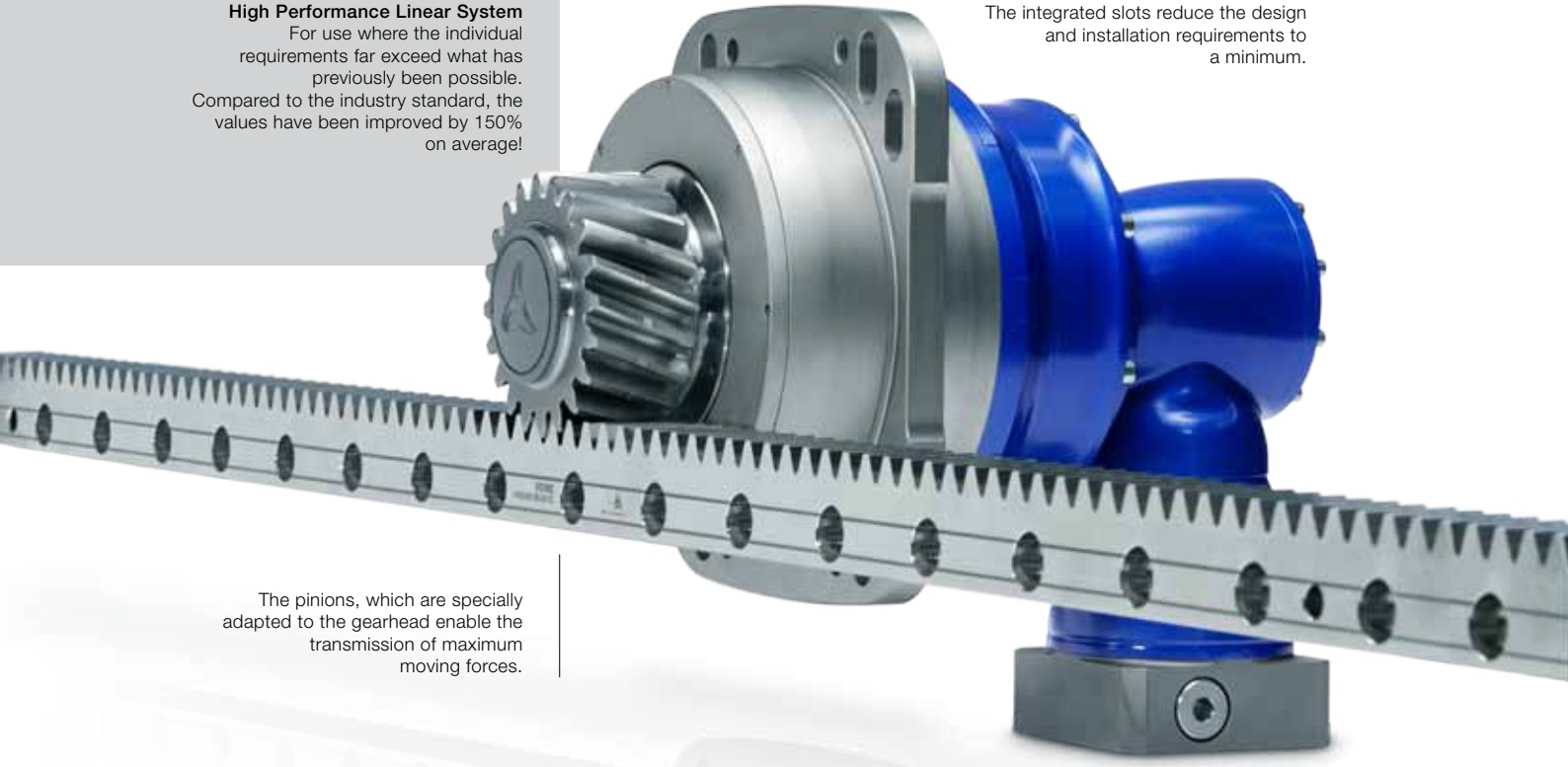
Torsional backlash [arcmin]	< 3
Ratios [-]	66-5,500
Max. torque [N]	10,000
Max. input speed [rpm]	6,000
Efficiency [%]	≤ 92

The geometry of the RPK+ output flange is perfectly adapted to the high power density.

The RPK+ high performance right-angle gearhead is optimized for rack and pinion applications.

High Performance Linear System
For use where the individual requirements far exceed what has previously been possible. Compared to the industry standard, the values have been improved by 150% on average!

The integrated slots reduce the design and installation requirements to a minimum.



The pinions, which are specially adapted to the gearhead enable the transmission of maximum moving forces.

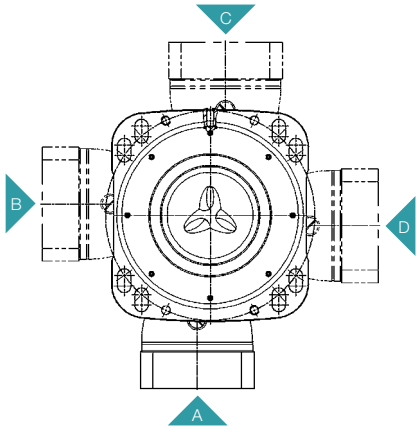
Further information is available in the High Performance Linear System catalog or on the Internet at www.rack-pinion.com

Performance data for linear system

Positioning accuracy [µm]	< 5*
Ratios [-]	66-5,500
Max. moving force per drive [N]	112,000
Movement speed [m/min]	30
Efficiency [%]	≤ 92

* Direct measuring system required

Flexibility during installation



The RP+ is also available as the RPM+ actuator version. The RPM+ combines the advantages of the RP+ series in an even more compact design. Thanks to its special design, the permanently excited servo motor ensures maximum power density.

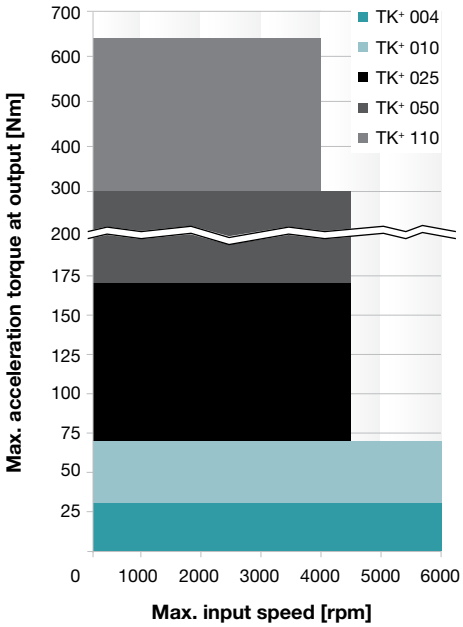
Sets standards in terms of power density, modularity and easy installation.

TK+/TPK+/TPK+ HIGH TORQUE –
new right-angle precision as flange version

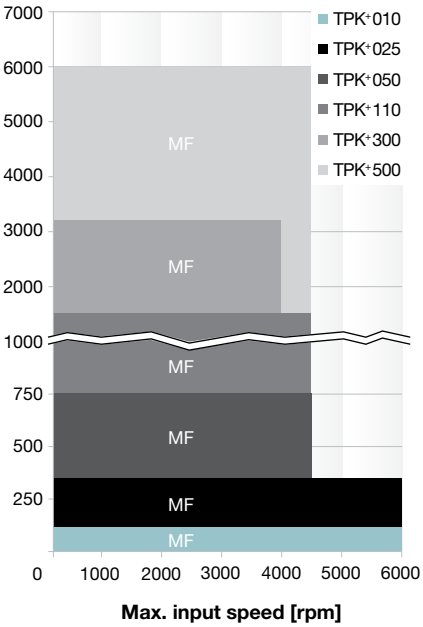
The successor to our versatile hypoid gearhead with TP+ compatible output flange and hollow shaft, with optional planetary stage (TPK+).

Quick size selection

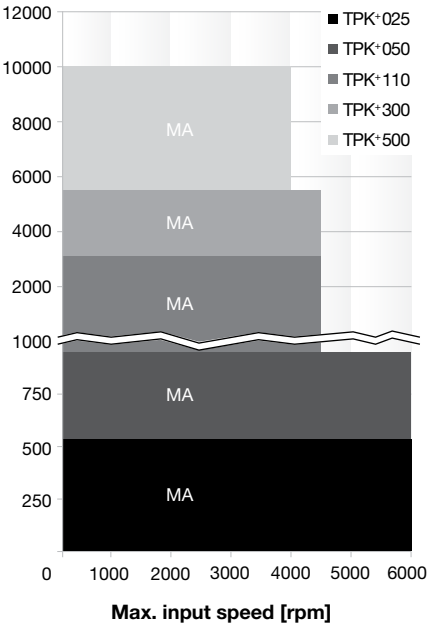
TK+ (ex. i = 5)
For applications in cyclic operation (ED ≤ 60%)



TPK+ MF (ex. i = 25)
For applications in cyclic operation (ED ≤ 60%)



TPK+ HIGH TORQUE MA (ex. i = 88)
For applications in cyclic operation (ED ≤ 60%)



Versions and Applications

TK+

- High power density
- Cyclic applications
- Reverse operation
- Highly dynamic applications
- Hollow shaft version

TPK+
MF version

- High positioning accuracy
- Cyclic applications
- Highly dynamic applications

TPK+ HIGH TORQUE
MA version

- Maximum power density
- Maximum positioning accuracy

Comparison

Features		**TK+** from page 152	**TPK+ MF version** from page 162	**TPK+ HIGH TORQUE MA version** from page 188
Ratios [c]		3 - 100	12 - 10000	66 - 5500
Torsional backlash [arcmin] [c]	Standard	≤ 4	≤ 4	≤ 1,3
	Reduced	-	≤ 2	-
Output type				
Smooth output shaft, rear side		•	•	•
Keywayed output shaft, rear side		•	•	•
Output flange			•	•
Hollow shaft interface, rear side Connected via shrink disc		•	•	•
Flanged hollow shaft		•		
Closed cover, rear side		•	•	•
System output with pinion			•	•
Input type				
Motor mounted version		•	•	•
Type				
ATEX [a]		•		
Food-grade lubrication [a] [b]		•	•	•
Corrosion resistant [a] [b]		•	•	•
Accessories				
Coupling		•	•	•
Rack		•	•	•
Pinion		•	•	•
Shrink disc		•	•	•
torqXis sensor flange		•	•	•
Flange shaft		•	•	•
Intermediate plate for cooling connection		•	•	•
Spindle system		•		

[a] Power reduction: technical data available upon request [b] Please contact WITTENSTEIN alpha [c] In relation to reference sizes

TK+ 004 MF 1/2-stage

					1-stage					2-stage									
Ratio [a]			*i*		**3**	**4**	**5**	**7**	**10**	**12**	**16**	**20**	**25**	**28**	**35**	**40**	**50**	**70**	**100**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B}	Nm	30	30	30	25	20	30	30	30	30	30	30	30	30	25	20
				in.lb	266	266	266	221	177	266	266	266	266	266	266	266	266	221	177
Nominal output torque (with n_{1N})			T_{2N}	Nm	22	22	22	20	15	22	22	22	22	22	22	22	22	20	15
				in.lb	195	195	195	177	133	195	195	195	195	195	195	195	195	177	133
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not}	Nm	40	50	50	45	40	50	50	50	50	50	50	50	50	45	40
				in.lb	354	443	443	398	354	443	443	443	443	443	443	443	443	398	354
Nominal input speed (with T_{2N} and 20 °C ambient temperature) [b), c)]			n_{1N}	rpm	2200	2400	2700	2700	2700	4400	4400	4400	4400	4400	4400	4400	4800	5500	5500
Max. continuous speed (with 20 % T_{2N} and 20 °C ambient temperature)			n_{1Ncym}	rpm	2700	3100	3600	3100	3100	5000	5000	5000	5000	5000	5000	5000	5000	5500	5500
Max. input speed			n_{1Max}	rpm	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000
Mean no load running torque (with n_1 = 3000 rpm and 20 °C gearhead temperature) [d)]			T_{012}	Nm	1.4	1.3	1.2	1.4	1.3	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1
				in.lb	12.4	11.5	10.6	12.4	11.5	1.8	1.8	1.8	1.8	1.8	1.8	0.9	0.9	0.9	0.9
Max. torsional backlash			j_t	arcmin	≤ 5														
Torsional rigidity			C_{t21}	Nm/ arcmin	2.6	2.8	3.0	2.6	2.3	2.8	2.8	2.8	2.8	2.8	2.8	2.8	3.0	2.6	2.3
				in.lb/ arcmin	23	25	26	23	20	25	25	25	25	25	25	25	26	23	20
Max. axial force [e)]			F_{2AMax}	N	2400														
				lb_f	540														
Max. radial force [e)]			F_{2RMax}	N	2700														
				lb_f	608														
Max. tilting moment			M_{2KMax}	Nm	251														
				in.lb	2220														
Efficiency at full load			η	%	96					94									
Service life (For calculation, see the Chapter "Information")			L_h	h	> 20000														
Weight incl. standard adapter plate			*m*	kg	2.9					3.2									
				lb_m	6.4					7.1									
Operating noise (with n_1 = 3000 rpm no load)			L_{PA}	dB(A)	≤ 64														
Max. permitted housing temperature				°C	+90														
				F	194														
Ambient temperature				°C	0 to +40														
				F	32 to 104														
Lubrication					Lubricated for life														
Paint					Blue RAL 5002														
Direction of rotation					Motor and gearhead opposite directions														
Protection class					IP 65														
Moment of inertia (relates to the drive) Clamping hub diameter [mm]	B	11	J_1	kgcm²	–	–	–	–	–	0.09	0.09	0.08	0.07	0.06	0.06	0.06	0.06	0.06	0.06
				10^{-3} in.lb.s²						0.08	0.08	0.07	0.07	0.06	0.06	0.05	0.05	0.05	0.05
	C	14	J_1	kgcm²	0.57	0.46	0.41	0.37	0.35	0.21	0.20	0.19	0.19	0.18	0.18	0.17	0.17	0.17	0.17
				10^{-3} in.lb.s²	0.50	0.41	0.36	0.33	0.31	0.18	0.18	0.17	0.16	0.16	0.16	0.15	0.15	0.15	0.15
	E	19	J_1	kgcm²	0.92	0.82	0.76	0.72	0.70	–	–	–	–	–	–	–	–	–	–
				10^{-3} in.lb.s²	0.81	0.72	0.68	0.64	0.62										

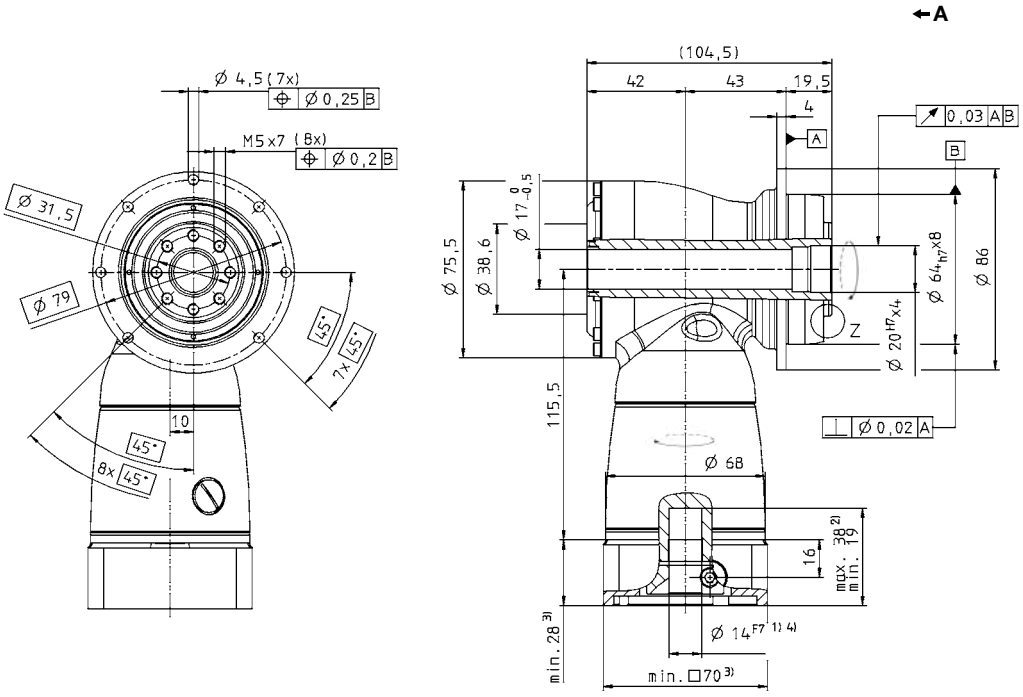
Please contact us for information on the best configuration for S1 conditions of use (continuous operation).

[a)] Other ratios available on request
[b)] Higher speeds are possible if the nominal torque is reduced
[c)] For higher ambient temperatures, please reduce input speed
[d)] Idling torques decrease during operation
[e)] Refers to center of the output shaft or flange

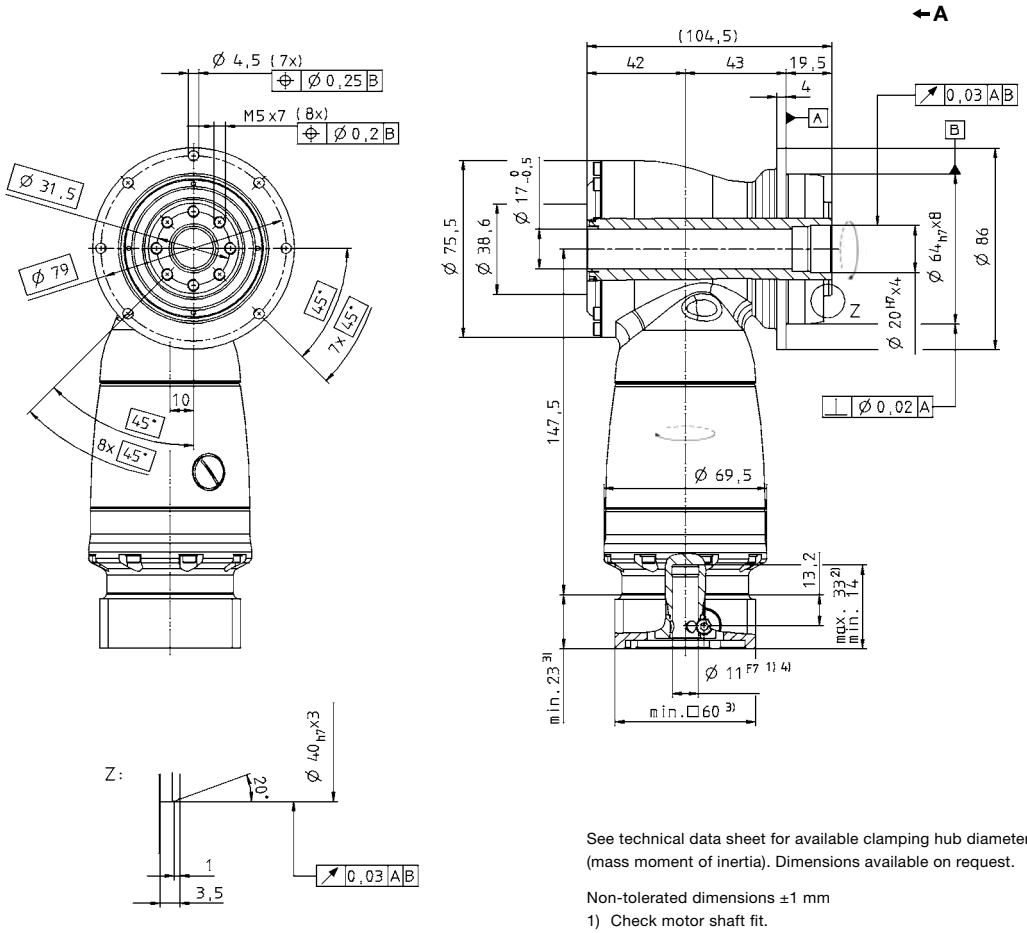
All technical data for front output side applies.
Technical data for rearward output versions, see page 386.

View A

1-stage:



2-stage:



See technical data sheet for available clamping hub diameters (mass moment of inertia). Dimensions available on request.

Non-tolerated dimensions ±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 with a minimum thickness of 1 mm.

CAD data is available under www.wittenstein-alpha.com

Motor mounting according to operating manual

TK+ 010 MF 1/2-stage

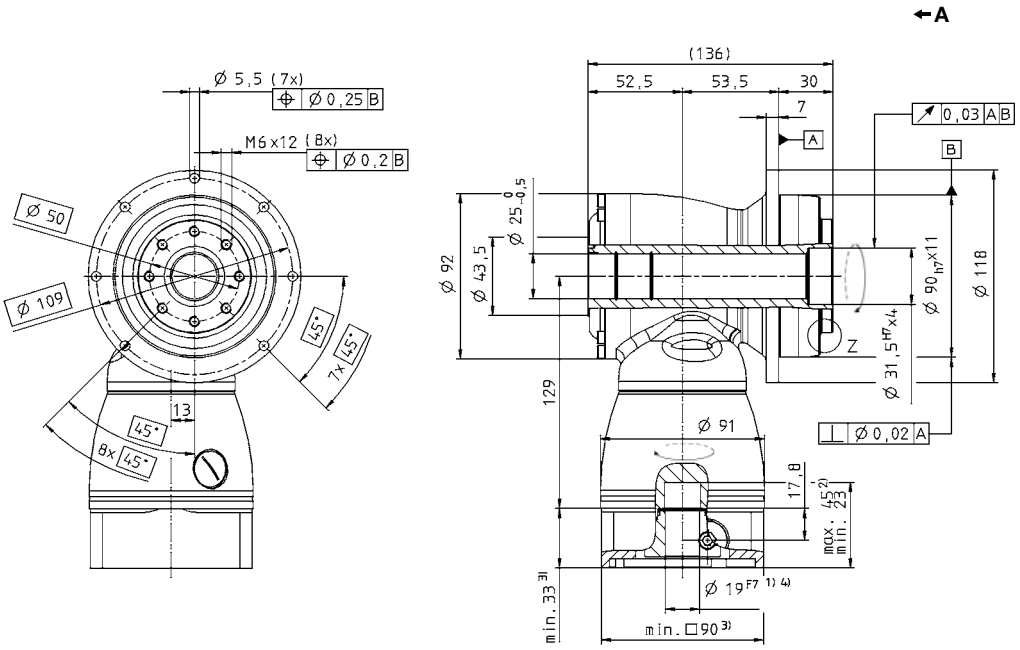
					1-stage					2-stage									
Ratio [a]			*i*		**3**	**4**	**5**	**7**	**10**	**12**	**16**	**20**	**25**	**28**	**35**	**40**	**50**	**70**	**100**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B}	Nm	70	70	70	60	50	70	70	70	70	70	70	70	70	60	50
				in.lb	620	620	620	531	443	620	620	620	620	620	620	620	620	531	443
Nominal output torque (with n_{1N})			T_{2N}	Nm	50	50	50	45	40	50	50	50	50	50	50	50	50	45	40
				in.lb	443	443	443	398	354	443	443	443	443	443	443	443	443	398	354
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not}	Nm	95	115	115	110	100	115	115	115	115	115	115	115	115	110	100
				in.lb	841	1018	1018	974	885	1018	1018	1018	1018	1018	1018	1018	1018	974	885
Nominal input speed (with T_{2N} and 20 °C ambient temperature) [b), c)]			n_{1N}	rpm	2100	2200	2500	2500	2500	3500	3500	3500	3500	3500	3500	3500	3800	4500	4500
Max. continuous speed (with 20 % T_{2N} and 20 °C ambient temperature)			n_{1Ncym}	rpm	2700	3100	3600	3100	3100	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500
Max. input speed			n_{1Max}	rpm	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000
Mean no load running torque (with n_1 = 3000 rpm and 20 °C gearhead temperature) [d)]			T_{012}	Nm	2.4	2.0	1.8	2.4	2.2	0.4	0.4	0.3	0.3	0.3	0.3	0.1	0.1	0.1	0.1
				in.lb	21	18	16	21	19	3.5	3.5	2.7	2.7	2.7	2.7	0.9	0.9	0.9	0.9
Max. torsional backlash			j_t	arcmin	≤ 4														
Torsional rigidity			C_{t21}	Nm/ arcmin	6.0	7.0	8.0	8.0	8.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	8.0	8.0	8.0
				in.lb/ arcmin	53	62	71	71	71	62	62	62	62	62	62	62	71	71	71
Max. axial force [e)]			F_{2AMax}	N	3400														
				lb_f	765														
Max. radial force [e)]			F_{2RMax}	N	4000														
				lb_f	900														
Max. tilting moment			M_{2KMax}	Nm	437														
				in.lb	3867														
Efficiency at full load			η	%	96					94									
Service life (For calculation, see the Chapter "Information")			L_h	h	> 20000														
Weight incl. standard adapter plate			*m*	kg	5.3					6.1									
				lb_m	11.7					13.5									
Operating noise (with n_1 = 3000 rpm no load)			L_{PA}	dB(A)	≤ 66														
Max. permitted housing temperature				°C	+90														
				F	194														
Ambient temperature				°C	0 to +40														
				F	32 to 104														
Lubrication					Lubricated for life														
Paint					Blue RAL 5002														
Direction of rotation					Motor and gearhead opposite directions														
Protection class					IP 65														
Moment of inertia (relates to the drive) Clamping hub diameter [mm]	C	14	J_1	kgcm²	–	–	–	–	–	0.31	0.28	0.24	0.23	0.21	0.20	0.19	0.18	0.18	0.18
				10^{-3} in.lb.s²						0.27	0.25	0.21	0.21	0.18	0.18	0.17	0.16	0.16	0.16
	E	19	J_1	kgcm²	1.81	1.39	1.18	1.02	0.93	0.75	0.72	0.68	0.68	0.63	0.63	0.63	0.63	0.63	0.63
				10^{-3} in.lb.s²	1.60	1.23	1.05	0.90	0.82	0.64	0.64	0.61	0.60	0.59	0.55	0.56	0.56	0.55	0.55
	H	28	J_1	kgcm²	3.22	2.80	2.60	2.43	2.34	–	–	–	–	–	–	–	–	–	–
				10^{-3} in.lb.s²	2.85	2.48	2.30	2.15	2.07										

Please contact us for information on the best configuration for S1 conditions of use (continuous operation).

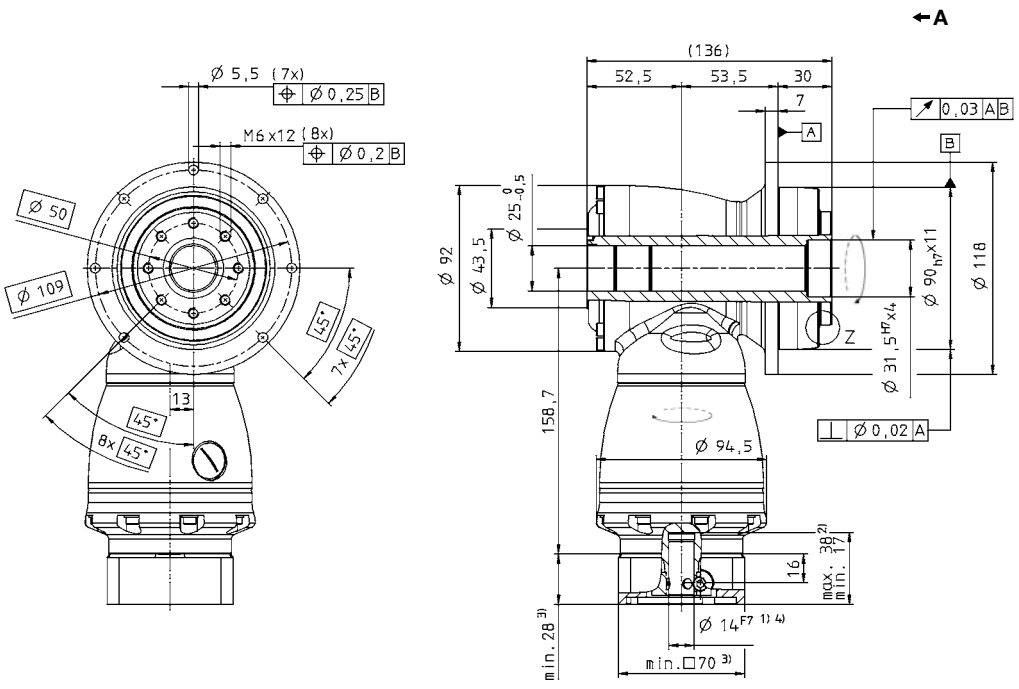
[a)] Other ratios available on request
[b)] Higher speeds are possible if the nominal torque is reduced
[c)] For higher ambient temperatures, please reduce input speed
[d)] Idling torques decrease during operation
[e)] Refers to center of the output shaft or flange

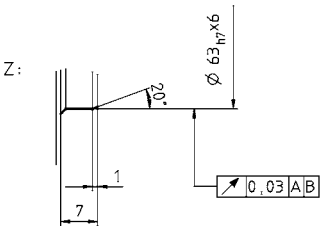
All technical data for front output side applies.
Technical data for rearward output versions, see page 386.

1-stage:



2-stage:





See technical data sheet for available clamping hub diameters (mass moment of inertia). Dimensions available on request.

Non-tolerated dimensions ±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 with a minimum thickness of 1 mm.

CAD data is available under www.wittenstein-alpha.com

Motor mounting according to operating manual

TK+ 025 MF 1/2-stage

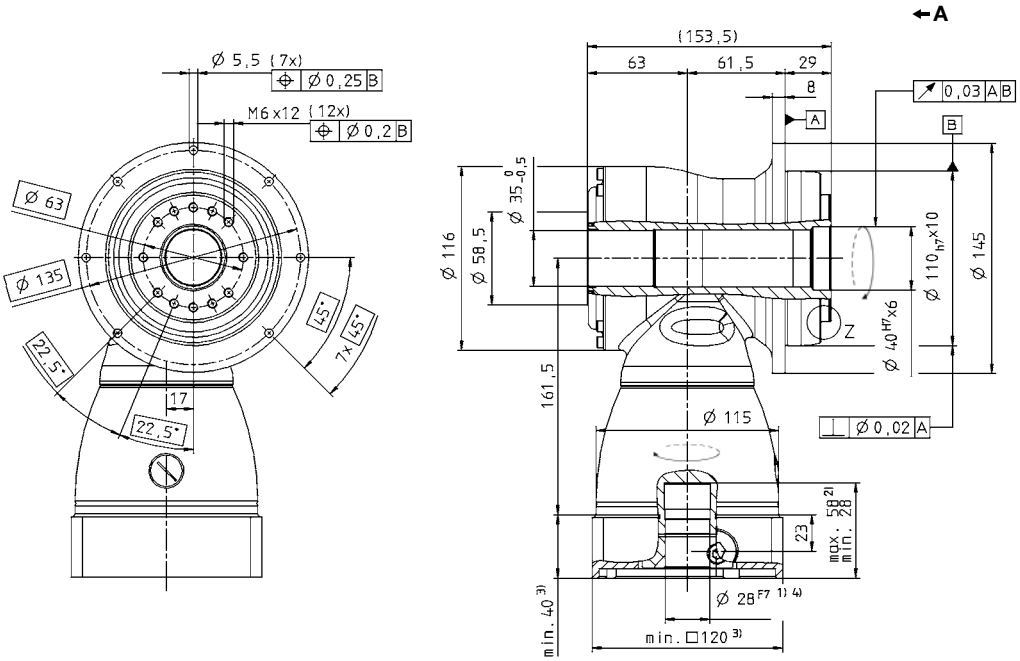
					1-stage					2-stage									
Ratio [a]			*i*		**3**	**4**	**5**	**7**	**10**	**12**	**16**	**20**	**25**	**28**	**35**	**40**	**50**	**70**	**100**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B}	Nm	170	170	170	145	125	170	170	170	170	170	170	170	170	145	125
				in.lb	1505	1505	1505	1283	1106	1505	1505	1505	1505	1505	1505	1505	1505	1283	1106
Nominal output torque (with n_{1N})			T_{2N}	Nm	100	100	100	90	80	100	100	100	100	100	100	100	100	90	80
				in.lb	885	885	885	797	708	885	885	885	885	885	885	885	885	797	708
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not}	Nm	220	260	260	255	250	260	260	260	260	260	260	260	260	255	250
				in.lb	1947	2301	2301	2257	2213	2301	2301	2301	2301	2301	2301	2301	2301	2257	2213
Nominal input speed (with T_{2N} and 20 °C ambient temperature) [b), c)]			n_{1N}	rpm	2000	2100	2400	2200	2200	3100	3100	3100	3100	3100	3100	3100	3500	4200	4200
Max. continuous speed (with 20 % T_{2N} and 20 °C ambient temperature)			n_{1Ncym}	rpm	2700	3000	3400	3000	3000	4000	4000	4000	4000	4000	4000	4000	4000	4200	4200
Max. input speed			n_{1Max}	rpm	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500
Mean no load running torque (with n_1 = 3000 rpm and 20 °C gearhead temperature) [d)]			T_{012}	Nm	4.6	3.6	2.8	4.2	3.4	0.7	0.7	0.6	0.5	0.5	0.4	0.2	0.2	0.2	0.2
				in.lb	41	32	25	37	30	6.2	6.2	5.3	4.4	4.4	3.5	1.8	1.8	1.8	1.8
Max. torsional backlash			j_t	arcmin	≤ 4														
Torsional rigidity			C_{t21}	Nm/ arcmin	12	13	16	16	16	13	13	13	13	13	13	13	16	16	16
				in.lb/ arcmin	106	115	142	142	142	115	115	115	115	115	115	115	142	142	142
Max. axial force [e)]			F_{2AMax}	N	5700														
				lb_f	1283														
Max. radial force [e)]			F_{2RMax}	N	6300														
				lb_f	1418														
Max. tilting moment			M_{2KMax}	Nm	833														
				in.lb	7370														
Efficiency at full load			η	%	96					94									
Service life (For calculation, see the Chapter "Information")			L_h	h	> 20000														
Weight incl. standardadapter plate			*m*	kg	8.9					10.6									
				lb_m	20					23									
Operating noise (with n_1 = 3000 rpm no load)			L_{PA}	dB(A)	≤ 66														
Max. permitted housing temperature				°C	+90														
				F	194														
Ambient temperature				°C	0 to +40														
				F	32 to 104														
Lubrication					Lubricated for life														
Paint					Blue RAL 5002														
Direction of rotation					Motor and gearhead opposite directions														
Protection class					IP 65														
Moment of inertia (relates to the drive) Clamping hub diameter [mm]	E	19	J_1	kgcm²	–	–	–	–	–	1.08	1.01	0.88	0.85	0.76	0.75	0.70	0.69	0.69	0.68
				10^{-3} in.lb.s²						0.96	0.89	0.78	0.75	0.67	0.66	0.62	0.66	0.61	0.60
	G	24	J_1	kgcm²	–	–	–	–	–	2.65	2.57	2.44	2.42	2.32	2.31	2.26	2.25	2.25	2.25
				10^{-3} in.lb.s²						2.34	2.28	2.16	2.14	2.06	2.05	2.00	2.00	1.99	1.99
	H	28	J_1	kgcm²	5.50	4.30	3.60	3.10	2.90	–	–	–	–	–	–	–	–	–	–
				10^{-3} in.lb.s²	4.83	3.77	3.22	2.77	2.54										
	K	38	J_1	kgcm²	12.7	11.5	10.9	10.4	10.1	–	–	–	–	–	–	–	–	–	–
				10^{-3} in.lb.s²	11.2	10.2	9.63	9.19	8.95										

Please contact us for information on the best configuration for S1 conditions of use (continuous operation).

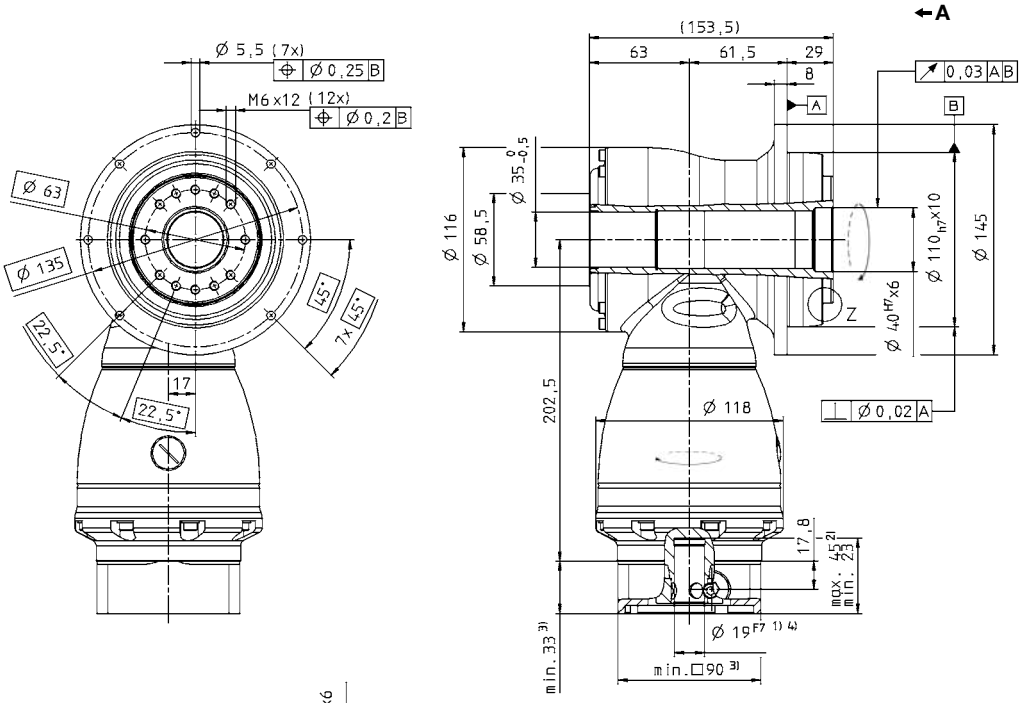
[a)] Other ratios available on request
[b)] Higher speeds are possible if the nominal torque is reduced
[c)] For higher ambient temperatures, please reduce input speed
[d)] Idling torques decrease during operation
[e)] Refers to center of the output shaft or flange

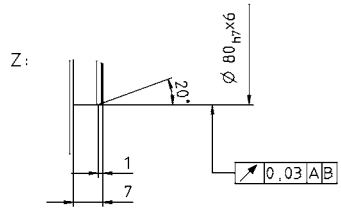
All technical data for front output side applies.
Technical data for rearward output versions, see page 386.

1-stage:



2-stage:





See technical data sheet for available clamping hub diameters (mass moment of inertia). Dimensions available on request.

Non-tolerated dimensions ±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 with a minimum thickness of 1 mm.

CAD data is available under www.wittenstein-alpha.com

Motor mounting according to operating manual

TK+ 050 MF 1/2-stage

				1-stage					2-stage									
Ratio [a]			***i***	**3**	**4**	**5**	**7**	**10**	**12**	**16**	**20**	**25**	**28**	**35**	**40**	**50**	**70**	**100**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B} Nm	300	300	300	250	210	300	300	300	300	300	300	300	300	250	210
			in.lb	2655	2655	2655	2213	1859	2655	2655	2655	2655	2655	2655	2655	2655	2213	1859
Nominal output torque (with n_{1N})			T_{2N} Nm	190	190	190	175	160	190	190	190	190	190	190	190	190	175	160
			in.lb	1682	1682	1682	1549	1416	1682	1682	1682	1682	1682	1682	1682	1682	1549	1416
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not} Nm	400	500	500	450	400	500	500	500	500	500	500	500	500	450	400
			in.lb	3540	4425	4425	3983	3540	4425	4425	4425	4425	4425	4425	4425	4425	3983	3540
Nominal input speed (with T_{2N} and 20 °C ambient temperature) [b), c)]			n_{1N} rpm	1700	1800	2000	1800	1800	2900	2900	2900	2900	2900	2900	2900	3200	3200	3900
Max. continuous speed (with 20 % T_{2N} and 20 °C ambient temperature)			n_{1Ncym} rpm	2200	2500	2800	2500	2500	4000	4000	4000	4000	4000	4000	4000	4200	4200	4200
Max. input speed			n_{1Max} rpm	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500
Mean no load running torque (with n_1 = 3000 rpm and 20 °C gearhead temperature) [d)]			T_{012} Nm	8.4	6.2	5.4	9.0	6.6	1.7	1.1	0.8	0.6	0.6	0.5	0.5	0.4	0.4	0.4
			in.lb	74	55	48	80	58	15.0	9.7	7.1	5.3	5.3	4.4	4.4	3.5	3.5	3.5
Max. torsional backlash			j_t arcmin	≤ 4														
Torsional rigidity			C_{t21} Nm/ arcmin	36	40	46	44	42	40	40	40	40	40	40	40	46	44	42
			in.lb/ arcmin	315	356	405	387	376	356	356	356	356	356	356	356	405	387	376
Max. axial force [e)]			F_{2AMax} N	9900														
			lb_f	2228														
Max. radial force [e)]			F_{2RMax} N	9500														
			lb_f	2138														
Max. tilting moment			M_{2KMax} Nm	1692														
			in.lb	14974														
Efficiency at full load			η %	96					94									
Service life (For calculation, see the Chapter "Information")			L_h h	> 20000														
Weight incl. standardadapter plate			*m* kg	22					26									
			lb_m	49					57									
Operating noise (with n_1 = 3000 rpm no load)			L_{PA} dB(A)	≤ 68														
Max. permitted housing temperature			°C	+90														
			F	194														
Ambient temperature			°C	0 to +40														
			F	32 to 104														
Lubrication				Lubricated for life														
Paint				Blue RAL 5002														
Direction of rotation				Motor and gearhead opposite directions														
Protection class				IP 65														
Moment of inertia (relates to the drive) Clamping hub diameter [mm]	G	24	J_1 kgcm²	–	–	–	–	–	4.43	3.97	3.36	3.22	2.82	2.75	2.50	2.47	2.44	2.42
			10^{-3} in.lb.s²						3.92	3.51	2.97	2.85	2.50	2.44	2.22	2.18	2.16	2.14
	K	38	J_1 kgcm²	28.4	21.0	17.6	14.7	13.1	11.3	10.9	10.3	10.1	9.74	9.66	9.41	9.38	9.35	9.33
			10^{-3} in.lb.s²	25.1	18.6	15.5	13.0	11.6	10.0	9.63	9.09	8.96	8.62	8.55	8.33	8.30	8.28	8.26

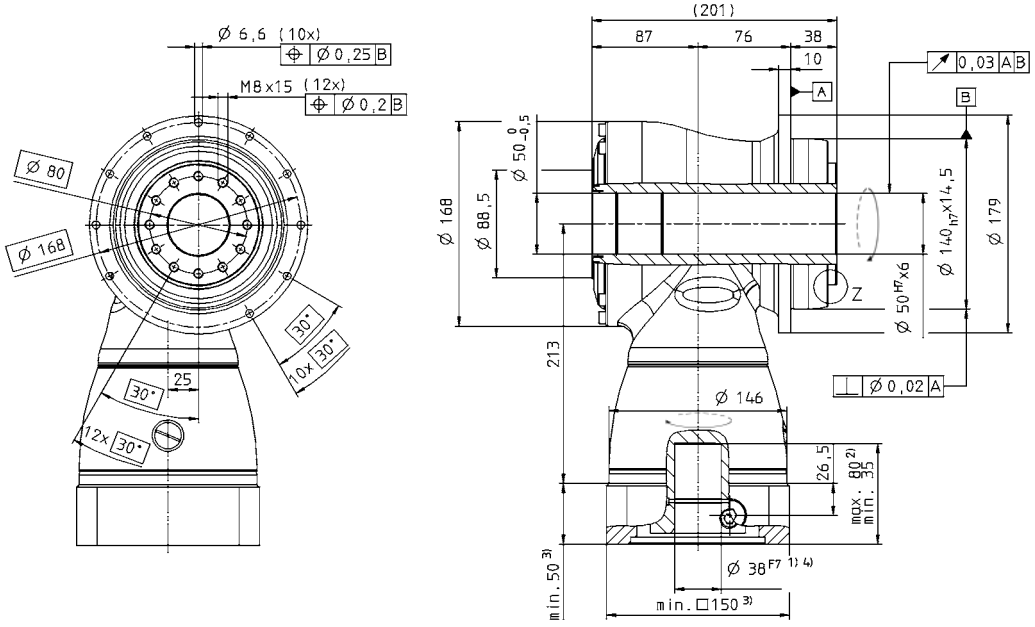
Please contact us for information on the best configuration for S1 conditions of use (continuous operation).

[a)] Other ratios available on request
[b)] Higher speeds are possible if the nominal torque is reduced
[c)] For higher ambient temperatures, please reduce input speed
[d)] Idling torques decrease during operation
[e)] Refers to center of the output shaft or flange

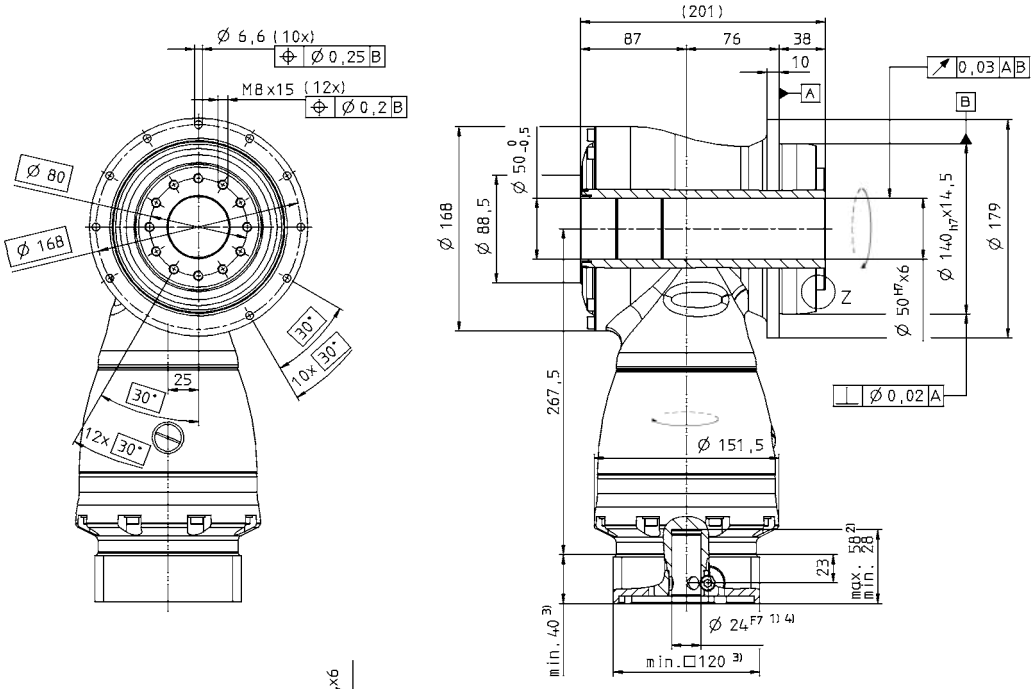
All technical data for front output side applies.
Technical data for rearward output versions, see page 386.

View A

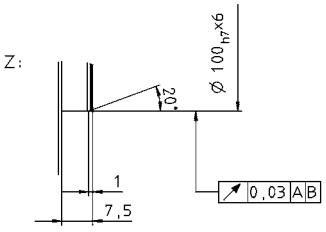
1-stage:



2-stage:



Z:



See technical data sheet for available clamping hub diameters (mass moment of inertia). Dimensions available on request.

Non-tolerated dimensions ±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 with a minimum thickness of 1 mm.

CAD data is available under www.wittenstein-alpha.com

Motor mounting according to operating manual

TK+ 110 MF 1/2-stage

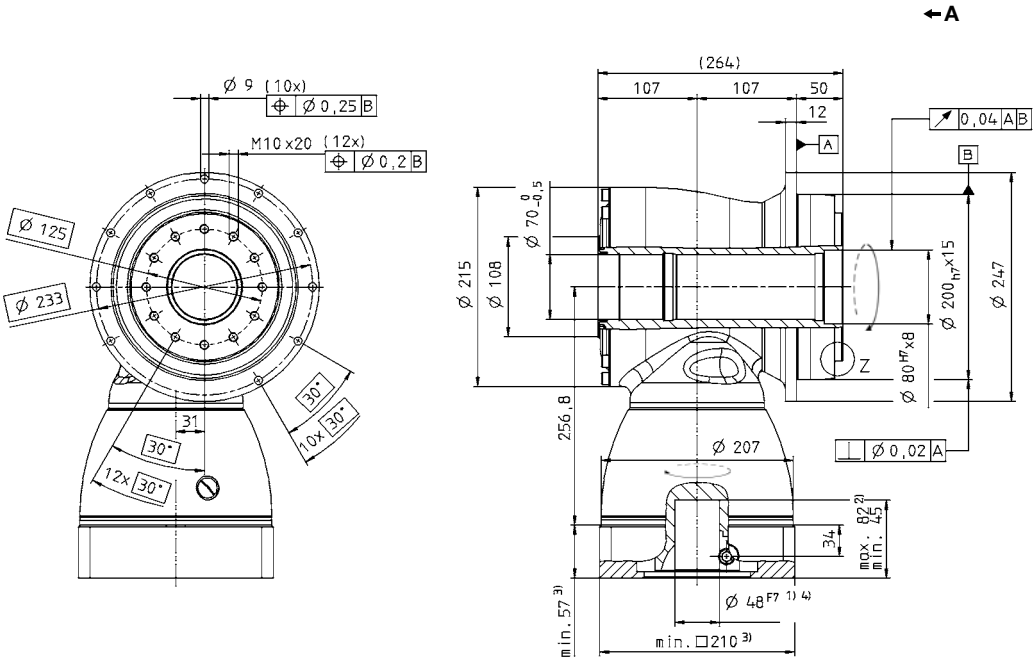
					1-stage					2-stage									
Ratio [a]			*i*		**3**	**4**	**5**	**7**	**10**	**12**	**16**	**20**	**25**	**28**	**35**	**40**	**50**	**70**	**100**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B}	Nm	640	640	640	550	470	640	640	640	640	640	640	640	640	550	470
				in.lb	5664	5664	5664	4868	4160	5664	5664	5664	5664	5664	5664	5664	5664	4868	4160
Nominal output torque (with n_{1N})			T_{2N}	Nm	400	400	400	380	360	400	400	400	400	400	400	400	400	380	360
				in.lb	3540	3540	3540	3363	3186	3540	3540	3540	3540	3540	3540	3540	3540	3363	3186
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not}	Nm	900	1050	1050	970	900	1050	1050	1050	1050	1050	1050	1050	1050	970	900
				in.lb	7965	9293	9293	8585	7965	9293	9293	9293	9293	9293	9293	9293	9293	8585	7965
Nominal input speed (with T_{2N} and 20 °C ambient temperature) [b), c)]			n_{1N}	rpm	1400	1600	1800	1600	1600	2700	2700	2700	2700	2700	2700	2700	2900	3200	3400
Max. continuous speed (with 20 % T_{2N} and 20 °C ambient temperature)			n_{1Ncym}	rpm	1800	2100	2500	2200	2200	3500	3500	3500	3500	3500	3500	3500	3500	3800	3800
Max. input speed			n_{1Max}	rpm	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000
Mean no load running torque (with n_1 = 3000 rpm and 20 °C gearhead temperature) [d)]			T_{012}	Nm	17.5	14.5	12.0	18.0	15.0	3.6	2.8	2.2	1.9	1.6	1.4	1.1	1.1	1.1	1.1
				in.lb	155	128	106	159	133	31.9	24.8	19.5	16.8	14.2	12.4	9.7	9.7	9.7	9.7
Max. torsional backlash			j_t	arcmin	≤ 4														
Torsional rigidity			C_{t21}	Nm/ arcmin	76	87	99	97	96	87	87	87	87	87	87	87	99	97	96
				in.lb/ arcmin	676	766	874	860	847	766	766	766	766	766	766	766	874	860	847
Max. axial force [e)]			F_{2AMax}	N	14200														
				lb_f	3195														
Max. radial force [e)]			F_{2RMax}	N	14700														
				lb_f	3308														
Max. tilting moment			M_{2KMax}	Nm	3213														
				in.lb	28435														
Efficiency at full load			η	%	96					94									
Service life (For calculation, see the Chapter "Information")			L_h	h	> 20000														
Weight incl. standardadapter plate			*m*	kg	48					54									
				lb_m	106					119									
Operating noise (with n_1 = 3000 rpm no load)			L_{PA}	dB(A)	≤ 68														
Max. permitted housing temperature				°C	+90														
				F	194														
Ambient temperature				°C	0 to +40														
				F	32 to 104														
Lubrication					Lubricated for life														
Paint					Blue RAL 5002														
Direction of rotation					Motor and gearhead opposite directions														
Protection class					IP 65														
Moment of inertia (relates to the drive) Clamping hub diameter [mm]	K	38	J_1	kgcm²	–	–	–	–	–	16.8	14.8	12.9	12.3	11.2	10.9	10.3	10.1	10.0	9.93
				10^{-3} in.lb.s²						14.8	13.1	11.4	10.9	9.88	9.63	9.08	8.95	8.84	8.79
	M	48	J_1	kgcm²	96.5	64.6	50.5	38.2	31.8	31.5	29.5	27.6	27.0	25.9	25.6	25.0	24.8	24.7	24.6
				10^{-3} in.lb.s²	85.4	57.2	44.7	33.8	28.1	27.9	26.1	24.4	23.9	22.9	22.6	22.1	22.0	21.9	21.8

Please contact us for information on the best configuration for S1 conditions of use (continuous operation).

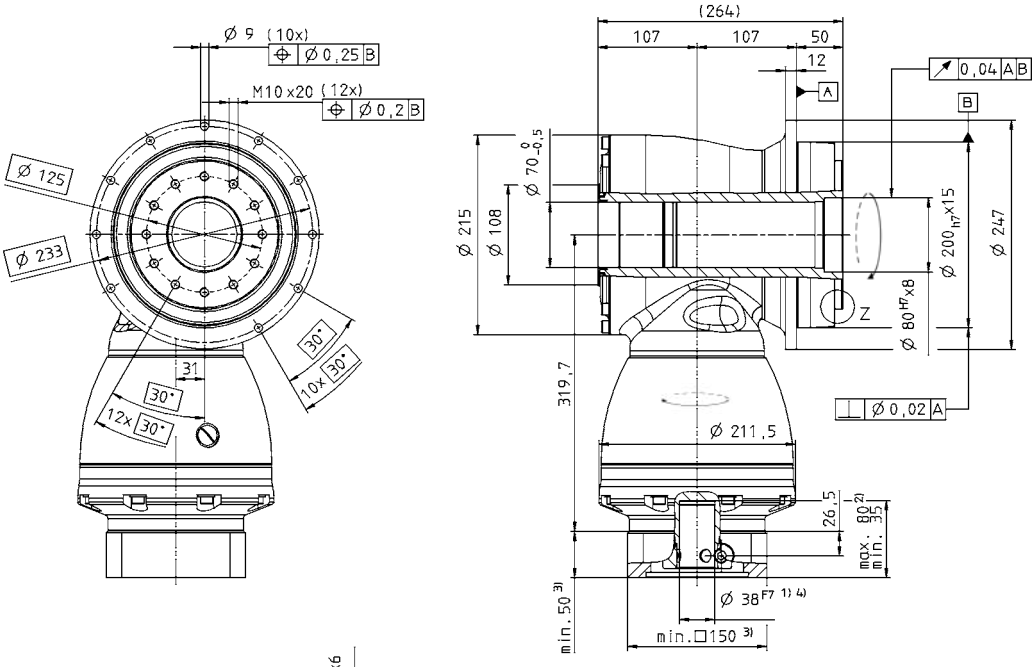
[a)] Other ratios available on request
[b)] Higher speeds are possible if the nominal torque is reduced
[c)] For higher ambient temperatures, please reduce input speed
[d)] Idling torques decrease during operation
[e)] Refers to center of the output shaft or flange

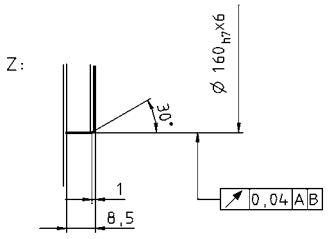
All technical data for front output side applies.
Technical data for rearward output versions, see page 386.

1-stage:



2-stage:





See technical data sheet for available clamping hub diameters (mass moment of inertia). Dimensions available on request.

Non-tolerated dimensions ±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 with a minimum thickness of 1 mm.

CAD data is available under www.wittenstein-alpha.com

Motor mounting according to operating manual

				2-stage										
Ratio [a]			*i*	**12**	**16**	**20**	**25**	**28**	**35**	**40**	**49**	**50**	**70**	**100**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B} Nm	120	120	130	130	130	130	80	130	100	130	100
			T_{2B} in.lb	1.062	1.062	1.151	1.151	1.151	1.151	708	1.151	885	1.151	885
Nominal output torque (with n_{1N})			T_{2N} Nm	75	75	75	75	75	75	60	75	75	75	60
			T_{2N} in.lb	664	664	664	664	664	664	531	664	664	664	531
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2NOt} Nm	160	200	250	250	250	250	160	250	200	250	250
			T_{2NOt} in.lb	1416	1770	2213	2213	2213	2213	1416	2213	1770	2213	2213
Nominal input speed (with T_{2N} and 20 °C ambient temperature) [b), c)]			n_{1N} rpm	2000	2400	2400	2700	2400	2500	2500	2500	2500	2500	2500
Max. continuous speed (with 20 % T_{2N} and 20 °C ambient temperature)			n_{1Ncym} rpm	3000	3400	3400	3800	3400	3200	3200	3200	3200	3200	3200
Max. input speed			n_{1Max} rpm	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000
Mean no load running torque (with n_1 = 3000 rpm and 20 °C gearhead temperature) [d)]			T_{012} Nm	1.5	1.3	1.2	1.2	1.2	1.3	1.3	1.3	1.3	1.3	1.3
			T_{012} in.lb	13.3	11.5	10.6	10.6	10.6	11.5	11.5	11.5	11.5	11.5	11.5
Max. torsional backlash			j_t arcmin	Standard ≤ 5 / Reduced ≤ 3										
Torsional rigidity			C_{t21} Nm/ arcmin	16	16	20	21	23	24	15	23	19	22	27
			C_{t21} in.lb/ arcmin	142	142	177	186	204	212	133	204	168	195	239
Tilting rigidity			C_{2K} Nm/ arcmin	225										
			C_{2K} in.lb/ arcmin	1991										
Max. axial force [e)]			F_{2AMax} N	2150										
			F_{2AMax} lb_f	484										
Max. tilting moment			M_{2KMax} Nm	235										
			M_{2KMax} in.lb	2080										
Efficiency at full load			η %	94										
Service life (For calculation, see the Chapter "Information")			L_h h	> 20000										
Weight incl. standard adapter plate			*m* kg	5.2										
			m lb_m	11.5										
Operating noise (with n_1 = 3000 rpm no load)			L_{PA} dB(A)	≤ 66										
Max. permitted housing temperature			°C	+90										
			F	194										
Ambient temperature			°C	0 to +40										
			F	32 to 104										
Lubrication				Lubricated for life										
Paint				Blue RAL 5002										
Direction of rotation				Motor and gearhead opposite directions										
Protection class				IP 65										
Moment of inertia (relates to the drive) Clamping hub diameter [mm]	C	14	J_1 kgcm²	0.55	0.46	0.44	0.39	0.43	0.36	0.34	0.37	0.34	0.34	0.34
			J_1 10^{-3} in.lb.s²	0.49	0.40	0.39	0.35	0.38	0.32	0.30	0.33	0.30	0.30	0.30
	E	19	J_1 kgcm²	0.90	0.81	0.79	0.75	0.78	0.71	0.70	0.72	0.70	0.69	0.69
			J_1 10^{-3} in.lb.s²	0.80	0.72	0.70	0.66	0.69	0.63	0.62	0.64	0.62	0.61	0.61

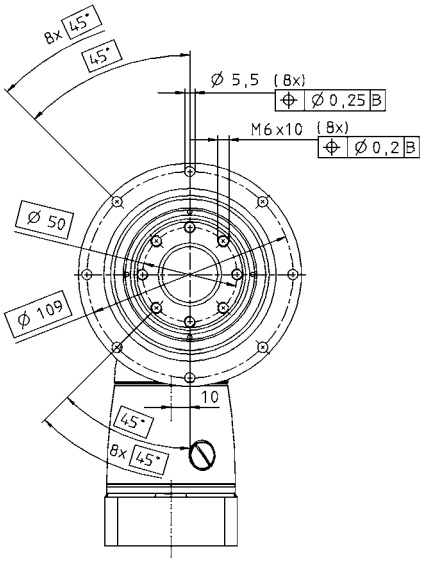
Please contact us for information on the best configuration for S1 conditions of use (continuous operation).

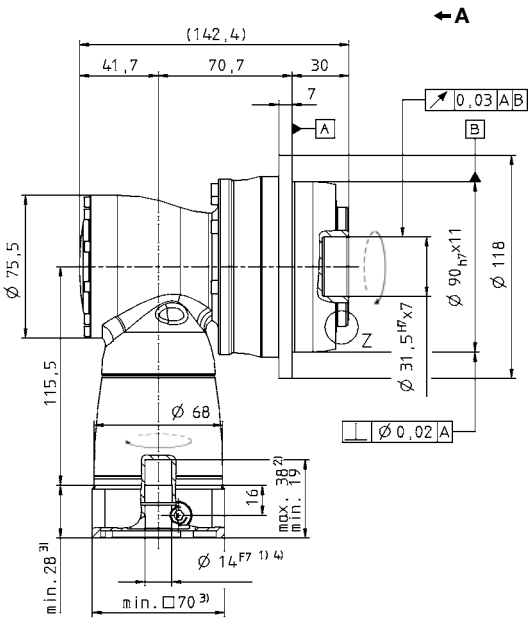
[a)] Other ratios up to i=1000 available on request
[b)] Higher speeds are possible if the nominal torque is reduced
[c)] For higher ambient temperatures, please reduce input speed
[d)] Idling torques decrease during operation
[e)] Refers to center of the output shaft or flange

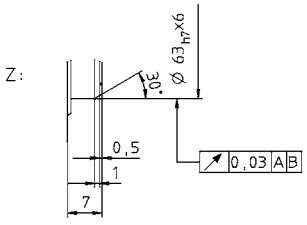
All technical data for front output side applies.
Technical data for rearward output versions, see page 386.

View A

2-stage:







See technical data sheet for available clamping hub diameters (mass moment of inertia). Dimensions available on request.

Non-tolerated dimensions ±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 with a minimum thickness of 1 mm.

CAD data is available under www.wittenstein-alpha.com

Motor mounting according to operating manual

TPK+ 010 MF 3-stage

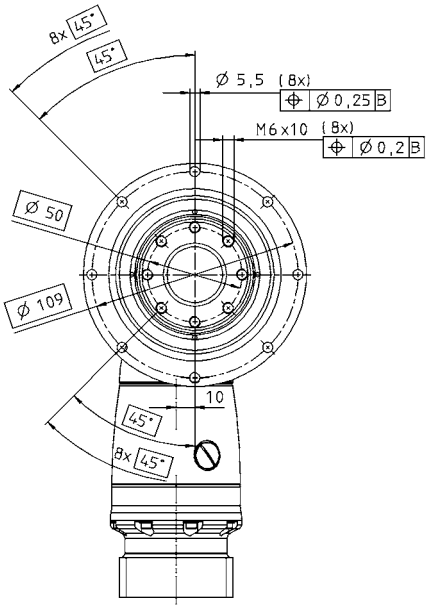
				3-stage													
Ratio [a]			*i*	**64**	**84**	**100**	**125**	**140**	**175**	**200**	**250**	**280**	**350**	**400**	**500**	**700**	**1000**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B} Nm	120	120	130	130	130	130	130	130	130	130	80	100	130	100
			T_{2B} in.lb	1062	1062	1151	1151	1151	1151	1151	1151	1151	1151	708	885	1151	885
Nominal output torque (with n_{1N})			T_{2N} Nm	85	85	90	90	90	90	90	90	75	90	60	75	90	60
			T_{2N} in.lb	752	752	797	797	797	797	797	797	664	797	531	664	797	531
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not} Nm	200	160	250	250	250	250	250	250	250	250	160	200	250	250
			T_{2Not} in.lb	1770	1416	2213	2213	2213	2213	2213	2213	2213	2213	1416	1770	2213	2213
Nominal input speed (with T_{2N} and 20 °C ambient temperature) [b), c)]			n_{1N} rpm	4400	4400	4400	4400	4400	4400	4400	4800	4400	4800	5500	5500	5500	5500
Max. continuous speed (with 20 % T_{2N} and 20 °C ambient temperature)			n_{1Ncym} rpm	5000	5000	5000	5000	5000	5000	5000	5000	5000	5500	5500	5500	5500	5500
Max. input speed			n_{1Max} rpm	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000
Mean no load running torque (with n_1 = 3000 rpm and 20 °C gearhead temperature) [d)]			T_{012} Nm	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
			T_{012} in.lb	2.7	2.7	2.7	2.7	2.7	2.7	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8
Max. torsional backlash			j_t arcmin	Standard ≤ 5 / Reduced ≤ 3													
Torsional rigidity			C_{t21} Nm/ arcmin	16	16	20	21	20	21	20	21	23	24	15	19	22	27
			C_{t21} in.lb/ arcmin	142	142	177	186	177	186	177	186	204	212	133	168	195	239
Tilting rigidity			C_{2K} Nm/ arcmin	225													
			C_{2K} in.lb/ arcmin	1991													
Max. axial force [e)]			F_{2AMax} N	2150													
			F_{2AMax} lb_f	484													
Max. tilting moment			M_{2KMax} Nm	235													
			M_{2KMax} in.lb	2080													
Efficiency at full load			η %	92													
Service life (For calculation, see the Chapter "Information")			L_h h	> 20000													
Weight incl. standard adapter plate			*m* kg	5,5													
			m lb_m	12,2													
Operating noise (with n_1 = 3000 rpm no load)			L_{PA} dB(A)	≤ 66													
Max. permitted housing temperature			°C	90													
			F	194													
Ambient temperature			°C	0 to +40													
			F	32 to 104													
Lubrication				Lubricated for life													
Paint				Blue RAL 5002													
Direction of rotation				Motor and gearhead opposite directions													
Protection class				IP 65													
Moment of inertia (relates to the drive) Clamping hub diameter [mm]	B	11	J_1 kgcm²	0.09	0.07	0.08	0.07	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
			J_1 10^{-3} in.lb.s²	0.08	0.06	0.07	0.06	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
	C	14	J_1 kgcm²	0.20	0.18	0.19	0.19	0.18	0.18	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17
			J_1 10^{-3} in.lb.s²	0.18	0.16	0.17	0.17	0.16	0.16	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15

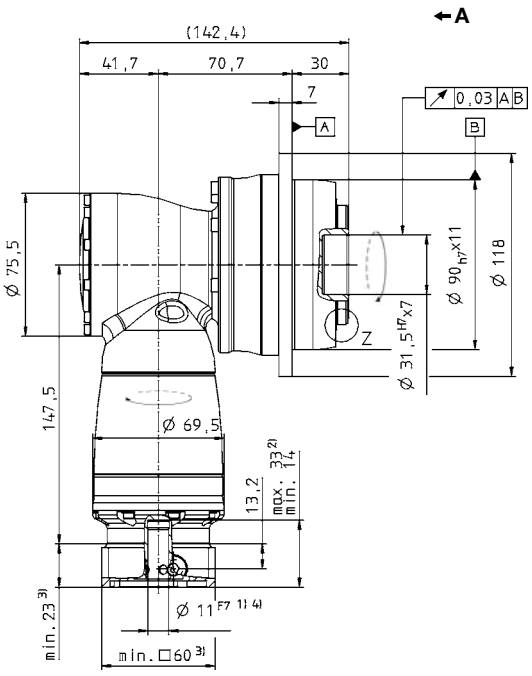
Please contact us for information on the best configuration for S1 conditions of use (continuous operation).

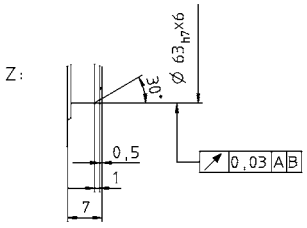
[a)] Other ratios available on request
[b)] Higher speeds are possible if the nominal torque is reduced
[c)] For higher ambient temperatures, please reduce input speed
[d)] Idling torques decrease during operation
[e)] Refers to center of the output shaft or flange

All technical data for front output side applies.
Technical data for rearward output versions, see page 386.

3-stage:







See technical data sheet for available clamping hub diameters (mass moment of inertia). Dimensions available on request.

Non-tolerated dimensions ±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 with a minimum thickness of 1 mm.

CAD data is available under www.wittenstein-alpha.com

Motor mounting according to operating manual

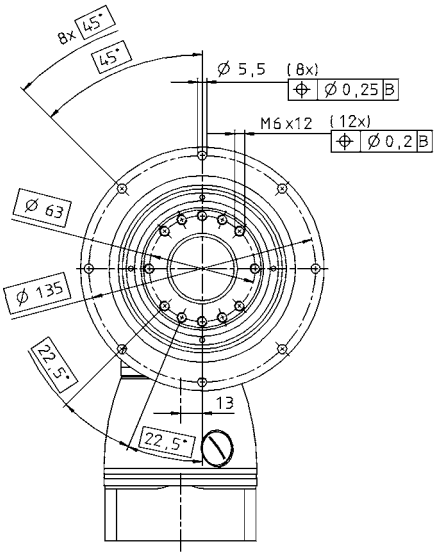
				2-stage										
Ratio [a]			*i*	**12**	**16**	**20**	**25**	**28**	**35**	**40**	**49**	**50**	**70**	**100**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B} Nm	280	280	350	350	350	330	330	330	265	400	400
			T_{2B} in.lb	2478	2478	3098	3098	3098	2921	1770	2921	2213	2921	2345
Nominal output torque (with n_{1N})			T_{2N} Nm	170	170	170	170	170	170	160	170	170	170	120
			T_{2N} in.lb	1505	1505	1505	1505	1505	1505	1416	1505	1505	1505	1062
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not} Nm	400	575	575	500	625	625	400	625	500	625	625
			T_{2Not} in.lb	3540	5089	5089	5089	5531	5531	3540	5531	4425	5531	5531
Nominal input speed (with T_{2N} and 20 °C ambient temperature) [b), c)]			n_{1N} rpm	2000	2400	2400	2700	2400	2500	2500	2500	2500	2500	2500
Max. continuous speed (with 20 % T_{2N} and 20 °C ambient temperature)			n_{1Ncym} rpm	3000	3400	3400	3800	3400	3200	3200	3200	3200	3200	3200
Max. input speed			n_{1Max} rpm	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000
Mean no load running torque (with n_1 = 3000 rpm and 20 °C gearhead temperature) [d)]			T_{012} Nm	2.5	2.1	2.0	1.8	2.0	1.8	2.0	2.2	2.0	2.0	2.0
			T_{012} in.lb	22.1	18.6	17.7	15.9	17.7	15.9	17.7	19.5	17.7	17.7	17.7
Max. torsional backlash			j_t arcmin	Standard ≤ 4 / Reduced ≤ 2										
Torsional rigidity			C_{t21} Nm/ arcmin	40	42	53	55	59	60	44	60	55	60	56
			C_{t21} in.lb/ arcmin	354	372	469	487	522	531	389	531	487	531	496
Tilting rigidity			C_{2K} Nm/ arcmin	550										
			C_{2K} in.lb/ arcmin	4868										
Max. axial force [e)]			F_{2AMax} N	4150										
			F_{2AMax} lb_f	934										
Max. tilting moment			M_{2KMax} Nm	413										
			M_{2KMax} in.lb	3655										
Efficiency at full load			η %	94										
Service life (For calculation, see the Chapter "Information")			L_h h	> 20000										
Weight incl. standard adapter plate			*m* kg	9.0										
			m lb_m	19.9										
Operating noise (with n_1 = 3000 rpm no load)			L_{PA} dB(A)	≤ 68										
Max. permitted housing temperature			°C	+90										
			F	194										
Ambient temperature			°C	0 to +40										
			F	32 to 104										
Lubrication				Lubricated for life										
Paint				Blue RAL 5002										
Direction of rotation				Motor and gearhead opposite directions										
Protection class				IP 65										
Moment of inertia (relates to the drive) Clamping hub diameter [mm]	E	19	J_1 kgcm²	1.43	1.18	1.16	1.04	1.14	0.94	0.89	0.95	0.89	0.89	0.89
			J_1 10^{-3} in.lb.s²	1.27	1.04	1.02	0.92	1.01	0.83	0.79	0.84	0.79	0.79	0.78
	H	28	J_1 kgcm²	2.85	2.59	2.57	2.45	2.56	2.40	2.31	2.37	2.30	2.30	2.30
			J_1 10^{-3} in.lb.s²	2.52	2.29	2.27	2.17	2.26	2.08	2.04	2.10	2.04	2.04	2.04

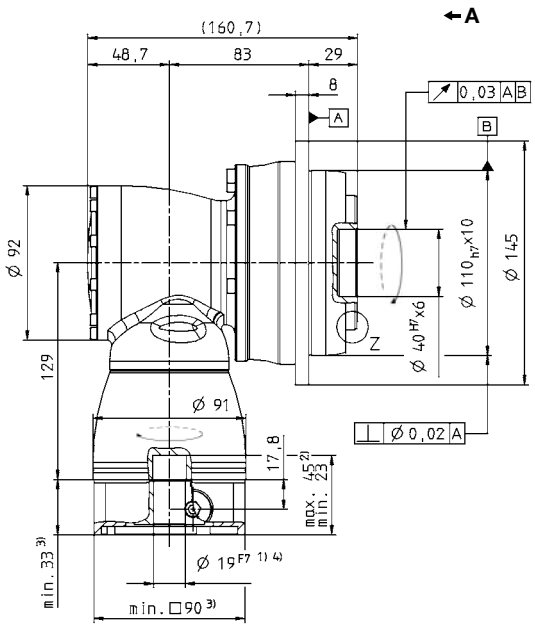
Please contact us for information on the best configuration for S1 conditions of use (continuous operation).

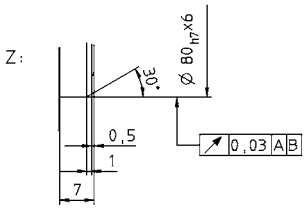
[a)] Other ratios up to i=1000 available on request
[b)] Higher speeds are possible if the nominal torque is reduced
[c)] For higher ambient temperatures, please reduce input speed
[d)] Idling torques decrease during operation
[e)] Refers to center of the output shaft or flange

All technical data for front output side applies.
Technical data for rearward output versions, see page 386.

2-stage:







See technical data sheet for available clamping hub diameters (mass moment of inertia). Dimensions available on request.

Non-tolerated dimensions ±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 with a minimum thickness of 1 mm.

CAD data is available under www.wittenstein-alpha.com

Motor mounting according to operating manual

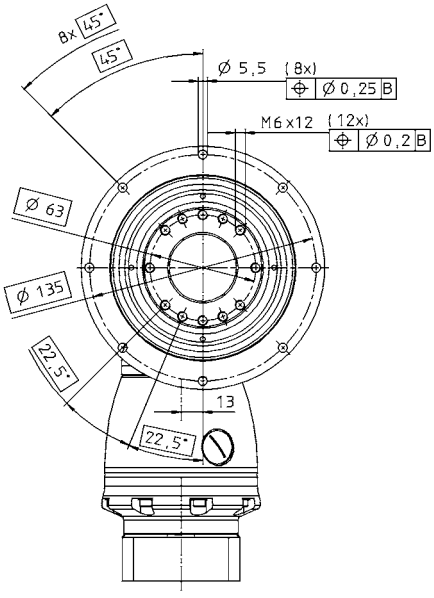
				3-stage													
Ratio [a]			*i*	**64**	**84**	**100**	**125**	**140**	**175**	**200**	**250**	**280**	**350**	**400**	**500**	**700**	**1000**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B} Nm	280	280	350	350	350	350	350	350	350	330	200	250	330	265
			T_{2B} in.lb	2478	2478	3098	3098	3098	3098	3098	3098	3098	2921	1770	2213	2921	2345
Nominal output torque (with n_{1N})			T_{2N} Nm	200	170	200	200	200	200	200	200	210	200	160	200	200	120
			T_{2N} in.lb	1770	1505	1770	1770	1770	1770	1770	1770	1859	1770	1416	1770	1770	1062
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not} Nm	460	400	575	575	575	575	575	575	625	625	400	500	625	625
			T_{2Not} in.lb	4071	3540	5089	5089	5089	5089	5089	5089	5531	5531	3540	4425	5531	5531
Nominal input speed (with T_{2N} and 20 °C ambient temperature) [b), c)]			n_{1N} rpm	3500	3500	3500	3500	3500	3500	3500	3800	3500	3800	4500	4500	4500	4500
Max. continuous speed (with 20 % T_{2N} and 20 °C ambient temperature)			n_{1Ncym} rpm	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500
Max. input speed			n_{1Max} rpm	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000
Mean no load running torque (with n_1 = 3000 rpm and 20 °C gearhead temperature) [d)]			T_{012} Nm	0.4	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
			T_{012} in.lb	3.5	2.7	2.7	2.7	2.7	2.7	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8
Max. torsional backlash			j_t arcmin	Standard ≤ 4 / Reduced ≤ 2													
Torsional rigidity			C_{t21} Nm/ arcmin	42	40	53	55	53	55	53	55	59	60	44	55	60	56
			C_{t21} in.lb/ arcmin	372	354	469	487	469	487	469	487	522	531	389	487	531	496
Tilting rigidity			C_{2K} Nm/ arcmin	550													
			C_{2K} in.lb/ arcmin	4868													
Max. axial force [e)]			F_{2AMax} N	4150													
			F_{2AMax} lb_f	934													
Max. tilting moment			M_{2KMax} Nm	413													
			M_{2KMax} in.lb	3655													
Efficiency at full load			η %	92													
Service life (For calculation, see the Chapter "Information")			L_h h	> 20000													
Weight incl. standard adapter plate			*m* kg	9,8													
			m lb_m	21,7													
Operating noise (with n_1 = 3000 rpm no load)			L_{PA} dB(A)	≤ 68													
Max. permitted housing temperature			°C	90													
			F	194													
Ambient temperature			°C	0 to +40													
			F	32 to 104													
Lubrication				Lubricated for life													
Paint				Blue RAL 5002													
Direction of rotation				Motor and gearhead opposite directions													
Protection class				IP 65													
Moment of inertia (relates to the drive) Clamping hub diameter [mm]	C	14	J_1 kgcm²	0.28	0.23	0.24	0.23	0.21	0.20	0.19	0.18	0.19	0.18	0.18	0.18	0.18	0.18
			J_1 10^{-3} in.lb.s²	0.25	0.20	0.21	0.20	0.19	0.18	0.17	0.16	0.17	0.16	0.16	0.16	0.16	0.16
	E	19	J_1 kgcm²	0.72	0.63	0.68	0.68	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63
			J_1 10^{-3} in.lb.s²	0.64	0.56	0.60	0.60	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56

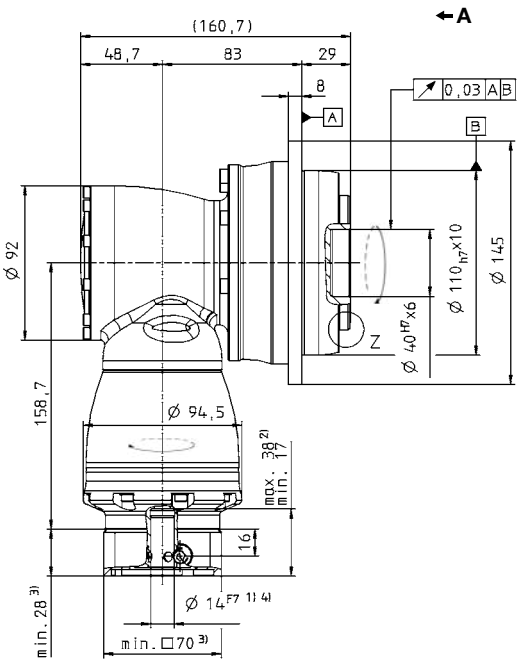
Please contact us for information on the best configuration for S1 conditions of use (continuous operation).

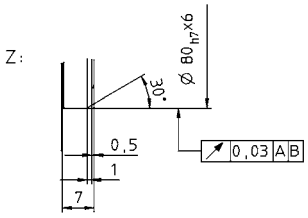
[a)] Other ratios available on request
[b)] Higher speeds are possible if the nominal torque is reduced
[c)] For higher ambient temperatures, please reduce input speed
[d)] Idling torques decrease during operation
[e)] Refers to center of the output shaft or flange

All technical data for front output side applies.
Technical data for rearward output versions, see page 386.

3-stage:







See technical data sheet for available clamping hub diameters (mass moment of inertia). Dimensions available on request.

Non-tolerated dimensions ±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 with a minimum thickness of 1 mm.

CAD data is available under www.wittenstein-alpha.com

Motor mounting according to operating manual

TPK+ 050 MF 2-stage

			2-stage										
Ratio [a]	*i*		**12**	**16**	**20**	**25**	**28**	**35**	**40**	**49**	**50**	**70**	**100**
Max. acceleration torque (max. 1000 cycles per hour)	T_{2B}	Nm	680	680	750	750	700	700	500	700	625	700	540
		in.lb	6018	6018	6638	6638	6195	6416	4425	6195	5531	6195	4779
Nominal output torque (with n_{1N})	T_{2N}	Nm	370	370	370	370	370	370	320	370	370	370	240
		in.lb	3275	3275	3275	3275	3275	3275	2832	3275	3275	3275	2124
Emergency stop torque (permitted 1000 times during the service life of the gearhead)	T_{2Not}	Nm	1000	1000	1250	1250	1250	1250	1000	1250	1250	1250	1250
		in.lb	8850	8850	11063	11063	11063	11063	8850	11063	11063	11063	11063
Nominal input speed (with T_{2N} and 20 °C ambient temperature) [b), c)]	n_{1N}	rpm	1900	2300	2300	2600	2300	2300	2300	2300	2300	2300	2300
Max. continuous speed (with 20 % T_{2N} and 20 °C ambient temperature)	n_{1Ncym}	rpm	2700	3100	3100	3500	3100	3000	3000	3000	3000	3000	3000
Max. input speed	n_{1Max}	rpm	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500
Mean no load running torque (with n_1 = 3000 rpm and 20 °C gearhead temperature) [d)]	T_{012}	Nm	4.0	3.7	3.6	2.8	3.5	2.8	3.1	3.9	3.1	3.1	3.1
		in.lb	35.4	32.7	31.9	24.8	31.0	24.8	27.4	34.5	27.4	27.4	27.4
Max. torsional backlash	j_t	arcmin	Standard ≤ 4 / Reduced ≤ 2										
Torsional rigidity	C_{t21}	Nm/ arcmin	87	91	111	119	123	127	96	127	115	125	112
		in.lb/ arcmin	770	805	982	1053	1089	1124	850	1124	1018	1106	991
Tilting rigidity	C_{2K}	Nm/ arcmin	560										
		in.lb/ arcmin	4956										
Max. axial force [e)]	F_{2AMax}	N	6130										
		lb_f	1379										
Max. tilting moment	M_{2KMax}	Nm	1295										
		in.lb	11461										
Efficiency at full load	η	%	94										
Service life (For calculation, see the Chapter "Information")	L_h	h	> 20000										
Weight incl. standard adapter platee	*m*	kg	17.0										
		lb_m	38										
Operating noise (with n_1 = 3000 rpm no load)	L_{PA}	dB(A)	≤ 68										
Max. permitted housing temperature		°C	+90										
		F	194										
Ambient temperature		°C	0 to +40										
		F	32 to 104										
Lubrication			Lubricated for life										
Paint			Blue RAL 5002										
Direction of rotation			Motor and gearhead opposite directions										
Protection class			IP 65										
Moment of inertia (relates to the drive) Clamping hub diameter [mm] H 28	J_1	$kgcm^2$	4.56	3.76	3.71	3.28	3.66	3.00	2.79	3.10	2.78	2.77	2.77
		10^{-3} in.lb.s²	4.04	3.32	3.28	2.90	3.24	2.61	2.47	2.74	2.46	2.45	2.45
K 38	J_1	$kgcm^2$	11.7	10.9	10.9	10.4	10.8	10.3	9.95	10.4	9.94	9.94	9.93
		10^{-3} in.lb.s²	10.38	9.67	9.62	9.24	9.58	8.96	8.81	9.20	8.80	8.80	8.79

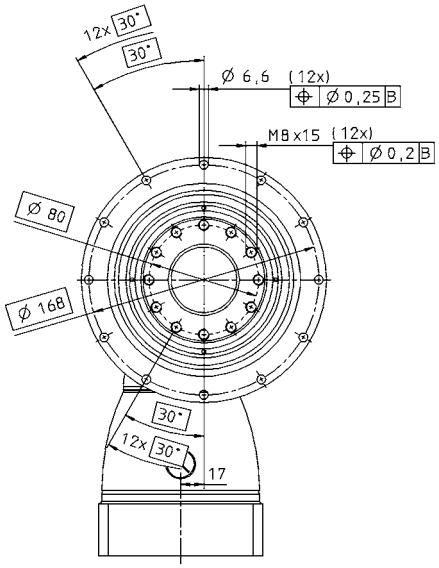
Please contact us for information on the best configuration for S1 conditions of use (continuous operation).

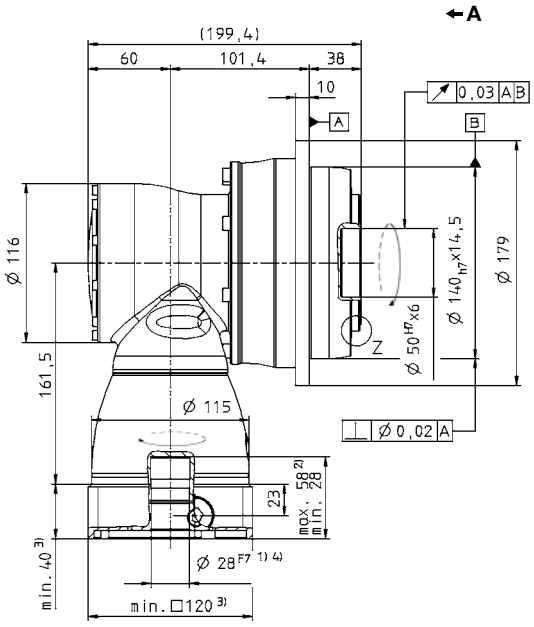
[a)] Other ratios up to i=1000 available on request
[b)] Higher speeds are possible if the nominal torque is reduced
[c)] For higher ambient temperatures, please reduce input speed
[d)] Idling torques decrease during operation
[e)] Refers to center of the output shaft or flange

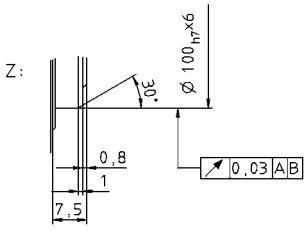
All technical data for front output side applies.
Technical data for rearward output versions, see page 386.

View A

2-stage:







See technical data sheet for available clamping hub diameters (mass moment of inertia). Dimensions available on request.

Non-tolerated dimensions ±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 with a minimum thickness of 1 mm.

CAD data is available under www.wittenstein-alpha.com

Motor mounting according to operating manual

TPK+ 050 MF 3-stage

				3-stage													
Ratio [a]			*i*	**64**	**84**	**100**	**125**	**140**	**175**	**200**	**250**	**280**	**350**	**400**	**500**	**700**	**1000**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B} Nm	680	680	750	750	750	750	750	750	700	700	500	625	700	540
			T_{2B} in.lb	6018	6018	6638	6638	6638	6638	6638	6638	6195	6195	4425	5531	6195	4779
Nominal output torque (with n_{1N})			T_{2N} Nm	400	400	400	400	400	400	400	400	400	400	320	370	400	240
			T_{2N} in.lb	3540	3540	3540	3540	3540	3540	3540	3540	3540	3540	2832	3275	3540	2124
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not} Nm	1000	1000	1250	1250	1250	1250	1250	1250	1250	1250	1000	1250	1250	1250
			T_{2Not} in.lb	8850	8850	11063	11063	11063	11063	11063	11063	11063	11063	8850	11063	11063	11063
Nominal input speed (with T_{2N} and 20 °C ambient temperature) [b), c)]			n_{1N} rpm	3100	3100	3100	3100	3100	3100	3100	3500	3100	3500	4200	4200	4200	4200
Max. continuous speed (with 20 % T_{2N} and 20 °C ambient temperature)			n_{1Ncym} rpm	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4200	4200	4200	4200
Max. input speed			n_{1Max} rpm	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500
Mean no load running torque (with n_1 = 3000 rpm and 20 °C gearhead temperature) [d)]			T_{012} Nm	0.7	0.4	0.6	0.5	0.5	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
			T_{012} in.lb	6.2	3.5	5.3	4.4	4.4	3.5	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7
Max. torsional backlash			j_t arcmin	Standard ≤ 4 / Reduced ≤ 2													
Torsional rigidity			C_{t21} Nm/ arcmin	91	87	111	119	111	119	111	119	123	127	95	115	125	112
			C_{t21} in.lb/ arcmin	805	770	982	1053	982	1053	982	1053	1089	1124	841	1018	1106	991
Tilting rigidity			C_{2K} Nm/ arcmin	560													
			C_{2K} in.lb/ arcmin	4956													
Max. axial force [e)]			F_{2AMax} N	6130													
			F_{2AMax} lb_f	1379													
Max. tilting moment			M_{2KMax} Nm	1295													
			M_{2KMax} in.lb	11461													
Efficiency at full load			η %	92													
Service life (For calculation, see the Chapter "Information")			L_h h	> 20000													
Weight incl. standard adapter plate			*m* kg	18,7													
			m lb_m	41,3													
Operating noise (with n_1 = 3000 rpm no load)			L_{PA} dB(A)	< 68													
Max. permitted housing temperature			°C	90													
			F	194													
Ambient temperature			°C	0 to +40													
			F	32 to 104													
Lubrication				Lubricated for life													
Paint				Blue RAL 5002													
Direction of rotation				Motor and gearhead opposite directions													
Protection class				IP 65													
Moment of inertia (relates to the drive) Clamping hub diameter [mm]	E	19	J_1 kgcm²	1.01	0.76	0.88	0.85	0.76	0.75	0.70	0.69	0.70	0.69	0.69	0.69	0.69	0.69
			J_1 10^{-3} in.lb.s²	0.89	0.67	0.78	0.75	0.67	0.66	0.62	0.61	0.62	0.61	0.61	0.61	0.61	0.61
	G	24	J_1 kgcm²	2.57	2.32	2.44	2.42	2.32	2.31	2.26	2.25	2.26	2.25	2.25	2.25	2.25	2.25
			J_1 10^{-3} in.lb.s²	2.27	2.05	2.16	2.14	2.05	2.04	2.00	1.99	2.00	1.99	1.99	1.99	1.99	1.99

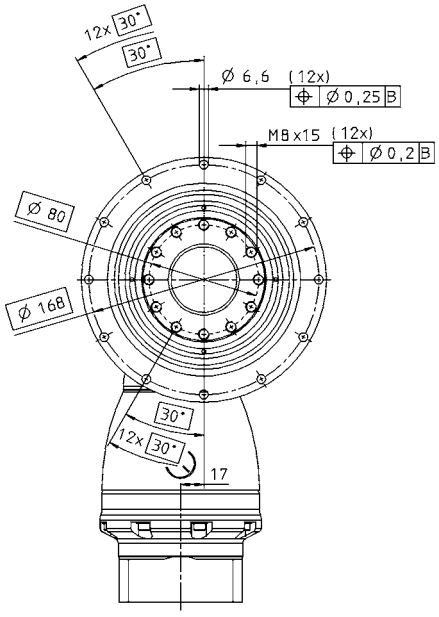
Please contact us for information on the best configuration for S1 conditions of use (continuous operation).

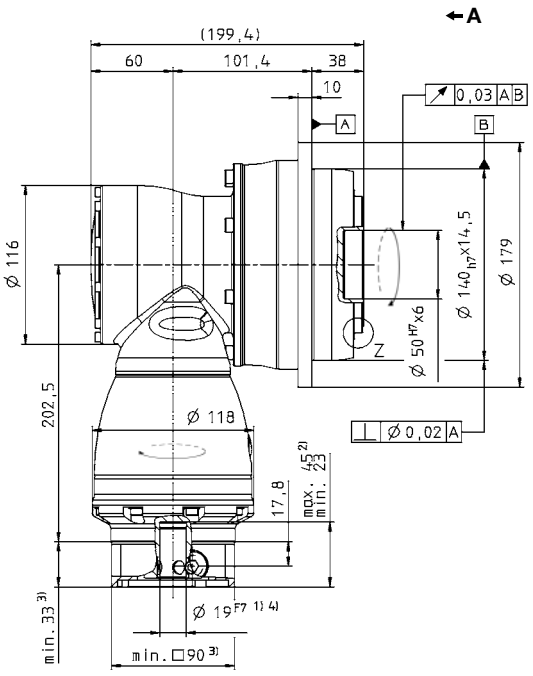
[a)] Other ratios available on request
[b)] Higher speeds are possible if the nominal torque is reduced
[c)] For higher ambient temperatures, please reduce input speed
[d)] Idling torques decrease during operation
[e)] Refers to center of the output shaft or flange

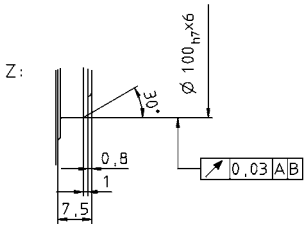
All technical data for front output side applies.
Technical data for rearward output versions, see page 386.

View A

3-stage:







See technical data sheet for available clamping hub diameters (mass moment of inertia). Dimensions available on request.

Non-tolerated dimensions ±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 with a minimum thickness of 1 mm.

CAD data is available under www.wittenstein-alpha.com

Motor mounting according to operating manual

				2-stage										
Ratio [a]			*i*	**12**	**16**	**20**	**25**	**28**	**35**	**40**	**49**	**50**	**70**	**100**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B} Nm	1200	1200	1500	1500	1600	1600	840	1600	1050	1470	1400
			T_{2B} in.lb	10620	10620	13275	13275	14160	14160	7434	14160	9293	13010	12390
Nominal output torque (with n_{1N})			T_{2N} Nm	700	700	750	750	750	750	640	750	750	750	750
			T_{2N} in.lb	6195	6195	6638	6638	6638	6638	5664	6638	6638	6638	6638
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not} Nm	1600	2000	2500	2500	2750	2750	1600	2750	2000	2750	2750
			T_{2Not} in.lb	14160	17700	22125	22125	24338	24338	14160	24338	17700	24338	24338
Nominal input speed (with T_{2N} and 20 °C ambient temperature) [b), c)]			n_{1N} rpm	1600	1900	1900	2100	1900	2100	2100	2100	2100	2100	2100
Max. continuous speed (with 20 % T_{2N} and 20 °C ambient temperature)			n_{1Ncym} rpm	2300	2600	2600	2800	2600	3000	3000	3000	3000	3000	3000
Max. input speed			n_{1Max} rpm	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500
Mean no load running torque (with n_1 = 3000 rpm and 20 °C gearhead temperature) [d)]			T_{012} Nm	9.0	6.5	6.5	5.5	6.0	6.0	6.0	8.0	6.0	6.0	6.0
			T_{012} in.lb	79.7	57.5	57.5	48.7	53.1	53.1	53.1	70.8	53.1	53.1	53.1
Max. torsional backlash			j_t arcmin	Standard ≤ 4 / Reduced ≤ 2										
Torsional rigidity			C_{t21} Nm/ arcmin	253	269	336	346	400	407	274	410	341	404	389
			C_{t21} in.lb/ arcmin	2239	2381	2974	3062	3540	3602	2425	3629	3018	3575	3443
Tilting rigidity			C_{2K} Nm/ arcmin	1452										
			C_{2K} in.lb/ arcmin	12850										
Max. axial force [e)]			F_{2AMax} N	10050										
			F_{2AMax} lb_f	2261										
Max. tilting moment			M_{2KMax} Nm	3064										
			M_{2KMax} in.lb	27116										
Efficiency at full load			η %	94										
Service life (For calculation, see the Chapter "Information")			L_h h	> 20000										
Weight incl. standard adapter plate			*m* kg	41.0										
			m lb_m	91										
Operating noise (with n_1 = 3000 rpm no load)			L_{PA} dB(A)	≤ 70										
Max. permitted housing temperature			°C	+90										
			F	194										
Ambient temperature			°C	0 to +40										
			F	32 to 104										
Lubrication				Lubricated for life										
Paint				Blue RAL 5002										
Direction of rotation				Motor and gearhead opposite directions										
Protection class				IP 65										
Moment of inertia (relates to the drive) Clamping hub diameter [mm]	K	38	J_1 kgcm²	24.3	19.0	18.7	16.1	18.5	15.7	12.8	17.5	12.7	12.7	12.7
			J_1 10^{-3} in.lb.s²	21.5	16.8	16.6	14.2	16.4	12.3	11.3	15.5	11.3	11.2	11.2

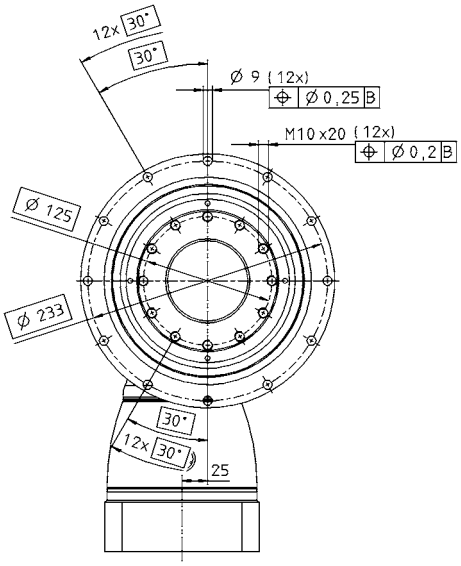
Please contact us for information on the best configuration for S1 conditions of use (continuous operation).

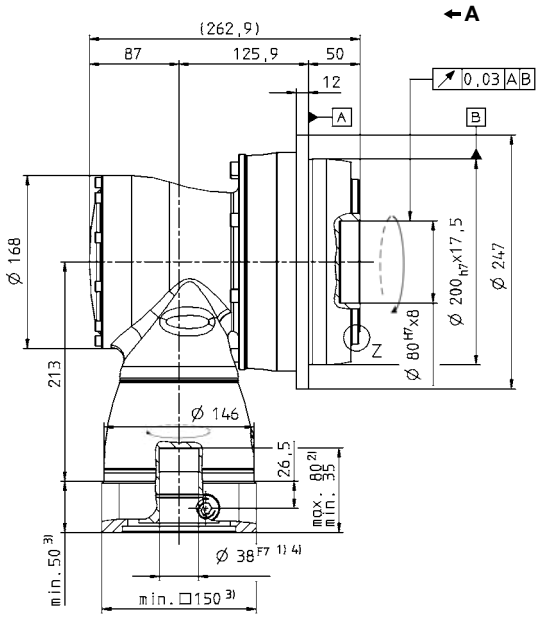
[a)] Other ratios up to i=1000 available on request
[b)] Higher speeds are possible if the nominal torque is reduced
[c)] For higher ambient temperatures, please reduce input speed
[d)] Idling torques decrease during operation
[e)] Refers to center of the output shaft or flange

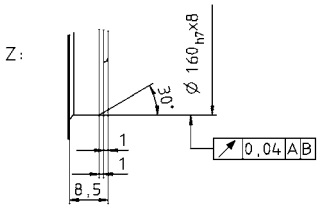
All technical data for front output side applies.
Technical data for rearward output versions, see page 386.

View A

2-stage:







See technical data sheet for available clamping hub diameters (mass moment of inertia). Dimensions available on request.

Non-tolerated dimensions ±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 with a minimum thickness of 1 mm.

CAD data is available under www.wittenstein-alpha.com

Motor mounting according to operating manual

				3-stage													
Ratio [a]			*i*	**64**	**84**	**100**	**125**	**140**	**175**	**200**	**250**	**280**	**350**	**400**	**500**	**700**	**1000**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B} Nm	1200	1200	1500	1500	1500	1500	1500	1500	1600	1600	840	1050	1470	1400
			T_{2B} in.lb	10620	10620	13275	13275	13275	13275	13275	13275	14160	14160	7434	9293	13010	12390
Nominal output torque (with n_{1N})			T_{2N} Nm	700	700	950	950	950	950	950	950	1120	1250	640	750	1120	800
			T_{2N} in.lb	6195	6195	8408	8408	8408	8408	8408	8408	9912	11063	5664	6638	9912	7080
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not} Nm	1600	1600	2500	2500	2500	2500	2500	2500	2750	2750	1600	2000	2750	2750
			T_{2Not} in.lb	14160	14160	22125	22125	22125	22125	22125	22125	24338	24338	14160	17700	24338	24338
Nominal input speed (with T_{2N} and 20 °C ambient temperature) [b), c)]			n_{1N} rpm	2900	2900	2900	2900	2900	2900	2900	3200	2900	3200	3900	3900	3900	3900
Max. continuous speed (with 20 % T_{2N} and 20 °C ambient temperature)			n_{1Ncym} rpm	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4200	4200	4200	4200
Max. input speed			n_{1Max} rpm	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500
Mean no load running torque (with n_1 = 3000 rpm and 20 °C gearhead temperature) [d)]			T_{012} Nm	1	0.5	0.8	0.6	0.6	0.5	0.5	0.4	0.5	0.4	0.4	0.4	0.4	0.4
			T_{012} in.lb	8.9	4.4	7.1	5.3	5.3	4.4	4.4	3.5	4.4	3.5	3.5	3.5	3.5	3.5
Max. torsional backlash			j_t arcmin	Standard ≤ 4 / Reduced ≤ 2													
Torsional rigidity			C_{t21} Nm/ arcmin	269	252	336	346	336	346	336	346	400	407	274	341	404	389
			C_{t21} in.lb/ arcmin	2381	2230	2974	3062	2974	3062	2974	3062	3540	3602	2425	3018	3575	3443
Tilting rigidity			C_{2K} Nm/ arcmin	1452													
			C_{2K} in.lb/ arcmin	12850													
Max. axial force [e)]			F_{2AMax} N	10050													
			F_{2AMax} lb_f	2261													
Max. tilting moment			M_{2KMax} Nm	3064													
			M_{2KMax} in.lb	27116													
Efficiency at full load			η %	92													
Service life (For calculation, see the Chapter "Information")			L_h h	> 20000													
Weight incl. standard adapter plate			*m* kg	45,4													
			m lb_m	100,3													
Operating noise (with n_1 = 3000 rpm no load)			L_{PA} dB(A)	< 70													
Max. permitted housing temperature			°C	90													
			F	194													
Ambient temperature			°C	0 to +40													
			F	32 to 104													
Lubrication				Lubricated for life													
Paint				Blue RAL 5002													
Direction of rotation				Motor and gearhead opposite directions													
Protection class				IP 65													
Moment of inertia (relates to the drive) Clamping hub diameter [mm]	G	24	J_1 kgcm²	3.97	2.82	3.36	3.22	2.82	2.75	2.50	2.47	2.50	2.44	2.42	2.42	2.42	2.42
			J_1 10^{-3} in.lb.s²	3.51	2.50	2.97	2.85	2.50	2.43	2.21	2.19	2.21	2.16	2.14	2.14	2.14	2.14
	K	38	J_1 kgcm²	10.90	9.74	10.30	10.10	9.74	9.66	9.41	9.38	9.41	9.38	9.33	9.33	9.33	9.33
			J_1 10^{-3} in.lb.s²	9.65	8.62	9.12	8.94	8.62	8.55	8.33	8.30	8.33	8.30	8.26	8.26	8.26	8.26

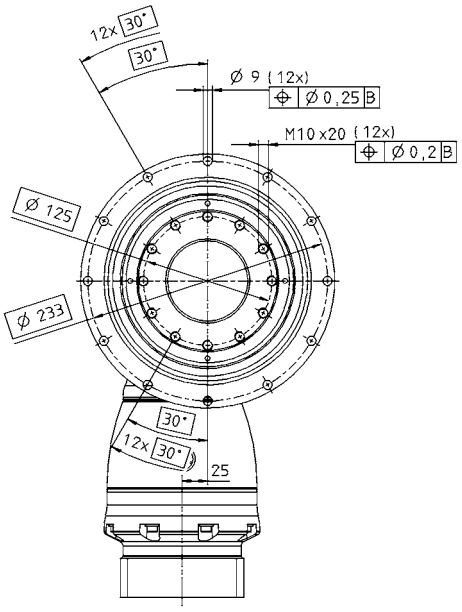
Please contact us for information on the best configuration for S1 conditions of use (continuous operation).

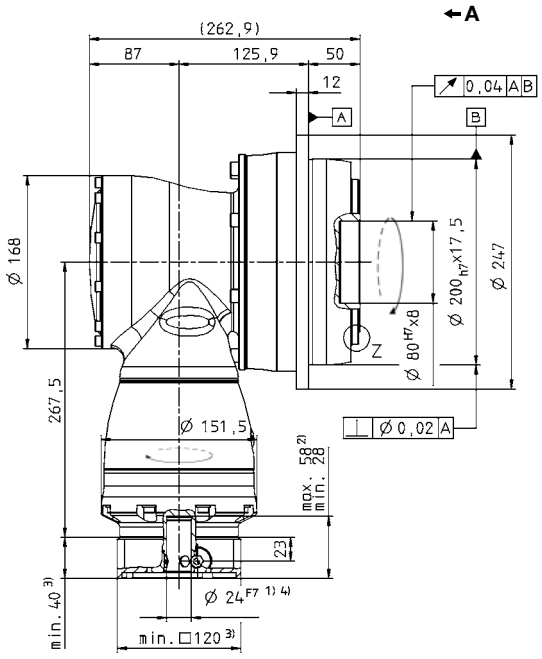
[a)] Other ratios available on request
[b)] Higher speeds are possible if the nominal torque is reduced
[c)] For higher ambient temperatures, please reduce input speed
[d)] Idling torques decrease during operation
[e)] Refers to center of the output shaft or flange

All technical data for front output side applies.
Technical data for rearward output versions, see page 386.

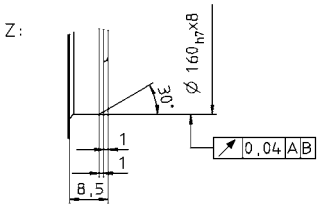
View A

3-stage:





Z:



See technical data sheet for available clamping hub diameters (mass moment of inertia). Dimensions available on request.

Non-tolerated dimensions ±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 with a minimum thickness of 1 mm.

CAD data is available under www.wittenstein-alpha.com

Motor mounting according to operating manual

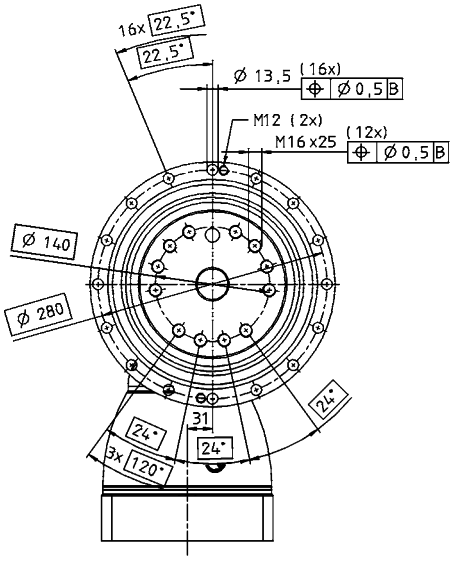
				2-stage							
Ratio [a]			*i*	**15**	**20**	**25**	**35**	**49**	**50**	**70**	**100**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B} Nm	3200	3200	3200	3300	3300	2350	3300	2800
			in.lb	28320	28320	28320	29205	29205	20798	29205	24780
Nominal output torque (with n_{1N})			T_{2N} Nm	2000	2000	2000	1800	1800	1800	1800	1600
			in.lb	17.700	17.700	17.700	15.930	15.930	15.930	15.930	14.160
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not} Nm	4500	5250	5250	7350	6800	4500	6300	8750
			in.lb	39825	46463	46463	65048	60180	39825	55755	77438
Nominal input speed (with T_{2N} and 20 °C ambient temperature) [b), c)]			n_{1N} rpm	1500	1700	1900	1900	1700	1700	1700	1700
Max. continuous speed (with 20 % T_{2N} and 20 °C ambient temperature)			n_{1Ncym} rpm	1900	2300	2700	2700	2400	2400	2400	2400
Max. input speed			n_{1Max} rpm	4000	4000	4000	4000	4000	4000	4000	4000
Mean no load running torque (with n_1 = 3000 rpm and 20 °C gearhead temperature) [d)]			T_{012} Nm	18.5	15.0	13.0	12.0	12.0	15.0	14.0	13.0
			in.lb	163.7	132.8	115.1	106.2	106.2	132.8	123.9	115.1
Max. torsional backlash			j_t arcmin	Standard ≤ 4 / Reduced ≤ 2							
Torsional rigidity			C_{t21} Nm/ arcmin	615	640	664	730	728	658	727	642
			in.lb/ arcmin	5.443	5.664	5.876	6.461	6.443	5.823	6.434	5.682
Tilting rigidity			C_{2K} Nm/ arcmin	5560							
			in.lb/ arcmin	49206							
Max. axial force [e)]			F_{2AMax} N	33000							
			lb_f	7425							
Max. tilting moment			M_{2KMax} Nm	5900							
			in.lb	52215							
Efficiency at full load			η %	94							
Service life (For calculation, see the Chapter "Information")			L_h h	> 20000							
Weight incl. standard adapter plate			*m* kg	83							
			lb_m	183							
Operating noise (with n_1 = 3000 rpm no load)			L_{PA} dB(A)	≤ 71							
Max. permitted housing temperature			°C	+90							
			F	+194							
Ambient temperature			°C	0 to +40							
			F	32 to 104							
Lubrication				Lubricated for life							
Paint				Blue RAL 5002							
Direction of rotation				Motor and gearhead opposite directions							
Protection class				IP 65							
Moment of inertia (relates to the drive) Clamping hub diameter [mm]	M	48	J_1 kgcm²	74.00	52.00	43.00	43.00	35.00	30.00	30.00	30.00
			10^{-3} in.lb.s²	65.49	46.02	38.06	38.06	30.98	26.55	26.55	26.55

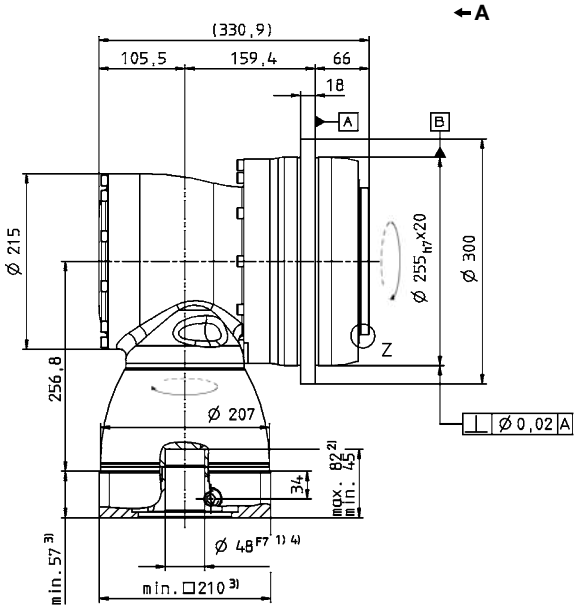
Please contact us for information on the best configuration for S1 conditions of use (continuous operation).

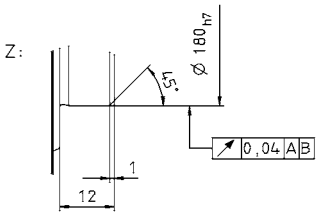
[a)] Other ratios available on request
[b)] Higher speeds are possible if the nominal torque is reduced
[c)] For higher ambient temperatures, please reduce input speed
[d)] Idling torques decrease during operation
[e)] Refers to center of the output shaft or flange

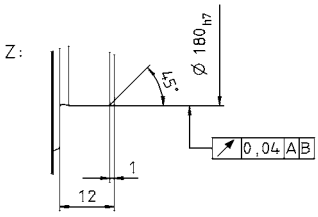
All technical data for front output side applies.
Technical data for rearward output versions, see page 386.

2-stage:









See technical data sheet for available clamping hub diameters (mass moment of inertia). Dimensions available on request.

Non-tolerated dimensions ±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 with a minimum thickness of 1 mm.

CAD data is available under www.wittenstein-alpha.com

Motor mounting according to operating manual

				3-stage											
Ratio [a]			*i*	**63**	**100**	**125**	**140**	**175**	**200**	**250**	**280**	**350**	**500**	**700**	**1000**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B} Nm	3300	3200	3200	3200	3200	3200	3200	3300	3300	2350	3300	2800
			T_{2B} in.lb	29205	28320	28320	28320	28320	28320	28320	29205	29205	20798	29205	24780
Nominal output torque (with n_{1N})			T_{2N} Nm	1800	2000	2000	2000	2000	2000	2000	1800	1800	1800	1800	1600
			T_{2N} in.lb	15.930	17.700	17.700	17.700	17.700	17.700	17.700	15.930	15.930	15.930	15.930	14.160
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not} Nm	6300	5250	5250	5250	5250	5250	5250	7350	7350	4500	6300	8750
			T_{2Not} in.lb	55755	46463	46463	46463	46463	46463	46463	65048	65048	39825	55755	77438
Nominal input speed (with T_{2N} and 20 °C ambient temperature) [b), c)]			n_{1N} rpm	2700	2700	2700	2700	2700	2700	2900	2700	2900	3400	3400	3400
Max. continuous speed (with 20 % T_{2N} and 20 °C ambient temperature)			n_{1Ncym} rpm	3200	3500	3500	3500	3500	3500	3500	3500	3500	3800	3800	3800
Max. input speed			n_{1Max} rpm	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000
Mean no load running torque (with n_1 = 3000 rpm and 20 °C gearhead temperature) [d)]			T_{012} Nm	5.4	3.0	2.5	2.1	1.9	1.5	1.4	1.3	1.2	1.1	1.1	1.0
			T_{012} in.lb	47.8	26.6	22.1	18.6	16.8	13.3	12.4	0.0	10.6	9.7	9.7	8.9
Max. torsional backlash			j_t arcmin	Standard ≤ 4 / Reduced ≤ 2											
Torsional rigidity			C_{t21} Nm/ arcmin	699	640	664	640	664	640	664	715	730	658	727	642
			C_{t21} in.lb/ arcmin	6.186	5.664	5.876	5.664	5.876	5.664	5.876	6.328	6.461	5.823	6.434	5.682
Tilting rigidity			C_{2K} Nm/ arcmin	5560											
			C_{2K} in.lb/ arcmin	49210											
Max. axial force [e)]			F_{2AMax} N	33000											
			F_{2AMax} lb_f	7425											
Max. tilting moment			M_{2KMax} Nm	5900											
			M_{2KMax} in.lb	52215											
Efficiency at full load			η %	92											
Service life (For calculation, see the Chapter "Information")			L_h h	> 20000											
Weight incl. standard adapter plate			*m* kg	87											
			m lb_m	192											
Operating noise (with n_1 = 3000 rpm no load)			L_{PA} dB(A)	≤ 71											
Max. permitted housing temperature			°C	+90											
			F	+194											
Ambient temperature			°C	0 to +40											
			F	32 to 104											
Lubrication				Lubricated for life											
Paint				Blue RAL 5002											
Direction of rotation				Motor and gearhead opposite directions											
Protection class				IP 65											
Moment of inertia (relates to the drive) Clamping hub diameter [mm]	K	38	J_1 kgcm²	17.80	14.10	12.10	11.00	10.80	10.20	10.10	10.10	10.00	9.90	9.90	9.90
			J_1 10^{-3} in.lb.s²	15.75	12.48	10.71	9.74	9.56	9.03	8.94	8.94	8.85	8.76	8.76	8.76
	M	48	J_1 kgcm²	32.50	28.80	26.80	25.70	25.50	24.90	24.80	24.90	24.80	24.60	24.60	24.60
			J_1 10^{-3} in.lb.s²	28.76	25.49	23.72	22.74	22.57	22.04	21.95	22.04	21.95	21.77	21.77	21.77

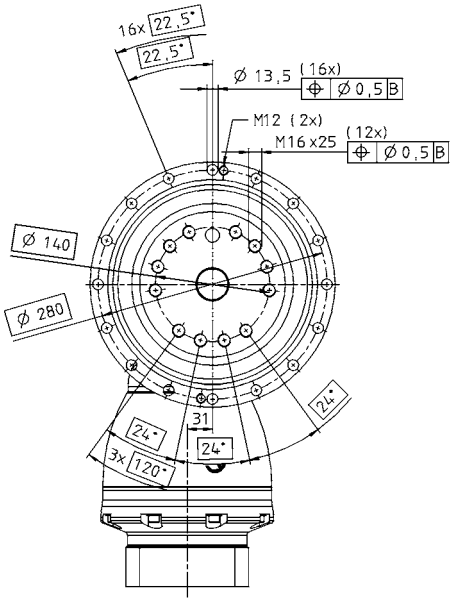
Please contact us for information on the best configuration for S1 conditions of use (continuous operation).

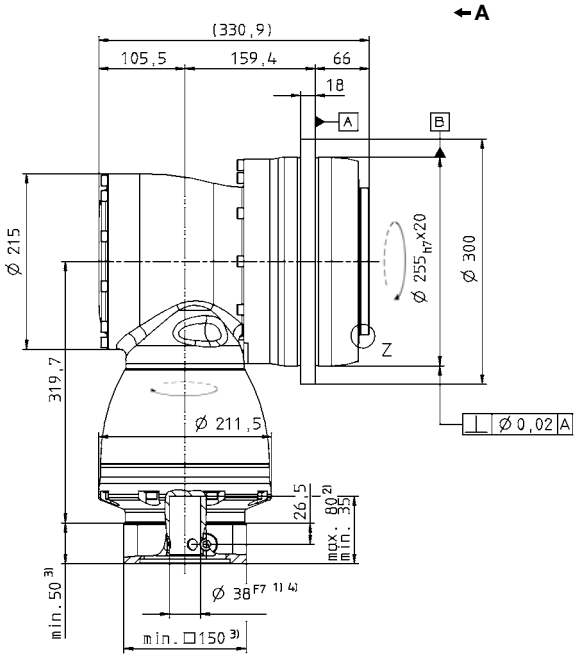
[a)] Other ratios available on request
[b)] Higher speeds are possible if the nominal torque is reduced
[c)] For higher ambient temperatures, please reduce input speed
[d)] Idling torques decrease during operation
[e)] Refers to center of the output shaft or flange

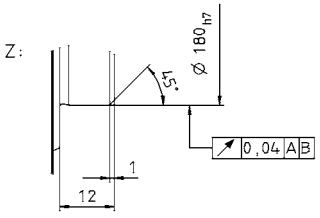
All technical data for front output side applies.
Technical data for rearward output versions, see page 386.

View A

3-stage:







See technical data sheet for available clamping hub diameters (mass moment of inertia). Dimensions available on request.

Non-tolerated dimensions ±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 with a minimum thickness of 1 mm.

CAD data is available under www.wittenstein-alpha.com

Motor mounting according to operating manual

			3-stage									
Ratio [a]	i		**100**	**125**	**140**	**175**	**200**	**250**	**350**	**500**	**700**	**1000**
Max. acceleration torque (max. 1000 cycles per hour)	T_{2B}	Nm	6000	6000	5000	6000	4200	5250	6000	4500	5000	4800
		in.lb	53100	53100	44250	53100	37170	46463	53100	39825	44250	42480
Nominal output torque (with n_{1N})	T_{2N}	Nm	3350	3800	3350	3800	3350	3800	3800	2900	2800	2900
		in.lb	29648	33630	29648	33630	29648	33630	33630	25665	24780	25665
Emergency stop torque (permitted 1000 times during the service life of the gearhead)	T_{2Not}	Nm	10000	12500	9000	11250	8000	10000	14000	15000	15000	15000
		in.lb	88500	110625	79650	99563	70800	88500	123900	132750	132750	132750
Nominal input speed (with T_{2N} and 20 °C ambient temperature) [b), c)]	n_{1N}	rpm	2100	2100	1900	1900	1900	1900	1900	1900	1900	1900
Max. continuous speed (with 20 % T_{2N} and 20 °C ambient temperature)	n_{1Ncym}	rpm	2900	2900	2600	2600	2600	2600	2600	2600	2600	2600
Max. input speed	n_{1Max}	rpm	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500
Mean no load running torque (with n_1 = 3000 rpm and 20 °C gearhead temperature) [d)]	T_{012}	Nm	5.5	5.5	8.5	8.5	6.0	6.0	6.0	6.0	6.0	6.0
		in.lb	48.7	48.7	75.2	75.2	53.1	53.1	53.1	53.1	53.1	53.1
Max. torsional backlash	j_t	arcmin	Standard ≤ 3,3 / Reduced ≤ 2,3									
Torsional rigidity	C_{t21}	Nm/ arcmin	1250	1350	1250	1350	1250	1350	1350	1280	1240	1050
		in.lb/ arcmin	11063	11948	11063	11948	11063	11948	11948	11328	10974	9293
Tilting rigidity	C_{2K}	Nm/ arcmin	9480									
		in.lb/ arcmin	83898									
Max. axial force [e)]	F_{2AMax}	N	50000									
		lb_f	11250									
Max. tilting moment	M_{2KMax}	Nm	8800									
		in.lb	77880									
Efficiency at full load	η	%	92									
Service life (For calculation, see the Chapter "Information")	L_h	h	> 20000									
Weight incl. standard adapter plate	m	kg	96									
		lb_m	212									
Operating noise (with n_1 = 3000 rpm no load)	L_{PA}	dB(A)	≤ 71									
Max. permitted housing temperature		°C	+90									
		F	+194									
Ambient temperature		°C	0 to +40									
		F	32 to 104									
Lubrication			Lubricated for life									
Paint			Blue RAL 5002									
Direction of rotation			Motor and gearhead opposite directions									
Protection class			IP 65									
Moment of inertia (relates to the drive) **Clamping hub diameter [mm]** K 38	J_1	kgcm²	16.70	16.70	16.50	16.50	16.40	16.40	16.40	16.40	16.40	16.40
		10^{-3} in.lb.s²	14.78	14.78	14.60	14.60	14.51	14.51	14.51	14.51	14.51	14.51

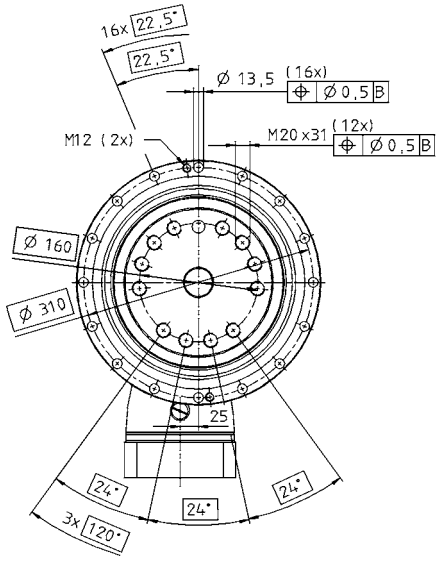
Please contact us for information on the best configuration for S1 conditions of use (continuous operation).

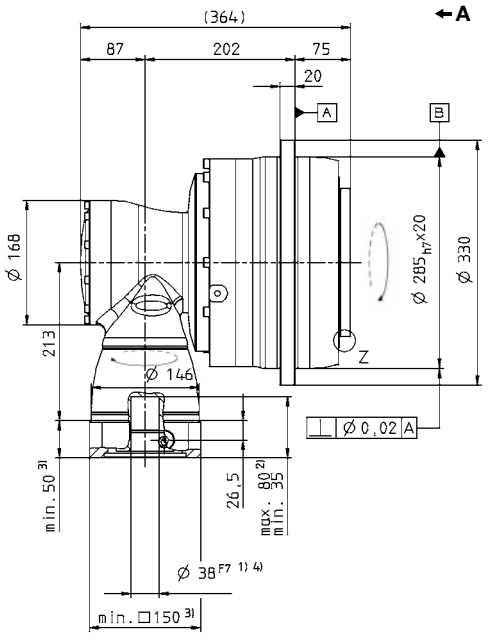
[a)] Other ratios available on request
[b)] Higher speeds are possible if the nominal torque is reduced
[c)] For higher ambient temperatures, please reduce input speed
[d)] Idling torques decrease during operation
[e)] Refers to center of the output shaft or flange

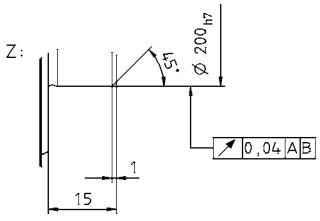
All technical data for front output side applies.
Technical data for rearward output versions, see page 386.

View A

3-stage:







See technical data sheet for available clamping hub diameters (mass moment of inertia). Dimensions available on request.

Non-tolerated dimensions ±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 with a minimum thickness of 1 mm.

CAD data is available under www.wittenstein-alpha.com

Motor mounting according to operating manual

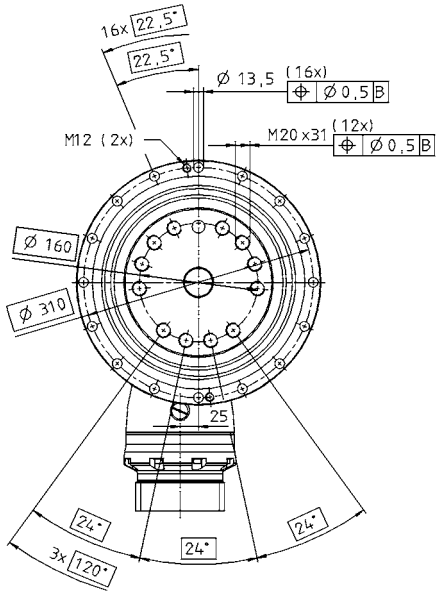
				4-stage											
Ratio [a]			***i***	**180**	**240**	**300**	**375**	**420**	**500**	**560**	**600**	**700**	**800**	**875**	**1000**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B} Nm	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000
			T_{2B} in.lb	53100	53100	53100	53100	53100	53100	53100	53100	53100	53100	53100	53100
Nominal output torque (with n_{1N})			T_{2N} Nm	3350	3350	3350	3800	3350	3350	3350	3350	3350	3350	3800	3350
			T_{2N} in.lb	29648	29648	29648	33630	29648	29648	29648	29648	29648	29648	33630	29648
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not} Nm	10000	10000	10000	12500	10000	10000	10000	10000	10000	10000	12500	10000
			T_{2Not} in.lb	88500	88500	88500	110625	88500	88500	88500	88500	88500	88500	110625	88500
Nominal input speed (with T_{2N} and 20 °C ambient temperature) [b), c)]			n_{1N} rpm	2700	2900	2900	2900	2900	2900	2900	2900	2900	2900	2900	3200
Max. continuous speed (with 20 % T_{2N} and 20 °C ambient temperature)			n_{1Ncym} rpm	3800	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4200
Max. input speed			n_{1Max} rpm	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500
Mean no load running torque (with n_1 = 3000 rpm and 20 °C gearhead temperature) [d)]			T_{012} Nm	3.4	2.5	1.6	1.4	1.1	1	1	0.8	0.8	0.7	0.7	0.6
			T_{012} in.lb	30.1	22.1	14.2	12.4	9.7	8.9	8.9	7.1	7.1	6.2	6.2	5.3
Max. torsional backlash			j_t arcmin	Standard ≤ 3,3 / Reduced ≤ 2,3											
Torsional rigidity			C_{t21} Nm/ arcmin	1250	1250	1250	1300	1250	1350	1250	1250	1262	1250	1350	1250
			C_{t21} in.lb/ arcmin	11063	11063	11063	11505	11063	11948	11063	11063	11169	11063	11948	11063
Tilting rigidity			C_{2K} Nm/ arcmin	9480											
			C_{2K} in.lb/ arcmin	83906											
Max. axial force [e)]			F_{2AMax} N	50000											
			F_{2AMax} lb_f	11250											
Max. tilting moment			M_{2KMax} Nm	8800											
			M_{2KMax} in.lb	77880											
Efficiency at full load			η %	90											
Service life (For calculation, see the Chapter "Information")			L_h h	> 20000											
Weight incl. standard adapter plate			m kg	99											
			m lb_m	219											
Operating noise (with n_1 = 3000 rpm no load)			L_{PA} dB(A)	≤ 71											
Max. permitted housing temperature			°C	+90											
			F	+194											
Ambient temperature			°C	0 to +40											
			F	32 to 104											
Lubrication				Lubricated for life											
Paint				Blue RAL 5002											
Direction of rotation				Motor and gearhead opposite directions											
Protection class				IP 65											
Moment of inertia (relates to the drive) Clamping hub diameter [mm]	G	24	J_1 kgcm²	5.93	4.29	3.33	3.32	2.81	3.19	2.80	2.50	2.74	2.49	2.74	2.46
			J_1 10^{-3} in.lb.s²	5.25	3.79	2.95	2.94	2.49	2.82	2.48	2.21	2.42	2.20	2.42	2.18
	K	38	J_1 kgcm²	12.84	11.18	10.24	10.23	9.72	10.10	9.71	9.41	9.65	9.40	9.65	9.37
			J_1 10^{-3} in.lb.s²	11.37	9.89	9.06	9.06	8.60	8.94	8.59	8.33	8.54	8.32	8.54	8.29

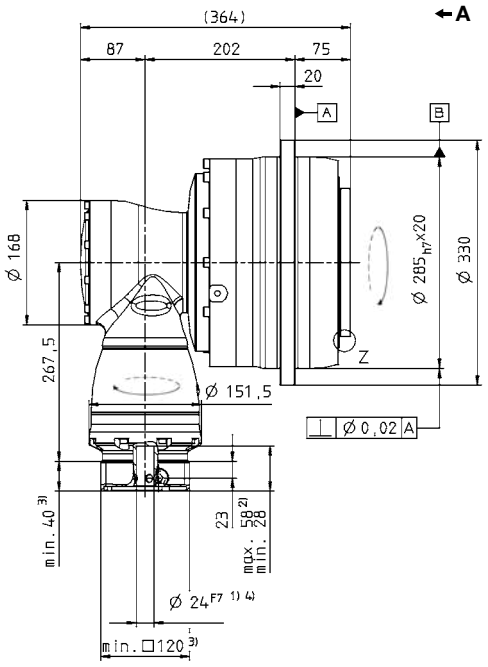
Please contact us for information on the best configuration for S1 conditions of use (continuous operation).

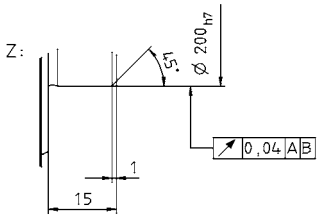
[a)] Other ratios available on request
[b)] Higher speeds are possible if the nominal torque is reduced
[c)] For higher ambient temperatures, please reduce input speed
[d)] Idling torques decrease during operation
[e)] Refers to center of the output shaft or flange

All technical data for front output side applies.
Technical data for rearward output versions, see page 386.

4-stage:







See technical data sheet for available clamping hub diameters (mass moment of inertia). Dimensions available on request.

Non-tolerated dimensions ±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 with a minimum thickness of 1 mm.

CAD data is available under www.wittenstein-alpha.com

Motor mounting according to operating manual

TPK+ 500 MF 4-stage i=1225-10000

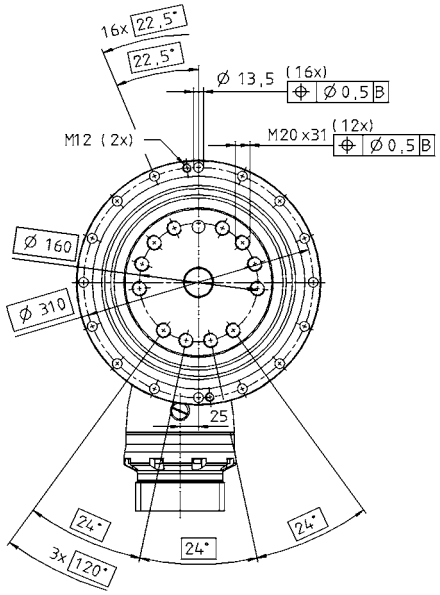
					4-stage								
Ratio [a]			*i*		**1225**	**1400**	**1750**	**2000**	**2800**	**3500**	**5000**	**7000**	**10000**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B}	Nm	6000	6000	6000	4200	5000	6000	4500	5000	4800
				in.lb	53100	53100	53100	37170	44250	53100	39825	44250	42480
Nominal output torque (with n_{1N})			T_{2N}	Nm	3800	3800	3800	3200	2800	3800	2900	2800	2900
				in.lb	33630	33630	33630	28320	24780	33630	25665	24780	25665
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not}	Nm	15000	15000	15000	8000	11200	14000	15000	15000	15000
				in.lb	132750	132750	132750	70800	99120	123900	132750	132750	132750
Nominal input speed (with T_{2N} and 20 °C ambient temperature) [b), c)]			n_{1N}	rpm	2900	2900	3200	3900	3900	3900	3900	3900	3900
Max. continuous speed (with 20 % T_{2N} and 20 °C ambient temperature)			n_{1Ncym}	rpm	4000	4000	4200	4200	4200	4200	4200	4200	4200
Max. input speed			n_{1Max}	rpm	4500	4500	4500	4500	4500	4500	4500	4500	4500
Mean no load running torque (with n_1 = 3000 rpm and 20 °C gearhead temperature) [d)]			T_{012}	Nm	0.6	0.6	0.4	0.4	0.4	0.4	0.4	0.4	0.4
				in.lb	5.3	5.3	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Max. torsional backlash			j_t	arcmin	Standard ≤ 3,3 / Reduced ≤ 2,3								
Torsional rigidity			C_{t21}	Nm/ arcmin	1350	1350	1350	1250	1250	1350	1250	1250	1050
				in.lb/ arcmin	11948	11948	11948	11063	11063	11948	11063	11063	9293
Tilting rigidity			C_{2K}	Nm/ arcmin	9480								
				in.lb/ arcmin	83906								
Max. axial force [e)]			F_{2AMax}	N	50000								
				lb_f	11250								
Max. tilting moment			M_{2KMax}	Nm	8800								
				in.lb	77880								
Efficiency at full load			η	%	90								
Service life (For calculation, see the Chapter "Information")			L_h	h	> 20000								
Weight incl. standard adapter plate			*m*	kg	99								
				lb_m	219								
Operating noise (with n_1 = 3000 rpm no load)			L_{PA}	dB(A)	≤ 71								
Max. permitted housing temperature				°C	+90								
				F	+194								
Ambient temperature				°C	0 to +40								
				F	32 to 104								
Lubrication					Lubricated for life								
Paint					Blue RAL 5002								
Direction of rotation					Motor and gearhead opposite directions								
Protection class					IP 65								
Moment of inertia (relates to the drive) Clamping hub diameter [mm]	G	24	J_1	kgcm²	2.73	2.49	2.46	2.42	2.42	2.42	2.42	2.42	2.42
				10^{-3} in.lb.s²	2.42	2.20	2.17	2.14	2.14	2.14	2.14	2.14	2.14
	K	38	J_1	kgcm²	9.64	9.40	9.37	9.33	9.33	9.33	9.33	9.33	9.33
				10^{-3} in.lb.s²	8.53	8.32	8.29	8.26	8.26	8.26	8.26	8.26	8.26

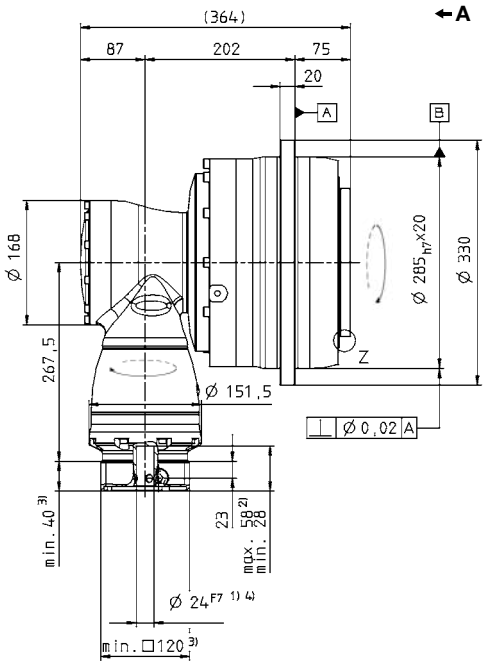
Please contact us for information on the best configuration for S1 conditions of use (continuous operation).

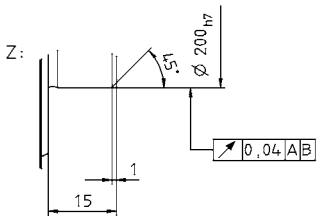
[a)] Other ratios available on request
[b)] Higher speeds are possible if the nominal torque is reduced
[c)] For higher ambient temperatures, please reduce input speed
[d)] Idling torques decrease during operation
[e)] Refers to center of the output shaft or flange

All technical data for front output side applies.
Technical data for rearward output versions, see page 386.

4-stage:







See technical data sheet for available clamping hub diameters (mass moment of inertia). Dimensions available on request.

Non-tolerated dimensions ±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 with a minimum thickness of 1 mm.

CAD data is available under www.wittenstein-alpha.com

Motor mounting according to operating manual

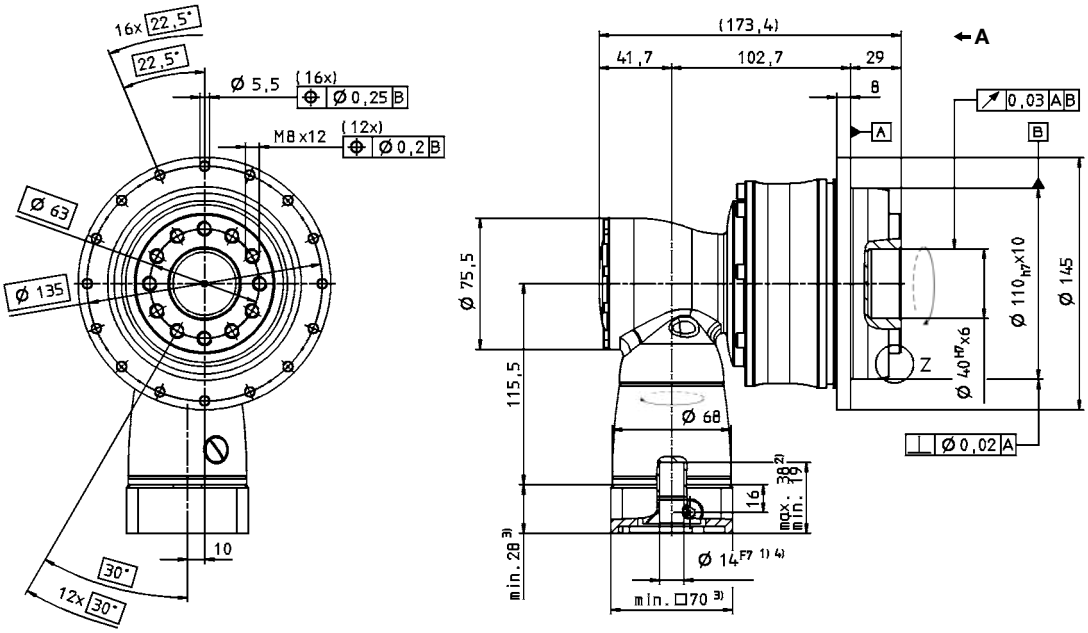
					3-stage							4-stage								
Ratio [a]			*i*		**66**	**88**	**110**	**137.5**	**154**	**220**	**385**	**330**	**462**	**577.5**	**770**	**1078**	**1540**	**2695**	**3850**	**5500**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B}	Nm	530	530	530	530	530	440	530	530	530	530	530	530	530	530	530	530
				in.lb	4691	4691	4691	4691	4691	3894	4691	4691	4691	4691	4691	4691	4691	4691	4691	4691
Nominal output torque (with n_{1N})			T_{2N}	Nm	375	375	375	375	375	330	375	375	375	375	375	375	375	375	375	375
				in.lb	3319	3319	3319	3319	3319	2921	3319	3319	3319	3319	3319	3319	3319	3319	3319	3319
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not}	Nm	880	1100	1100	1100	990	880	1200	880	1200	1100	1200	1200	1200	1200	1200	1200
				in.lb	7788	9735	9735	9735	8762	7788	10620	7788	10620	9735	10620	10620	10620	10620	10620	10620
Nominal input speed (with T_{2N} and 20 °C ambient temperature) [b), c)]			n_{1N}	rpm	2400	2600	2900	2900	2900	2900	2900	4300	4300	4300	4300	4300	4300	5400	5400	5400
Max. continuous speed (with 20 % T_{2N} and 20 °C ambient temperature)			n_{1Ncym}	rpm	2800	3300	3800	3800	3300	3300	3300	4800	4800	4800	4800	4800	4800	5400	5400	5400
Max. input speed			n_{1Max}	rpm	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000
Mean no load running torque (with n_1 = 3000 rpm and 20 °C gearhead temperature) [d)]			T_{012}	Nm	1.6	1.4	1.2	1.2	1.4	1.2	1.2	0.3	0.3	0.2	0.2	0.2	0.1	0.1	0.1	0.1
				in.lb	13.9	12.2	10.8	10.6	12.0	10.7	10.4	2.4	2.4	2.2	2.1	2.0	1.1	1.0	1.0	0.9
Max. torsional backlash			j_t	arcmin	≤1.3															
Torsional rigidity			C_{t21}	Nm/ arcmin	95	95	96	99	95	94	101	95	101	98	98	102	102	101	101	98
				in.lb/ arcmin	838	842	846	874	838	829	894	838	897	869	872	899	899	897	894	869
Tilting rigidity			C_{2K}	Nm/ arcmin	550															
				in.lb/ arcmin	4868															
Max. axial force [e)]			F_{2AMax}	N	4150															
				lb_f	934															
Max. tilting moment			M_{2KMax}	Nm	550															
				in.lb	4868															
Efficiency at full load			η	%	92							90								
Service life (For calculation, see the Chapter "Information")			L_h	h	> 20.000															
Weight incl. standard adapter plate			*m*	kg	–															
				lb_m	–															
Operating noise (with n_1 = 3000 rpm no load)			L_{PA}	dB(A)	≤ 66															
Max. permitted housing temperature				°C	90															
				F	194															
Ambient temperature				°C	0 to +40															
				F	32 to 104															
Lubrication					Lubricated for life															
Paint					Blue RAL 5002															
Direction of rotation					Motor and gearhead opposite directions															
Protection class					IP 65															
Moment of inertia (relates to the drive) Clamping hub diameter [mm]	B	11	J_1	kgcm²	–	–	–	–	–	–	–	0.08	0.09	0.06	0.06	0.06	0.06	0.06	0.06	0.06
				10^{-3} in.lb.s²	–	–	–	–	–	–	–	0.07	0.08	0.06	0.06	0.06	0.05	0.05	0.05	0.05
	C	14	J_1	kgcm²	0.56	0.46	0.41	0.40	0.37	0.35	0.34	0.19	0.20	0.18	0.18	0.18	0.17	0.17	0.17	0.17
				10^{-3} in.lb.s²	0.50	0.41	0.36	0.36	0.33	0.31	0.31	0.17	0.18	0.16	0.16	0.16	0.15	0.15	0.15	0.15
	E	19	J_1	kgcm²	0.91	0.81	0.76	0.76	0.72	0.70	0.70	–	–	–	–	–	–	–	–	–
				10^{-3} in.lb.s²	0.81	0.72	0.67	0.67	0.64	0.62	0.62	–	–	–	–	–	–	–	–	–

Please contact us for information on the best configuration for S1 conditions of use (continuous operation).

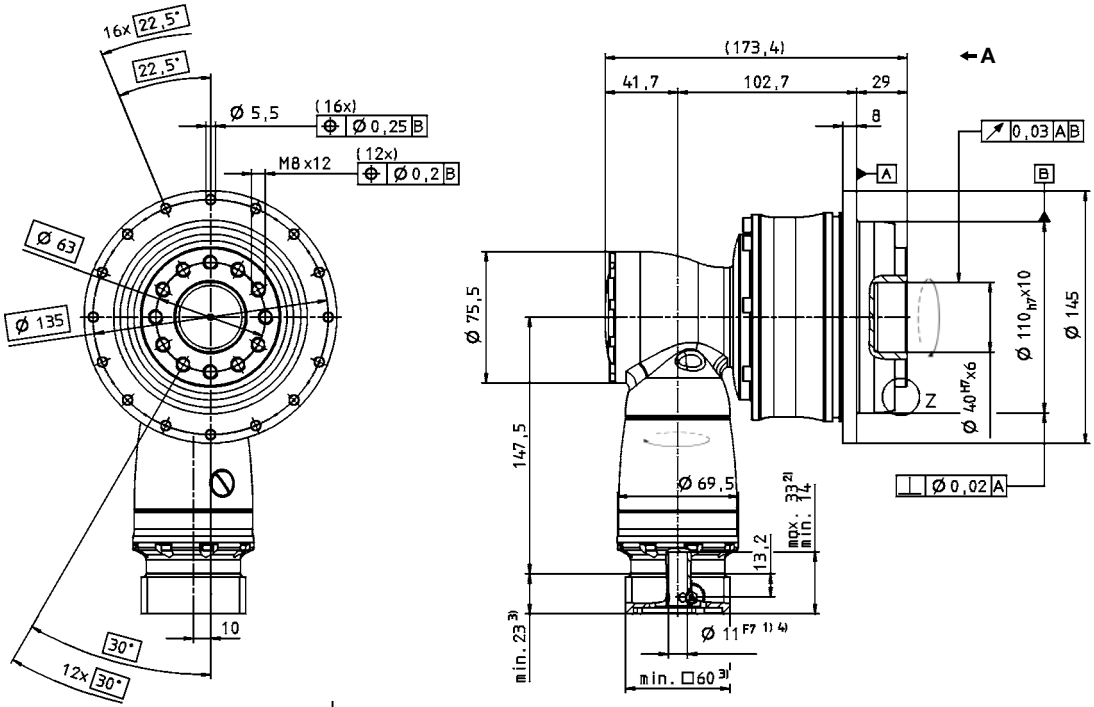
[a)] Other ratios available on request
[b)] Higher speeds are possible if the nominal torque is reduced
[c)] For higher ambient temperatures, please reduce input speed
[d)] Idling torques decrease during operation
[e)] Refers to center of the output shaft or flange

All technical data for front output side applies.
Technical data for rearward output versions, see page 386.

3-stage:



4-stage:



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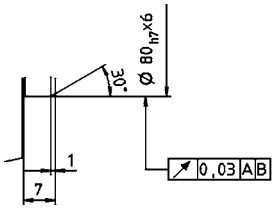


See technical data sheet for available clamping hub diameters (mass moment of inertia). Dimensions available on request.

Non-tolerated dimensions ±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 with a minimum thickness of 1 mm.

CAD data is available under www.wittenstein-alpha.com

Motor mounting according to operating manual

TPK+ 050 MA HIGH TORQUE 3/4-stage

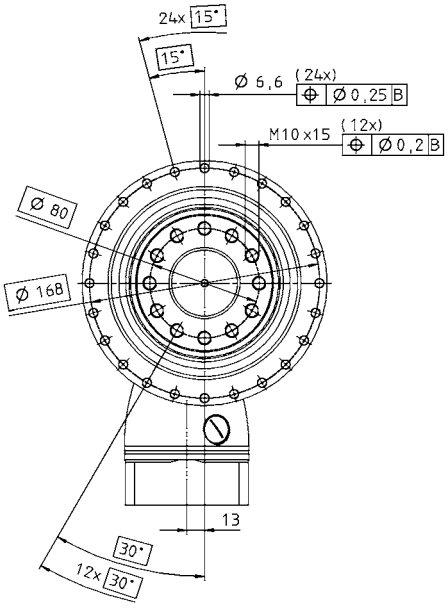
					3-stage							4-stage								
Ratio [a]			i		**66**	**88**	**110**	**137,5**	**154**	**220**	**385**	**330**	**462**	**577,5**	**770**	**1078**	**1540**	**2695**	**3850**	**5500**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B}	Nm	950	950	950	950	950	950	950	950	950	950	950	950	950	950	950	950
				in.lb	8408	8408	8408	8408	8408	8408	8408	8408	8408	8408	8408	8408	8408	8408	8408	8408
Nominal output torque (with n_{1N})			T_{2N}	Nm	675	675	675	675	675	675	675	675	675	675	675	675	675	675	675	675
				in.lb	5.974	5.974	5.974	5.974	5.974	5.974	5.974	5.974	5.974	5.974	5.974	5.974	5.974	5.974	5.974	5.974
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not}	Nm	2100	2375	2375	2375	2375	2200	2375	2100	2375	2375	2375	2375	2375	2375	2375	2375
				in.lb	18585	21019	21019	21019	21019	19470	21019	18585	21019	21019	21019	21019	21019	21019	21019	21019
Nominal input speed (with T_{2N} and 20 °C ambient temperature) [b), c)]			n_{1N}	rpm	2200	2400	2700	2700	2700	2700	2700	3400	3400	3400	3400	3400	3400	4400	4400	4400
Max. continuous speed (with 20 % T_{2N} and 20 °C ambient temperature)			n_{1Ncym}	rpm	2800	3300	3800	3800	3300	3300	3300	4300	4300	4300	4300	4300	4300	4400	4400	4400
Max. input speed			n_{1Max}	rpm	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000
Mean no load running torque (with n_1 = 3000 rpm and 20 °C gearhead temperature) [d)]			T_{012}	Nm	2.9	2.4	2.0	2.1	2.4	2.1	2.0	0.4	0.5	0.3	0.3	0.3	0.2	0.1	0.1	0.1
				in.lb	25.7	21.0	18.1	18.4	21.1	18.3	17.7	3.4	4.1	3.0	2.7	2.4	1.3	1.1	1.1	1.0
Max. torsional backlash			j_t	arcmin	≤ 1,3															
Torsional rigidity			C_{t21}	Nm/ arcmin	202	203	205	210	205	205	215	202	214	208	209	214	214	215	215	217
				in.lb/ arcmin	1785	1798	1810	1857	1810	1810	1900	1785	1891	1840	1849	1896	1896	1900	1900	1924
Tilting rigidity			C_{2K}	Nm/ arcmin	560															
				in.lb/ arcmin	4956															
Max. axial force [e)]			F_{2AMax}	N	6130															
				lb_f	1379															
Max. tilting moment			M_{2KMax}	Nm	1335															
				in.lb	11815															
Efficiency at full load			η	%	92							90								
Service life (For calculation, see the Chapter "Information")			L_h	h	> 20000															
Weight incl. standardadapter plate			m	kg	-															
				lb_m																
Operating noise (with n_1 = 3000 rpm no load)			L_{PA}	dB(A)	≤ 68															
Max. permitted housing temperature				°C	+90															
				F	+194															
Ambient temperature				°C	0 to +40															
				F	32 to 104															
Lubrication					Lubricated for life															
Paint					Blue RAL 5002															
Direction of rotation					Motor and gearhead opposite directions															
Protection class					IP 65															
Moment of inertia (relates to the drive)	E	19	J_1	kgcm²	-	-	-	-	-	-	-	0,24	0,29	0,20	0,20	0,20	0,19	0,18	0,18	0,18
				10^{-3} in.lb.s²	-	-	-	-	-	-	-	0,21	0,26	0,18	0,18	0,18	0,16	0,16	0,16	0,16
Clamping hub diameter [mm]	G	24	J_1	kgcm²	1,65	1,30	1,13	1,11	0,99	0,91	0,90	0,68	0,73	0,63	0,63	0,63	0,63	0,63	0,63	0,63
				10^{-3} in.lb.s²	1,46	1,15	1,00	0,98	0,87	0,81	0,80	0,61	0,65	0,56	0,56	0,56	0,56	0,55	0,55	0,55
	H	28	J_1	kgcm²	3,07	2,71	2,54	2,53	2,40	2,33	2,32	-	-	-	-	-	-	-	-	-
				10^{-3} in.lb.s²	2,72	2,40	2,25	2,24	2,13	2,06	2,05	-	-	-	-	-	-	-	-	-

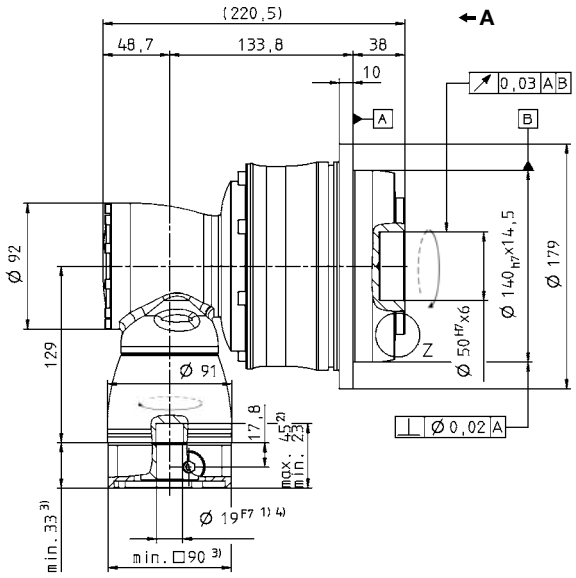
Please contact us for information on the best configuration for S1 conditions of use (continuous operation).

[a)] Other ratios available on request
[b)] Higher speeds are possible if the nominal torque is reduced
[c)] For higher ambient temperatures, please reduce input speed
[d)] Idling torques decrease during operation
[e)] Refers to center of the output shaft or flange

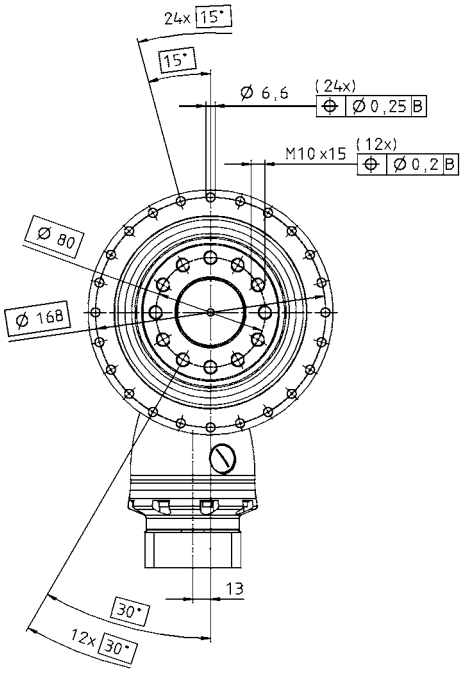
All technical data for front output side applies.
Technical data for rearward output versions, see page 386.

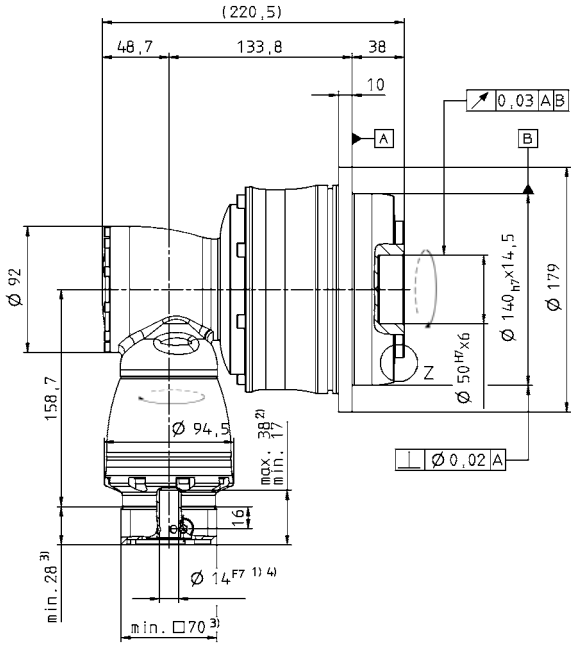
3-stage:





4-stage:





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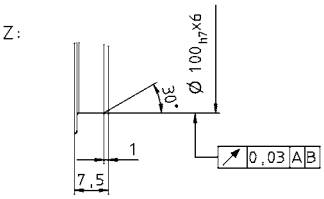


See technical data sheet for available clamping hub diameters (mass moment of inertia). Dimensions available on request.

Non-tolerated dimensions ±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 with a minimum thickness of 1 mm.

CAD data is available under www.wittenstein-alpha.com

Motor mounting according to operating manual

TPK+ 110 MA HIGH TORQUE 3/4-stage

					3-stage							4-stage								
Ratio [a]			*i*		**66**	**88**	**110**	**137,5**	**154**	**220**	**385**	**330**	**462**	**577,5**	**770**	**1078**	**1540**	**2695**	**3850**	**5500**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B}	Nm	3100	3100	3100	3100	3100	2750	3100	3100	3100	3100	3100	3100	3100	3100	3100	2000
				in.lb	27435	27435	27435	27435	27435	24338	27435	27435	27435	27435	27435	27435	27435	27435	27435	17700
Nominal output torque (with n_{1N})			T_{2N}	Nm	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1400
				in.lb	14603	14603	14603	14603	14603	14603	14603	14603	14603	14603	14603	14603	14603	14603	14603	12390
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not}	Nm	4800	5700	5700	6500	5600	5500	6500	4800	6500	6000	6500	6500	6500	6500	6500	6500
				in.lb	42480	50445	50445	57525	49560	48675	57525	42480	57525	53100	57525	57525	57525	57525	57525	57525
Nominal input speed (with T_{2N} and 20 °C ambient temperature) [b), c)]			n_{1N}	rpm	2100	2300	2600	2600	2400	2400	2400	3000	3000	3000	3000	3000	3000	4100	4100	4100
Max. continuous speed (with 20 % T_{2N} and 20 °C ambient temperature)			n_{1Ncym}	rpm	2800	3200	3600	3600	3200	3200	3200	3800	3800	3800	3800	3800	3800	4100	4100	4100
Max. input speed			n_{1Max}	rpm	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500
Mean no load running torque (with n_1 = 3000 rpm and 20 °C gearhead temperature) [d)]			T_{012}	Nm	6.0	4.6	3.6	3.4	4.4	3.5	3.3	0.9	1.0	0.7	0.6	0.6	0.3	0.3	0.2	0.2
				in.lb	53.1	40.7	31.9	30.1	38.9	31.0	29.2	8.0	8.9	6.2	5.3	5.3	2.7	2.7	1.8	1.8
Max. torsional backlash			j_t	arcmin	≤ 1,3															
Torsional rigidity			C_{t21}	Nm/ arcmin	634	642	654	675	654	648	687	634	682	662	667	685	685	689	687	658
				in.lb/ arcmin	5614	5681	5789	5976	5789	5739	6083	5614	6037	5855	5902	6062	6062	6101	6083	5822
Tilting rigidity			C_{2K}	Nm/ arcmin	1452															
				in.lb/ arcmin	12850															
Max. axial force [e)]			F_{2AMax}	N	10050															
				lb_f	2261															
Max. tilting moment			M_{2KMax}	Nm	3280															
				in.lb	29028															
Efficiency at full load			η	%	92							90								
Service life (For calculation, see the Chapter "Information")			L_h	h	> 20000															
Weight incl. standardadapter plate			*m*	kg	-															
				lb_m																
Operating noise (with n_1 = 3000 rpm no load)			L_{PA}	dB(A)	≤ 70															
Max. permitted housing temperature				°C	+90															
				F	+194															
Ambient temperature				°C	0 to +40															
				F	32 to 104															
Lubrication					Lubricated for life															
Paint					Blue RAL 5002															
Direction of rotation					Motor and gearhead opposite directions															
Protection class					IP 65															
Moment of inertia (relates to the drive)	E	19	J_1	kgcm²	-	-	-	-	-	-	-	0.89	1.06	0.76	0.76	0.76	0.69	0.68	0.68	0.68
				10^{-3} in.lb.s²	-	-	-	-	-	-	-	0.79	0.94	0.68	0.67	0.67	0.61	0.61	0.60	0.60
Clamping hub diameter [mm]	G	24	J_1	kgcm²	-	-	-	-	-	-	-	2.46	2.63	2.33	2.32	2.32	2.26	2.25	2.25	2.25
				10^{-3} in.lb.s²	-	-	-	-	-	-	-	2.17	2.33	2.06	2.06	2.05	2.00	1.99	1.99	1.99
	H	28	J_1	kgcm²	5.48	4.27	3.64	3.58	3.14	2.87	2.84	-	-	-	-	-	-	-	-	-
				10^{-3} in.lb.s²	4.85	3.78	3.22	3.17	2.78	2.54	2.51	-	-	-	-	-	-	-	-	-
	K	38	J_1	kgcm²	12.72	11.52	10.89	10.83	10.39	10.12	10.09	-	-	-	-	-	-	-	-	-
				10^{-3} in.lb.s²	11.26	10.19	9.64	9.58	9.19	8.95	8.93	-	-	-	-	-	-	-	-	-

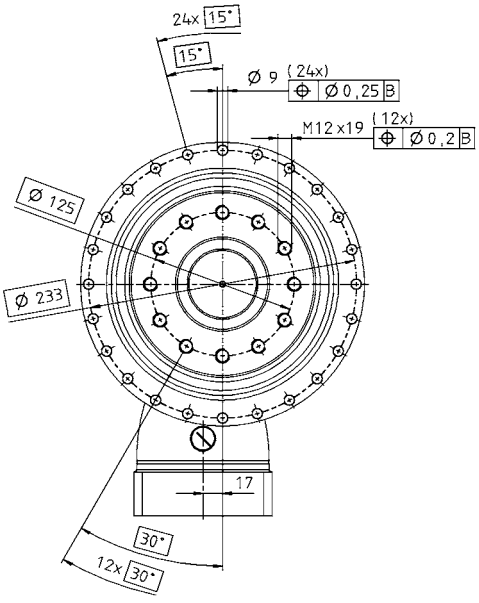
Please contact us for information on the best configuration for S1 conditions of use (continuous operation).

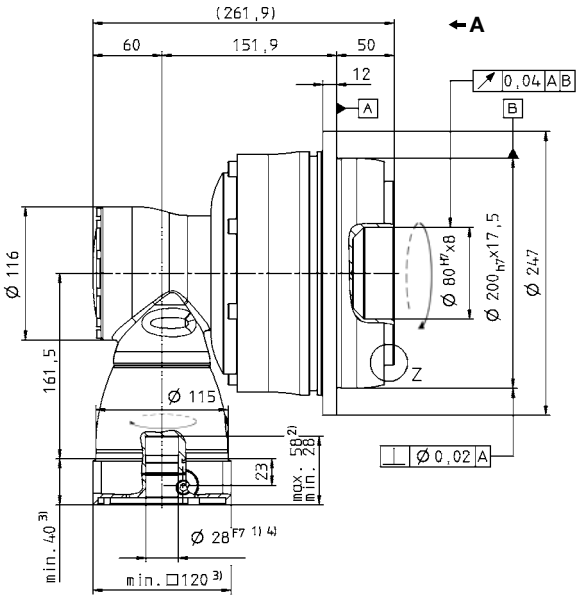
[a)] Other ratios available on request
[b)] Higher speeds are possible if the nominal torque is reduced
[c)] For higher ambient temperatures, please reduce input speed
[d)] Idling torques decrease during operation
[e)] Refers to center of the output shaft or flange

All technical data for front output side applies.
Technical data for rearward output versions, see page 386.

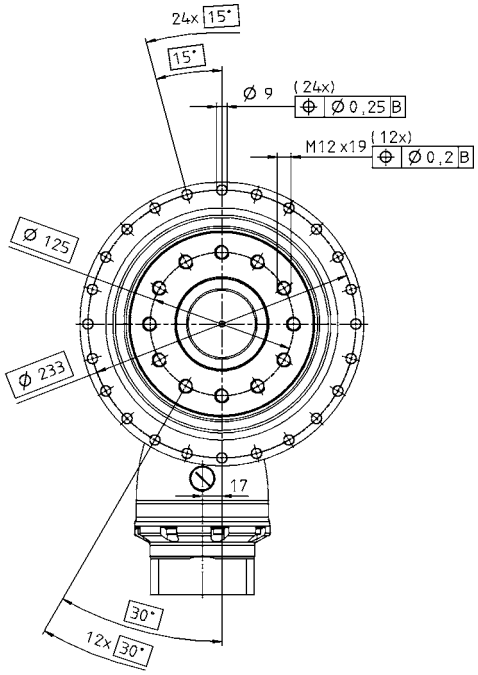
View A

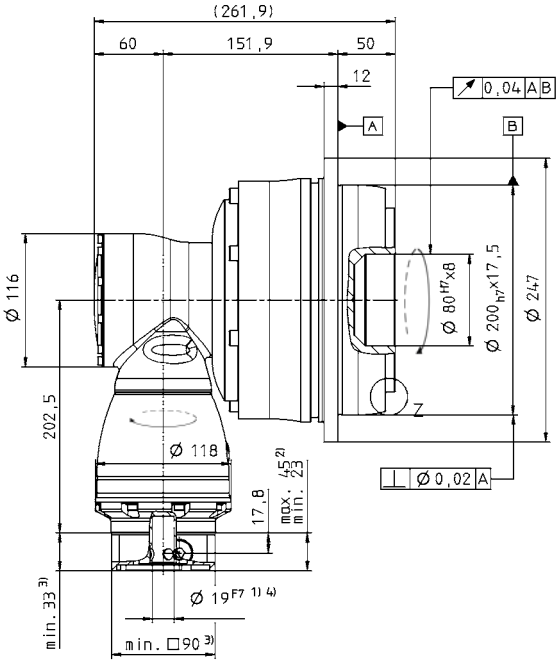
3-stage:





4-stage:





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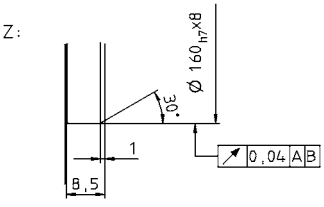


See technical data sheet for available clamping hub diameters (mass moment of inertia). Dimensions available on request.

Non-tolerated dimensions ±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 with a minimum thickness of 1 mm.

CAD data is available under www.wittenstein-alpha.com

Motor mounting according to operating manual

TPK+ 300 MA HIGH TORQUE 3/4-stage

					3-stage							4-stage								
Ratio [a]			*i*		**66**	**88**	**110**	**137.5**	**154**	**220**	**385**	**330**	**462**	**577.5**	**770**	**1078**	**1540**	**2695**	**3850**	**5500**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B}	Nm	5500	5500	5500	5500	5500	4600	5500	5500	5500	5500	5500	5500	5500	5500	5500	3900
				in.lb	48675	48675	48675	48675	48675	40710	48675	48675	48675	48675	48675	48675	48675	48675	48675	34515
Nominal output torque (with n_{1N})			T_{2N}	Nm	3500	3500	3500	3500	3500	3500	3500	3500	3500	3500	3500	3500	3500	3500	3500	3500
				in.lb	30975	30975	30975	30975	30975	30975	30975	30975	30975	30975	30975	30975	30975	30975	30975	30975
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not}	Nm	8800	11000	11000	11000	9900	8800	13250	8800	13250	11000	13250	13250	13250	13250	13250	13250
				in.lb	77880	97350	97350	97350	87615	77880	117263	77880	117263	97350	117263	117263	117263	117263	117263	117263
Nominal input speed (with T_{2N} and 20 °C ambient temperature) [b), c)]			n_{1N}	rpm	1800	1900	2100	2100	1900	1900	1900	2800	2800	2800	2800	2800	2800	3100	3800	3800
Max. continuous speed (with 20 % T_{2N} and 20 °C ambient temperature)			n_{1Ncym}	rpm	2300	2600	2900	2900	2600	2600	2600	3800	3800	3800	3800	3800	3800	4000	4000	4000
Max. input speed			n_{1Max}	rpm	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500
Mean no load running torque (with n_1 = 3000 rpm and 20 °C gearhead temperature) [d)]			T_{012}	Nm	11.0	8.2	6.9	6.5	9.2	6.7	6.4	1.5	2.2	1.0	0.9	0.8	0.6	0.4	0.4	0.4
				in.lb	97.4	72.6	61.1	57.5	81.4	59.3	56.6	13.3	19.5	8.9	8.0	7.1	5.3	3.5	3.5	3.5
Max. torsional backlash			j_t	arcmin	Standard ≤3,3 / Reduced ≤1,8															
Torsional rigidity			C_{t21}	Nm/ arcmin	1099	1108	1114	960	1114	1111	979	1099	976	953	958	978	978	979	979	989
				in.lb/ arcmin	9727	9809	9856	8499	9856	9834	8662	9727	8634	8437	8476	8655	8655	8667	8662	8757
Tilting rigidity			C_{2K}	Nm/ arcmin	5560															
				in.lb/ arcmin	49210															
Max. axial force [e)]			F_{2AMax}	N	33000															
				lb_f	7425															
Max. tilting moment			M_{2KMax}	Nm	6500															
				in.lb	57525															
Efficiency at full load			η	%	92							90								
Service life (For calculation, see the Chapter "Information")			L_h	h	> 20000															
Weight incl. standardadapter plate			*m*	kg	83							87								
				lb_m	183							192								
Operating noise (with n_1 = 3000 rpm no load)			L_{PA}	dB(A)	≤ 71															
Max. permitted housing temperature				°C	+90															
				F	+194															
Ambient temperature				°C	0 to +40															
				F	32 to 104															
Lubrication					Lubricated for life															
Paint					Blue RAL 5002															
Direction of rotation					Motor and gearhead opposite directions															
Protection class					IP 65															
Moment of inertia (relates to the drive)	G	24	J_1	kgcm²	-	-	-	-	-	-	-	3.32	4.24	2.80	2.79	2.79	2.49	2.43	2.42	2.42
				10^{-3} in.lb.s²	-	-	-	-	-	-	-	2.94	3.75	2.48	2.47	2.47	2.20	2.15	2.14	2.14
Clamping hub diameter [mm]	K	38	J_1	kgcm²	26.04	19.71	16.71	16.58	14.26	12.89	12.83	10.23	11.15	9.71	9.70	9.70	9.40	9.34	9.33	9.33
				10^{-3} in.lb.s²	23.05	17.44	14.78	14.67	12.62	11.41	11.36	9.06	9.87	8.59	8.59	8.58	8.32	8.27	8.26	8.26

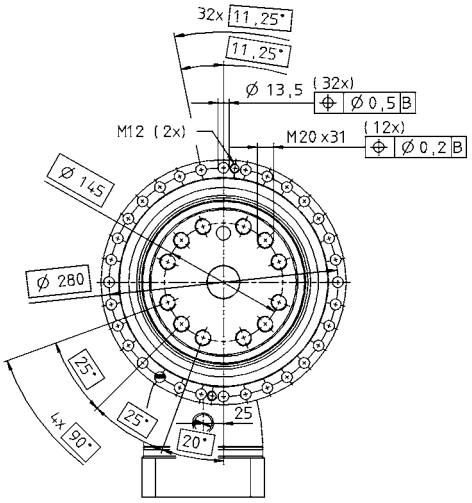
Please contact us for information on the best configuration for S1 conditions of use (continuous operation).

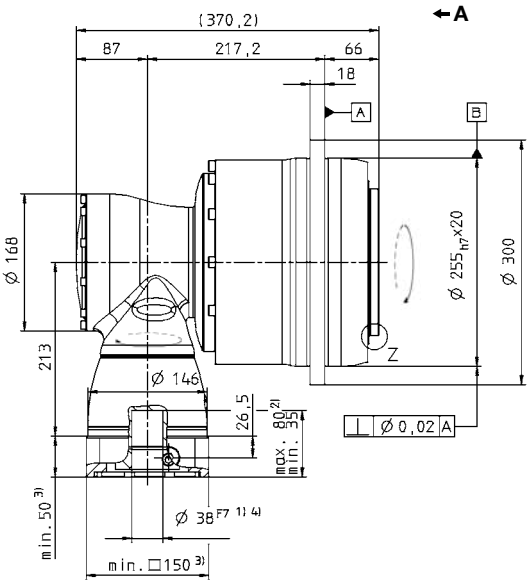
[a)] Other ratios available on request
[b)] Higher speeds are possible if the nominal torque is reduced
[c)] For higher ambient temperatures, please reduce input speed
[d)] Idling torques decrease during operation
[e)] Refers to center of the output shaft or flange

All technical data for front output side applies.
Technical data for rearward output versions, see page 386.

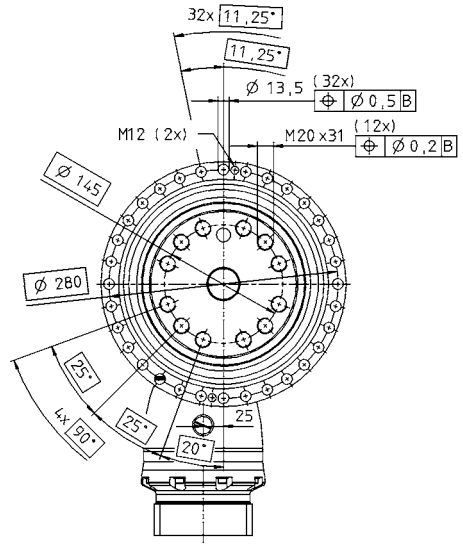
View A

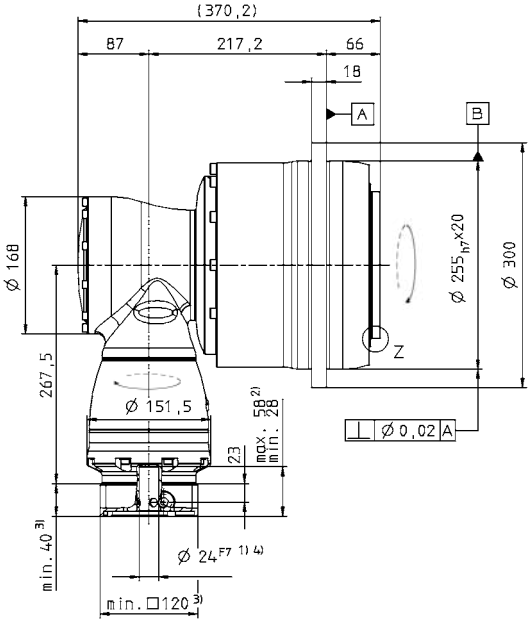
3-stage:

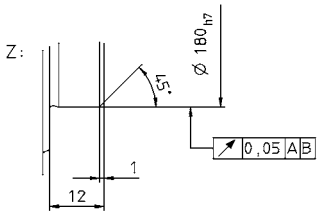




4-stage:







See technical data sheet for available clamping hub diameters (mass moment of inertia). Dimensions available on request.

Non-tolerated dimensions ±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 with a minimum thickness of 1 mm.

CAD data is available under www.wittenstein-alpha.com

Motor mounting according to operating manual

TPK+ 500 MA HIGH TORQUE 3/4-stage

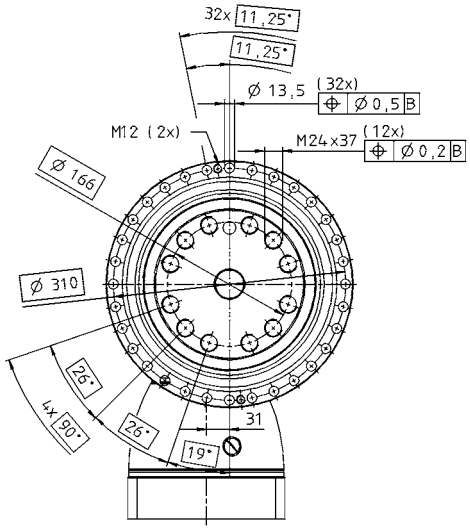
					3-stage							4-stage								
Ratio [a]			*i*		**66**	**88**	**110**	**137,5**	**154**	**220**	**385**	**330**	**462**	**577,5**	**770**	**1078**	**1540**	**2695**	**3850**	**5500**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B}	Nm	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	10000	7200
				in.lb	88500	88500	88500	88500	88500	88500	88500	88500	88500	88500	88500	88500	88500	88500	88500	63720
Nominal output torque (with n_{1N})			T_{2N}	Nm	5400	5400	5400	5400	5400	5400	5400	5400	5400	5400	5400	5400	5400	5400	5400	5400
				in.lb	47790	47790	47790	47790	47790	47790	47790	47790	47790	47790	47790	47790	47790	47790	47790	47790
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not}	Nm	19800	23000	23000	25000	21300	19800	25000	19800	25000	25000	25000	25000	25000	25000	25000	25000
				in.lb	175230	203550	203550	221250	188505	175230	221250	175230	221250	221250	221250	221250	221250	221250	221250	221250
Nominal input speed (with T_{2N} and 20 °C ambient temperature) [b), c)]			n_{1N}	rpm	1500	1700	1900	1900	1700	1700	1700	2600	2600	2600	2600	2600	2600	3100	3300	3300
Max. continuous speed (with 20 % T_{2N} and 20 °C ambient temperature)			n_{1Ncym}	rpm	1800	2200	2600	2600	2300	2300	3100	3300	3300	3300	3300	3300	3300	3600	3600	3600
Max. input speed			n_{1Max}	rpm	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000
Mean no load running torque (with n_1 = 3000 rpm and 20 °C gearhead temperature) [d)]			T_{012}	Nm	20.5	16.5	13.6	12.8	17.6	14.3	13.7	3.0	4.0	2.0	1.8	1.7	1.2	1.1	1.0	1.0
				in.lb	181.4	146.0	120.4	113.3	155.8	126.6	121.2	26.6	35.4	17.7	15.9	15.0	10.6	9.7	8.9	8.9
Max. torsional backlash			j_t	arcmin	Standard ≤3,3 / Reduced ≤1,8															
Torsional rigidity			C_{t21}	Nm/ arcmin	1879	1890	1901	1747	1899	1898	1772	1879	1766	1735	1742	1770	1770	1772	1772	1786
				in.lb/ arcmin	16626	16727	16820	15464	16809	16799	15683	16626	15633	15359	15413	15662	15662	15686	15683	15808
Tilting rigidity			C_{2K}	Nm/ arcmin	9480															
				in.lb/ arcmin	83906															
Max. axial force [e)]			F_{2AMax}	N	50000															
				lb_f	11250															
Max. tilting moment			M_{2KMax}	Nm	9500															
				in.lb	84075															
Efficiency at full load			η	%	92							90								
Service life (For calculation, see the Chapter "Information")			L_h	h	> 20000															
Weight incl. standardadapter plate			*m*	kg	120							124								
				lb_m	265							274								
Operating noise (with n_1 = 3000 rpm no load)			L_{PA}	dB(A)	≤ 71															
Max. permitted housing temperature				°C	+90															
				F	+194															
Ambient temperature				°C	0 to +40															
				F	32 to 104															
Lubrication					Lubricated for life															
Paint					Blue RAL 5002															
Direction of rotation					Motor and gearhead opposite directions															
Protection class					IP 65															
Moment of inertia (relates to the drive) Clamping hub diameter [mm]	K	38	J_1	kgcm²	-	-	-	-	-	-	-	12.43	15.36	10.93	10.92	10.91	10.13	9.95	9.91	9.91
				10^{-3} in.lb.s²	-	-	-	-	-	-	-	11.00	13.59	9.67	9.66	9.66	8.96	8.81	8.77	8.77
	M	48	J_1	kgcm²	75.54	52.83	42.94	42.67	34.37	29.87	29.73	27.14	30.07	25.64	25.63	25.62	24.84	24.66	24.62	24.62
				10^{-3} in.lb.s²	66.85	46.76	38.01	37.76	30.41	26.43	26.31	24.02	26.61	22.69	22.68	22.68	21.98	21.83	21.79	21.79

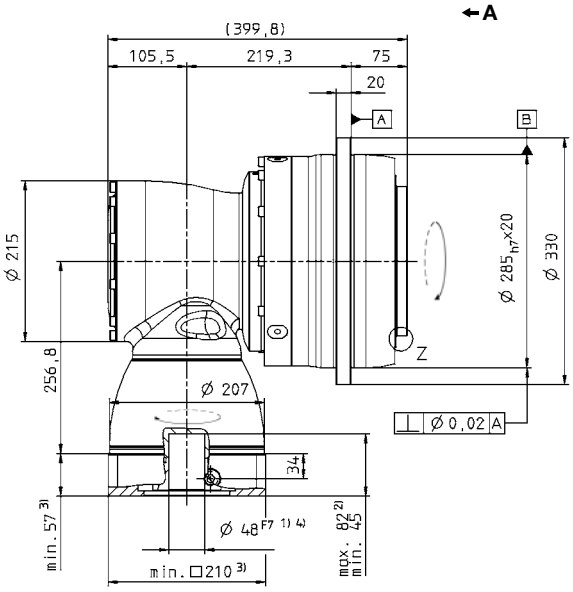
Please contact us for information on the best configuration for S1 conditions of use (continuous operation).

[a)] Other ratios available on request
[b)] Higher speeds are possible if the nominal torque is reduced
[c)] For higher ambient temperatures, please reduce input speed
[d)] Idling torques decrease during operation
[e)] Refers to center of the output shaft or flange

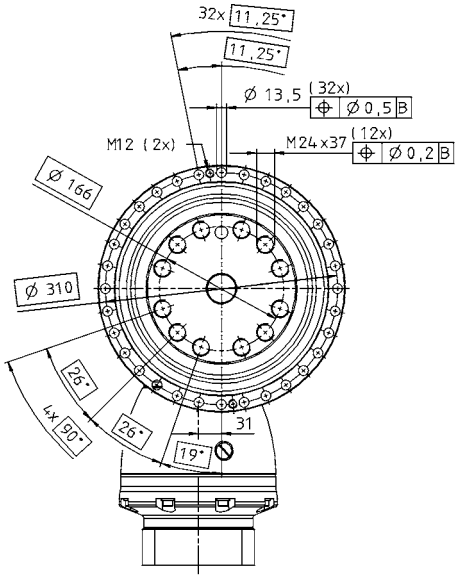
All technical data for front output side applies.
Technical data for rearward output versions, see page 386.

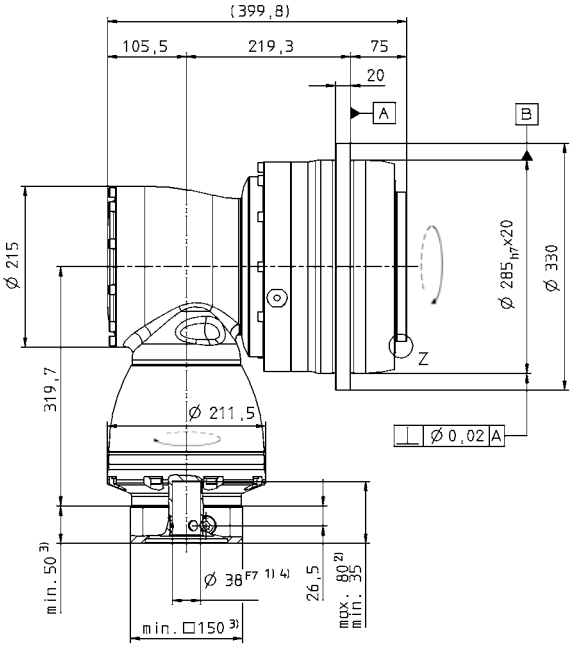
3-stage:

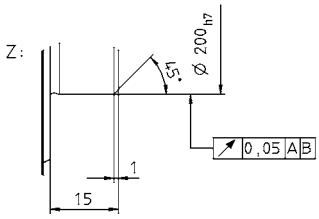




4-stage:







See technical data sheet for available clamping hub diameters (mass moment of inertia). Dimensions available on request.

Non-tolerated dimensions ±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 with a minimum thickness of 1 mm.

CAD data is available under www.wittenstein-alpha.com

Motor mounting according to operating manual

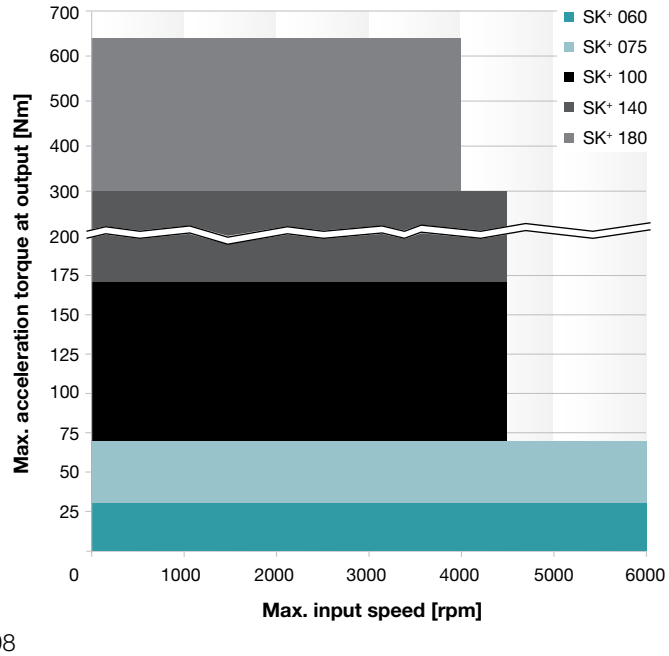
SK+/SPK+ –
New right-angle precision as classic shaft version

SK+ SPK+

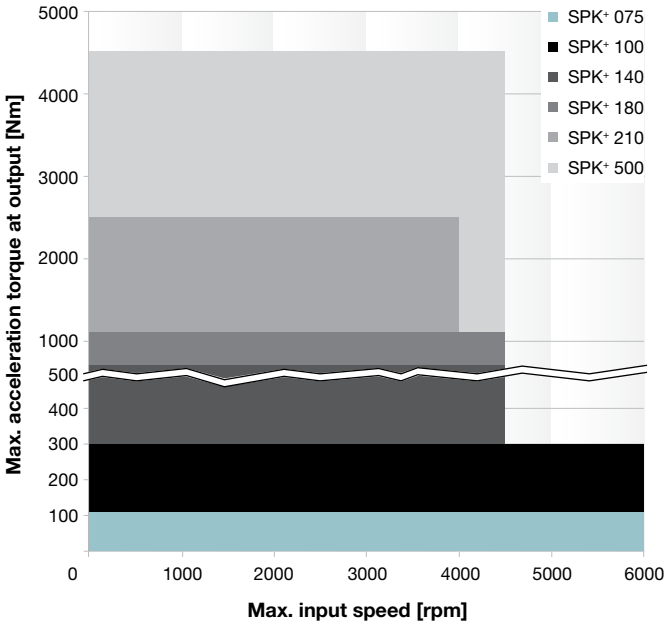
The successor to our versatile hypoid gearhead with SP+ compatible output shaft, also available with planetary stage (SPK+).

Quick size selection

SK+ (example for i = 5)
For applications in cyclic operation (ED ≤ 60%)



SPK+ (example for i = 25)
For applications in cyclic operation (ED ≤ 60%)



Versions and Applications

SK+

- Cyclic applications
- Reverse operation
- Highly dynamic applications
- High positioning accuracy

SPK+

- Maximum power density
- Maximum positioning accuracy

Comparison

Features		SK+ from page 200	SPK+ from page 210
Ratios [c]		3 – 100	12 – 10000
Torsional backlash [arcmin] [c]	Standard	≤ 4	≤ 4
	Reduced	–	–
Output type			
Smooth output shaft		•	•
Smooth output shaft, rear side		•	•
Keywayed output shaft		•	•
Keywayed output shaft, rear side		•	•
Output shaft with involute gearing		•	•
Hollow shaft interface, rear side Connected via shrink disc		•	•
Mounted shaft Connected via shrink disc			•
Closed cover, rear side		•	•
Input type			
Motor mounted version		•	•
Type			
ATEX [a]		•	
Food-grade lubrication [a] [b]		•	•
Corrosion resistant [a] [b]		•	•
Accessories			
Coupling		•	•
Rack		•	•
Pinion		•	•
Shrink disc		•	•
torqXis sensor flange		•	•
Intermediate plate for cooling connection		•	•

[a] Power reduction: technical data available upon request [b] Please contact WITTENSTEIN alpha [c] In relation to reference sizes

SK+ 060 MF 1/2-stage

				1-stage					2-stage									
Ratio [a]			*i*	**3**	**4**	**5**	**7**	**10**	**12**	**16**	**20**	**25**	**28**	**35**	**40**	**50**	**70**	**100**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B} Nm	30	30	30	25	20	30	30	30	30	30	30	30	30	25	20
			T_{2B} in.lb	266	266	266	221	177	266	266	266	266	266	266	266	266	221	177
Nominal output torque (with n_{1N})			T_{2N} Nm	22	22	22	20	15	22	22	22	22	22	22	22	22	20	15
			T_{2N} in.lb	195	195	195	177	133	195	195	195	195	195	195	195	195	177	133
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not} Nm	40	50	50	45	40	50	50	50	50	50	50	50	50	45	40
			T_{2Not} in.lb	354	443	443	398	354	443	443	443	443	443	443	443	443	398	354
Nominal input speed (with T_{2N} and 20°C ambient temperature) [b), c)]			n_{1N} rpm	2500	2700	3000	3000	3000	4400	4400	4400	4400	4400	4400	4400	4800	5500	5500
Max. continuous speed (with 20% T_{2N} and 20°C ambient temperature)			n_{1Ncym} rpm	3000	3500	4000	3500	3500	5000	5000	5000	5000	5000	5000	5000	5000	5500	5500
Max. input speed			n_{1Max} rpm	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000
Mean no load running torque (with n_1 = 3000 rpm and 20°C gearhead temperature) [d)]			T_{012} Nm	1.2	1.1	1.0	1.2	1.1	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1
			T_{012} in.lb	10.6	9.7	8.9	10.6	9.7	1.8	1.8	1.8	1.8	1.8	1.8	0.9	0.9	0.9	0.9
Max. torsional backlash			j_t arcmin	≤ 5														
Torsional rigidity			C_{t21} Nm/ arcmin	2.0	2.1	2.2	2.0	1.8	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.2	2.0	1.8
			C_{t21} in.lb/ arcmin	18	19	19	18	16	19	19	19	19	19	19	19	19	18	16
Max. axial force [e)]			F_{2AMax} N	2400														
			F_{2AMax} lb_f	540														
Max. radial force [e)]			F_{2RMax} N	2700														
			F_{2RMax} lb_f	608														
Max. tilting moment			M_{2KMax} Nm	251														
			M_{2KMax} in.lb	2220														
Efficiency at full load			η %	96					94									
Service life (For calculation, see the Chapter "Information")			L_h h	> 20000														
Weight incl. standard adapter plate			*m* kg	2.9					3.2									
			m lb_m	6.4					7.1									
Operating noise (with n_1 = 3000 rpm no load)			L_{PA} dB(A)	≤ 64														
Max. permitted housing temperature			°C	+90														
			F	194														
Ambient temperature			°C	0 to +40														
			F	32 to 104														
Lubrication				Lubricated for life														
Paint				Blue RAL 5002														
Direction of rotation				Motor and gearhead opposite directions														
Protection class				IP 65														
Moment of inertia (relates to the drive)	B	11	J_1 kgcm²	–	–	–	–	–	0.09	0.09	0.07	0.07	0.06	0.06	0.06	0.06	0.06	0.06
			J_1 10^{-3} in.lb.s²						0.08	0.08	0.07	0.06	0.06	0.06	0.05	0.05	0.05	0.05
Clamping hub diameter [mm]	C	14	J_1 kgcm²	0.52	0.44	0.40	0.36	0.34	0.20	0.20	0.19	0.19	0.18	0.18	0.17	0.17	0.17	0.17
			J_1 10^{-3} in.lb.s²	0.46	0.39	0.35	0.32	0.30	0.18	0.18	0.17	0.16	0.16	0.16	0.15	0.15	0.15	0.15
	E	19	J_1 kgcm²	0.87	0.79	0.75	0.71	0.70	–	–	–	–	–	–	–	–	–	–
			J_1 10^{-3} in.lb.s²	0.77	0.70	0.66	0.63	0.62										

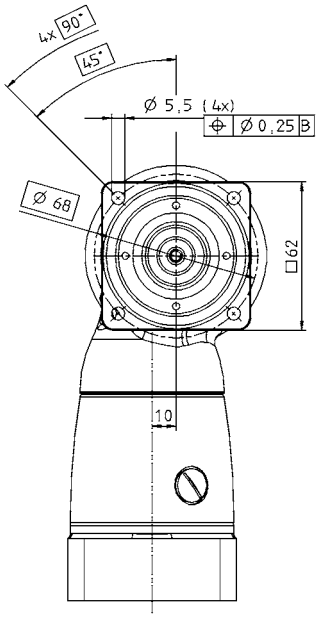
Please contact us for information on the best configuration for S1 conditions of use (continuous operation).

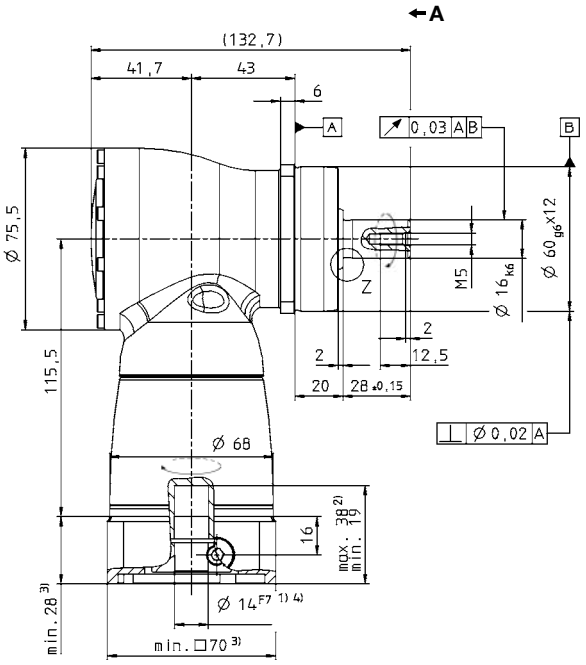
[a)] Other ratios available on request
[b)] Higher speeds are possible if the nominal torque is reduced
[c)] For higher ambient temperatures, please reduce input speed
[d)] Idling torques decrease during operation
[e)] Refers to center of the output shaft or flange

All technical data for front output side applies.
Technical data for rearward output versions, see page 386.

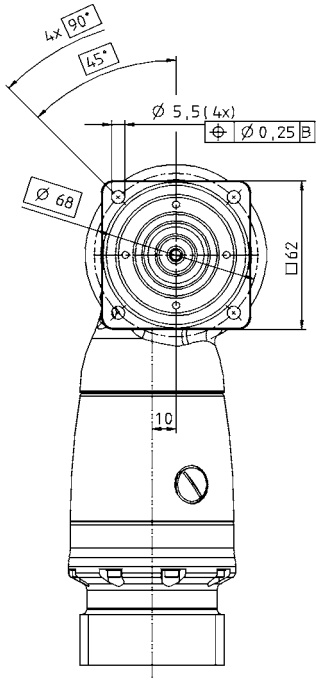
View A

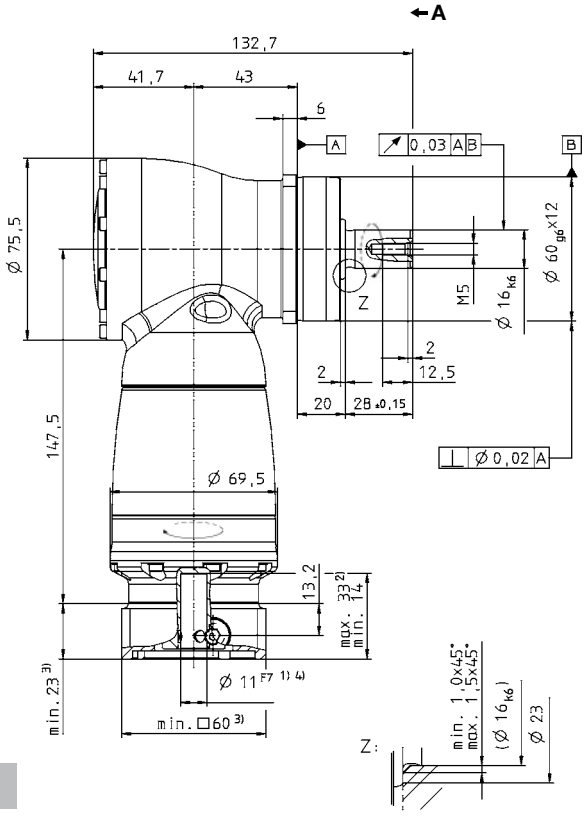
1-stage:





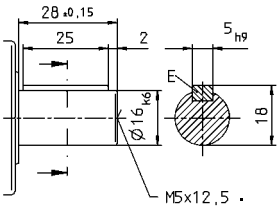
2-stage:



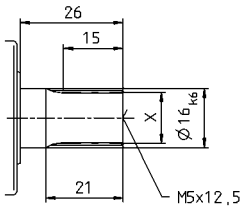


Alternatives: Output shaft variants

Keywayed output shaft in mm
E = key as per DIN 6885, sheet 1, form A



Involute gearing DIN 5480
X = W 16 x 0,8 x 30 x 18 x 6m, DIN 5480



See technical data sheet for available clamping hub diameters (mass moment of inertia). Dimensions available on request.

Non-tolerated dimensions ±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 with a minimum thickness of 1 mm.

CAD data is available under www.wittenstein-alpha.com

Motor mounting according to operating manual

SK+ 075 MF 1/2-stage

					1-stage					2-stage									
Ratio [a]			*i*		**3**	**4**	**5**	**7**	**10**	**12**	**16**	**20**	**25**	**28**	**35**	**40**	**50**	**70**	**100**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B}	Nm	70	70	70	60	50	70	70	70	70	70	70	70	70	60	50
				in.lb	620	620	620	531	443	620	620	620	620	620	620	620	620	531	443
Nominal output torque (with n_{1N})			T_{2N}	Nm	50	50	50	45	40	50	50	50	50	50	50	50	50	45	40
				in.lb	443	443	443	398	354	443	443	443	443	443	443	443	443	398	354
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not}	Nm	95	115	115	110	100	115	115	115	115	115	115	115	115	110	100
				in.lb	841	1018	1018	974	885	1018	1018	1018	1018	1018	1018	1018	1018	974	885
Nominal input speed (with T_{2N} and 20°C ambient temperature) [b), c)]			n_{1N}	rpm	2300	2500	2800	2800	2800	3500	3500	3500	3500	3500	3500	3500	3800	4500	4500
Max. continuous speed (with 20% T_{2N} and 20°C ambient temperature)			n_{1Ncym}	rpm	3000	3500	4000	3500	3500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500
Max. input speed			n_{1Max}	rpm	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000
Mean no load running torque (with n_1 = 3000 rpm and 20°C gearhead temperature) [d)]			T_{012}	Nm	2.0	1.7	1.5	2.0	1.8	0.3	0.3	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1
				in.lb	18	15	13	18	16	2.7	2.7	1.8	1.8	1.8	1.8	0.9	0.9	0.9	0.9
Max. torsional backlash			j_t	arcmin	≤ 4														
Torsional rigidity			C_{t21}	Nm/ arcmin	5.0	5.5	6.0	6.0	6.0	5.5	5.5	5.5	5.5	5.5	5.5	5.5	6.0	6.0	6.0
				in.lb/ arcmin	44	49	53	53	53	49	49	49	49	49	49	49	53	53	53
Max. axial force [e)]			F_{2AMax}	N	3400														
				lb_f	765														
Max. radial force [e)]			F_{2RMax}	N	4000														
				lb_f	900														
Max. tilting moment			M_{2KMax}	Nm	437														
				in.lb	3867														
Efficiency at full load			η	%	96					94									
Service life (For calculation, see the Chapter "Information")			L_h	h	> 20000														
Weight incl. standard adapter plate			*m*	kg	4.8					5.4									
				lb_m	10.6					11.9									
Operating noise (with n_1 = 3000 rpm no load)			L_{PA}	dB(A)	≤ 66														
Max. permitted housing temperature				°C	+90														
				F	194														
Ambient temperature				°C	0 to +40														
				F	32 to 104														
Lubrication					Lubricated for life														
Paint					Blue RAL 5002														
Direction of rotation					Motor and gearhead opposite directions														
Protection class					IP 65														
Moment of inertia (relates to the drive) Clamping hub diameter [mm]	C	14	J_1	kgcm²	–	–	–	–	–	0.28	0.27	0.23	0.23	0.20	0.20	0.18	0.18	0.18	0.18
				10^{-3} in.lb.s²						0.25	0.24	0.21	0.20	0.18	0.18	0.16	0.16	0.16	0.16
	E	19	J_1	kgcm²	1.46	1.19	1.06	0.95	0.90	0.73	0.71	0.68	0.67	0.63	0.62	0.63	0.63	0.63	0.63
				10^{-3} in.lb.s²	1.29	1.05	0.94	0.84	0.79	0.64	0.63	0.60	0.59	0.55	0.55	0.56	0.55	0.55	0.55
	H	28	J_1	kgcm²	2.88	2.61	2.47	2.37	2.31	–	–	–	–	–	–	–	–	–	–
				10^{-3} in.lb.s²	2.55	2.31	2.19	2.10	2.04										

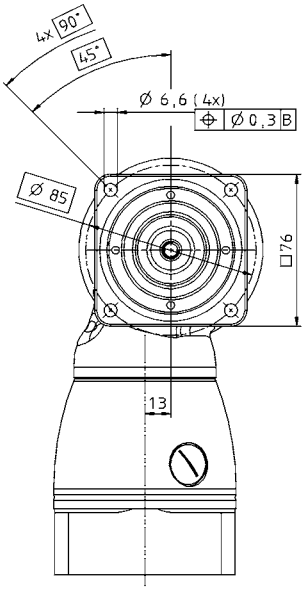
Please contact us for information on the best configuration for S1 conditions of use (continuous operation).

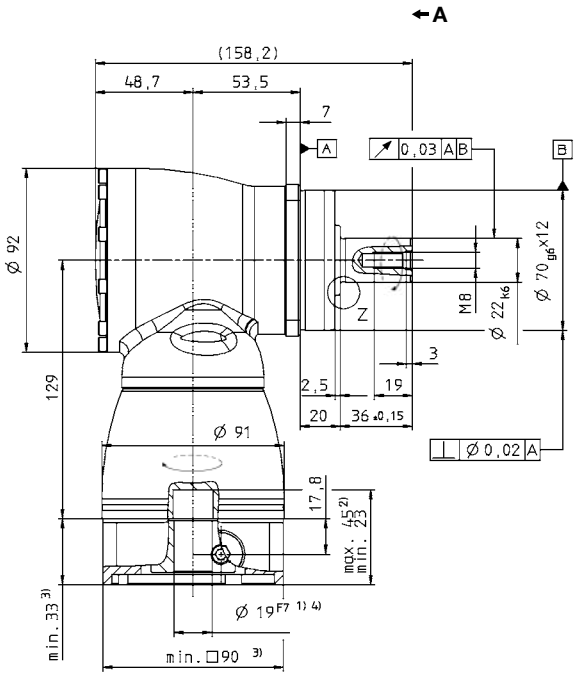
[a)] Other ratios available on request
[b)] Higher speeds are possible if the nominal torque is reduced
[c)] For higher ambient temperatures, please reduce input speed
[d)] Idling torques decrease during operation
[e)] Refers to center of the output shaft or flange

All technical data for front output side applies.
Technical data for rearward output versions, see page 386.

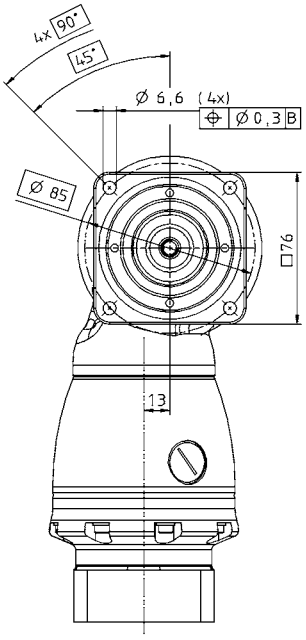
View A

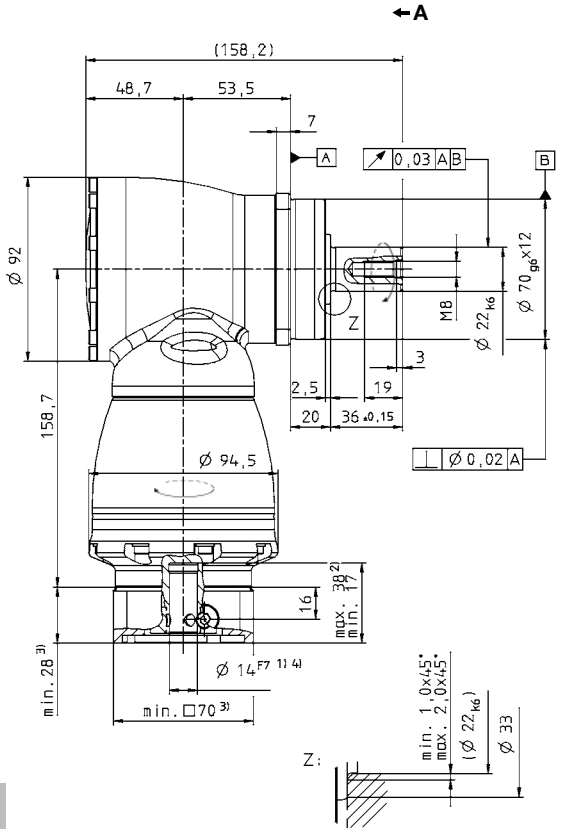
1-stage:





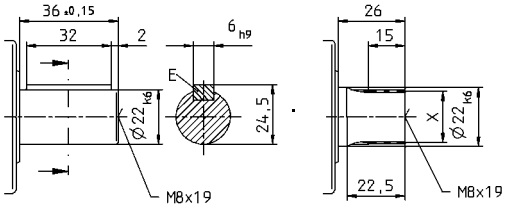
2-stage:





Alternatives: Output shaft variants

Keywayed output shaft in mm
E = key as per DIN 6885, sheet 1, form A



Involute gearing DIN 5480 in mm
X = W 22 x 1.25 x 30 x 16 x 6m

See technical data sheet for available clamping hub diameters (mass moment of inertia). Dimensions available on request.

Non-tolerated dimensions ±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 with a minimum thickness of 1 mm.

CAD data is available under www.wittenstein-alpha.com

Motor mounting according to operating manual

SK+ 100 MF 1/2-stage

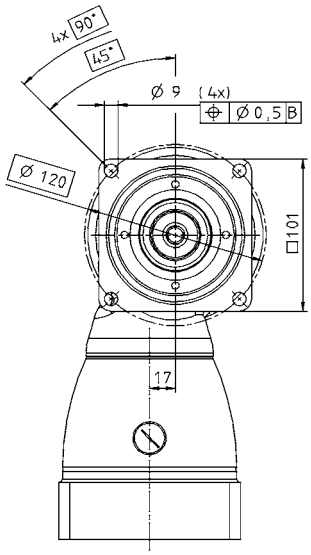
					1-stage					2-stage									
Ratio [a]			*i*		**3**	**4**	**5**	**7**	**10**	**12**	**16**	**20**	**25**	**28**	**35**	**40**	**50**	**70**	**100**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B}	Nm	170	170	170	145	125	170	170	170	170	170	170	170	170	145	125
				in.lb	1505	1505	1505	1283	1106	1505	1505	1505	1505	1505	1505	1505	1505	1283	1106
Nominal output torque (with n_{1N})			T_{2N}	Nm	100	100	100	90	80	100	100	100	100	100	100	100	100	90	80
				in.lb	885	885	885	797	708	885	885	885	885	885	885	885	885	797	708
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not}	Nm	220	260	260	255	250	260	260	260	260	260	260	260	260	255	250
				in.lb	1947	2301	2301	2257	2213	2301	2301	2301	2301	2301	2301	2301	2301	2257	2213
Nominal input speed (with T_{2N} and 20°C ambient temperature) [b), c)]			n_{1N}	rpm	2200	2400	2700	2500	2500	3100	3100	3100	3100	3100	3100	3100	3500	4200	4200
Max. continuous speed (with 20% T_{2N} and 20°C ambient temperature)			n_{1Ncym}	rpm	3000	3400	3800	3400	3400	4000	4000	4000	4000	4000	4000	4000	4000	4200	4200
Max. input speed			n_{1Max}	rpm	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500
Mean no load running torque (with n_1 = 3000 rpm and 20°C gearhead temperature) [d)]			T_{012}	Nm	3.8	3.0	2.3	3.5	2.8	0.6	0.6	0.5	0.4	0.4	0.3	0.2	0.2	0.2	0.2
				in.lb	34	27	20	31	25	5.3	5.3	4.4	3.5	3.5	2.7	1.8	1.8	1.8	1.8
Max. torsional backlash			j_t	arcmin	≤ 4														
Torsional rigidity			C_{t21}	Nm/ arcmin	10	11	13	13	13	11	11	11	11	11	11	11	13	13	13
				in.lb/ arcmin	89	97	115	115	115	97	97	97	97	97	97	97	115	115	115
Max. axial force [e)]			F_{2AMax}	N	5700														
				lb_f	1283														
Max. radial force [e)]			F_{2RMax}	N	6300														
				lb_f	1418														
Max. tilting moment			M_{2KMax}	Nm	833														
				in.lb	7370														
Efficiency at full load			η	%	96					94									
Service life (For calculation, see the Chapter "Information")			L_h	h	> 20000														
Weight incl. standardadapter plate			*m*	kg	9.3					10.0									
				lb_m	21					22									
Operating noise (with n_1 = 3000 rpm no load)			L_{PA}	dB(A)	≤ 66														
Max. permitted housing temperature				°C	+90														
				F	194														
Ambient temperature				°C	0 to +40														
				F	32 to 104														
Lubrication					Lubricated for life														
Paint					Blue RAL 5002														
Direction of rotation					Motor and gearhead opposite directions														
Protection class					IP 65														
Moment of inertia (relates to the drive) Clamping hub diameter [mm]	E	19	J_1	kgcm²	–	–	–	–	–	1.02	0.97	0.86	0.84	0.75	0.74	0.69	0.69	0.68	0.68
				10^{-3} in.lb.s²						0.91	0.86	0.76	0.74	0.66	0.66	0.61	0.61	0.60	0.60
	G	24	J_1	kgcm²	–	–	–	–	–	2.59	2.54	2.42	2.40	2.31	2.30	2.26	2.25	2.25	2.25
				10^{-3} in.lb.s²						2.29	2.25	2.14	2.13	2.05	2.04	2.00	1.99	1.99	1.99
	H	28	J_1	kgcm²	4.64	3.80	3.34	2.98	2.79	–	–	–	–	–	–	–	–	–	–
				10^{-3} in.lb.s²	4.10	3.36	2.95	2.64	2.47										
	K	38	J_1	kgcm²	11.9	11.0	10.6	10.2	10.0	–	–	–	–	–	–	–	–	–	–
				10^{-3} in.lb.s²	10.5	9.77	9.37	9.05	8.89										

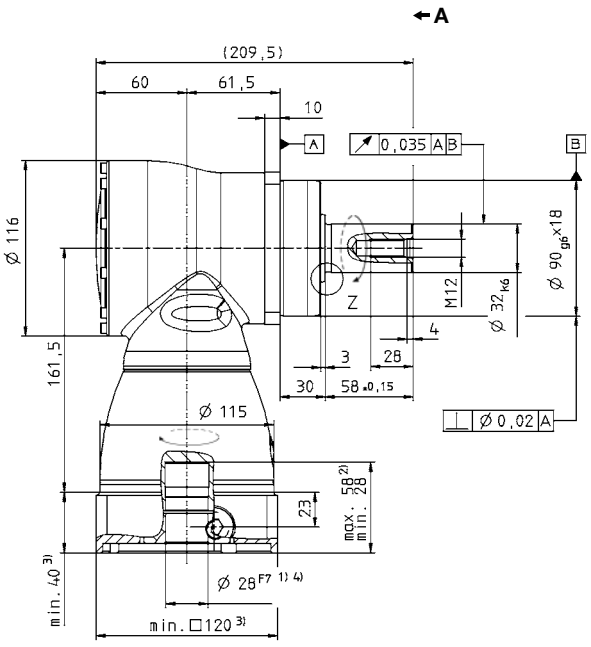
Please contact us for information on the best configuration for S1 conditions of use (continuous operation).

[a)] Other ratios available on request
[b)] Higher speeds are possible if the nominal torque is reduced
[c)] For higher ambient temperatures, please reduce input speed
[d)] Idling torques decrease during operation
[e)] Refers to center of the output shaft or flange

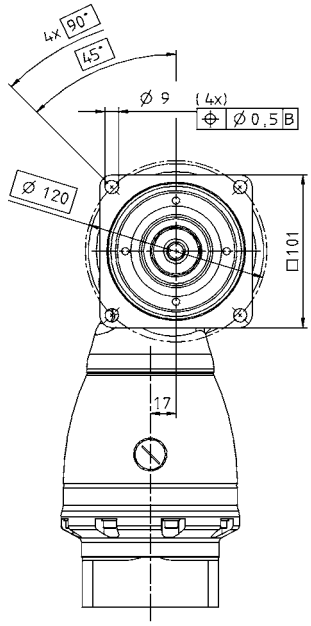
All technical data for front output side applies.
Technical data for rearward output versions, see page 386.

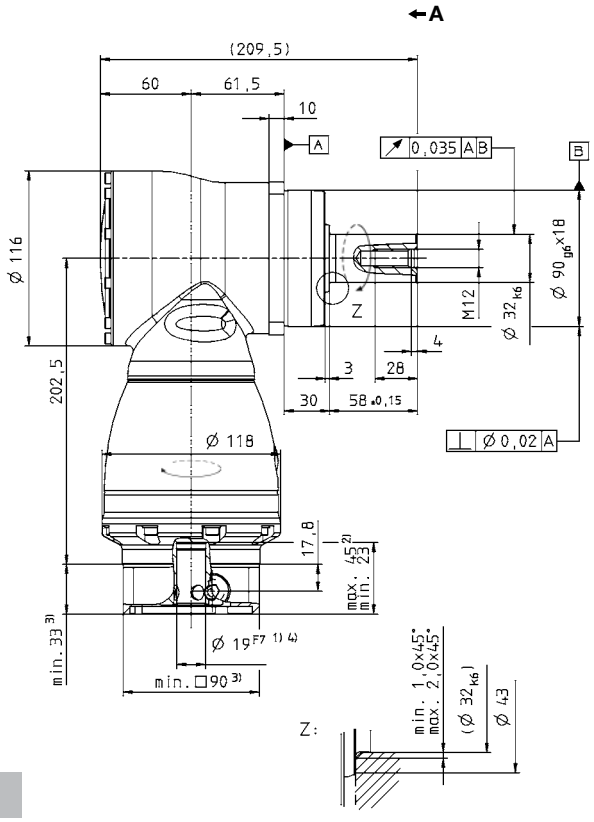
1-stage:





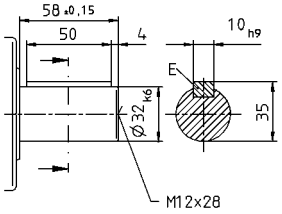
2-stage:



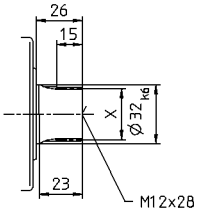


Alternatives: Output shaft variants

Keywayed output shaft in mm
E = key as per DIN 6885, sheet 1, form A



Involute gearing DIN 5480
X = W 32 x 1.25 x 30 x 24 x 6m



See technical data sheet for available clamping hub diameters (mass moment of inertia). Dimensions available on request.

Non-tolerated dimensions ±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 with a minimum thickness of 1 mm.

CAD data is available under www.wittenstein-alpha.com

Motor mounting according to operating manual

SK+ 140 MF 1/2-stage

				1-stage					2-stage									
Ratio [a]			*i*	**3**	**4**	**5**	**7**	**10**	**12**	**16**	**20**	**25**	**28**	**35**	**40**	**50**	**70**	**100**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B} Nm	300	300	300	250	210	300	300	300	300	300	300	300	300	250	210
			in.lb	2655	2655	2655	2213	1859	2655	2655	2655	2655	2655	2655	2655	2655	2213	1859
Nominal output torque (with n_{1N})			T_{2N} Nm	190	190	190	175	160	190	190	190	190	190	190	190	190	175	160
			in.lb	1682	1682	1682	1549	1416	1682	1682	1682	1682	1682	1682	1682	1682	1549	1419
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not} Nm	400	500	500	450	400	500	500	500	500	500	500	500	500	450	400
			in.lb	3540	4425	4425	3983	3540	4425	4425	4425	4425	4425	4425	4425	4425	3983	3540
Nominal input speed (with T_{2N} and 20°C ambient temperature) [b), c)]			n_{1N} rpm	1900	2000	2200	2000	2000	2900	2900	2900	2900	2900	2900	2900	3200	3200	3900
Max. continuous speed (with 20% T_{2N} and 20°C ambient temperature)			n_{1Ncym} rpm	2500	2800	3100	2800	2800	4000	4000	4000	4000	4000	4000	4000	4200	4200	4200
Max. input speed			n_{1Max} rpm	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500
Mean no load running torque (with n_1 = 3000 rpm and 20°C gearhead temperature) [d)]			T_{012} Nm	7.0	5.2	4.5	7.5	5.5	1.4	0.9	0.7	0.5	0.5	0.4	0.4	0.3	0.3	0.3
			in.lb	62	46	40	66	49	12.4	8	6.2	4.4	4.4	3.5	3.5	2.7	2.7	2.7
Max. torsional backlash			j_t arcmin	≤ 4														
Torsional rigidity			C_{t21} Nm/ arcmin	27	30	32	32	32	29	29	29	29	29	29	29	31	31	31
			in.lb/ arcmin	239	266	283	283	283	257	257	257	257	257	257	257	274	274	274
Max. axial force [e)]			F_{2AMax} N	9900														
			lb_f	2228														
Max. radial force [e)]			F_{2RMax} N	9500														
			lb_f	2138														
Max. tilting moment			M_{2KMax} Nm	1692														
			in.lb	14974														
Efficiency at full load			η %	96					94									
Service life (For calculation, see the Chapter "Information")			L_h h	> 20000														
Weight incl. standardadapter plate			*m* kg	22.6					25.0									
			lb_m	50					55									
Operating noise (with n_1 = 3000 rpm without load)			L_{PA} dB(A)	≤ 68														
Max. permitted housing temperature			°C	+90														
			F	194														
Ambient temperature			°C	0 to +40														
			F	32 to 104														
Lubrication				Lubricated for life														
Paint				Blue RAL 5002														
Direction of rotation				Motor and gearhead opposite directions														
Protection class				IP 65														
Moment of inertia (relates to the drive) Clamping hub diameter [mm]	G	24	J_1 kgcm²	–	–	–	–	–	4.21	3.85	3.28	3.17	2.78	2.73	2.48	2.46	2.43	2.42
			10^{-3} in.lb.s²						3.73	3.41	2.90	2.80	2.46	2.41	2.20	2.17	2.15	2.14
	K	38	J_1 kgcm²	25.0	19.1	16.3	14.1	12.8	11.1	10.7	10.2	10.1	9.69	9.64	9.39	9.37	9.34	9.33
			10^{-3} in.lb.s²	22.1	16.9	14.4	12.4	11.3	9.83	9.51	9.01	8.92	8.58	8.53	8.31	8.29	8.27	8.26

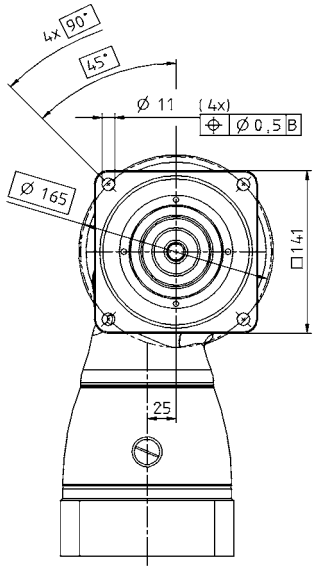
[a)] Other ratios available on request
[b)] Higher speeds are possible if the nominal torque is reduced
[c)] For higher ambient temperatures, please reduce input speed
[d)] Idling torques decrease during operation
[e)] Refers to center of the output shaft or flange

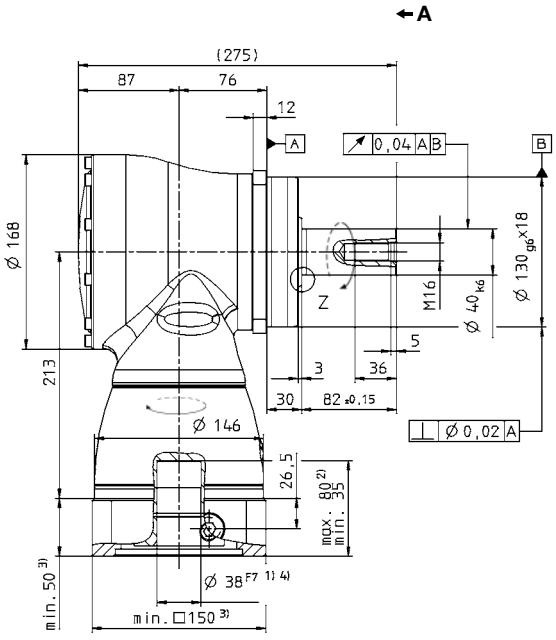
All technical data for front output side applies.
Technical data for rearward output versions, see page 386.

Please contact us for information on the best configuration for S1 conditions of use (continuous operation).

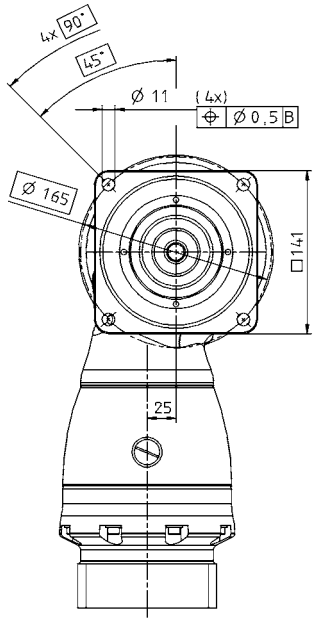
View A

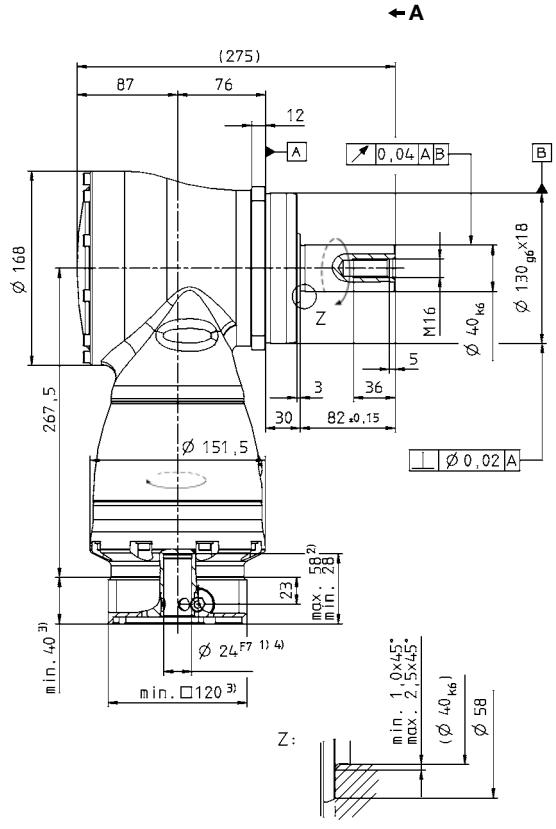
1-stage:





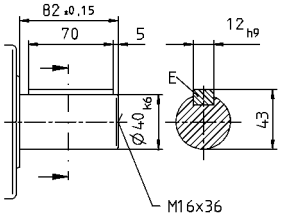
2-stage:



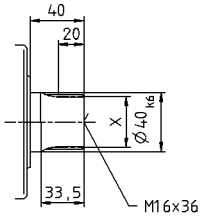


Alternatives: Output shaft variants

Keywayed output shaft in mm
E = key as per DIN 6885, sheet 1, form A



Involute gearing DIN 5480
X = W 40 x 2 x 30 x 18 x 6m



See technical data sheet for available clamping hub diameters (mass moment of inertia). Dimensions available on request.

Non-tolerated dimensions ±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 with a minimum thickness of 1 mm.

CAD data is available under www.wittenstein-alpha.com

Motor mounting according to operating manual

				1-stage					2-stage									
Ratio [a]			*i*	**3**	**4**	**5**	**7**	**10**	**12**	**16**	**20**	**25**	**28**	**35**	**40**	**50**	**70**	**100**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B} Nm	640	640	640	550	470	640	640	640	640	640	640	640	640	550	470
			T_{2B} in.lb	5664	5664	5664	4868	4160	5664	5664	5664	5664	5664	5664	5664	5664	4868	4160
Nominal output torque (with n_{1N})			T_{2N} Nm	400	400	400	380	360	400	400	400	400	400	400	400	400	380	360
			T_{2N} in.lb	3540	3540	3540	3363	3186	3540	3540	3540	3540	3540	3540	3540	3540	3363	3186
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not} Nm	900	1050	1050	970	900	1050	1050	1050	1050	1050	1050	1050	1050	970	900
			T_{2Not} in.lb	7965	9293	9293	8585	7965	9293	9293	9293	9293	9293	9293	9293	9293	8585	7965
Nominal input speed (with T_{2N} and 20°C ambient temperature) [b), c)]			n_{1N} rpm	1600	1800	2000	1800	1800	2700	2700	2700	2700	2700	2700	2700	2900	3200	3400
Max. continuous speed (with 20% T_{2N} and 20°C ambient temperature)			n_{1Ncym} rpm	2000	2400	2800	2500	2500	3500	3500	3500	3500	3500	3500	3500	3500	3800	3800
Max. input speed			n_{1Max} rpm	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000
Mean no load running torque (with n_1 = 3000 rpm and 20°C gearhead temperature) [d)]			T_{012} Nm	14.5	12.0	10.0	15.0	12.5	3.0	2.3	1.8	1.6	1.3	1.2	0.9	0.9	0.9	0.9
			T_{012} in.lb	128	106	89	133	111	26.6	20.4	15.9	14.2	11.5	10.6	8.0	8.0	8.0	8.0
Max. torsional backlash			j_t arcmin	≤ 4														
Torsional rigidity			C_{t21} Nm/ arcmin	64	71	79	78	77	71	71	71	71	71	71	71	78	78	78
			C_{t21} in.lb/ arcmin	566	628	699	690	681	628	628	628	628	628	628	628	690	690	690
Max. axial force [e)]			F_{2AMax} N	14200														
			F_{2AMax} lb_f	3195														
Max. radial force [e)]			F_{2RMax} N	14700														
			F_{2RMax} lb_f	3308														
Max. tilting moment			M_{2KMax} Nm	3213														
			M_{2KMax} in.lb	28435														
Efficiency at full load			η %	96					94									
Service life (For calculation, see the Chapter "Information")			L_h h	> 20000														
Weight incl. standardadapter plate			*m* kg	45.4					48									
			m lb_m	100					106									
Operating noise (with n_1 = 3000 rpm no load)			L_{PA} dB(A)	≤ 68														
Max. permitted housing temperature			°C	+90														
			F	194														
Ambient temperature			°C	0 to +40														
			F	32 to 104														
Lubrication				Lubricated for life														
Paint				Blue RAL 5002														
Direction of rotation				Motor and gearhead opposite directions														
Protection class				IP 65														
Moment of inertia (relates to the drive) Clamping hub diameter [mm]	K	38	J_1 kgcm²	–	–	–	–	–	15.3	14.0	12.3	12.0	10.9	10.7	10.1	10.0	9.95	9.91
			J_1 10^{-3} in.lb.s²						13.6	12.3	10.9	10.6	9.65	9.48	8.96	8.88	8.81	8.77
	M	48	J_1 kgcm²	73.3	51.6	42.1	34.0	29.7	30.0	28.7	27.1	26.7	25.6	25.4	24.8	24.7	24.7	24.6
			J_1 10^{-3} in.lb.s²	64.9	45.6	37.3	30.1	26.3	26.6	25.4	23.9	23.6	22.7	22.5	22.0	21.9	21.8	21.8

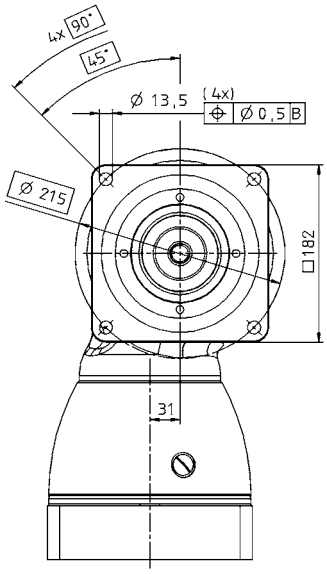
[a)] Other ratios available on request
[b)] Higher speeds are possible if the nominal torque is reduced
[c)] For higher ambient temperatures, please reduce input speed
[d)] Idling torques decrease during operation
[e)] Refers to center of the output shaft or flange

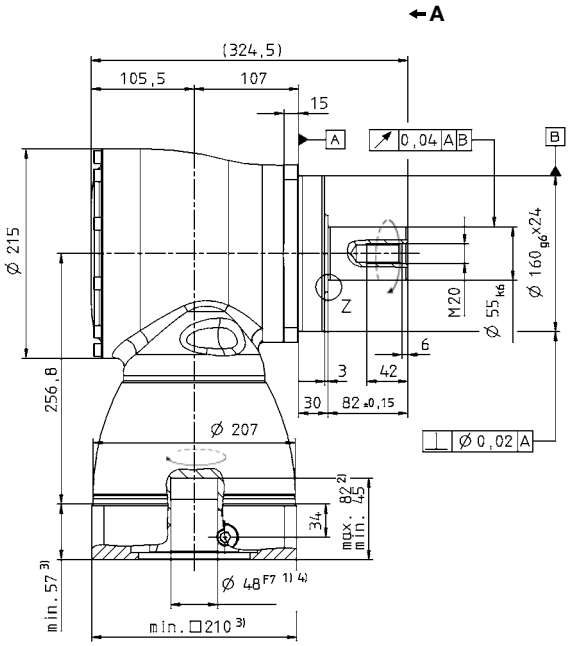
All technical data for front output side applies.
Technical data for rearward output versions, see page 386.

Please contact us for information on the best configuration for S1 conditions of use (continuous operation).

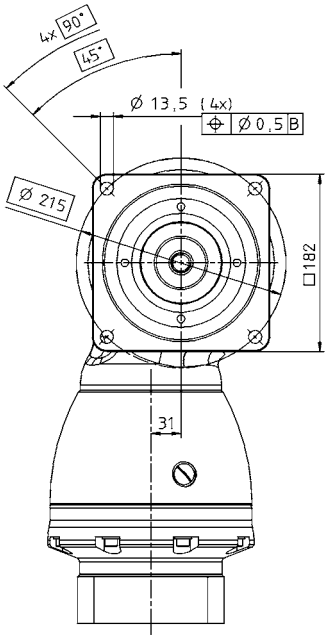
View A

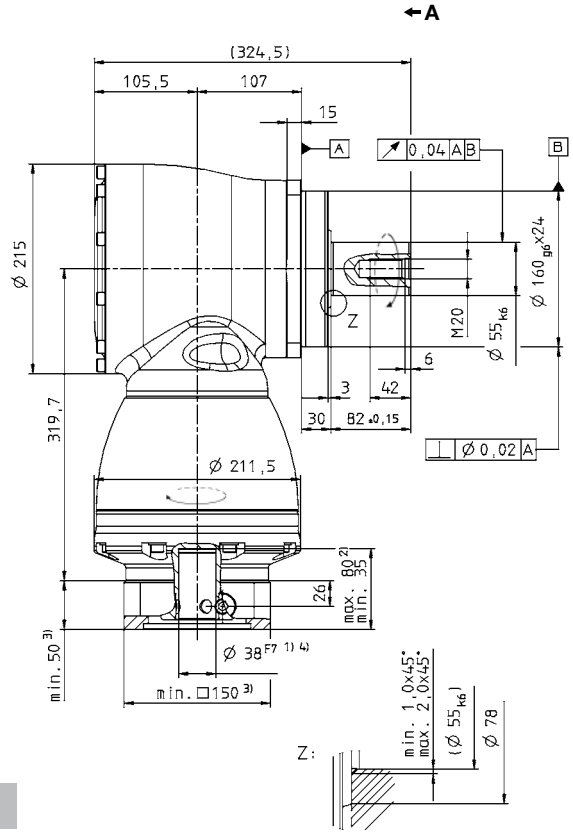
1-stage:





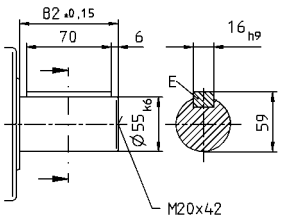
2-stage:



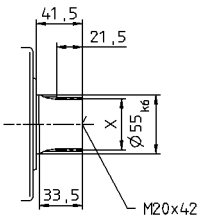


Alternatives: Output shaft variants

Keywayed output shaft in mm
E = key as per DIN 6885, sheet 1, form A



Involute gearing DIN 5480
X = W 55 x 2 x 30 x 26 x 6m



See technical data sheet for available clamping hub diameters (mass moment of inertia). Dimensions available on request.

Non-tolerated dimensions ±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 with a minimum thickness of 1 mm.

CAD data is available under www.wittenstein-alpha.com

Motor mounting according to operating manual

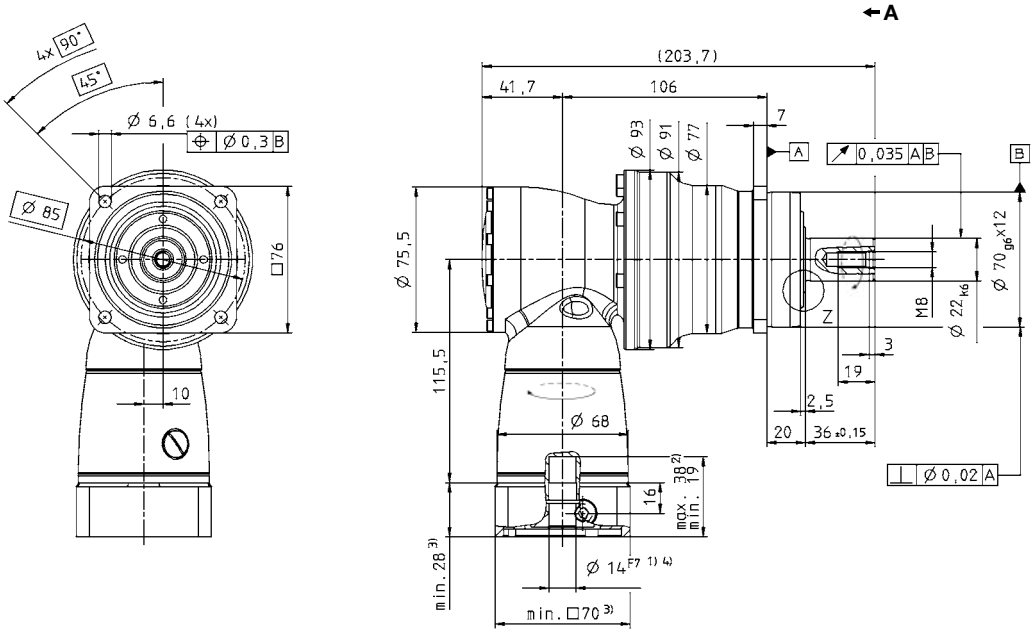
				2-stage									
Ratio [a]			*i*	**12**	**16**	**20**	**25**	**28**	**35**	**40**	**50**	**70**	**100**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B} Nm	110	110	110	110	110	110	80	100	110	90
			T_{2B} in.lb	974	974	974	974	974	974	974	885	974	797
Nominal output torque (with n_{1N})			T_{2N} Nm	75	75	75	75	75	75	60	75	75	52
			T_{2N} in.lb	664	664	664	664	664	664	531	664	664	460
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2NOt} Nm	160	160	200	200	250	175	120	150	210	200
			T_{2NOt} in.lb	1416	1416	1770	1770	2213	1549	1062	1328	1859	1770
Nominal input speed (with T_{2N} and 20°C ambient temperature) [b), c)]			n_{1N} rpm	2000	2400	2400	2700	2400	2500	2500	2500	2500	2500
Max. continuous speed (with 20% T_{2N} and 20°C ambient temperature)			n_{1Ncym} rpm	3000	3400	3400	3800	3400	3200	3200	3200	3200	3200
Max. input speed			n_{1Max} rpm	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000
Mean no load running torque (with n_1 = 3000 rpm and 20°C gearhead temperature) [d)]			T_{012} Nm	1.5	1.3	1.2	1.2	1.2	1.3	1.3	1.3	1.3	1.3
			T_{012} in.lb	13.3	11.5	10.6	10.6	10.6	11.5	11.5	11.5	11.5	11.5
Max. torsional backlash			j_t arcmin	Standard ≤ 5 / Reduced ≤ 3									
Torsional rigidity			C_{t21} Nm/ arcmin	10									
			C_{t21} in.lb/ arcmin	89									
Max. axial force [e)]			F_{2AMax} N	3350									
			F_{2AMax} lb_f	753									
Max. radial force [e)]			F_{2RMax} N	4000									
			F_{2RMax} lb_f	900									
Max. tilting moment			M_{2KMax} Nm	236									
			M_{2KMax} in.lb	2089									
Efficiency at full load			η %	94									
Service life (For calculation, see the Chapter "Information")			L_h h	> 20000									
Weight incl. standard adapter plate			*m* kg	5.2									
			m lb_m	11.5									
Operating noise (with n_1 = 3000 rpm no load)			L_{PA} dB(A)	≤ 66									
Max. permitted housing temperature			°C	+90									
			F	194									
Ambient temperature			°C	0 to +40									
			F	32 to 104									
Lubrication				Lubricated for life									
Paint				Blue RAL 5002									
Direction of rotation				Motor and gearhead opposite directions									
Protection class				IP 65									
Moment of inertia (relates to the drive) Clamping hub diameter [mm]	C	14	J_1 kgcm²	0.54	0.45	0.44	0.40	0.44	0.36	0.35	0.34	0.34	0.34
			J_1 10^{-3} in.lb.s²	0.48	0.40	0.39	0.35	0.39	0.32	0.31	0.30	0.30	0.30
	E	19	J_1 kgcm²	0.89	0.80	0.79	0.75	0.79	0.71	0.70	0.70	0.70	0.69
			J_1 10^{-3} in.lb.s²	0.79	0.71	0.70	0.66	0.70	0.63	0.62	0.62	0.62	0.61

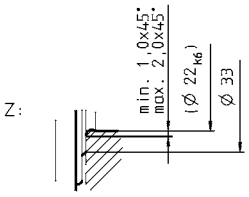
[a)] Other ratios up to i=1000 available on request
[b)] Higher speeds are possible if the nominal torque is reduced
[c)] For higher ambient temperatures, please reduce input speed
[d)] Idling torques decrease during operation
[e)] Refers to center of the output shaft or flange

All technical data for front output side applies.
Technical data for rearward output versions, see page 386.

Please contact us for information on the best configuration for S1 conditions of use (continuous operation).

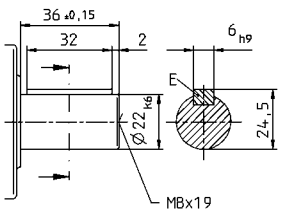
2-stage:



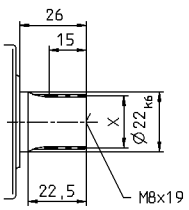


Alternatives: Output shaft variants

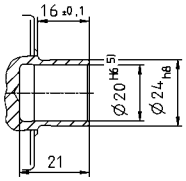
Keywayed output shaft in mm
E = key as per DIN 6885, sheet 1, form A



Involute gearing DIN 5480 in mm
X = W 22 x 1.25 x 30 x 16 x 6m, DIN 5480



Shaft mounted
Mounted via shrink disc



See technical data sheet for available clamping hub diameters (mass moment of inertia). Dimensions available on request.

Non-tolerated dimensions ±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 with a minimum thickness of 1 mm.

CAD data is available under www.wittenstein-alpha.com

Motor mounting according to operating manual

SPK+ 075 MF 3-stage

				3-stage													
Ratio [a]			*i*	**64**	**84**	**100**	**125**	**140**	**175**	**200**	**250**	**280**	**350**	**400**	**500**	**700**	**1000**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B} Nm	110	110	110	110	110	110	110	110	110	110	80	100	110	90
			T_{2B} in.lb	974	974	974	974	974	974	974	974	974	974	708	885	974	797
Nominal output torque (with n_{1N})			T_{2N} Nm	75	75	75	75	75	75	75	75	75	75	60	75	75	52
			T_{2N} in.lb	664	664	664	664	664	664	664	664	664	664	531	664	664	460
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not} Nm	160	160	200	200	200	200	200	200	250	175	120	150	210	200
			T_{2Not} in.lb	1416	1416	1770	1770	1770	1770	1770	1770	2213	1549	1062	1328	1859	1770
Nominal input speed (with T_{2N} and 20°C ambient temperature) [b), c)]			n_{1N} rpm	4400	4400	4400	4400	4400	4400	4400	4800	4400	4800	5500	5500	5500	5500
Max. continuous speed (with 20% T_{2N} and 20°C ambient temperature)			n_{1Ncym} rpm	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5500	5500	5500	5500
Max. input speed			n_{1Max} rpm	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000
Mean no load running torque (with n_1 = 3000 rpm and 20°C gearhead temperature) [d)]			T_{012} Nm	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
			T_{012} in.lb	2.7	2.7	2.7	2.7	2.7	2.7	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8
Max. torsional backlash			j_t arcmin	Standard ≤ 5 / Reduced ≤ 3													
Torsional rigidity			C_{t21} Nm/ arcmin	10													
			C_{t21} in.lb/ arcmin	89													
Max. axial force [e)]			F_{2AMax} N	3350													
			F_{2AMax} lb_f	754													
Max. radial force [e)]			F_{2RMax} N	4000													
			F_{2RMax} lb_f	900													
Max. tilting moment			M_{2KMax} Nm	236													
			M_{2KMax} in.lb	2089													
Efficiency at full load			η %	92													
Service life (For calculation, see the Chapter "Information")			L_h h	> 20000													
Weight incl. standard adapter plate			*m* kg	5.5													
			m lb_m	12.2													
Operating noise (with n_1 = 3000 rpm no load)			L_{PA} dB(A)	≤ 66													
Max. permitted housing temperature			°C	+90													
			F	194													
Ambient temperature			°C	0 to +40													
			F	32 to 104													
Lubrication				Lubricated for life													
Paint				Blue RAL 5002													
Direction of rotation				Motor and gearhead opposite directions													
Protection class				IP 65													
Moment of inertia (relates to the drive) Clamping hub diameter [mm]	B	11	J_1 kgcm²	0.09	0.07	0.08	0.07	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
			J_1 10^{-3} in.lb.s²	0.08	0.06	0.07	0.06	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
	C	14	J_1 kgcm²	0.20	0.18	0.19	0.19	0.18	0.18	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17
			J_1 10^{-3} in.lb.s²	0.18	0.16	0.17	0.17	0.16	0.16	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15

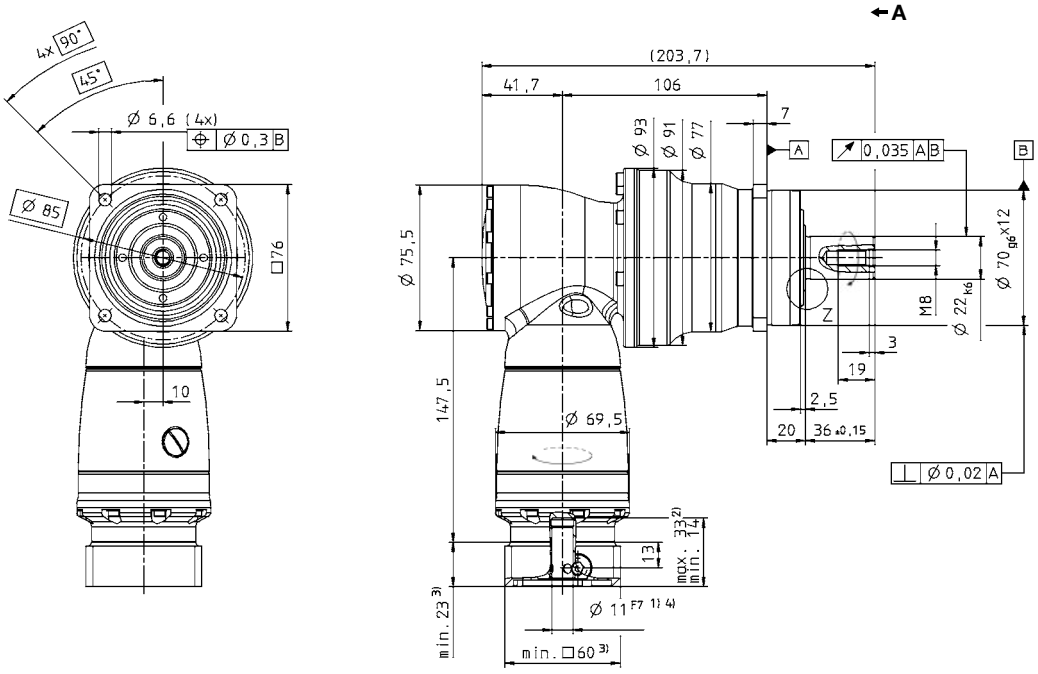
[a)] Other ratios up to i=1000 available on request
[b)] Higher speeds are possible if the nominal torque is reduced
[c)] For higher ambient temperatures, please reduce input speed
[d)] Idling torques decrease during operation
[e)] Refers to center of the output shaft or flange

All technical data for front output side applies.
Technical data for rearward output versions, see page 386.

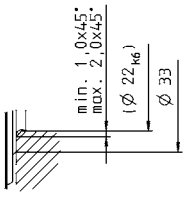
Please contact us for information on the best configuration for S1 conditions of use (continuous operation).

View A

3-stage:

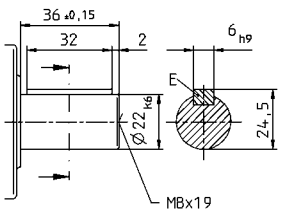


Z:

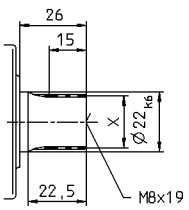


Alternatives: Output shaft variants

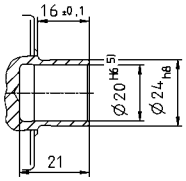
Keywayed output shaft in mm
E = key as per DIN 6885, sheet 1, form A



Involute gearing DIN 5480 in mm
X = W 22 x 1.25 x 30 x 16 x 6m, DIN 5480



Shaft mounted
Mounted via shrink disc



See technical data sheet for available clamping hub diameters (mass moment of inertia). Dimensions available on request.

Non-tolerated dimensions ±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 with a minimum thickness of 1 mm.

CAD data is available under www.wittenstein-alpha.com

Motor mounting according to operating manual

					2-stage									
Ratio [a]			*i*		**12**	**16**	**20**	**25**	**28**	**35**	**40**	**50**	**70**	**100**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B}	Nm	280	280	300	300	300	300	200	250	300	225
				in.lb	2478	2478	2655	2655	2655	2655	1770	2213	2655	1991
Nominal output torque (with n_{1N})			T_{2N}	Nm	180	180	175	175	170	175	160	175	170	120
				in.lb	1593	1593	1549	1549	1505	1549	1416	1549	1505	1062
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not}	Nm	400	400	500	500	625	500	400	500	625	500
				in.lb	3540	3540	4425	4425	5531	4425	3540	4425	5531	4425
Nominal input speed (with T_{2N} and 20°C ambient temperature) [b), c)]			n_{1N}	rpm	2000	2400	2400	2700	2400	2500	2500	2500	2500	2500
Max. continuous speed (with 20% T_{2N} and 20°C ambient temperature)			n_{1Ncym}	rpm	3000	3400	3400	3800	3400	3200	3200	3200	3200	3200
Max. input speed			n_{1Max}	rpm	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000
Mean no load running torque (with n_1 = 3000 rpm and 20°C gearhead temperature) [d)]			T_{012}	Nm	2.5	2.1	2.0	1.8	2.0	2.2	2.0	2.0	2.0	2.0
				in.lb	22.1	18.6	17.7	15.9	17.7	19.5	17.7	17.7	17.7	17.7
Max. torsional backlash			j_t	arcmin	Standard ≤ 4 / Reduced ≤ 2									
Torsional rigidity			C_{t21}	Nm/ arcmin	31									
				in.lb/ arcmin	274									
Max. axial force [e)]			F_{2AMax}	N	5650									
				lb_f	1271									
Max. radial force [e)]			F_{2RMax}	N	6300									
				lb_f	1418									
Max. tilting moment			M_{2KMax}	Nm	487									
				in.lb	4310									
Efficiency at full load			η	%	94									
Service life (For calculation, see the Chapter "Information")			L_h	h	> 20000									
Weight incl. standard adapter plate			*m*	kg	9.7									
				lb_m	21.4									
Operating noise (with n_1 = 3000 rpm no load)			L_{PA}	dB(A)	≤ 68									
Max. permitted housing temperature				°C	+90									
				F	194									
Ambient temperature				°C	0 to +40									
				F	32 to 104									
Lubrication					Lubricated for life									
Paint					Blue RAL 5002									
Direction of rotation					Motor and gearhead opposite directions									
Protection class					IP 65									
Moment of inertia (relates to the drive) Clamping hub diameter [mm]	E	19	J_1	kgcm²	1.48	1.20	1.17	1.05	1.15	0.95	0.90	0.89	0.89	0.89
				10^{-3} in.lb.s²	1.31	1.06	1.04	0.93	1.02	0.84	0.79	0.79	0.79	0.78
	H	28	J_1	kgcm²	2.89	2.62	2.59	2.46	2.56	2.36	2.31	2.31	2.30	2.30
				10^{-3} in.lb.s²	2.56	2.31	2.29	2.18	2.27	2.09	2.05	2.04	2.04	2.04

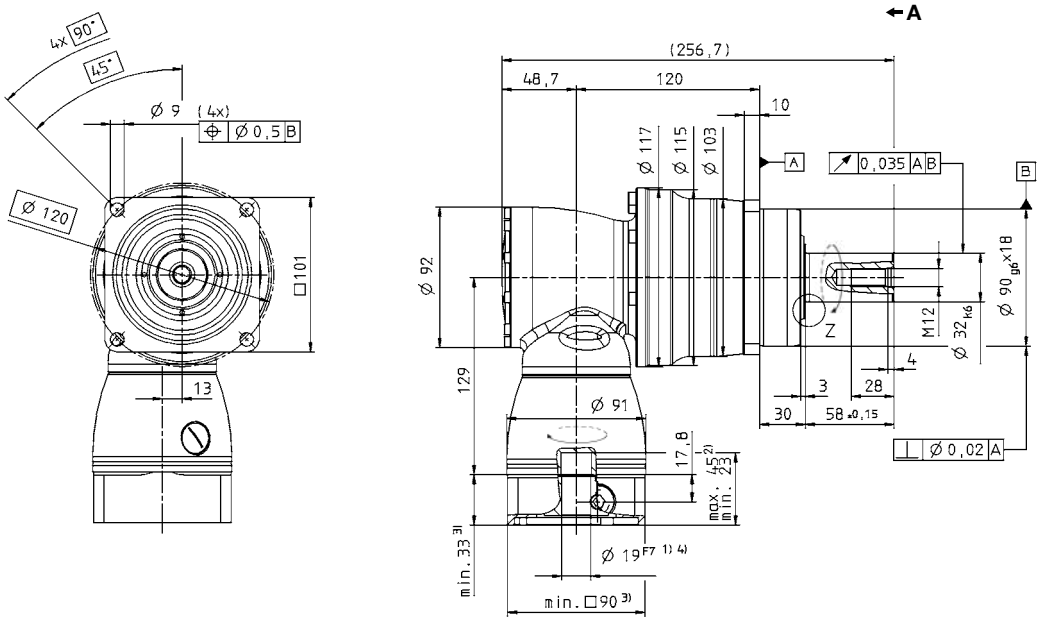
[a)] Other ratios up to i=1000 available on request
[b)] Higher speeds are possible if the nominal torque is reduced
[c)] For higher ambient temperatures, please reduce input speed
[d)] Idling torques decrease during operation
[e)] Refers to center of the output shaft or flange

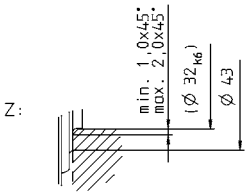
All technical data for front output side applies.
Technical data for rearward output versions, see page 386.

Please contact us for information on the best configuration for S1 conditions of use (continuous operation).

View A

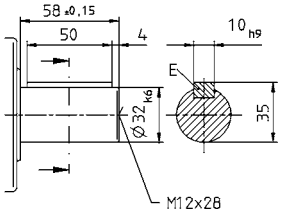
2-stage:



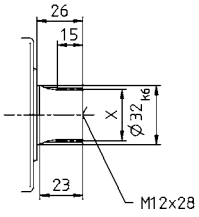


Alternatives: Output shaft variants

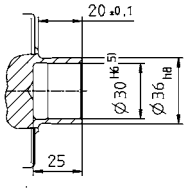
Keywayed output shaft in mm
E = key as per DIN 6885, sheet 1, form A



Involute gearing DIN 5480 in mm
X = W 32 x 1.25 x 30 x 24 x 6m, DIN 5480



Shaft mounted
Mounted via shrink disc



See technical data sheet for available clamping hub diameters (mass moment of inertia). Dimensions available on request.

Non-tolerated dimensions ±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 with a minimum thickness of 1 mm.

CAD data is available under www.wittenstein-alpha.com

Motor mounting according to operating manual

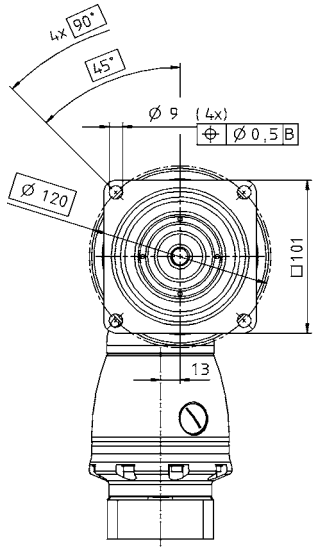
				3-stage													
Ratio [a]	*i*			**64**	**84**	**100**	**125**	**140**	**175**	**200**	**250**	**280**	**350**	**400**	**500**	**700**	**1000**
Max. acceleration torque (max. 1000 cycles per hour)	T_{2B}		Nm	280	280	300	300	300	300	300	300	300	300	200	250	300	225
			in.lb	2478	2478	2655	2655	2655	2655	2655	2655	2655	2655	1770	2213	2655	1991
Nominal output torque (with n_{1N})	T_{2N}		Nm	180	180	175	175	175	175	175	175	170	175	160	175	170	120
			in.lb	1593	1593	1549	1549	1549	1549	1549	1549	1505	1549	1416	1549	1505	1062
Emergency stop torque (permitted 1000 times during the service life of the gearhead)	T_{2Not}		Nm	400	400	500	500	500	500	500	500	625	500	400	500	625	500
			in.lb	3540	3540	4425	4425	4425	4425	4425	4425	5531	4425	3540	4425	5531	4425
Nominal input speed (with T_{2N} and 20°C ambient temperature) [b), c)]	n_{1N}		rpm	3500	3500	3500	3500	3500	3500	3500	3800	3500	3800	4500	4500	4500	4500
Max. continuous speed (with 20% T_{2N} and 20°C ambient temperature)	n_{1Ncym}		rpm	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500
Max. input speed	n_{1Max}		rpm	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000
Mean no load running torque (with n_1 = 3000 rpm and 20°C gearhead temperature) [d)]	T_{012}		Nm	0.4	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
			in.lb	3.5	2.7	2.7	2.7	2.7	2.7	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8
Max. torsional backlash	j_t		arcmin	Standard ≤ 4 / Reduced ≤ 2													
Torsional rigidity	C_{t21}		Nm/ arcmin	31													
			in.lb/ arcmin	274													
Max. axial force [e)]	F_{2AMax}		N	5650													
			lb_f	1271													
Max. radial force [e)]	F_{2RMax}		N	6300													
			lb_f	1418													
Max. tilting moment	M_{2KMax}		Nm	487													
			in.lb	4310													
Efficiency at full load	η		%	92													
Service life (For calculation, see the Chapter "Information")	L_h		h	> 20000													
Weight incl. standard adapter plate	*m*		kg	10.3													
			lb_m	22.8													
Operating noise (with n_1 = 3000 rpm no load)	L_{PA}		dB(A)	≤ 68													
Max. permitted housing temperature			°C	+90													
			F	194													
Ambient temperature			°C	0 to +40													
			F	32 to 104													
Lubrication				Lubricated for life													
Paint				Blue RAL 5002													
Direction of rotation				Motor and gearhead opposite directions													
Protection class				IP 65													
Moment of inertia (relates to the drive) Clamping hub diameter [mm]	C	14	J_1	kgcm²	0.28	0.23	0.24	0.23	0.21	0.20	0.19	0.18	0.19	0.18	0.18	0.18	0.18	0.18
				10^{-3} in.lb.s²	0.25	0.20	0.21	0.20	0.19	0.18	0.17	0.16	0.17	0.16	0.16	0.16	0.16	0.16
	E	19	J_1	kgcm²	0.72	0.63	0.68	0.68	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63
				10^{-3} in.lb.s²	0.64	0.56	0.60	0.60	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56

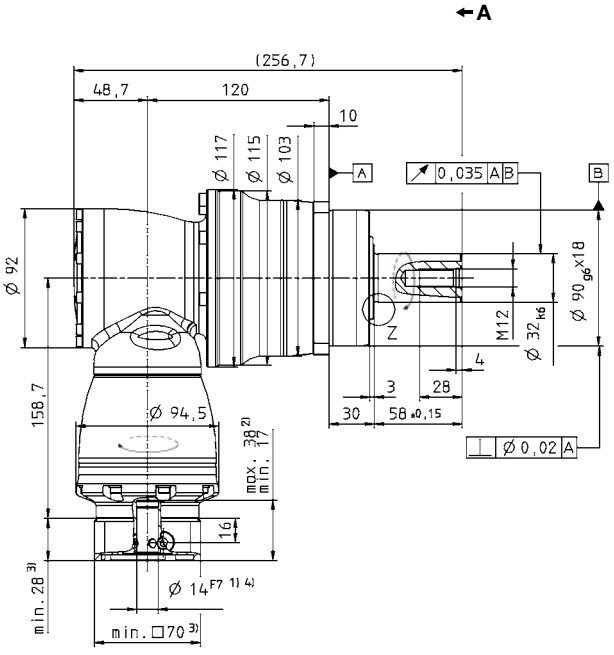
[a)] Other ratios up to i=1000 available on request
[b)] Higher speeds are possible if the nominal torque is reduced
[c)] For higher ambient temperatures, please reduce input speed
[d)] Idling torques decrease during operation
[e)] Refers to center of the output shaft or flange

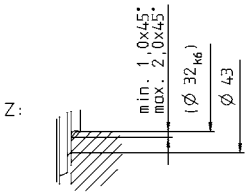
All technical data for front output side applies.
Technical data for rearward output versions, see page 386.

Please contact us for information on the best configuration for S1 conditions of use (continuous operation).

3-stage:

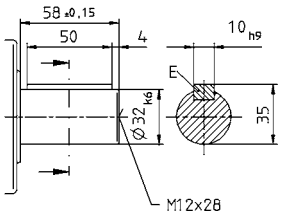




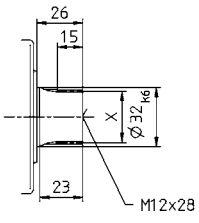


Alternatives: Output shaft variants

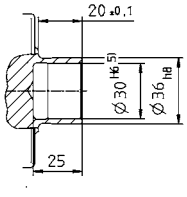
Keywayed output shaft in mm
E = key as per DIN 6885, sheet 1, form A



Involute gearing DIN 5480 in mm
X = W 32 x 1.25 x 30 x 24 x 6m, DIN 5480



Shaft mounted
Mounted via shrink disc



See technical data sheet for available clamping hub diameters (mass moment of inertia). Dimensions available on request.

Non-tolerated dimensions ±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 with a minimum thickness of 1 mm.

CAD data is available under www.wittenstein-alpha.com

Motor mounting according to operating manual

				2-stage									
Ratio [a]			*i*	**12**	**16**	**20**	**25**	**28**	**35**	**40**	**50**	**70**	**100**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B} Nm	600	600	600	600	600	600	500	600	600	480
			T_{2B} in.lb	5310	5310	5310	5310	5310	5310	4425	5310	5310	4248
Nominal output torque (with n_{1N})			T_{2N} Nm	360	360	360	360	360	360	320	360	360	220
			T_{2N} in.lb	3186	3186	3186	3186	3186	3186	2832	3186	3186	1947
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not} Nm	1000	1000	1250	1250	1250	1250	1000	1250	1250	1000
			T_{2Not} in.lb	8850	8850	11063	11063	11063	11063	8850	11063	11063	8850
Nominal input speed (with T_{2N} and 20°C ambient temperature) [b), c)]			n_{1N} rpm	1900	2300	2300	2600	2300	2300	2300	2300	2300	2300
Max. continuous speed (with 20% T_{2N} and 20°C ambient temperature)			n_{1Ncym} rpm	2700	3100	3100	3500	3100	3000	3000	3000	3000	3000
Max. input speed			n_{1Max} rpm	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500
Mean no load running torque (with n_1 = 3000 rpm and 20°C gearhead temperature) [d)]			T_{012} Nm	4.0	3.7	3.6	2.8	3.5	3.9	3.1	3.1	3.1	3.1
			T_{012} in.lb	35.4	32.7	31.9	24.8	31	34.5	27.4	27.4	27.4	27.4
Max. torsional backlash			j_t arcmin	Standard ≤ 4 / Reduced ≤ 2									
Torsional rigidity			C_{t21} Nm/ arcmin	53									
			C_{t21} in.lb/ arcmin	469									
Max. axial force [e)]			F_{2AMax} N	9870									
			F_{2AMax} lb_f	2221									
Max. radial force [e)]			F_{2RMax} N	9450									
			F_{2RMax} lb_f	2126									
Max. tilting moment			M_{2KMax} Nm	952									
			M_{2KMax} in.lb	8425									
Efficiency at full load			η %	94									
Service life (For calculation, see the Chapter "Information")			L_h h	> 20000									
Weight incl. standard adapter plate			*m* kg	20									
			m lb_m	44									
Operating noise (with n_1 = 3000 rpm no load)			L_{PA} dB(A)	≤ 68									
Max. permitted housing temperature			°C	+90									
			F	194									
Ambient temperature			°C	0 to +40									
			F	32 to 104									
Lubrication				Lubricated for life									
Paint				Blue RAL 5002									
Direction of rotation				Motor and gearhead opposite directions									
Protection class				IP 65									
Moment of inertia (relates to the drive) Clamping hub diameter [mm]	H	28	J_1 kgcm²	4.68	3.82	3.75	3.31	3.68	2.97	2.80	2.79	2.78	2.77
			J_1 10^{-3} in.lb.s²	4.14	3.38	3.32	2.93	3.26	2.63	2.48	2.47	2.46	2.45
	K	38	J_1 kgcm²	11.8	11.0	10.9	10.5	10.9	10.1	9.96	9.95	9.94	9.94
			J_1 10^{-3} in.lb.s²	10.5	9.73	9.66	9.27	9.60	8.97	8.82	8.81	8.80	8.79

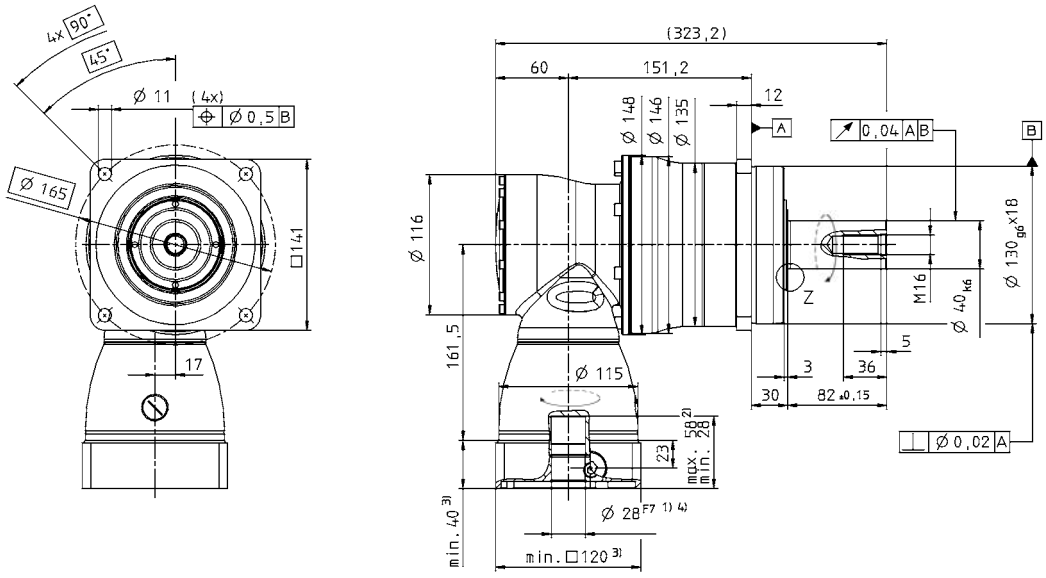
[a)] Other ratios up to i=1000 available on request
[b)] Higher speeds are possible if the nominal torque is reduced
[c)] For higher ambient temperatures, please reduce input speed
[d)] Idling torques decrease during operation
[e)] Refers to center of the output shaft or flange

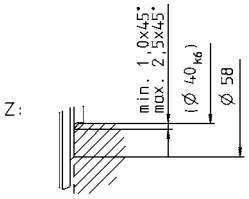
All technical data for front output side applies.
Technical data for rearward output versions, see page 386.

Please contact us for information on the best configuration for S1 conditions of use (continuous operation).

View A

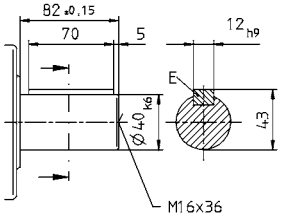
2-stage:



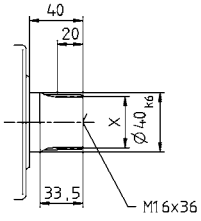


Alternatives: Output shaft variants

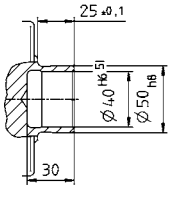
Keywayed output shaft in mm
E = key as per DIN 6885, sheet 1, form A



Involute gearing DIN 5480 in mm
X = W 40 x 2 x 30 x 18 x 6m, DIN 5480



Shaft mounted
Mounted via shrink disc



See technical data sheet for available clamping hub diameters (mass moment of inertia). Dimensions available on request.

Non-tolerated dimensions ±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 with a minimum thickness of 1 mm.

CAD data is available under www.wittenstein-alpha.com

Motor mounting according to operating manual

SPK+ 140 MF 3-stage

				3-stage													
Ratio [a]			*i*	**64**	**84**	**100**	**125**	**140**	**175**	**200**	**250**	**280**	**350**	**400**	**500**	**700**	**1000**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B} Nm	600	600	600	600	600	600	600	600	600	600	500	600	600	480
			T_{2B} in.lb	5310	5310	5310	5310	5310	5310	5310	5310	5310	5310	4425	5310	5310	4248
Nominal output torque (with n_{1N})			T_{2N} Nm	360	360	360	360	360	360	360	360	360	360	320	360	360	220
			T_{2N} in.lb	3186	3186	3186	3186	3186	3186	3186	3186	3186	3186	2832	3186	3186	1947
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not} Nm	1000	1000	1250	1250	1250	1250	1250	1250	1250	1250	1000	1250	1250	1000
			T_{2Not} in.lb	8850	8850	11063	11063	11063	11063	11063	11063	11063	11063	8850	11063	11063	8850
Nominal input speed (with T_{2N} and 20°C ambient temperature) [b), c)]			n_{1N} rpm	3100	3100	3100	3100	3100	3100	3100	3500	3100	3500	4200	4200	4200	4200
Max. continuous speed (with 20% T_{2N} and 20°C ambient temperature)			n_{1Ncym} rpm	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4200	4200	4200	4200
Max. input speed			n_{1Max} rpm	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500
Mean no load running torque (with n_1 = 3000 rpm and 20°C gearhead temperature) [d)]			T_{012} Nm	0.7	0.4	0.6	0.5	0.5	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
			T_{012} in.lb	6.2	3.5	5.3	4.4	4.4	3.5	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7
Max. torsional backlash			j_t arcmin	Standard ≤ 4 / Reduced ≤ 2													
Torsional rigidity			C_{t21} Nm/ arcmin	53													
			C_{t21} in.lb/ arcmin	469													
Max. axial force [e)]			F_{2AMax} N	9870													
			F_{2AMax} lb_f	2221													
Max. radial force [e)]			F_{2RMax} N	9450													
			F_{2RMax} lb_f	2126													
Max. tilting moment			M_{2KMax} Nm	952													
			M_{2KMax} in.lb	8425													
Efficiency at full load			η %	92													
Service life (For calculation, see the Chapter "Information")			L_h h	> 20000													
Weight incl. standard adapter plate			*m* kg	20.7													
			m lb_m	45.7													
Operating noise (with n_1 = 3000 rpm no load)			L_{PA} dB(A)	< 68													
Max. permitted housing temperature			°C	+90													
			F	194													
Ambient temperature			°C	0 to +40													
			F	32 to 104													
Lubrication				Lubricated for life													
Paint				Blue RAL 5002													
Direction of rotation				Motor and gearhead opposite directions													
Protection class				IP 65													
Moment of inertia (relates to the drive) Clamping hub diameter [mm]	E	19	J_1 kgcm²	1.01	0.76	0.88	0.85	0.76	0.75	0.70	0.69	0.70	0.69	0.69	0.69	0.69	0.69
			J_1 10^{-3} in.lb.s²	0.89	0.67	0.78	0.75	0.67	0.66	0.62	0.61	0.62	0.61	0.61	0.61	0.61	0.61
	G	24	J_1 kgcm²	2.57	2.32	2.44	2.42	2.32	2.31	2.26	2.25	2.26	2.25	2.25	2.25	2.25	2.25
			J_1 10^{-3} in.lb.s²	2.27	2.05	2.16	2.14	2.05	2.04	2.00	1.99	2.00	1.99	1.99	1.99	1.99	1.99

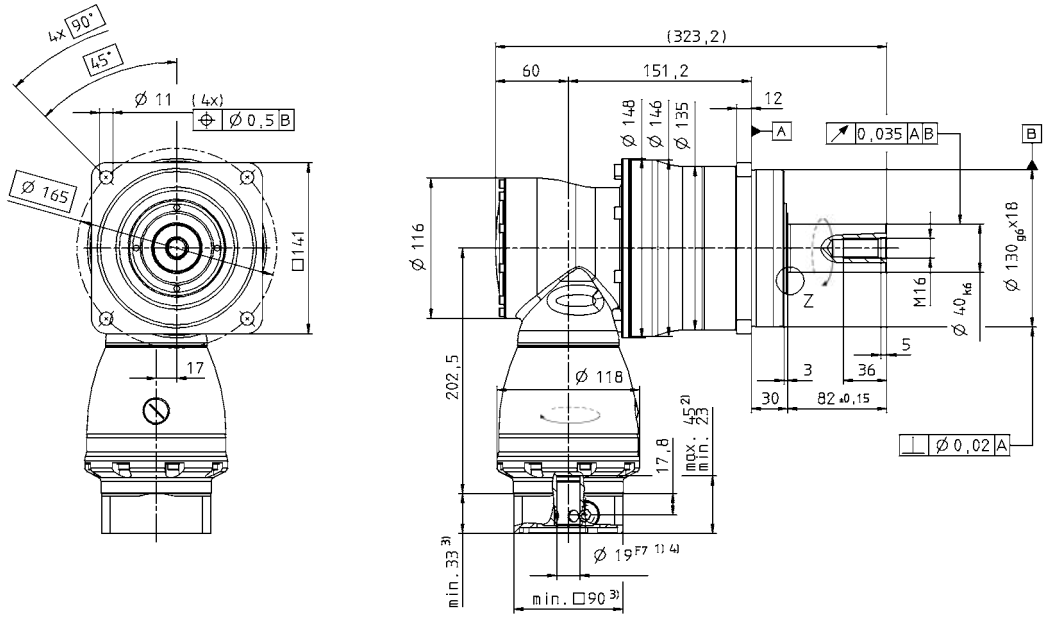
[a)] Other ratios up to i=1000 available on request
[b)] Higher speeds are possible if the nominal torque is reduced
[c)] For higher ambient temperatures, please reduce input speed
[d)] Idling torques decrease during operation
[e)] Refers to center of the output shaft or flange

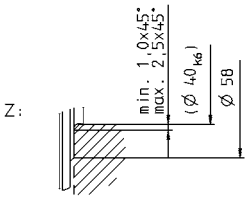
All technical data for front output side applies.
Technical data for rearward output versions, see page 386.

Please contact us for information on the best configuration for S1 conditions of use (continuous operation).

View A

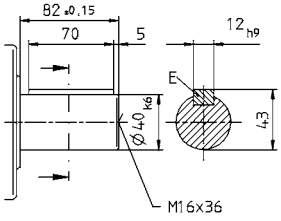
3-stage:



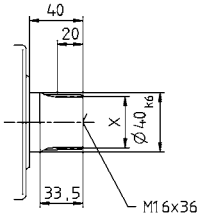


Alternatives: Output shaft variants

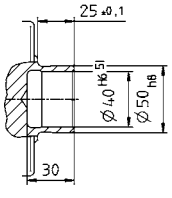
Keywayed output shaft in mm
E = key as per DIN 6885, sheet 1, form A



Involute gearing DIN 5480 in mm
X = W 40 x 2 x 30 x 18 x 6m, DIN 5480



Shaft mounted
Mounted via shrink disc



See technical data sheet for available clamping hub diameters (mass moment of inertia). Dimensions available on request.

Non-tolerated dimensions ±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 with a minimum thickness of 1 mm.

CAD data is available under www.wittenstein-alpha.com

Motor mounting according to operating manual

				2-stage									
Ratio [a]			*i*	**12**	**16**	**20**	**25**	**28**	**35**	**40**	**50**	**70**	**100**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B} Nm	1100	1100	1100	1100	1100	1100	840	1050	1100	880
			T_{2B} in.lb	9735	9735	9735	9735	9735	9735	7434	9293	9735	7788
Nominal output torque (with n_{1N})			T_{2N} Nm	750	750	750	750	750	750	640	750	750	750
			T_{2N} in.lb	6638	6638	6638	6638	6638	6638	5664	6638	6638	6638
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not} Nm	1600	1600	2000	2000	2750	2000	1600	2000	2750	2200
			T_{2Not} in.lb	14160	14160	17700	17700	24338	17700	14160	17700	24338	19470
Nominal input speed (with T_{2N} and 20°C ambient temperature) [b), c)]			n_{1N} rpm	1600	1900	1900	2100	1900	2100	2100	2100	2100	2100
Max. continuous speed (with 20% T_{2N} and 20°C ambient temperature)			n_{1Ncym} rpm	2300	2600	2600	2800	2600	3000	3000	3000	3000	3000
Max. input speed			n_{1Max} rpm	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500
Mean no load running torque (with n_1 = 3000 rpm and 20°C gearhead temperature) [d)]			T_{012} Nm	9.0	6.5	6.5	5.5	6.0	8.0	6.0	6.0	6.0	6.0
			T_{012} in.lb	79.7	57.5	57.5	48.7	53.1	70.8	53.1	53.1	53.1	53.1
Max. torsional backlash			j_t arcmin	Standard ≤ 4 / Reduced ≤ 2									
Torsional rigidity			C_{t21} Nm/ arcmin	175									
			C_{t21} in.lb/ arcmin	1549									
Max. axial force [e)]			F_{2AMax} N	14150									
			F_{2AMax} lb_f	3184									
Max. radial force [e)]			F_{2RMax} N	14700									
			F_{2RMax} lb_f	3308									
Max. tilting moment			M_{2KMax} Nm	1600									
			M_{2KMax} in.lb	14160									
Efficiency at full load			η %	94									
Service life (For calculation, see the Chapter "Information")			L_h h	> 20000									
Weight incl. standardadapter plate			*m* kg	45									
			m lb_m	99									
Operating noise (with n_1 = 3000 rpm no load)			L_{PA} dB(A)	≤ 70									
Max. permitted housing temperature			°C	+90									
			F	194									
Ambient temperature			°C	0 to +40									
			F	32 to 104									
Lubrication				Lubricated for life									
Paint				Blue RAL 5002									
Direction of rotation				Motor and gearhead opposite directions									
Protection class				IP 65									
Moment of inertia (relates to the drive) Clamping hub diameter [mm]	K	38	J_1 kgcm²	24.7	19.5	19.0	16.3	18.6	14.0	12.9	12.8	12.7	12.7
			J_1 10^{-3} in.lb.s²	21.9	17.2	16.8	14.4	16.5	12.4	11.4	11.3	11.3	11.2

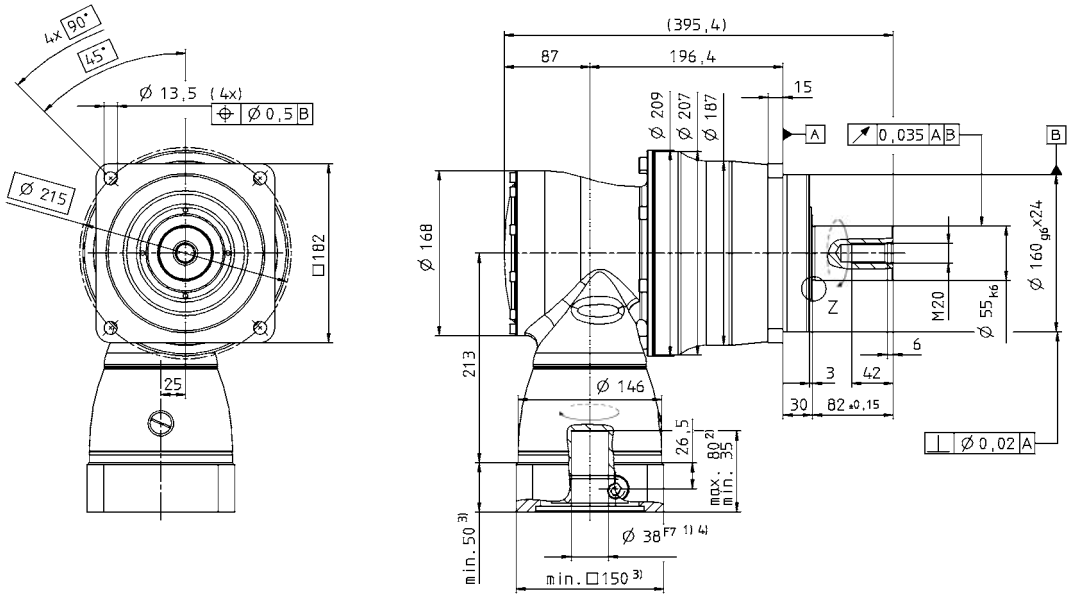
[a)] Other ratios up to i=1000 available on request
[b)] Higher speeds are possible if the nominal torque is reduced
[c)] For higher ambient temperatures, please reduce input speed
[d)] Idling torques decrease during operation
[e)] Refers to center of the output shaft or flange

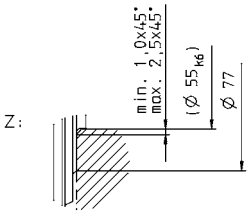
All technical data for front output side applies.
Technical data for rearward output versions, see page 386.

Please contact us for information on the best configuration for S1 conditions of use (continuous operation).

View A

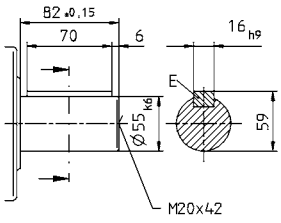
2-stage:



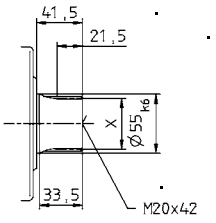


Alternatives: Output shaft variants

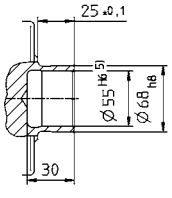
Keywayed output shaft in mm
E = key as per DIN 6885, sheet 1, form A



Involute gearing DIN 5480 in mm
X = W 55 x 2 x 30 x 26 x 6m, DIN 5480



Shaft mounted
Mounted via shrink disc



See technical data sheet for available clamping hub diameters (mass moment of inertia). Dimensions available on request.

Non-tolerated dimensions ±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 with a minimum thickness of 1 mm.

CAD data is available under www.wittenstein-alpha.com

Motor mounting according to operating manual

					3-stage													
Ratio [a]			*i*		**64**	**84**	**100**	**125**	**140**	**175**	**200**	**250**	**280**	**350**	**400**	**500**	**700**	**1000**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B}	Nm	1100	1100	1100	1100	1100	1100	1100	1100	1100	1100	840	1050	1100	880
				in.lb	9735	9735	9735	9735	9735	9735	9735	9735	9735	9735	7434	9293	9735	7788
Nominal output torque (with n_{1N})			T_{2N}	Nm	750	750	750	750	750	750	750	750	750	750	640	750	750	750
				in.lb	6638	6638	6638	6638	6638	6638	6638	6638	6638	6638	5664	6638	6638	6638
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not}	Nm	1600	1600	2000	2000	2000	2000	2000	2000	2750	2000	1600	2000	2750	2200
				in.lb	14160	14160	17700	17700	17700	17700	17700	17700	24338	17700	14160	17700	24338	19470
Nominal input speed (with T_{2N} and 20°C ambient temperature) [b), c)]			n_{1N}	rpm	2900	2900	2900	2900	2900	2900	2900	3200	2900	3200	3900	3900	3900	3900
Max. continuous speed (with 20% T_{2N} and 20°C ambient temperature)			n_{1Ncym}	rpm	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4200	4200	4200	4200
Max. input speed			n_{1Max}	rpm	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500
Mean no load running torque (with n_1 = 3000 rpm and 20°C gearhead temperature) [d)]			T_{012}	Nm	1	0.5	0.8	0.6	0.6	0.5	0.5	0.4	0.5	0.4	0.4	0.4	0.4	0.4
				in.lb	8.9	4.4	7.1	5.3	5.3	4.4	4.4	3.5	4.4	3.5	3.5	3.5	3.5	3.5
Max. torsional backlash			j_t	arcmin	Standard ≤ 4 / Reduced ≤ 2													
Torsional rigidity			C_{t21}	Nm/ arcmin	175													
				in.lb/ arcmin	1549													
Max. axial force [e)]			F_{2AMax}	N	14150													
				lb_f	3184													
Max. radial force [e)]			F_{2RMax}	N	14700													
				lb_f	3308													
Max. tilting moment			M_{2KMax}	Nm	1600													
				in.lb	14160													
Efficiency at full load			η	%	92													
Service life (For calculation, see the Chapter "Information")			L_h	h	> 20000													
Weight incl. standardadapter plate			*m*	kg	47.4													
				lb_m	104.8													
Operating noise (with n_1 = 3000 rpm no load)			L_{PA}	dB(A)	< 70													
Max. permitted housing temperature				°C	+90													
				F	194													
Ambient temperature				°C	0 to +40													
				F	32 to 104													
Lubrication					Lubricated for life													
Paint					Blue RAL 5002													
Direction of rotation					Motor and gearhead opposite directions													
Protection class					IP 65													
Moment of inertia (relates to the drive) Clamping hub diameter [mm]	G	24	J_1	kgcm²	3.97	2.82	3.36	3.22	2.82	2.75	2.50	2.47	2.50	2.44	2.42	2.42	2.42	2.42
				10^{-3} in.lb.s²	3.51	2.50	2.97	2.85	2.50	2.43	2.21	2.19	2.21	2.16	2.14	2.14	2.14	2.14
	K	38	J_1	kgcm²	10.90	9.74	10.30	10.10	9.74	9.66	9.41	9.38	9.41	9.38	9.33	9.33	9.33	9.33
				10^{-3} in.lb.s²	9.65	8.62	9.12	8.94	8.62	8.55	8.33	8.30	8.33	8.30	8.26	8.26	8.26	8.26

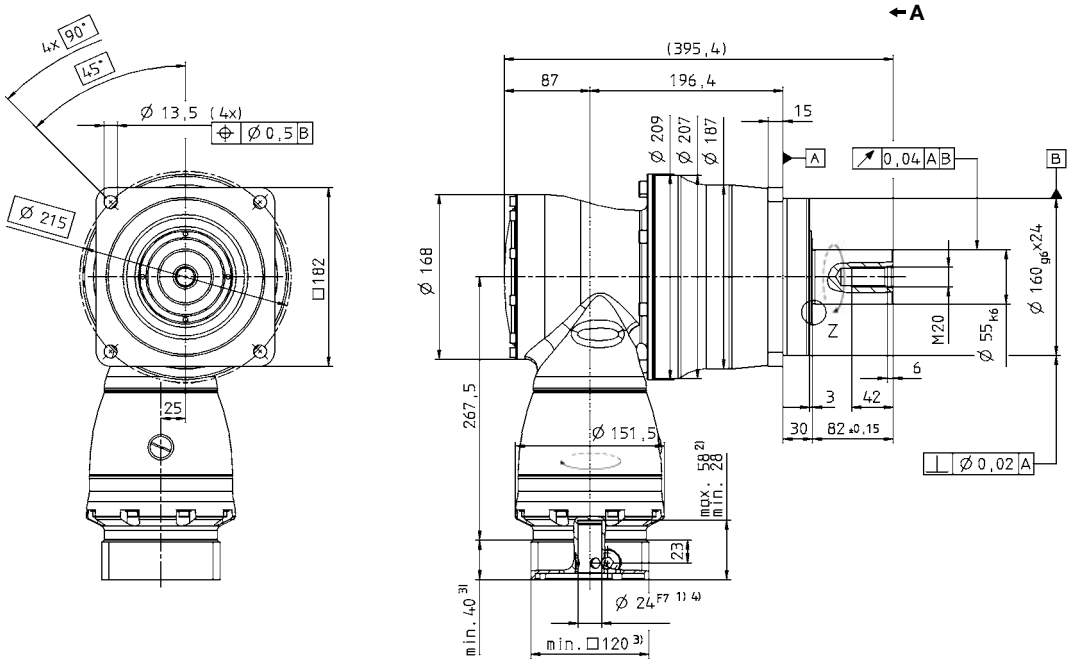
[a)] Other ratios up to i=1000 available on request
[b)] Higher speeds are possible if the nominal torque is reduced
[c)] For higher ambient temperatures, please reduce input speed
[d)] Idling torques decrease during operation
[e)] Refers to center of the output shaft or flange

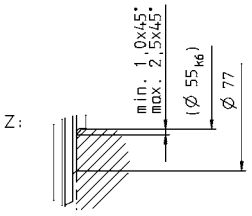
All technical data for front output side applies.
Technical data for rearward output versions, see page 386.

Please contact us for information on the best configuration for S1 conditions of use (continuous operation).

View A

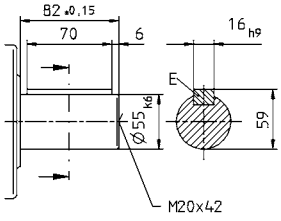
3-stage:



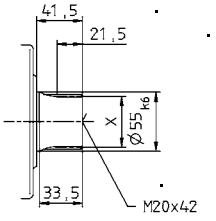


Alternatives: Output shaft variants

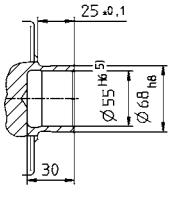
Keywayed output shaft in mm
E = key as per DIN 6885, sheet 1, form A



Involute gearing DIN 5480 in mm
X = W 55 x 2 x 30 x 26 x 6m, DIN 5480



Shaft mounted
Mounted via shrink disc



See technical data sheet for available clamping hub diameters (mass moment of inertia). Dimensions available on request.

Non-tolerated dimensions ±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 with a minimum thickness of 1 mm.

CAD data is available under www.wittenstein-alpha.com

Motor mounting according to operating manual

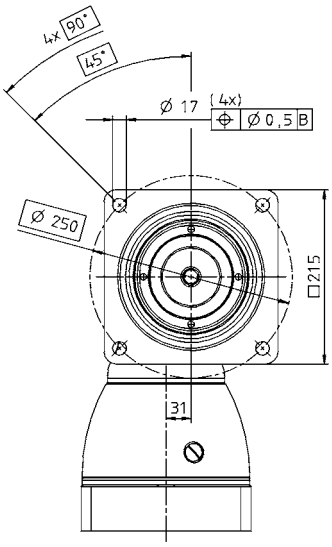
			2-stage									
Ratio [a]	i		**12**	**16**	**20**	**25**	**28**	**35**	**40**	**50**	**70**	**100**
Max. acceleration torque (max. 1000 cycles per hour)	T_{2B}	Nm	2500	2500	2500	2500	2400	2400	1850	2300	2400	1900
		in.lb	22125	22125	22125	22125	21240	21240	16373	20355	21240	16815
Nominal output torque (with n_{1N})	T_{2N}	Nm	1500	1500	1500	1500	1400	1500	1400	1500	1400	1000
		in.lb	13.275	13275	13275	13275	12390	13275	12390	13275	12390	8850
Emergency stop torque (permitted 1000 times during the service life of the gearhead)	T_{2Not}	Nm	3600	4200	5200	5200	5200	5200	3600	4500	5200	5000
		in.lb	31860	37170	46020	46020	46020	46020	31860	39825	46020	44250
Nominal input speed (with T_{2N} and 20°C ambient temperature) [b), c)]	n_{1N}	rpm	1500	1700	1700	1900	1700	1900	1700	1700	1700	1700
Max. continuous speed (with 20 % T_{2N} and 20°C ambient temperature)	n_{1Ncym}	rpm	1900	2300	2300	2700	2300	2700	2400	2400	2400	2400
Max. input speed	n_{1Max}	rpm	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000
Mean no load running torque (with n_1 = 3000 rpm and 20°C gearhead temperature) [d)]	T_{012}	Nm	18.5	17.0	15.0	13.0	14.0	12.0	15.0	15.0	14.0	13.0
		in.lb	163.7	150.5	132.8	115.1	123.9	106.2	132.8	132.8	123.9	115.1
Max. torsional backlash	j_t	arcmin	Standard ≤4 / Reduced ≤2									
Torsional rigidity	C_{t21}	Nm/ arcmin	300	300	300	300	300	300	300	300	300	300
		in.lb/ arcmin	2.655	2.655	2.655	2.655	2.655	2.655	2.655	2.655	2.655	2.655
Max. axial force [e)]	F_{2AMax}	N	30000									
		lb_f	6750									
Max. radial force [e)]	F_{2RMax}	N	21000									
		lb_f	4725									
Max. tilting moment	M_{2KMax}	Nm	3100									
		in.lb	27435									
Efficiency at full load	η	%	94									
Service life (For calculation, see the Chapter "Information")	L_h	h	> 20000									
Weight incl. standard adapter plate	m	kg	82									
		lb_m	181									
Operating noise (with n_1 = 3000 rpm no load)	L_{PA}	dB(A)	≤ 71									
Max. permitted housing temperature		°C	+90									
		F	194									
Ambient temperature		°C	0 to +40									
		F	32 to 104									
Lubrication			Lubricated for life									
Paint			Blue RAL 5002									
Direction of rotation			Motor and gearhead opposite directions									
Protection class			IP 65									
Moment of inertia (relates to the drive) **Clamping hub diameter [mm]** M 48	J_1	$kgcm^2$	78.80	54.60	53.00	43.40	51.50	42.20	30.20	30.00	29.80	29.80
		10^{-3} in.lb.s^2	69.74	48.32	46.91	38.41	45.58	37.35	26.73	26.55	26.37	26.37

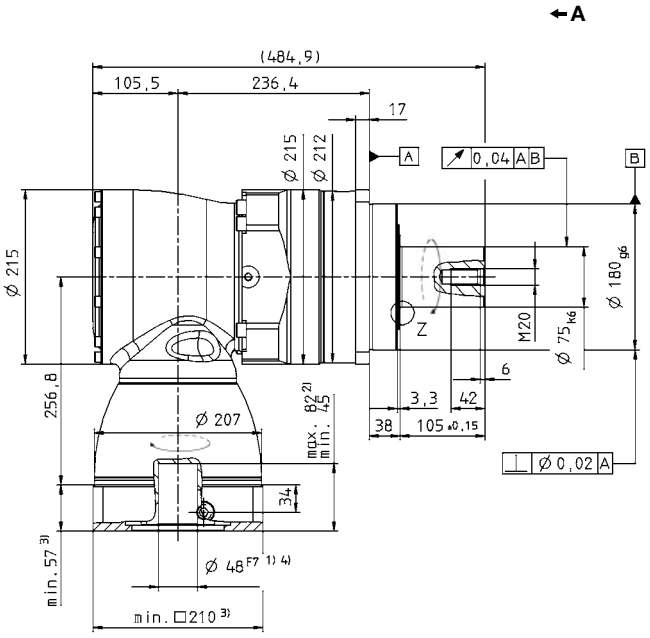
[a)] Other ratios available on request
[b)] Higher speeds are possible if the nominal torque is reduced
[c)] For higher ambient temperatures, please reduce input speed
[d)] Idling torques decrease during operation
[e)] Refers to center of the output shaft or flange

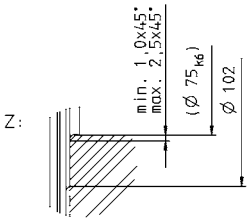
All technical data for front output side applies.
Technical data for rearward output versions, see page 386.

Please contact us for information on the best configuration for S1 conditions of use (continuous operation).

2-stage:

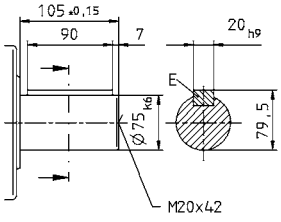




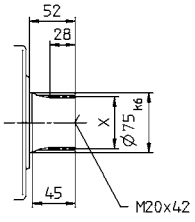


Alternatives: Output shaft variants

Keywayed output shaft in mm
E = key as per DIN 6885, sheet 1, form A



Involute gearing DIN 5480 in mm
X = W 70 x 2 x 30 x 34 x 6m, DIN 5480



See technical data sheet for available clamping hub diameters (mass moment of inertia). Dimensions available on request.

Non-tolerated dimensions ±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 with a minimum thickness of 1 mm.

CAD data is available under www.wittenstein-alpha.com

Motor mounting according to operating manual

SPK+ 210 MF 3-stage

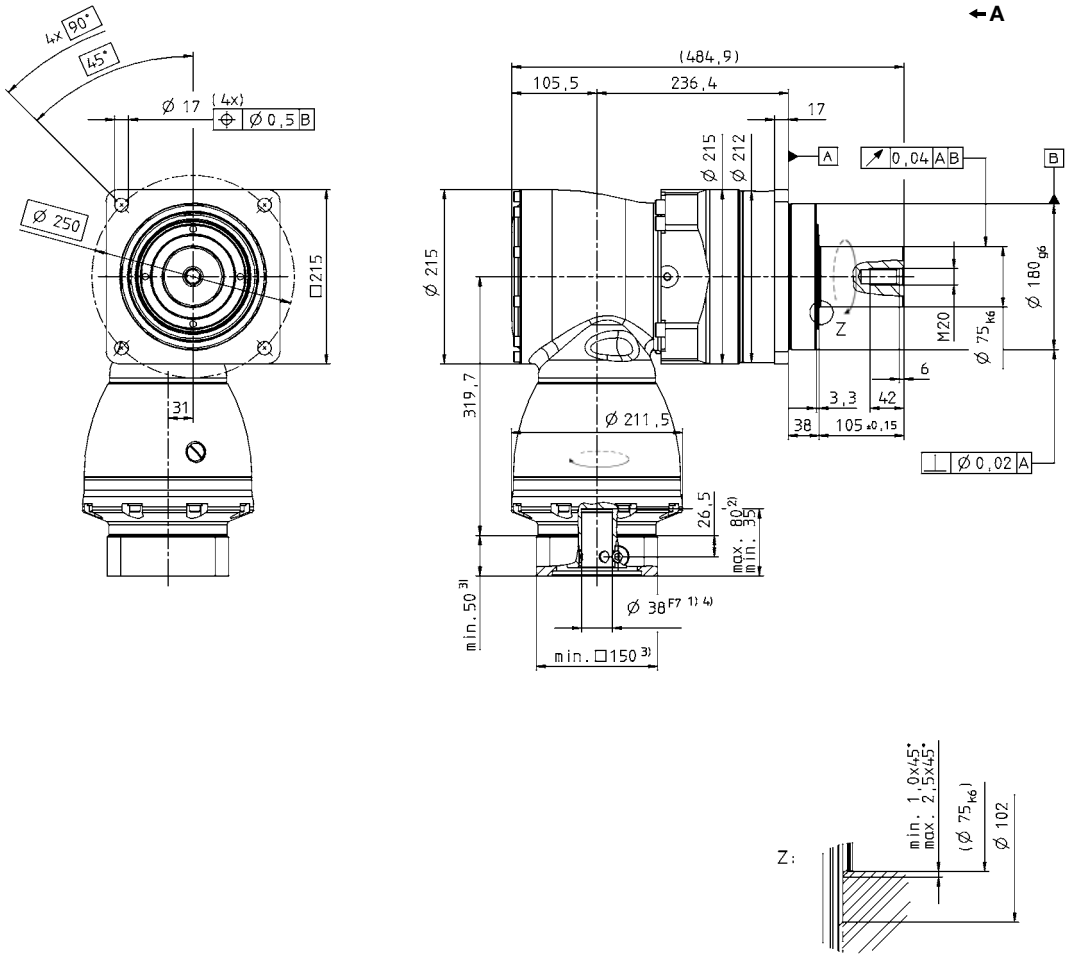
				3-stage													
Ratio [a]			*i*	**64**	**84**	**100**	**125**	**140**	**175**	**200**	**250**	**280**	**350**	**400**	**500**	**700**	**1000**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B} Nm	2400	2400	2500	2500	2500	2500	2500	2500	2400	2400	1900	2350	2400	1900
			T_{2B} in.lb	21240	21240	22125	22125	22125	22125	22125	22125	21240	21240	16815	20798	21240	16815
Nominal output torque (with n_{1N})			T_{2N} Nm	1500	1500	1500	1500	1500	1500	1500	1500	1400	1400	1500	1500	1400	1000
			T_{2N} in.lb	13275	13275	13275	13275	13275	13275	13275	13275	12390	12390	13275	13275	12390	8850
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not} Nm	4200	3600	5200	5200	5200	5200	5200	5200	5200	5200	3600	4500	5200	5000
			T_{2Not} in.lb	37170	31860	46020	46020	46020	46020	46020	46020	46020	46020	31860	39825	46020	44250
Nominal input speed (with T_{2N} and 20°C ambient temperature) [b), c)]			n_{1N} rpm	2700	2700	2700	2700	2700	2700	2700	2900	2700	2900	3400	3400	3400	3400
Max. continuous speed (with 20 % T_{2N} and 20°C ambient temperature)			n_{1Ncym} rpm	3500	3500	3500	3500	3500	3500	3500	3500	3500	3500	3500	3500	3800	3800
Max. input speed			n_{1Max} rpm	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000
Mean no load running torque (with n_1 = 3000 rpm and 20°C gearhead temperature) [d)]			T_{012} Nm	2.4	1.2	1.9	1.7	1.3	1.3	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
			T_{012} in.lb	21.2	10.6	16.8	15.0	11.5	11.5	8.9	8.9	8.9	8.9	8.9	8.9	8.9	8.9
Max. torsional backlash			j_t arcmin	Standard ≤4 / Reduced ≤2													
Torsional rigidity			C_{t21} Nm/ arcmin	300	300	300	300	300	300	300	300	300	300	300	300	300	300
			C_{t21} in.lb/ arcmin	2.655	2.655	2.655	2.655	2.655	2.655	2.655	2.655	2.655	2.655	2.655	2.655	2.655	2.655
Max. axial force [e)]			F_{2AMax} N	30000													
			F_{2AMax} lb_f	6750													
Max. radial force [e)]			F_{2RMax} N	21000													
			F_{2RMax} lb_f	4725													
Max. tilting moment			M_{2KMax} Nm	3100													
			M_{2KMax} in.lb	27435													
Efficiency at full load			η %	92													
Service life (For calculation, see the Chapter "Information")			L_h h	> 20000													
Weight incl. standard adapter plate			*m* kg	86													
			m lb_m	190													
Operating noise (with n_1 = 3000 rpm no load)			L_{PA} dB(A)	≤ 71													
Max. permitted housing temperature			°C	+90													
			F	194													
Ambient temperature			°C	0 to +40													
			F	32 to 104													
Lubrication				Lubricated for life													
Paint				Blue RAL 5002													
Direction of rotation				Motor and gearhead opposite directions													
Protection class				IP 65													
Moment of inertia (relates to the drive) Clamping hub diameter [mm]	K	38	J_1 kgcm²	14.00	10.90	12.30	12.00	10.90	10.70	10.10	10.00	10.10	10.00	9.90	9.90	9.90	9.90
			J_1 10^{-3} in.lb.s²	12.39	9.65	10.89	10.62	9.65	9.47	8.94	8.85	8.94	8.85	8.76	8.76	8.76	8.76
	M	48	J_1 kgcm²	28.70	25.60	27.10	26.70	26.70	25.60	24.80	24.70	24.80	24.70	24.60	24.60	24.60	24.60
			J_1 10^{-3} in.lb.s²	25.40	22.66	23.98	23.63	23.63	22.66	21.95	21.86	21.95	21.86	21.77	21.77	21.77	21.77

[a)] Other ratios available on request
[b)] Higher speeds are possible if the nominal torque is reduced
[c)] For higher ambient temperatures, please reduce input speed
[d)] Idling torques decrease during operation
[e)] Refers to center of the output shaft or flange

All technical data for front output side applies.
Technical data for rearward output versions, see page 386.

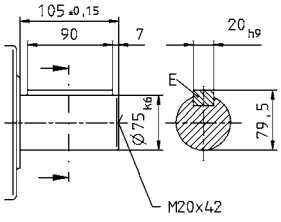
Please contact us for information on the best configuration for S1 conditions of use (continuous operation).

3-stage:

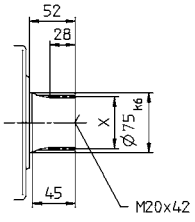


Alternatives: Output shaft variants

Keywayed output shaft in mm
E = key as per DIN 6885, sheet 1, form A



Involute gearing DIN 5480 in mm
X = W 70 x 2 x 30 x 34 x 6m, DIN 5480



See technical data sheet for available clamping hub diameters (mass moment of inertia). Dimensions available on request.

Non-tolerated dimensions ±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 with a minimum thickness of 1 mm.

CAD data is available under www.wittenstein-alpha.com

Motor mounting according to operating manual

SPK+ 240 MF 3-stage

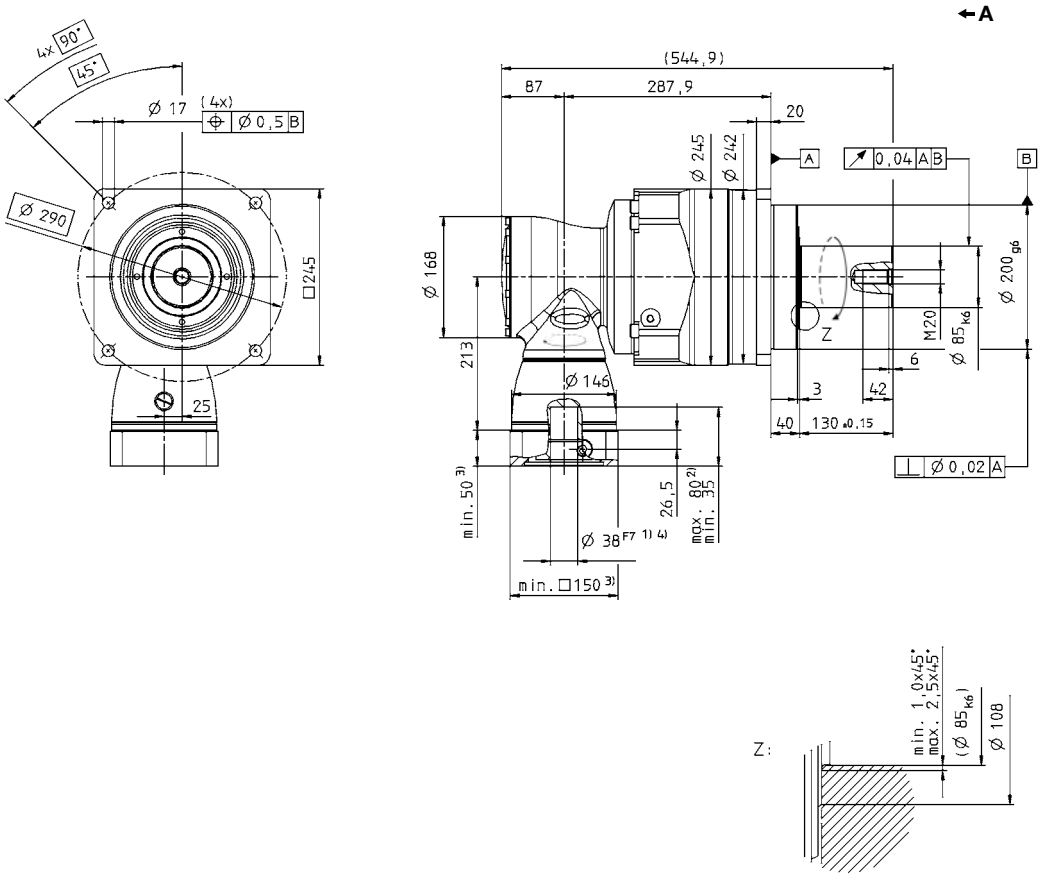
			3-stage													
Ratio [a]	*i*		**48**	**64**	**100**	**125**	**140**	**175**	**200**	**250**	**280**	**350**	**400**	**500**	**700**	**1000**
Max. acceleration torque (max. 1000 cycles per hour)	T_{2B}	Nm	4500	4500	4500	4500	4500	4500	4500	4500	4300	4500	4000	4300	4300	3400
		in.lb	39825	39825	39825	39825	39825	39825	39825	39825	38055	39825	35400	38055	38055	30090
Nominal output torque (with n_{1N})	T_{2N}	Nm	2500	2500	2500	2500	2500	2500	2500	2500	2300	2500	2500	2500	2300	1700
		in.lb	22125	22125	22125	22125	22125	22125	22125	22125	20355	22125	22125	22125	20355	15045
Emergency stop torque (permitted 1000 times during the service life of the gearhead)	T_{2Not}	Nm	6400	8000	8500	8500	8500	8500	8500	8500	8500	8500	8500	8500	8500	6800
		in.lb	56640	70800	75225	75225	75225	75225	75225	75225	75225	75225	75225	75225	75225	60180
Nominal input speed (with T_{2N} and 20°C ambient temperature) [b), c)]	n_{1N}	rpm	1800	1900	1900	2100	1900	2100	2100	2100	2100	2100	2100	2100	2100	2100
Max. continuous speed (with 20 % T_{2N} and 20°C ambient temperature)	n_{1Ncym}	rpm	2000	2200	2600	2600	2300	2300	2300	2300	2300	2300	2300	2300	2300	2300
Max. input speed	n_{1Max}	rpm	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500
Mean no load running torque (with n_1 = 3000 rpm and 20°C gearhead temperature) [d)]	T_{012}	Nm	11.0	8.0	7.0	7.0	8.0	8.0	7.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
		in.lb	94.3	70.8	62.0	62.0	70.8	70.8	62.0	53.1	53.1	53.1	53.1	53.1	53.1	53.1
Max. torsional backlash	j_t	arcmin	Standard ≤ 5,5 / Reduced ≤ 3,5													
Torsional rigidity	C_{t21}	Nm/ arcmin	510	510	510	510	510	510	510	510	510	510	510	510	510	510
		in.lb/ arcmin	4.514	4.514	4.514	4.514	4.514	4.514	4.514	4.514	4.514	4.514	4.514	4.514	4.514	4.514
Max. axial force [e)]	F_{2AMax}	N	33000													
		lb_f	7425													
Max. radial force [e)]	F_{2RMax}	N	30000													
		lb_f	6750													
Max. tilting moment	M_{2KMax}	Nm	5000													
		in.lb	44250													
Efficiency at full load	η	%	92													
Service life (For calculation, see the Chapter "Information")	L_h	h	> 20000													
Weight incl. standard adapter plate	*m*	kg	93													
		lb_m	206													
Operating noise (with n_1 = 3000 rpm no load)	L_{PA}	dB(A)	≤ 71													
Max. permitted housing temperature		°C	+90													
		F	194													
Ambient temperature		°C	0 to +40													
		F	32 to 104													
Lubrication			Lubricated for life													
Paint			Blue RAL 5002													
Direction of rotation			Motor and gearhead opposite directions													
Protection class			IP 65													
Moment of inertia (relates to the drive) Clamping hub diameter [mm] K 38	J_1	kgcm²	26.5	20.00	17.00	17.00	15.00	15.00	13.00	13.00	13.00	13.00	13.00	13.00	13.00	13.00
		10^{-3} in.lb.s²	23.40	17.70	15.05	15.05	13.28	13.28	11.51	11.51	11.51	11.51	11.51	11.51	11.51	11.51

[a)] Other ratios available on request
[b)] Higher speeds are possible if the nominal torque is reduced
[c)] For higher ambient temperatures, please reduce input speed
[d)] Idling torques decrease during operation
[e)] Refers to center of the output shaft or flange

All technical data for front output side applies.
Technical data for rearward output versions, see page 386.

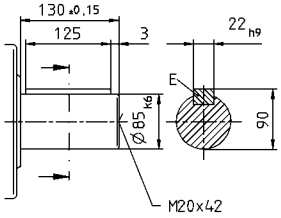
Please contact us for information on the best configuration for S1 conditions of use (continuous operation).

3-stage:

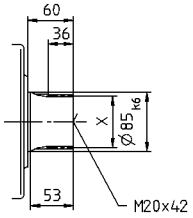


Alternatives: Output shaft variants

Keywayed output shaft in mm
E = key as per DIN 6885, sheet 1, form A



Involute gearing DIN 5480 in mm
X = W 80 x 2 x 30 x 38 x 6m, DIN 5480



See technical data sheet for available clamping hub diameters (mass moment of inertia). Dimensions available on request.

Non-tolerated dimensions ±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 with a minimum thickness of 1 mm.

CAD data is available under www.wittenstein-alpha.com

Motor mounting according to operating manual

SPK+ 240 MF 4-stage i=144-1000

				4-stage												
Ratio [a]			*i*	**144**	**192**	**256**	**300**	**375**	**420**	**500**	**560**	**600**	**700**	**800**	**875**	**1000**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B} Nm	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500
			T_{2B} in.lb	39825	39825	39825	39825	39825	39825	39825	39825	39825	39825	39825	39825	39825
Nominal output torque (with n_{1N})			T_{2N} Nm	2500	2500	2500	2500	2500	2500	2500	2500	2500	2500	2500	2500	2500
			T_{2N} in.lb	22125	22125	22125	22125	22125	22125	22125	22125	22125	22125	22125	22125	22125
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not} Nm	8000	8000	8000	8500	8500	8500	8500	8500	8500	8500	8500	8500	8500
			T_{2Not} in.lb	70800	70800	70800	75225	75225	75225	75225	75225	75225	75225	75225	75225	75225
Nominal input speed (with T_{2N} and 20°C ambient temperature) [b), c)]			n_{1N} rpm	2700	2900	2900	2900	2900	2900	2900	2900	2900	2900	2900	2900	3200
Max. continuous speed (with 20 % T_{2N} and 20°C ambient temperature)			n_{1Ncym} rpm	3800	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4200
Max. input speed			n_{1Max} rpm	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500
Mean no load running torque (with n_1 = 3000 rpm and 20°C gearhead temperature) [d)]			T_{012} Nm	3.2	2.3	1.6	1.3	0.7	0.9	0.9	0.8	0.7	0.7	0.6	0.6	0.5
			T_{012} in.lb	28.3	20.4	14.2	11.5	6.2	8.0	8.0	7.1	6.2	6.2	5.3	5.3	4.4
Max. torsional backlash			j_t arcmin	Standard ≤ 5,5 / Reduced ≤ 3,5												
Torsional rigidity			C_{t21} Nm/ arcmin	510	510	510	510	510	510	510	510	510	510	510	510	510
			C_{t21} in.lb/ arcmin	4.514	4.514	4.514	4.514	4.514	4.514	4.514	4.514	4.514	4.514	4.514	4.514	4.514
Max. axial force [e)]			F_{2AMax} N	33000												
			F_{2AMax} lb_f	7425												
Max. radial force [e)]			F_{2RMax} N	30000												
			F_{2RMax} lb_f	6750												
Max. tilting moment			M_{2KMax} Nm	5000												
			M_{2KMax} in.lb	44250												
Efficiency at full load			η %	90												
Service life (For calculation, see the Chapter "Information")			L_h h	> 20000												
Weight incl. standard adapter plate			*m* kg	96												
			m lb_m	212												
Operating noise (with n_1 = 3000 rpm no load)			L_{PA} dB(A)	≤ 71												
Max. permitted housing temperature			°C	+90												
			F	194												
Ambient temperature			°C	0 to +40												
			F	32 to 104												
Lubrication				Lubricated for life												
Paint				Blue RAL 5002												
Direction of rotation				Motor and gearhead opposite directions												
Protection class				IP 65												
Moment of inertia (relates to the drive) Clamping hub diameter [mm]	G	24	J_1 kgcm²	5.96	4.30	3.90	3.32	3.31	2.80	3.18	2.80	2.49	2.73	2.49	2.73	2.46
			J_1 10^{-3} in.lb.s²	5.28	3.81	3.45	2.94	2.93	2.48	2.82	2.47	2.21	2.42	2.20	2.42	2.18
	K	38	J_1 kgcm²	12.87	11.19	10.81	10.23	10.22	9.72	10.09	9.71	9.40	9.65	9.40	9.65	9.37
			J_1 10^{-3} in.lb.s²	11.39	9.91	9.57	9.05	9.05	8.60	8.93	8.59	8.32	8.54	8.32	8.54	8.29

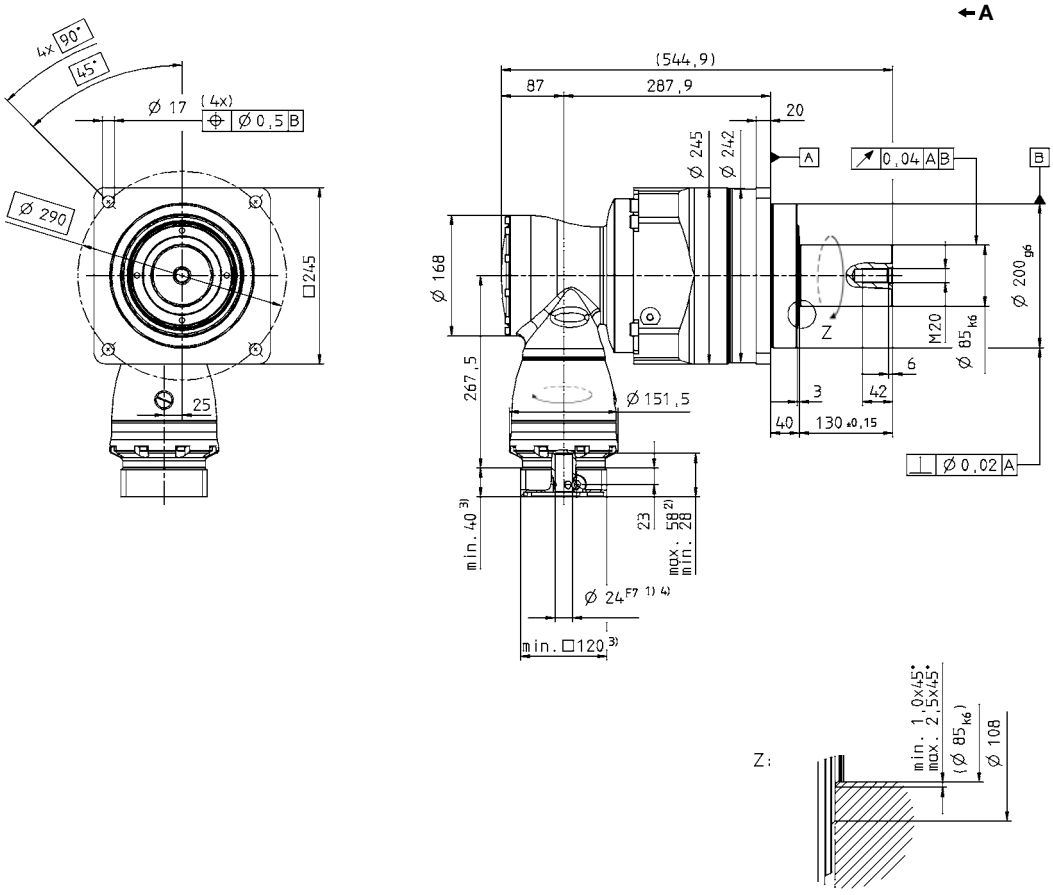
[a)] Other ratios available on request
[b)] Higher speeds are possible if the nominal torque is reduced
[c)] For higher ambient temperatures, please reduce input speed
[d)] Idling torques decrease during operation
[e)] Refers to center of the output shaft or flange

All technical data for front output side applies.
Technical data for rearward output versions, see page 386.

Please contact us for information on the best configuration for S1 conditions of use (continuous operation).

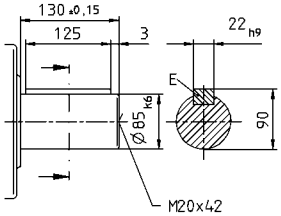
View A

4-stage:

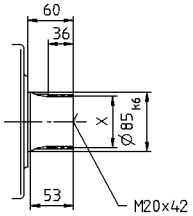


Alternatives: Output shaft variants

Keywayed output shaft in mm
E = key as per DIN 6885, sheet 1, form A



Involute gearing DIN 5480 in mm
X = W 80 x 2 x 30 x 38 x 6m, DIN 5480



See technical data sheet for available clamping hub diameters (mass moment of inertia). Dimensions available on request.

Non-tolerated dimensions ±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 with a minimum thickness of 1 mm.

CAD data is available under www.wittenstein-alpha.com

Motor mounting according to operating manual

SPK+ 240 MF 4-stage i=1225-10000

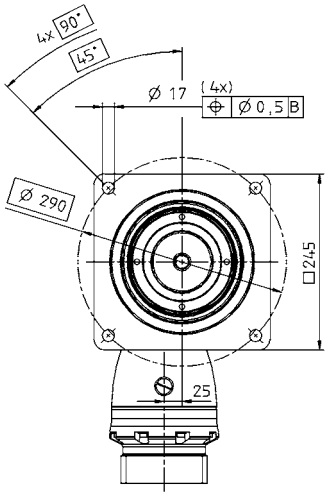
				4-stage								
Ratio [a]			***i***	**1225**	**1400**	**1750**	**2000**	**2800**	**3500**	**5000**	**7000**	**10000**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B} Nm	4500	4500	4500	4200	4300	4500	4300	4300	3400
			T_{2B} in.lb	39825	39825	39825	37170	38055	39825	38055	38055	30090
Nominal output torque (with n_{1N})			T_{2N} Nm	2500	2500	2500	2500	2300	2500	2500	2300	1700
			T_{2N} in.lb	22125	22125	22125	22125	20355	22125	22125	20355	15045
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not} Nm	8500	8500	8500	8000	8500	8500	8500	8500	6800
			T_{2Not} in.lb	75225	75225	75225	70800	75225	75225	75225	75225	60180
Nominal input speed (with T_{2N} and 20°C ambient temperature) [b), c)]			n_{1N} rpm	2900	2900	3200	3900	3900	3900	3900	3900	3900
Max. continuous speed (with 20 % T_{2N} and 20°C ambient temperature)			n_{1Ncym} rpm	4000	4000	4200	4200	4200	4200	4200	4200	4200
Max. input speed			n_{1Max} rpm	4500	4500	4500	4500	4500	4500	4500	4500	4500
Mean no load running torque (with n_1 = 3000 rpm and 20°C gearhead temperature) [d)]			T_{012} Nm	0.6	0.6	0.4	0.4	0.4	0.4	0.4	0.3	0.3
			T_{012} in.lb	5.3	5.3	3.5	3.5	3.5	3.5	3.5	2.7	2.7
Max. torsional backlash			j_t arcmin	Standard ≤5,5 / Reduced ≤3,5								
Torsional rigidity			C_{t21} Nm/ arcmin	510	510	510	510	510	510	510	510	510
			C_{t21} in.lb/ arcmin	4.514	4.514	4.514	4.514	4.514	4.514	4.514	4.514	4.514
Max. axial force [e)]			F_{2AMax} N	33000								
			F_{2AMax} lb_f	7425								
Max. radial force [e)]			F_{2RMax} N	30000								
			F_{2RMax} lb_f	6750								
Max. tilting moment			M_{2KMax} Nm	5000								
			M_{2KMax} in.lb	44250								
Efficiency at full load			η %	90								
Service life (For calculation, see the Chapter "Information")			L_h h	> 20000								
Weight incl. standard adapter plate			m kg	96								
			m lb_m	212								
Operating noise (with n_1 = 3000 rpm no load)			L_{PA} dB(A)	≤ 71								
Max. permitted housing temperature			°C	+90								
			F	194								
Ambient temperature			°C	0 to +40								
			F	32 to 104								
Lubrication				Lubricated for life								
Paint				Blue RAL 5002								
Direction of rotation				Motor and gearhead opposite directions								
Protection class				IP 65								
Moment of inertia (relates to the drive) Clamping hub diameter [mm]	G	24	J_1 kgcm²	2.73	2.49	2.46	2.42	2.42	2.42	2.42	2.42	2.42
			J_1 10^{-3} in.lb.s²	2.42	2.20	2.17	2.14	2.14	2.14	2.14	2.14	2.14
	K	38	J_1 kgcm²	9.64	9.40	9.37	9.33	9.33	9.33	9.33	9.33	9.33
			J_1 10^{-3} in.lb.s²	8.53	8.32	8.29	8.26	8.26	8.26	8.26	8.26	8.26

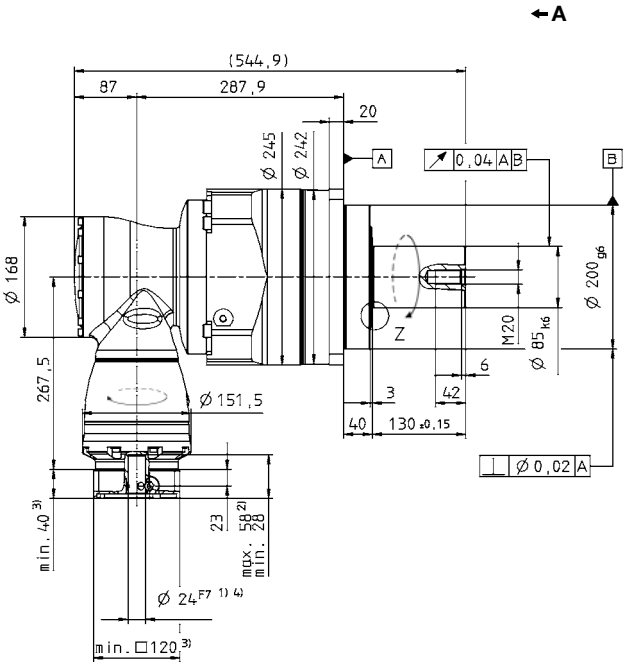
[a)] Other ratios available on request
[b)] Higher speeds are possible if the nominal torque is reduced
[c)] For higher ambient temperatures, please reduce input speed
[d)] Idling torques decrease during operation
[e)] Refers to center of the output shaft or flange

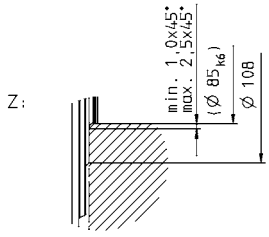
All technical data for front output side applies.
Technical data for rearward output versions, see page 386.

Please contact us for information on the best configuration for S1 conditions of use (continuous operation).

4-stage:

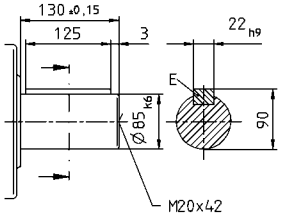




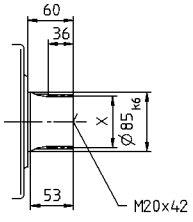


Alternatives: Output shaft variants

Keywayed output shaft in mm
E = key as per DIN 6885, sheet 1, form A



Involute gearing DIN 5480 in mm
X = W 80 x 2 x 30 x 38 x 6m, DIN 5480



See technical data sheet for available clamping hub diameters (mass moment of inertia). Dimensions available on request.

Non-tolerated dimensions ±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 with a minimum thickness of 1 mm.

CAD data is available under www.wittenstein-alpha.com

Motor mounting according to operating manual

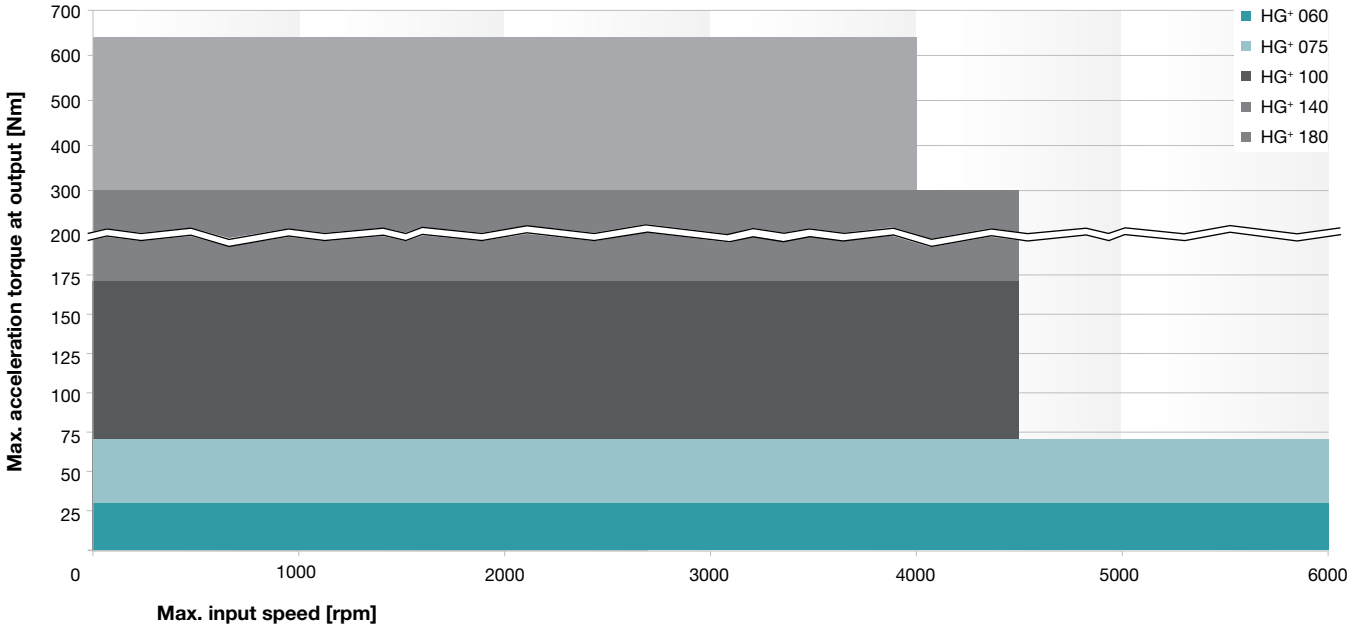
HG+ – New hollow shaft precision

The successor to our versatile hypoid gearhead with hollow shaft on one/both sides.

With the HG+, low torsional backlash and high torsional rigidity assure maximum positioning accuracy of your drives and precision of your machines – even during highly dynamic operation.

Quick size selection

HG+ (example for i = 5)
For applications in cyclic operation (ED ≤ 60%)



Versions and their uses

HG+

- Cyclic applications
- Reverse operation
- Highly dynamic applications
- High positioning accuracy
- Hollow shaft version

Comparison

Features		**HG+** Catalog page 238
Ratios [c]		3 – 100
Torsional backlash [arcmin] [c]	Standard	≤ 4
	Reduced	–
Output type		
Smooth output shaft, rear side		•
Keywayed output shaft, rear side		•
Hollow shaft interface Connected via shrink disc		•
Hollow shaft interface, rear side Connected via shrink disc		•
Closed cover, rear side		•
Input type		
Motor mounted version		•
Type		
ATEX [a]		•
Food-grade lubrication [a] [b]		•
Corrosion resistant [a] [b]		•
Accessories		
Coupling		•
Shrink disc		•
torqXis sensor flange		•
Intermediate plate for cooling connection		•

[a] Power reduction: technical data available upon request [b] Please contact WITTENSTEIN alpha [c] In relation to reference sizes

HG+ 060 MF 1/2-stage

				1-stage					2-stage									
Ratio [a]			***i***	**3**	**4**	**5**	**7**	**10**	**12**	**16**	**20**	**25**	**28**	**35**	**40**	**50**	**70**	**100**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B} Nm	30	30	30	25	20	30	30	30	30	30	30	30	30	25	20
			T_{2B} in.lb	266	266	266	221	177	266	266	266	266	266	266	266	266	221	177
Nominal output torque (with n_{1N})			T_{2N} Nm	22	22	22	20	15	22	22	22	22	22	22	22	22	20	15
			T_{2N} in.lb	195	195	195	177	133	195	195	195	195	195	195	195	195	177	133
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not} Nm	40	50	50	45	40	50	50	50	50	50	50	50	50	45	40
			T_{2Not} in.lb	354	443	443	398	354	443	443	443	443	443	443	443	443	398	354
Nominal input speed (with T_{2N} and 20°C ambient temperature) [b), c)]			n_{1N} rpm	2500	2700	3000	3000	3000	4400	4400	4400	4400	4400	4400	4400	4800	5500	5500
Max. continuous speed (with 20% T_{2N} and 20°C ambient temperature)			n_{1Ncym} rpm	3000	3500	4000	3500	3500	5000	5000	5000	5000	5000	5000	5000	5000	5500	5500
Max. input speed			n_{1Max} rpm	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000
Mean no load running torque (with n_1 = 3000 rpm and 20°C gearhead temperature) [d)]			T_{012} Nm	1.3	1.2	1.1	1.3	1.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1
			T_{012} in.lb	11.5	10.6	9.7	11.5	10.6	1.8	1.8	1.8	1.8	1.8	1.8	0.9	0.9	0.9	0.9
Max. torsional backlash			j_t arcmin	≤ 5														
Torsional rigidity			C_{t21} Nm/ arcmin	2.2	2.3	2.4	2.2	1.9	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.2	1.9
			C_{t21} in.lb/ arcmin	19	20	21	19	17	20	20	20	20	20	20	20	21	19	17
Max. axial force [e)]			F_{2AMax} N	2400														
			F_{2AMax} lb_f	540														
Max. radial force [e)]			F_{2RMax} N	2700														
			F_{2RMax} lb_f	608														
Max. tilting moment			M_{2KMax} Nm	251														
			M_{2KMax} in.lb	2220														
Efficiency at full load			η %	96					94									
Service life (For calculation, see the Chapter "Information")			L_h h	> 20000														
Weight incl. standard adapter plate			m kg	2.9					3.2									
			m lb_m	6.4					7.1									
Operating noise (with n_1 = 3000 rpm no load)			L_{PA} dB(A)	≤ 64														
Max. permitted housing temperature			°C	+90														
			F	194														
Ambient temperature			°C	0 to +40														
			F	32 to 104														
Lubrication				Lubricated for life														
Paint				Blue RAL 5002														
Direction of rotation				Motor and gearhead opposite directions														
Protection class				IP 65														
Moment of inertia (relates to the drive) Clamping hub diameter [mm]	B	11	J_1 kgcm²	–	–	–	–	–	0.09	0.09	0.07	0.07	0.06	0.06	0.06	0.06	0.06	0.06
			J_1 10^{-3} in.lb.s²						0.08	0.08	0.07	0.06	0.06	0.06	0.05	0.05	0.05	0.05
	C	14	J_1 kgcm²	0.52	0.44	0.40	0.36	0.34	0.20	0.20	0.19	0.19	0.18	0.18	0.17	0.17	0.17	0.17
			J_1 10^{-3} in.lb.s²	0.46	0.39	0.35	0.32	0.30	0.18	0.18	0.17	0.16	0.16	0.16	0.15	0.15	0.15	0.15
	E	19	J_1 kgcm²	0.87	0.79	0.75	0.71	0.70	–	–	–	–	–	–	–	–	–	–
			J_1 10^{-3} in.lb.s²	0.77	0.70	0.66	0.63	0.62										

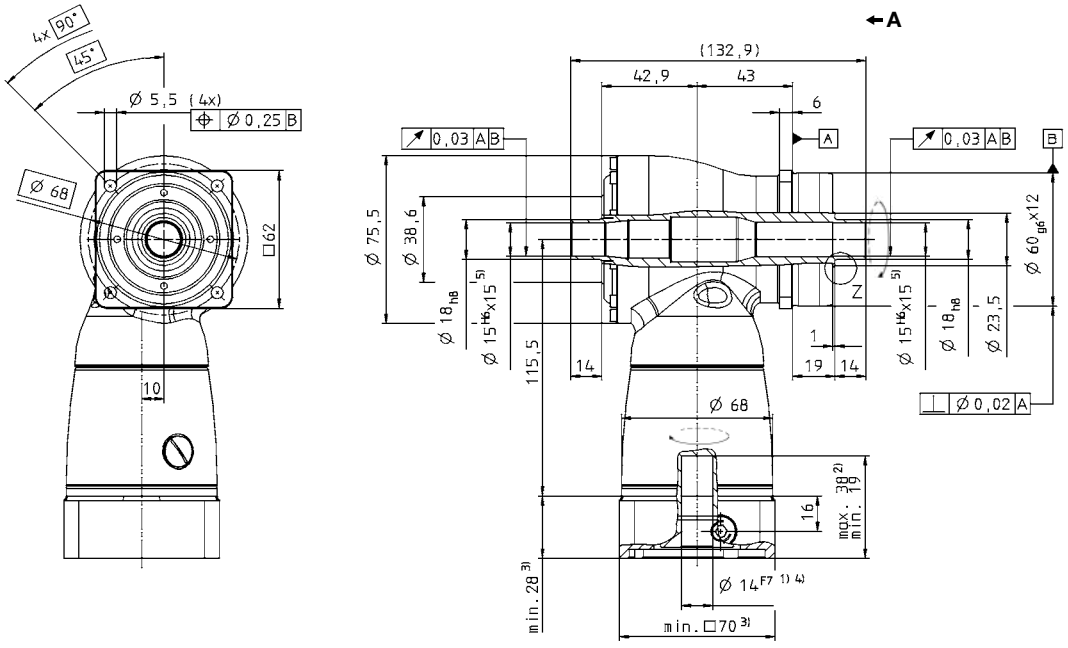
Please contact us for information on the best configuration for S1 conditions of use (continuous operation).

[a)] Other ratios available on request
[b)] Higher speeds are possible if the nominal torque is reduced
[c)] For higher ambient temperatures, please reduce input speed
[d)] Idling torques decrease during operation
[e)] Refers to center of the output shaft or flange

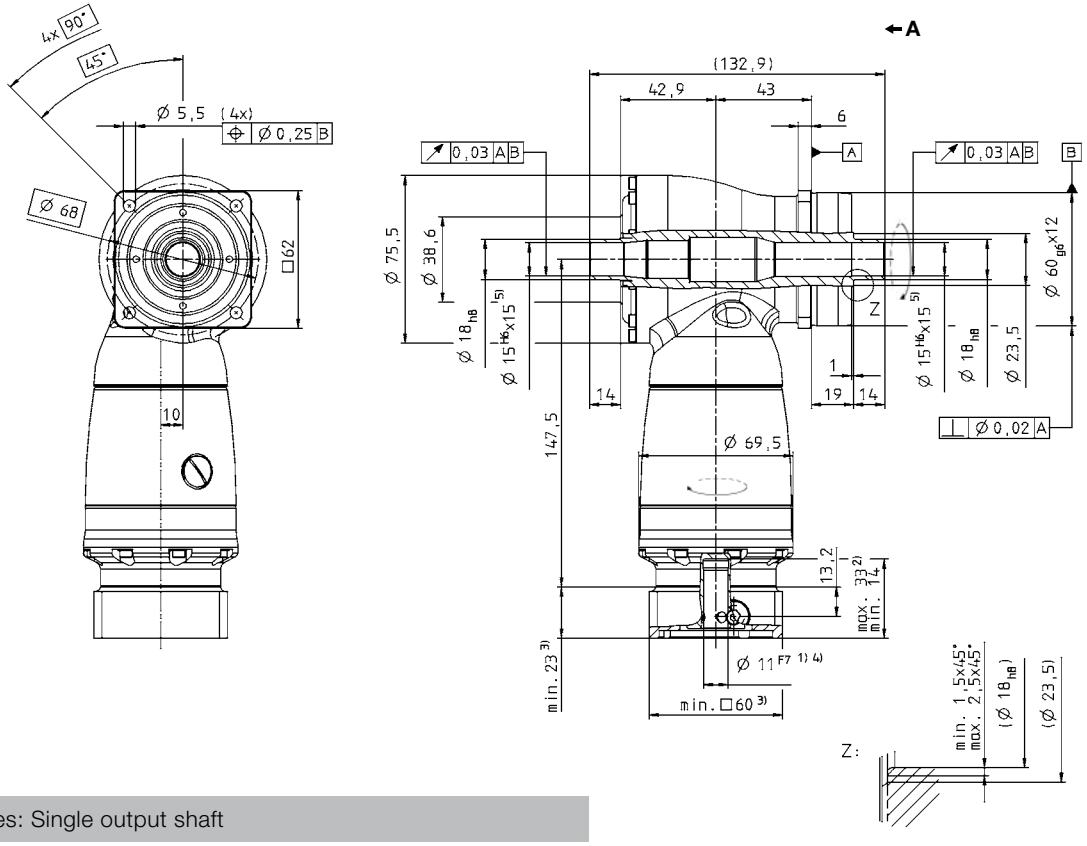
All technical data for front output side applies.
Technical data for rearward output versions, see page 386.

View A

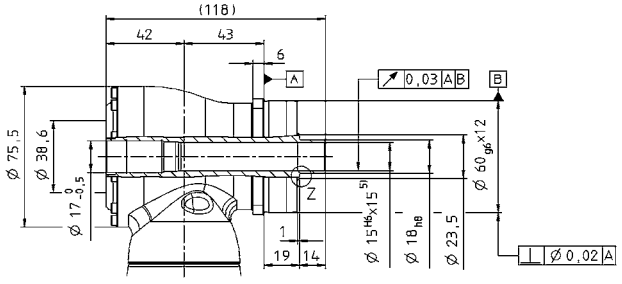
1-stage:



2-stage:



Alternatives: Single output shaft



See technical data sheet for available clamping hub diameters (mass moment of inertia). Dimensions available on request.

Non-tolerated dimensions ±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 with a minimum thickness of 1 mm.
5) Tolerance h6 for mounted shaft.

CAD data is available under www.wittenstein-alpha.com

Motor mounting according to operating manual

HG+ 075 MF 1/2-stage

					1-stage					2-stage									
Ratio [a]			*i*		**3**	**4**	**5**	**7**	**10**	**12**	**16**	**20**	**25**	**28**	**35**	**40**	**50**	**70**	**100**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B}	Nm	70	70	70	60	50	70	70	70	70	70	70	70	70	60	50
				in.lb	620	620	620	531	443	620	620	620	620	620	620	620	620	531	443
Nominal output torque (with n_{1N})			T_{2N}	Nm	50	50	50	45	40	50	50	50	50	50	50	50	50	45	40
				in.lb	443	443	443	398	354	443	443	443	443	443	443	443	443	398	354
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not}	Nm	95	115	115	110	100	115	115	115	115	115	115	115	115	110	100
				in.lb	841	1018	1018	974	885	1018	1018	1018	1018	1018	1018	1018	1018	974	885
Nominal input speed (with T_{2N} and 20°C ambient temperature) [b), c)]			n_{1N}	rpm	2300	2500	2800	2800	2800	3500	3500	3500	3500	3500	3500	3500	3800	4500	4500
Max. continuous speed (with 20?% T_{2N} and 20°C ambient temperature)			n_{1Ncym}	rpm	3000	3500	4000	3500	3500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500
Max. input speed			n_{1Max}	rpm	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000
Mean no load running torque (with n_1 = 3000 rpm and 20°C gearhead temperature) [d)]			T_{012}	Nm	2.2	1.9	1.7	2.2	2.0	0.3	0.3	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1
				in.lb	19	17	15	19	18	2.7	2.7	1.8	1.8	1.8	1.8	0.9	0.9	0.9	0.9
Max. torsional backlash			j_t	arcmin	≤ 4														
Torsional rigidity			C_{t21}	Nm/ arcmin	5.3	5.9	6.7	6.6	6.5	5.9	5.9	5.9	5.9	5.9	5.9	5.9	6.7	6.6	6.5
				in.lb/ arcmin	47	52	60	58	57	52	52	52	52	52	52	52	59	58	58
Max. axial force [e)]			F_{2AMax}	N	3400														
				lb_f	765														
Max. radial force [e)]			F_{2RMax}	N	4000														
				lb_f	900														
Max. tilting moment			M_{2KMax}	Nm	437														
				in.lb	3867														
Efficiency at full load			η	%	96					94									
Service life (For calculation, see the Chapter "Information")			L_h	h	> 20000														
Weight incl. standard adapter plate			*m*	kg	4.8					5.1									
				lb_m	10.6					11.3									
Operating noise (with n_1 = 3000 rpm no load)			L_{PA}	dB(A)	≤ 66														
Max. permitted housing temperature				°C	+90														
				F	194														
Ambient temperature				°C	0 to +40														
				F	32 to 104														
Lubrication					Lubricated for life														
Paint					Blue RAL 5002														
Direction of rotation					Motor and gearhead opposite directions														
Protection class					IP 65														
Moment of inertia (relates to the drive) Clamping hub diameter [mm]	C	14	J_1	kgcm²	–	–	–	–	–	0.28	0.27	0.23	0.23	0.20	0.20	0.18	0.18	0.18	0.18
				10^{-3} in.lb.s²						0.25	0.24	0.21	0.20	0.18	0.18	0.16	0.16	0.16	0.16
	E	19	J_1	kgcm²	1.46	1.19	1.06	0.95	0.90	0.73	0.71	0.68	0.67	0.63	0.62	0.63	0.63	0.63	0.63
				10^{-3} in.lb.s²	1.29	1.05	0.94	0.84	0.79	0.64	0.63	0.60	0.59	0.55	0.55	0.56	0.55	0.55	0.55
	H	28	J_1	kgcm²	2.86	2.60	2.47	2.36	2.31	–	–	–	–	–	–	–	–	–	–
				10^{-3} in.lb.s²	2.53	2.30	2.19	2.09	2.04										

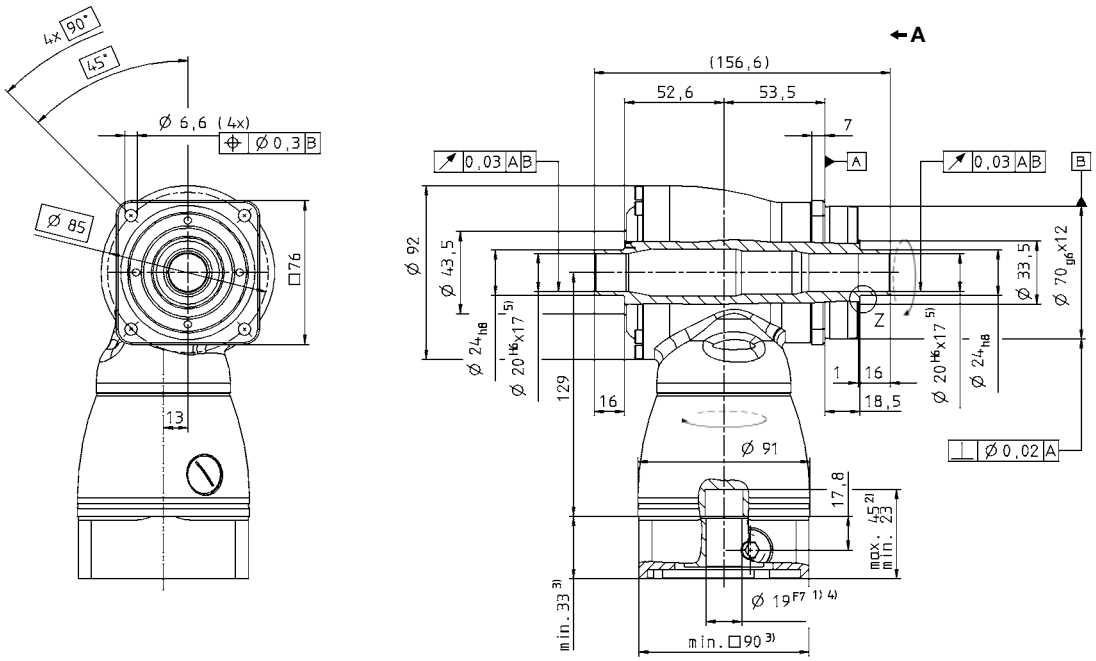
Please contact us for information on the best configuration for S1 conditions of use (continuous operation).

[a)] Other ratios available on request
[b)] Higher speeds are possible if the nominal torque is reduced
[c)] For higher ambient temperatures, please reduce input speed
[d)] Idling torques decrease during operation
[e)] Refers to center of the output shaft or flange

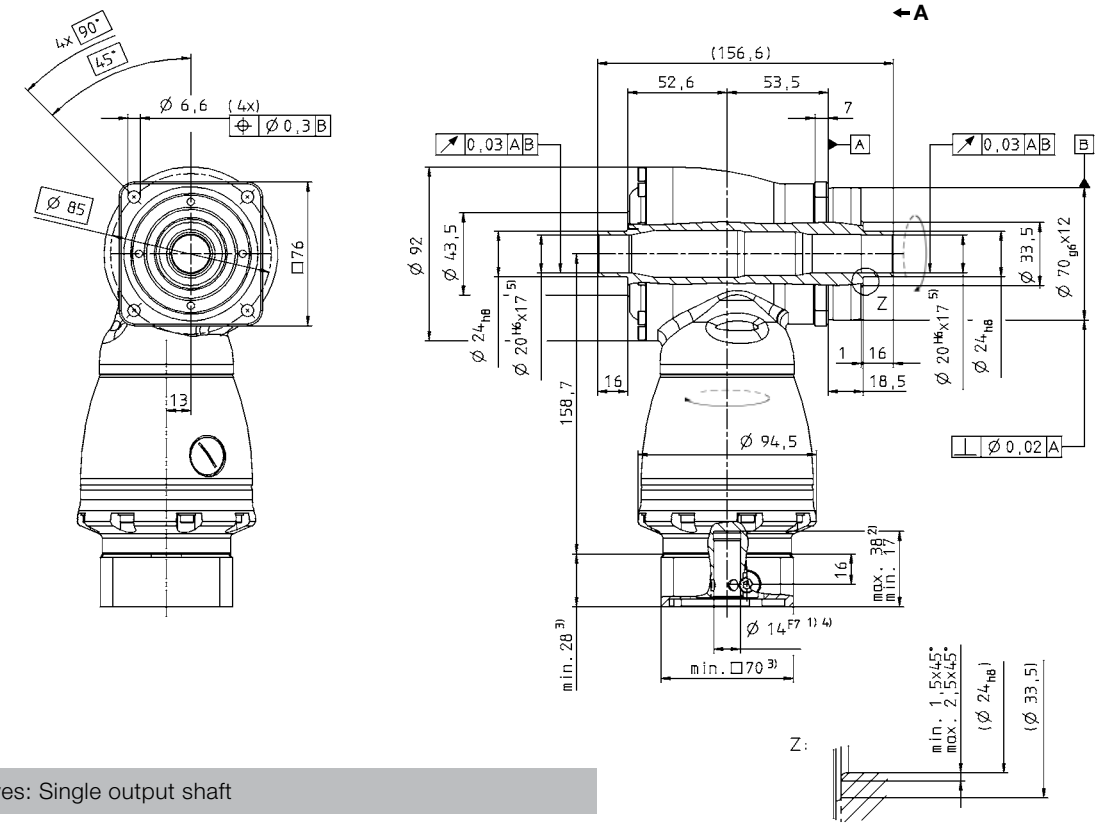
All technical data for front output side applies.
Technical data for rearward output versions, see page 386.

View A

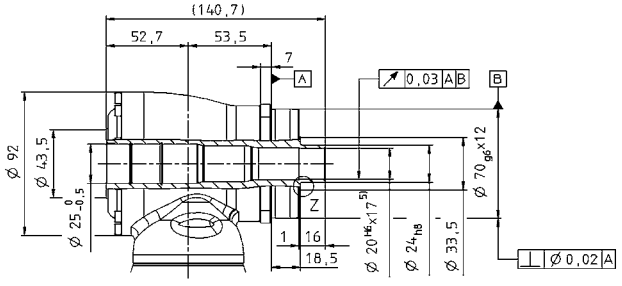
1-stage:



2-stage:



Alternatives: Single output shaft



See technical data sheet for available clamping hub diameters (mass moment of inertia). Dimensions available on request.

Non-tolerated dimensions ±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 with a minimum thickness of 1 mm.
5) Tolerance h6 for mounted shaft.

CAD data is available under www.wittenstein-alpha.com

Motor mounting according to operating manual

HG+ 100 MF 1/2-stage

					1-stage					2-stage									
Ratio [a]			*i*		**3**	**4**	**5**	**7**	**10**	**12**	**16**	**20**	**25**	**28**	**35**	**40**	**50**	**70**	**100**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B}	Nm	170	170	170	145	125	170	170	170	170	170	170	170	170	145	125
				in.lb	1505	1505	1505	1283	1106	1505	1505	1505	1505	1505	1505	1505	1505	1283	1106
Nominal output torque (with n_{1N})			T_{2N}	Nm	100	100	100	90	80	100	100	100	100	100	100	100	100	90	80
				in.lb	885	885	885	797	708	885	885	885	885	885	885	885	885	797	708
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not}	Nm	220	260	260	255	250	260	260	260	260	260	260	260	260	255	250
				in.lb	1947	2301	2301	2257	2213	2301	2301	2301	2301	2301	2301	2301	2301	2257	2213
Nominal input speed (with T_{2N} and 20°C ambient temperature) [b), c)]			n_{1N}	rpm	2200	2400	2700	2500	2500	3100	3100	3100	3100	3100	3100	3100	3500	4200	4200
Max. continuous speed (with 20% T_{2N} and 20°C ambient temperature)			n_{1Ncym}	rpm	3000	3400	3800	3400	3400	4000	4000	4000	4000	4000	4000	4000	4000	4200	4200
Max. input speed			n_{1Max}	rpm	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500
Mean no load running torque (with n_1 = 3000 rpm and 20°C gearhead temperature) [d)]			T_{012}	Nm	4.2	3.3	2.5	3.9	3.1	0.7	0.7	0.6	0.4	0.4	0.3	0.2	0.2	0.2	0.2
				in.lb	37	29	22	35	27	6.2	6.2	5.3	3.5	3.5	2.7	1.8	1.8	1.8	1.8
Max. torsional backlash			j_t	arcmin	≤ 4														
Torsional rigidity			C_{t21}	Nm/ arcmin	10.7	12.1	14.0	14.2	14.4	12.1	12.1	12.1	12.1	12.1	12.1	12.1	14.0	14.2	14.4
				in.lb/ arcmin	95	107	124	126	127	107	107	107	107	107	107	107	124	126	127
Max. axial force [e)]			F_{2AMax}	N	5700														
				lb_f	1283														
Max. radial force [e)]			F_{2RMax}	N	6300														
				lb_f	1418														
Max. tilting moment			M_{2KMax}	Nm	833														
				in.lb	7370														
Efficiency at full load			η	%	96					94									
Service life (For calculation, see the Chapter "Information")			L_h	h	> 20000														
Weight incl. standard adapter plate			*m*	kg	9.3					9.5									
				lb_m	21					21									
Operating noise (with n_1 = 3000 rpm no load)			L_{PA}	dB(A)	≤ 66														
Max. permitted housing temperature				°C	+90														
				F	194														
Ambient temperature				°C	0 to +40														
				F	32 to 104														
Lubrication					Lubricated for life														
Paint					Blue RAL 5002														
Direction of rotation					Motor and gearhead opposite directions														
Protection class					IP 65														
Moment of inertia (relates to the drive) Clamping hub diameter [mm]	E	19	J_1	kgcm²	–	–	–	–	–	1.02	0.97	0.86	0.84	0.75	0.74	0.69	0.69	0.68	0.68
				10^{-3} in.lb.s²						0.91	0.86	0.76	0.74	0.66	0.66	0.61	0.61	0.60	0.60
	G	24	J_1	kgcm²	–	–	–	–	–	2.59	2.54	2.42	2.40	2.31	2.30	2.26	2.25	2.25	2.25
				10^{-3} in.lb.s²						2.29	2.25	2.14	2.13	2.05	2.04	2.00	1.99	1.99	1.99
	H	28	J_1	kgcm²	4.64	3.80	3.34	2.98	2.79	–	–	–	–	–	–	–	–	–	–
				10^{-3} in.lb.s²	4.10	3.36	2.95	2.64	2.47										
	K	38	J_1	kgcm²	11.8	11.0	10.6	10.2	10.0	–	–	–	–	–	–	–	–	–	–
				10^{-3} in.lb.s²	10.4	9.73	9.34	9.04	8.88										

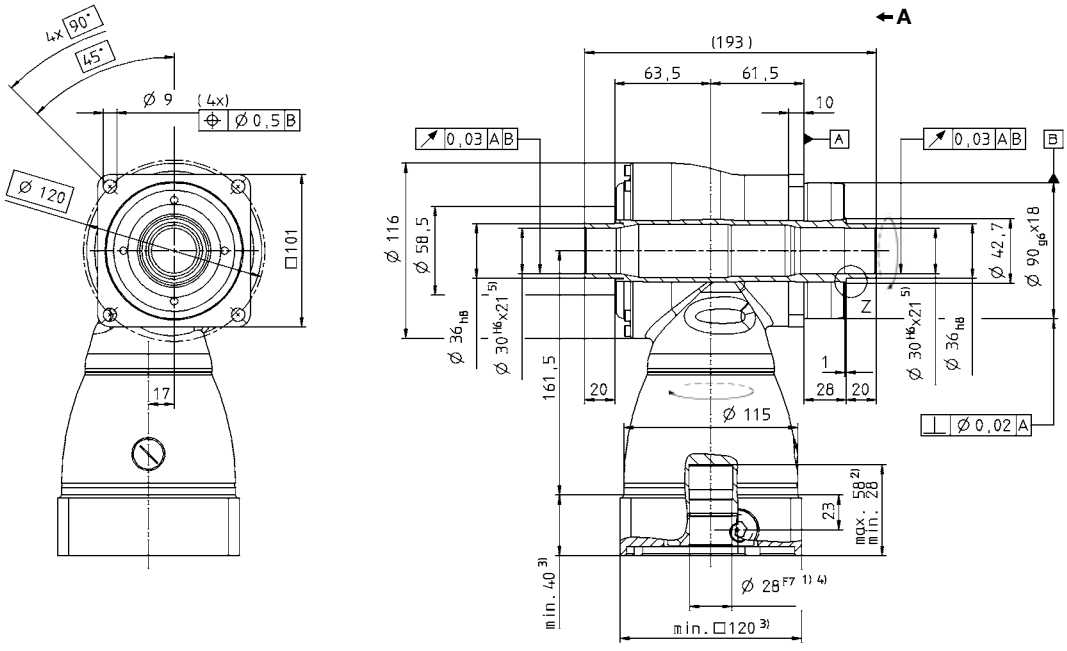
Please contact us for information on the best configuration for S1 conditions of use (continuous operation).

[a)] Other ratios available on request
[b)] Higher speeds are possible if the nominal torque is reduced
[c)] For higher ambient temperatures, please reduce input speed
[d)] Idling torques decrease during operation
[e)] Refers to center of the output shaft or flange

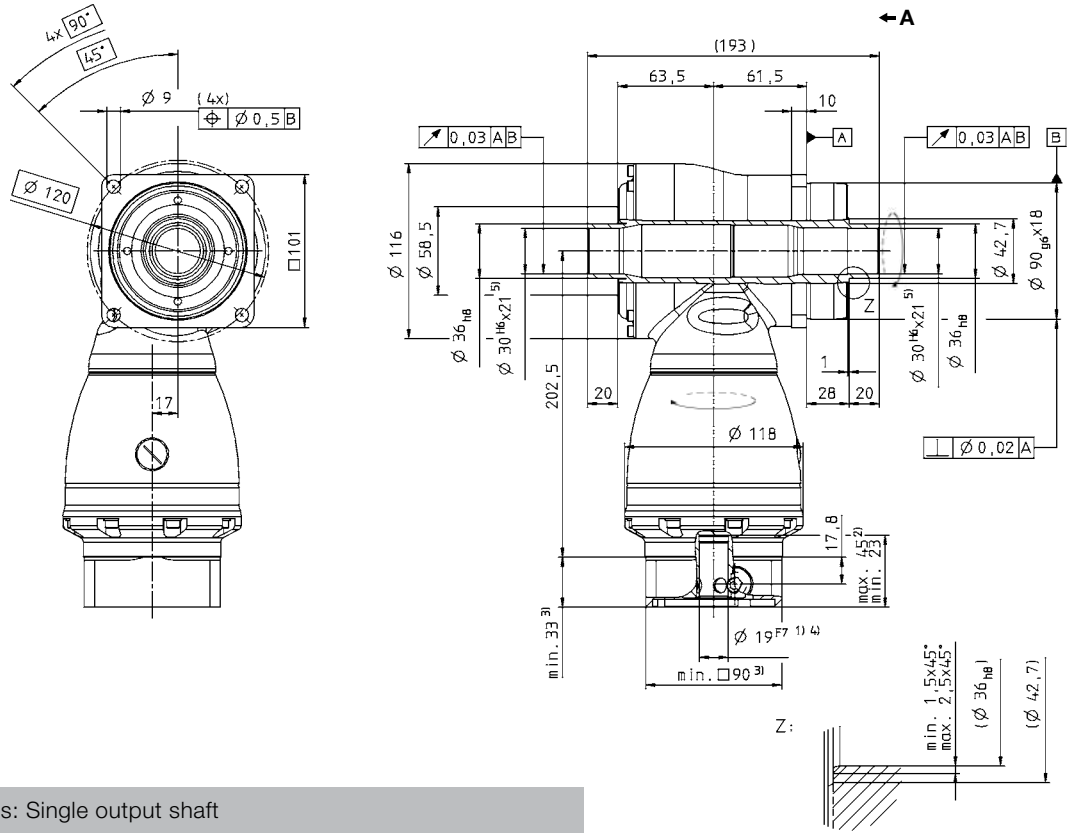
All technical data for front output side applies.
Technical data for rearward output versions, see page 386.

View A

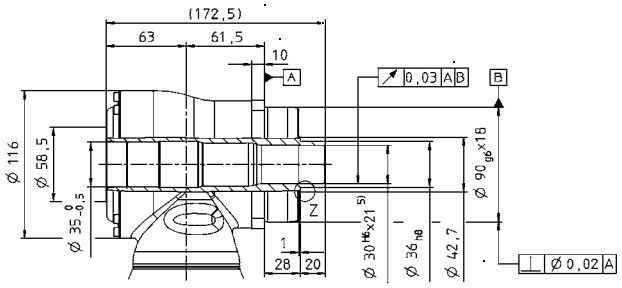
1-stage:



2-stage:



Alternatives: Single output shaft



See technical data sheet for available clamping hub diameters (mass moment of inertia). Dimensions available on request.

Non-tolerated dimensions ±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 with a minimum thickness of 1 mm.
5) Tolerance h6 for mounted shaft.

CAD data is available under www.wittenstein-alpha.com

Motor mounting according to operating manual

HG+ 140 MF 1/2-stage

				1-stage					2-stage									
Ratio [a]			*i*	**3**	**4**	**5**	**7**	**10**	**12**	**16**	**20**	**25**	**28**	**35**	**40**	**50**	**70**	**100**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B} Nm	300	300	300	250	210	300	300	300	300	300	300	300	300	250	210
			in.lb	2655	2655	2655	2213	1859	2655	2655	2655	2655	2655	2655	2655	2655	2213	1859
Nominal output torque (with n_{1N})			T_{2N} Nm	190	190	190	175	160	190	190	190	190	190	190	190	190	175	160
			in.lb	1682	1682	1682	1549	1416	1682	1682	1682	1682	1682	1682	1682	1682	1549	1416
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not} Nm	400	500	500	450	400	500	500	500	500	500	500	500	500	450	400
			in.lb	3540	4425	4425	3983	3540	4425	4425	4425	4425	4425	4425	4425	4425	3983	3540
Nominal input speed (with T_{2N} and 20°C ambient temperature) [b), c)]			n_{1N} rpm	1900	2000	2200	2000	2000	2900	2900	2900	2900	2900	2900	2900	3200	3200	3900
Max. continuous speed (with 20% T_{2N} and 20°C ambient temperature)			n_{1Ncym} rpm	2500	2800	3100	2800	2800	4000	4000	4000	4000	4000	4000	4000	4200	4200	4200
Max. input speed			n_{1Max} rpm	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500
Mean no load running torque (with n_1 = 3000 rpm and 20°C gearhead temperature) [d)]			T_{012} Nm	7.7	5.7	5.0	8.3	6.1	1.5	1.0	0.8	0.6	0.6	0.4	0.4	0.3	0.3	0.3
			in.lb	68	50	44	73	54	13.3	8.9	7.1	5.3	5.3	3.5	3.5	2.7	2.7	2.7
Max. torsional backlash			j_t arcmin	≤ 4														
Torsional rigidity			C_{t21} Nm/ arcmin	32	36	41	39	38	36	36	36	36	36	36	36	41	39	38
			in.lb/ arcmin	287	321	360	346	337	319	319	319	319	319	319	319	363	345	336
Max. axial force [e)]			F_{2AMax} N	9900														
			lb_f	2228														
Max. radial force [e)]			F_{2RMax} N	9500														
			lb_f	2138														
Max. tilting moment			M_{2KMax} Nm	1692														
			in.lb	14974														
Efficiency at full load			η %	96					94									
Service life (For calculation, see the Chapter "Information")			L_h h	> 20000														
Weight incl. standardadapter plate			*m* kg	22.6					24									
			lb_m	50					53									
Operating noise (with n_1 = 3000 rpm no load)			L_{PA} dB(A)	≤ 68														
Max. permitted housing temperature			°C	+90														
			F	194														
Ambient temperature			°C	0 to +40														
			F	32 to 104														
Lubrication				Lubricated for life														
Paint				Blue RAL 5002														
Direction of rotation				Motor and gearhead opposite directions														
Protection class				IP 65														
Moment of inertia (relates to the drive)	G	24	J_1 kgcm²	–	–	–	–	–	4.20	3.84	3.27	3.16	2.78	2.73	2.48	2.45	2.43	2.42
			10^{-3} in.lb.s²						3.71	3.40	2.90	2.80	2.46	2.41	2.20	2.17	2.15	2.14
Clamping hub diameter [mm]	K	38	J_1 kgcm²	25.0	19.1	16.3	14.1	12.8	11.1	10.7	10.2	10.1	9.69	9.64	9.39	9.37	9.34	9.33
			10^{-3} in.lb.s²	22.1	16.9	14.4	12.4	11.3	9.83	9.51	9.01	8.92	8.58	8.53	8.31	8.29	8.27	8.26

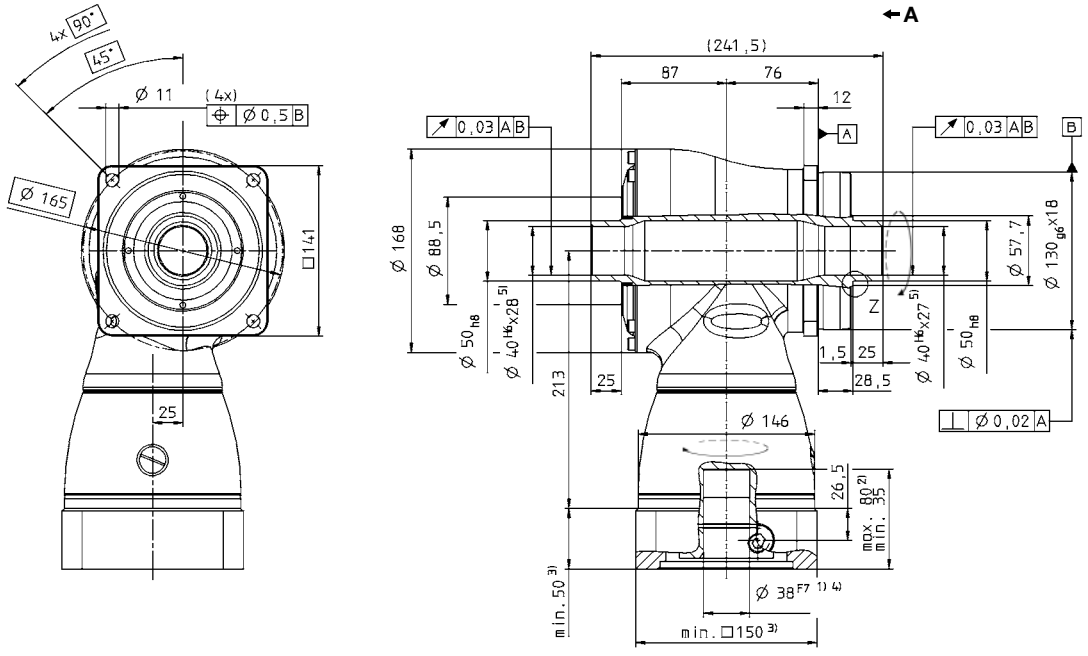
Please contact us for information on the best configuration for S1 conditions of use (continuous operation).

[a)] Other ratios available on request
[b)] Higher speeds are possible if the nominal torque is reduced
[c)] For higher ambient temperatures, please reduce input speed
[d)] Idling torques decrease during operation
[e)] Refers to center of the output shaft or flange

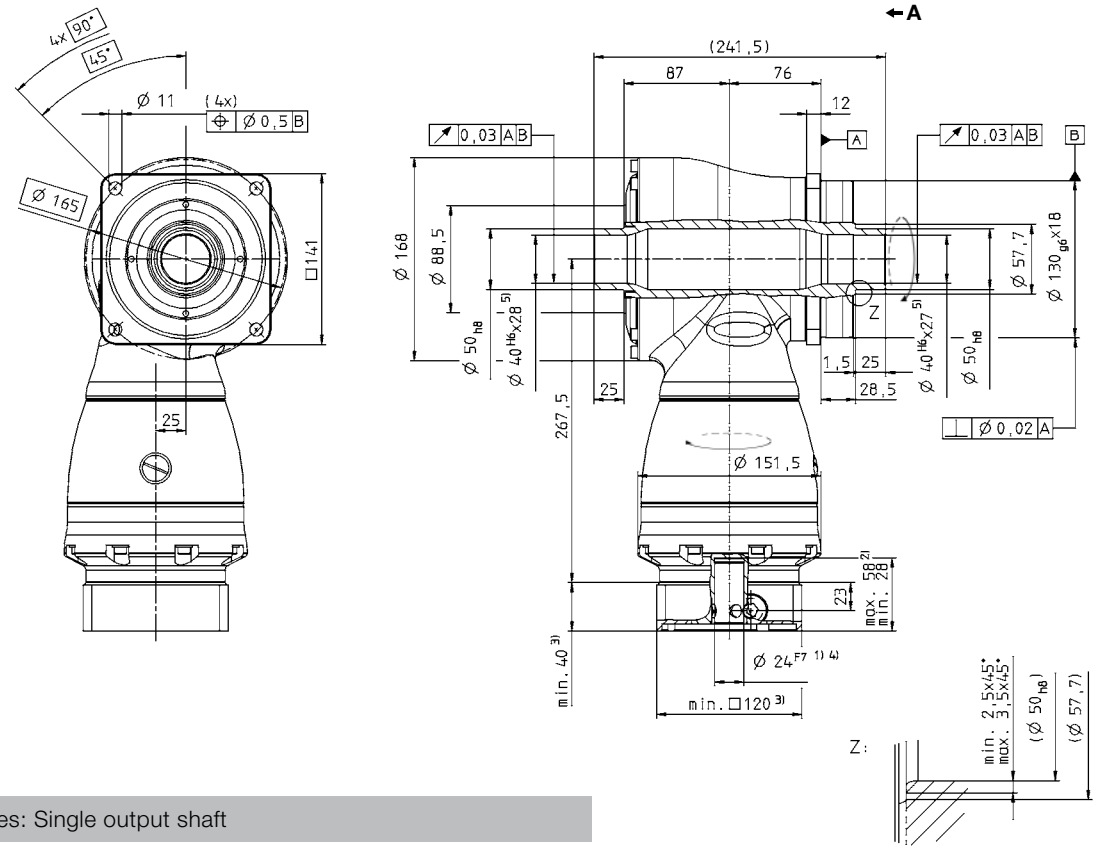
All technical data for front output side applies.
Technical data for rearward output versions, see page 386.

View A

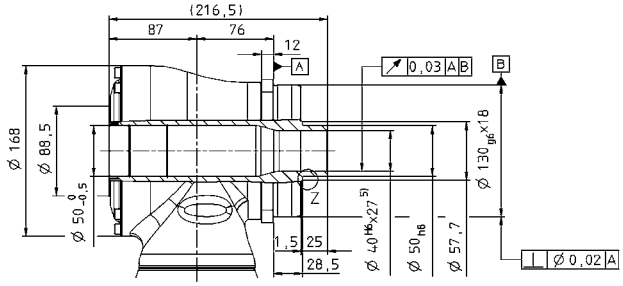
1-stage:



2-stage:



Alternatives: Single output shaft



See technical data sheet for available clamping hub diameters (mass moment of inertia). Dimensions available on request.

Non-tolerated dimensions ±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 with a minimum thickness of 1 mm.
5) Tolerance h6 for mounted shaft.

CAD data is available under www.wittenstein-alpha.com

Motor mounting according to operating manual

HG+ 180 MF 1/2-stage

				1-stage					2-stage									
Ratio [a]			*i*	**3**	**4**	**5**	**7**	**10**	**12**	**16**	**20**	**25**	**28**	**35**	**40**	**50**	**70**	**100**
Max. acceleration torque (max. 1000 cycles per hour)			T_{2B} Nm	640	640	640	550	470	640	640	640	640	640	640	640	640	550	470
			T_{2B} in.lb	5664	5664	5664	4868	4160	5664	5664	5664	5664	5664	5664	5664	5664	4868	4160
Nominal output torque (with n_{1N})			T_{2N} Nm	400	400	400	380	360	400	400	400	400	400	400	400	400	380	360
			T_{2N} in.lb	3540	3540	3540	3363	3186	3540	3540	3540	3540	3540	3540	3540	3540	3363	3186
Emergency stop torque (permitted 1000 times during the service life of the gearhead)			T_{2Not} Nm	900	1050	1050	970	900	1050	1050	1050	1050	1050	1050	1050	1050	970	900
			T_{2Not} in.lb	7965	9293	9293	8585	7965	9293	9293	9293	9293	9293	9293	9293	9293	8585	7965
Nominal input speed (with T_{2N} and 20°C ambient temperature) [b), c)]			n_{1N} rpm	1600	1800	2000	1800	1800	2700	2700	2700	2700	2700	2700	2700	2900	3200	3400
Max. continuous speed (with 20% T_{2N} and 20°C ambient temperature)			n_{1Ncym} rpm	2000	2400	2800	2500	2500	3500	3500	3500	3500	3500	3500	3500	3500	3800	3800
Max. input speed			n_{1Max} rpm	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000
Mean no load running torque (with n_1 = 3000 rpm and 20°C gearhead temperature) [d)]			T_{012} Nm	16.0	13.0	11.0	16.5	14.0	3.3	2.5	2.0	1.8	1.4	1.3	1.0	1.0	1.0	1.0
			T_{012} in.lb	142	115	97	146	124	29.2	22.1	17.7	15.9	12.4	11.5	8.9	8.9	8.9	8.9
Max. torsional backlash			j_t arcmin	≤ 4														
Torsional rigidity			C_{t21} Nm/ arcmin	71	80	91	89	88	80	80	80	80	80	80	80	91	89	88
			C_{t21} in.lb/ arcmin	633	711	803	791	780	708	708	708	708	708	708	708	805	788	779
Max. axial force [e)]			F_{2AMax} N	14200														
			F_{2AMax} lb_f	3195														
Max. radial force [e)]			F_{2RMax} N	14700														
			F_{2RMax} lb_f	3308														
Max. tilting moment			M_{2KMax} Nm	3213														
			M_{2KMax} in.lb	28435														
Efficiency at full load			η %	96					94									
Service life (For calculation, see the Chapter "Information")			L_h h	> 20000														
Weight incl. standardadapter plate			*m* kg	45.4					47									
			m lb_m	100					104									
Operating noise (with n_1 = 3000 rpm no load)			L_{PA} dB(A)	≤ 68														
Max. permitted housing temperature			°C	+90														
			F	194														
Ambient temperature			°C	0 to +40														
			F	32 to 104														
Lubrication				Lubricated for life														
Paint				Blue RAL 5002														
Direction of rotation				Motor and gearhead opposite directions														
Protection class				IP 65														
Moment of inertia (relates to the drive) Clamping hub diameter [mm]	K	38	J_1 kgcm²	–	–	–	–	–	15.3	13.9	12.3	12.0	10.9	10.7	10.1	10.0	9.95	9.91
			J_1 10^{-3} in.lb.s²						13.5	12.3	10.9	10.6	9.65	9.48	8.96	8.88	8.80	8.77
	M	48	J_1 kgcm²	73.3	51.6	42.1	34.0	29.7	30.0	28.7	27.0	26.7	25.6	25.4	24.8	24.7	24.7	24.6
			J_1 10^{-3} in.lb.s²	64.9	45.6	37.3	30.1	26.3	26.6	25.4	23.9	23.6	22.7	22.5	22.0	21.9	21.8	21.8

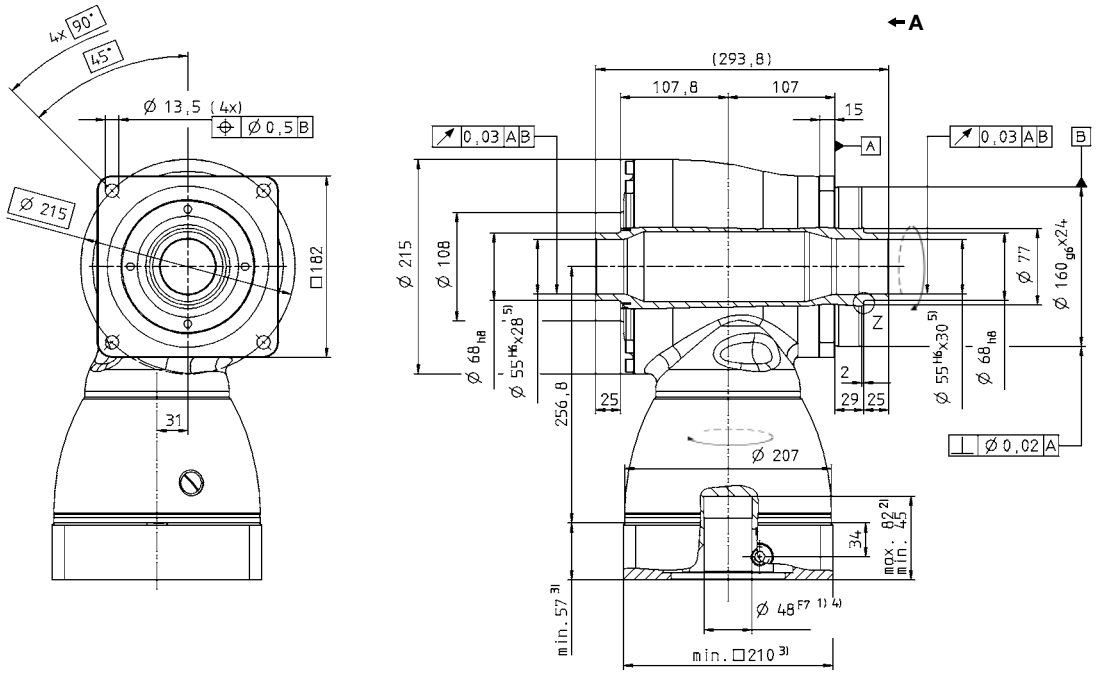
Please contact us for information on the best configuration for S1 conditions of use (continuous operation).

[a)] Other ratios available on request
[b)] Higher speeds are possible if the nominal torque is reduced
[c)] For higher ambient temperatures, please reduce input speed
[d)] Idling torques decrease during operation
[e)] Refers to center of the output shaft or flange

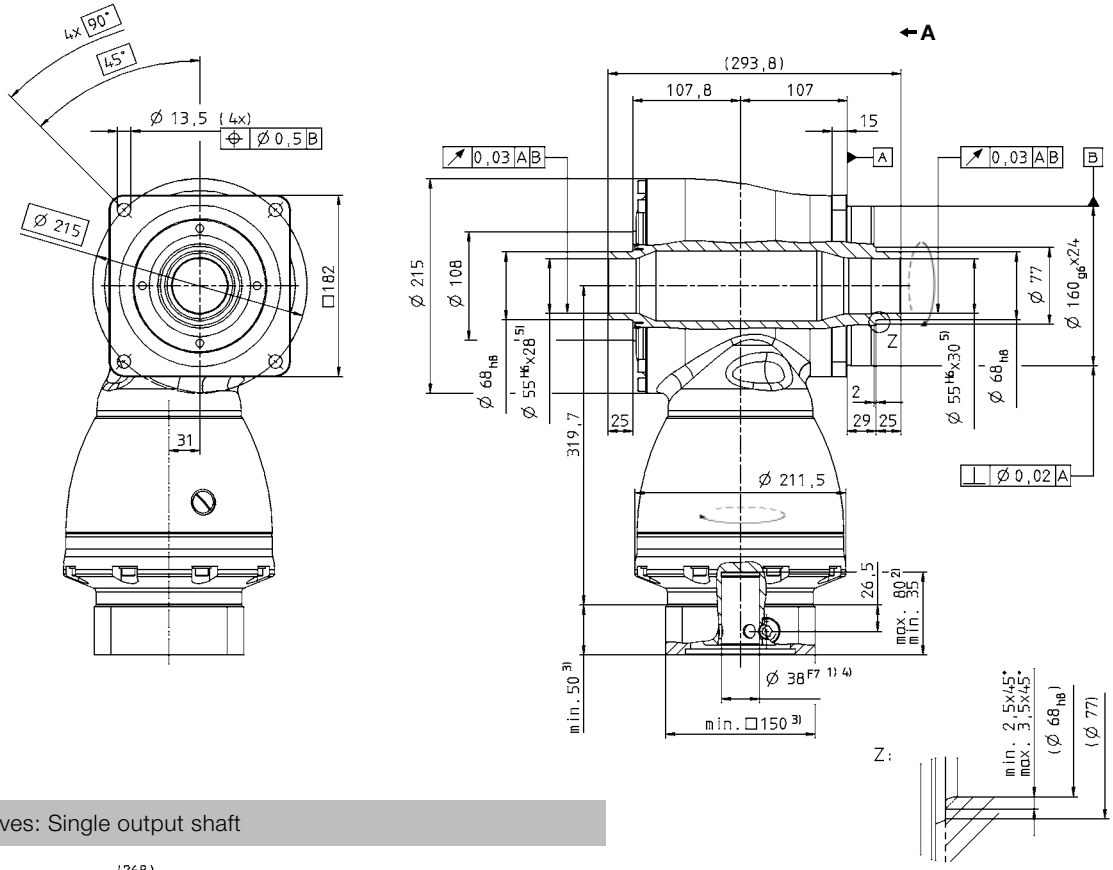
All technical data for front output side applies.
Technical data for rearward output versions, see page 386.

View A

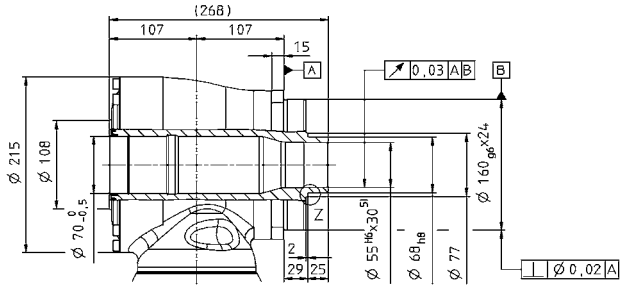
1-stage:



2-stage:



Alternatives: Single output shaft



See technical data sheet for available clamping hub diameters (mass moment of inertia). Dimensions available on request.

Non-tolerated dimensions ±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 with a minimum thickness of 1 mm.
5) Tolerance h6 for mounted shaft.

CAD data is available under www.wittenstein-alpha.com

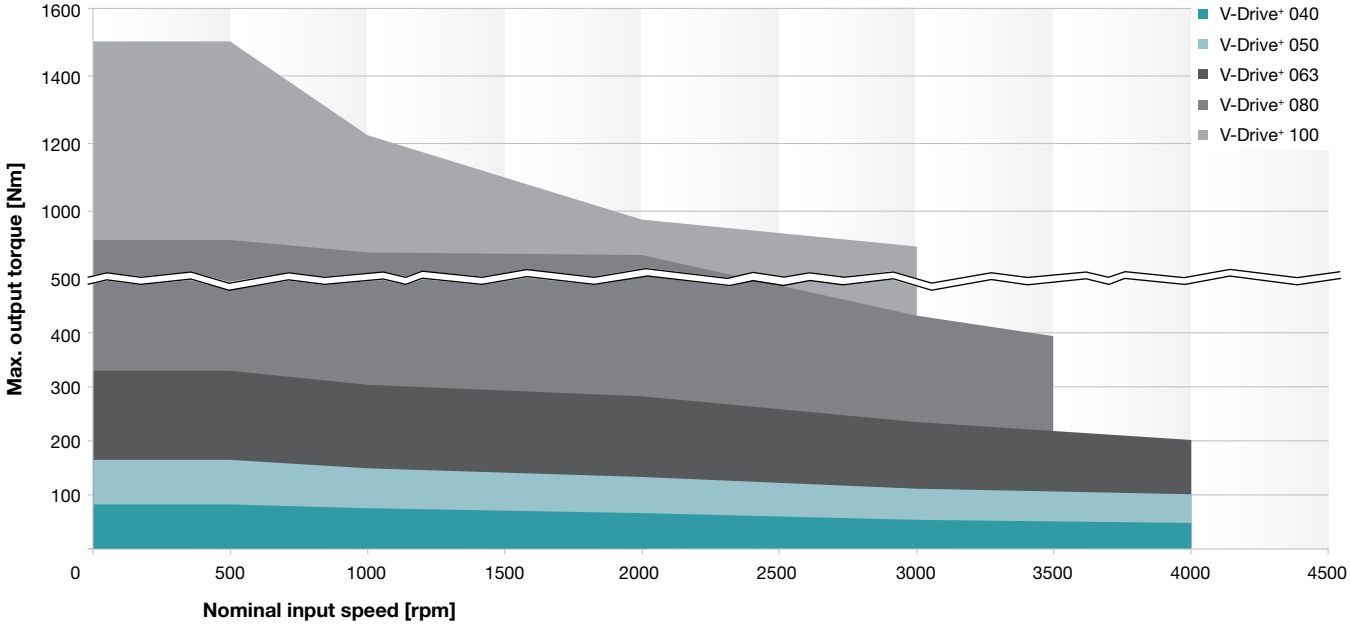
Motor mounting according to operating manual

V-Drive⁺ – The plus stands for torque

The servo worm gearhead with solid shaft, hollow shaft and hollow shaft flange outputs.
With its consistently high positioning accuracy and low torsional backlash of < 3 arcmin, the V-Drive⁺ sets new standards for servo worm gearheads. With these exceptional quality features, an optimum power-to-precision ratio is achieved.

Quick size selection

V-Drive⁺ (example for i = 28)
For applications in cyclic operation (ED ≥ 60%)



Versions and Applications

VDT⁺
with flange shaft

- Applications in continuous operation (ED ≥ 60%)
- Maximum power density
- High positioning accuracy
- Very low noise level

VDH⁺
with hollow shaft smooth/keywayed

- Applications in continuous operation (ED ≥ 60%)
- Maximum power density
- High positioning accuracy
- Very low noise level

VDS⁺
with solid shaft, smooth/ keywayed or involute gearing

- Applications in continuous operation (ED ≥ 60%)
- Maximum power density
- High positioning accuracy
- Very low noise level

Comparison

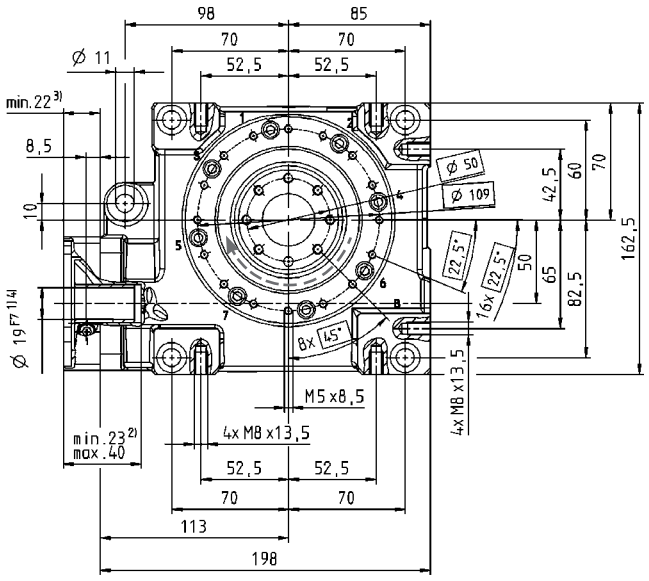
Features	**VDT⁺** from page 250	**VDH⁺** from page 258	**VDS⁺** from page 268
Ratios	4 – 40	4 – 40	4 – 40
Torsional backlash [arcmin]	≤ 3	≤ 3	≤ 3
Output type			
Smooth output shaft			•
Keywayed output shaft			•
Output shaft with involute gearing			•
Output flange	•		
Hollow shaft interface Connected via shrink disc		•	
Hollow shaft interface, rear side Connected via shrink disc		•	
Flanged hollow shaft	•		
Shaft on both sides			•
Input type			
Motor mounted version	•	•	•
Type			
Food-grade lubrication [a) b)]	•	•	•
Corrosion resistant [a) b)]	•	•	•
Accessories			
Coupling	•		•
Rack	•		•
Pinion	•		•
Shrink disc		•	
Flange shaft	•		

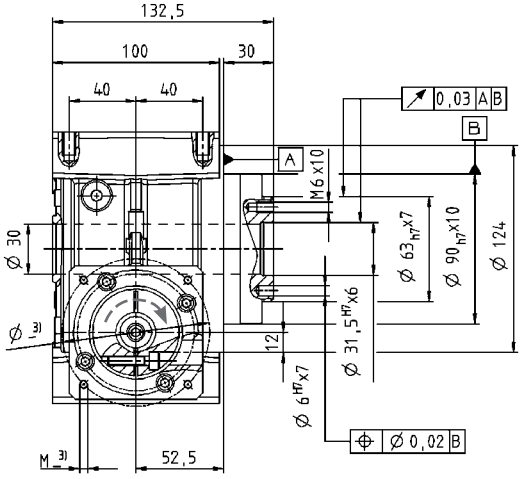
[a)] Power reduction: technical data available upon request [b)] Please contact WITTENSTEIN alpha

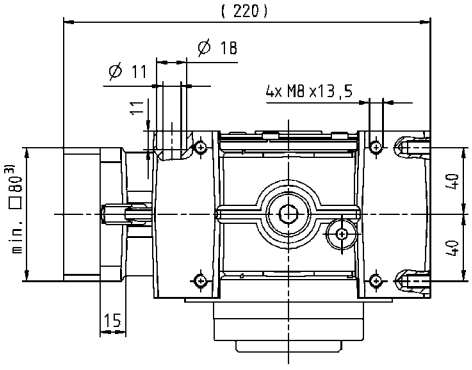
			1-stage					
Ratio	***i***		**4**	**7**	**10**	**16**	**28**	**40**
n_{1N}=500 rpm	T_{2Max}	Nm	124	132	148	154	165	158
		in.lb	1097	1168	1310	1363	1460	1398
	T_{2Servo}	Nm	54	71	74	81	90	74
		in.lb	478	628	655	717	797	655
	η	%	92	89	86	82	72	64
n_{1N}=1000 rpm	T_{2Max}	Nm	124	130	136	140	151	142
		in.lb	1097	1151	1204	1239	1336	1257
	T_{2Servo}	Nm	58	76	80	88	97	81
		in.lb	513	673	708	779	858	717
	η	%	94	91	89	85	77	69
n_{1N}=2000 rpm	T_{2Max}	Nm	88	106	112	120	134	122
		in.lb	779	938	991	1062	1186	1080
	T_{2Servo}	Nm	60	78	82	89	99	83
		in.lb	531	690	726	788	876	735
	η	%	95	93	91	88	75	75
n_{1N}=3000 rpm	T_{2Max}	Nm	72	86	95	106	112	108
		in.lb	637	761	841	938	991	956
	T_{2Servo}	Nm	59	77	81	88	97	81
		in.lb	522	681	717	779	858	717
	η	%	96	94	93	90	83	78
n_{1N}=4000 rpm	T_{2Max}	Nm	62	77	83	92	102	95
		in.lb	549	681	735	814	903	841
	T_{2Servo}	Nm	58	76	79	87	96	80
		in.lb	513	673	699	770	850	708
	η	%	96	95	93	91	85	80
Emergency stop torque	T_{2Not}	Nm	230	242	242	250	262	236
		in.lb	2036	2142	2142	2213	2319	2089
Max. input speed	n_{1Max}	rpm	6000					
Mean no load running torque [a] (With n_1=3000 min^{-1} and 20° C gear temperature)	T_{012}	Nm	1,3	1,2	1,2	1,1	1	0,9
		in.lb	11,5	10,6	10,6	9,7	8,9	8,0
Max. torsional backlash	j_t	arcmin	≤3					
Torsional rigidity	C_{t21}	Nm/arcmin	17					
		in.lb/arcmin	150					
Max. axial force [b]	F_{2AMax}	N	5000					
		lb_f	1125					
Max. radial force [b]	F_{2RMax}	N	3800					
		lb_f	855					
Max. tilting moment	M_{2KMax}	Nm	409					
		in.lb	3620					
Tilting rigidity	C_{2K}	Nm/arcmin	504					
		in.lb/arcmin	4460					
Service life (For calculation see "Information")	L_h	h	> 20000					
Weight (without motor attechment parts)	m	kg	8,8					
		lb_m	19,4					
Operating noise (with n_1 = 3000 rpm no load)	L_{PA}	dB(A)	≤ 62					
Max. permitted housing temperature		°C	+90					
		F	194					
Ambient temperature		°C	-15 to +40					
		F	5 to 104					
Lubrication			Synthetic transmission oil					
Paint			None					
Direction of rotation			See drawing					
Protection class			IP 65					
Moment of inertia (relates to the drive)	J_1	kgcm²	2,59	2,12	1,98	1,86	1,82	1,86
		10^{-3} in.lb.s²	2,29	1,87	1,75	1,64	1,61	1,65

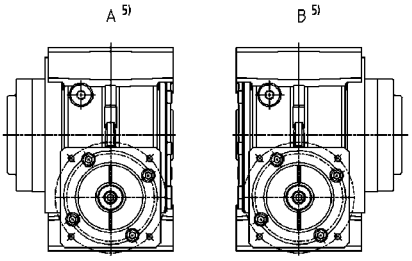
[a] Idling torques decrease during operation

[b] Refers to center of the output shaft or flange









Non-tolerated dimensions ± 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 with a minimum thickness of 1 mm.
5) Output side

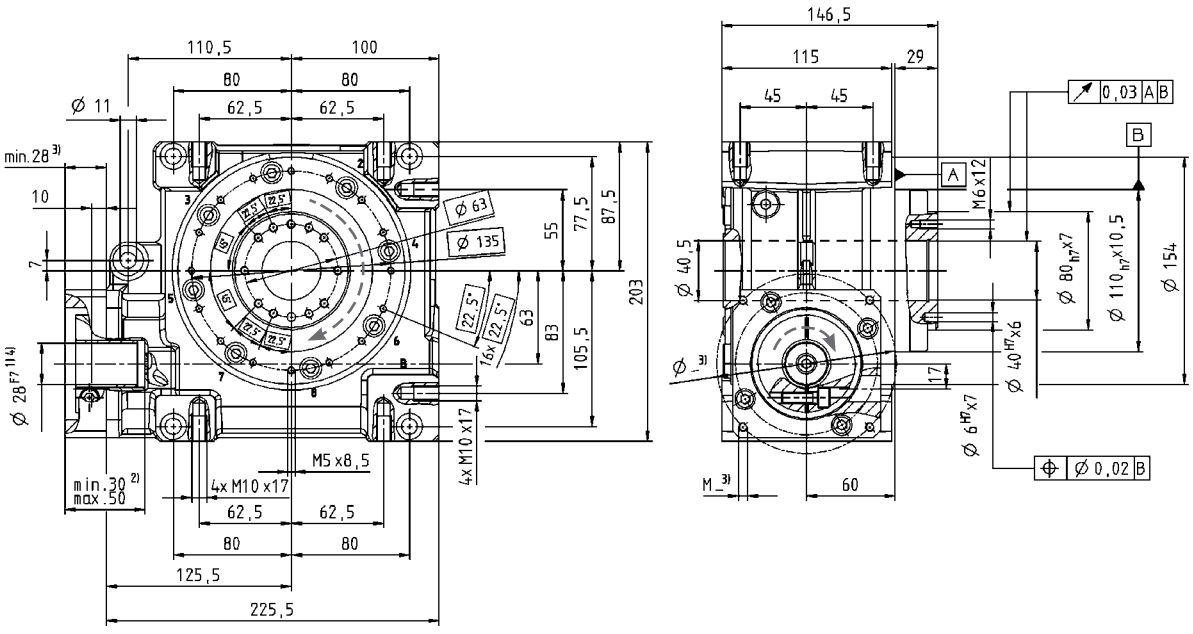
CAD data is available under www.wittenstein-alpha.com

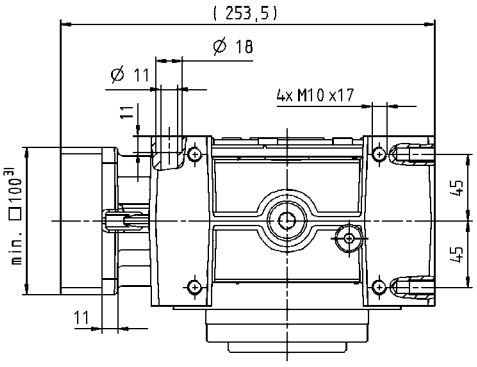
Motor mounting according to operating manual

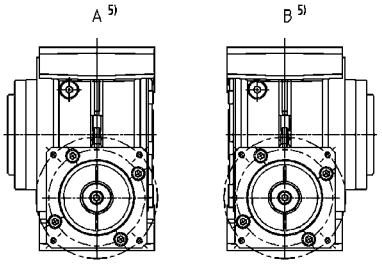
			1-stage					
Ratio	***i***		**4**	**7**	**10**	**16**	**28**	**40**
n_{1N}=500 rpm	T_{2Max}	Nm	302	314	315	320	328	324
		in.lb	2673	2779	2788	2832	2903	2867
	T_{2Servo}	Nm	198	210	225	221	229	226
		in.lb	1752	1859	1991	1956	2027	2000
	η	%	93	91	88	83	74	68
n_{1N}=1000 rpm	T_{2Max}	Nm	264	284	290	298	304	301
		in.lb	2336	2513	2567	2637	2690	2664
	T_{2Servo}	Nm	192	228	240	238	245	241
		in.lb	1699	2018	2124	2106	2168	2133
	η	%	94	93	91	86	78	73
n_{1N}=2000 rpm	T_{2Max}	Nm	202	243	262	271	282	278
		in.lb	1788	2151	2319	2398	2496	2460
	T_{2Servo}	Nm	174	212	230	238	248	243
		in.lb	1540	1876	2036	2106	2195	2151
	η	%	96	94	93	89	83	78
n_{1N}=3000 rpm	T_{2Max}	Nm	164	190	202	209	235	231
		in.lb	1451	1682	1788	1850	2080	2044
	T_{2Servo}	Nm	128	166	184	209	198	194
		in.lb	1133	1469	1628	1850	1752	1717
	η	%	96	95	94	91	85	81
n_{1N}=4000 rpm	T_{2Max}	Nm	128	148	164	175	201	198
		in.lb	1133	1310	1451	1549	1779	1752
	T_{2Servo}	Nm	104	132	152	175	165	162
		in.lb	920	1168	1345	1549	1460	1434
	η	%	97	96	94	92	86	83
Emergency stop torque	T_{2Not}	Nm	460	484	491	494	518	447
		in.lb	4071	4283	4345	4372	4584	3956
Max. input speed	n_{1Max}	rpm	4500					
Mean no load running torque [a] (With n_1=3000 min^{-1} and 20° C gear temperature)	T_{012}	Nm	2,1	1,9	1,8	1,7	1,6	1,4
		in.lb	18,6	16,8	15,9	15,0	14,2	12,4
Max. torsional backlash	j_t	arcmin	≤3					
Torsional rigidity	C_{t21}	Nm/arcmin	50					
		in.lb/arcmin	443					
Max. axial force [b]	F_{2AMax}	N	8250					
		lb_f	1856					
Max. radial force [b]	F_{2RMax}	N	6000					
		lb_f	1350					
Max. tilting moment	M_{2KMax}	Nm	843					
		in.lb	7461					
Tilting rigidity	C_{2K}	Nm/arcmin	603					
		in.lb/arcmin	5337					
Service life (For calculation see "Information")	L_h	h	> 20000					
Weight (without motor attechment parts)	m	kg	14,5					
		lb_m	32					
Operating noise (with n_1 = 3000 rpm no load)	L_{PA}	dB(A)	≤ 64					
Max. permitted housing temperature		°C	+90					
		F	194					
Ambient temperature		°C	-15 to +40					
		F	5 to 104					
Lubrication			Synthetic transmission oil					
Paint			None					
Direction of rotation			See drawing					
Protection class			IP 65					
Moment of inertia (relates to the drive)	J_1	kgcm²	7,45	6,02	5,65	5,49	5,42	5,36
		10^{-3} in.lb.s²	6,60	5,33	5,00	4,86	4,80	4,75

[a] Idling torques decrease during operation

[b] Refers to center of the output shaft or flange







Non-tolerated dimensions ± 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 with a minimum thickness of 1 mm.
5) Output side

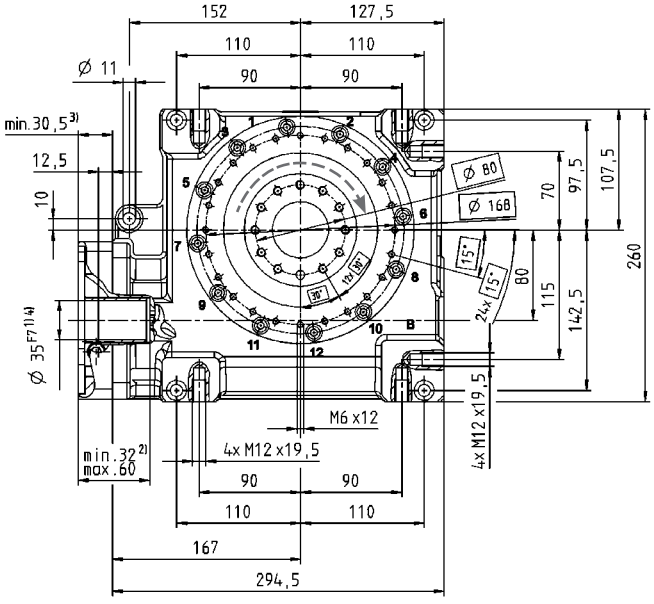
CAD data is available under www.wittenstein-alpha.com

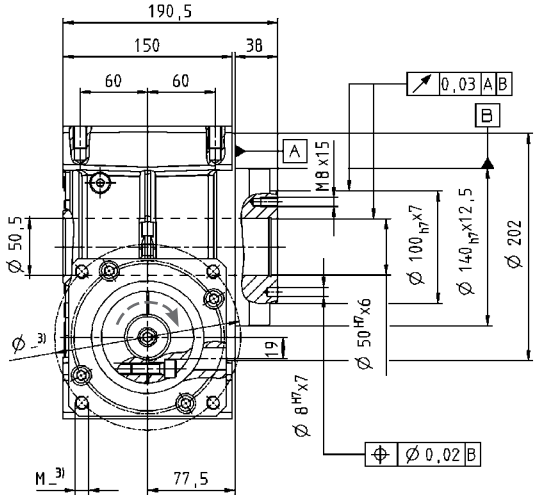
Motor mounting according to operating manual

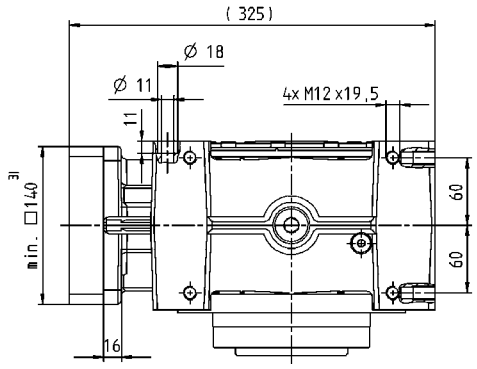
			1-stage					
Ratio	***i***		**4**	**7**	**10**	**16**	**28**	**40**
n_{1N}=500 rpm	T_{2Max}	Nm	578	646	672	702	785	676
		in.lb	5115	5717	5947	6213	6947	5983
	T_{2Servo}	Nm	469	601	613	677	764	631
		in.lb	4151	5319	5425	5991	6761	5584
	η	%	94	92	89	86	77	70
n_{1N}=1000 rpm	T_{2Max}	Nm	514	602	588	656	698	613
		in.lb	4549	5328	5204	5806	6177	5425
	T_{2Servo}	Nm	491	574	561	625	665	584
		in.lb	4345	5080	4965	5531	5885	5168
	η	%	95	93	91	88	81	74
n_{1N}=2000 rpm	T_{2Max}	Nm	350	435	431	500	536	470
		in.lb	3098	3850	3814	4425	4744	4160
	T_{2Servo}	Nm	335	415	411	476	511	448
		in.lb	2965	3673	3637	4213	4522	3965
	η	%	96	95	93	89	84	79
n_{1N}=3000 rpm	T_{2Max}	Nm	259	336	334	400	433	380
		in.lb	2292	2974	2956	3540	3832	3363
	T_{2Servo}	Nm	247	320	319	381	413	362
		in.lb	2186	2832	2823	3372	3655	3204
	η	%	97	96	94	92	86	81
n_{1N}=3500 rpm	T_{2Max}	Nm	227	299	300	362	394	346
		in.lb	2009	2646	2655	3204	3487	3062
	T_{2Servo}	Nm	217	285	286	345	376	330
		in.lb	1920	2522	2531	3053	3328	2921
	η	%	97	96	94	92	87	82
Emergency stop torque	T_{2Not}	Nm	938	993	963	1005	1064	941
		in.lb	8301	8788	8523	8894	9416	8328
Max. input speed	n_{1Max}	rpm	4000					
Mean no load running torque [a] (With n_1=3000 min^{-1} and 20° C gear temperature)	T_{012}	Nm	3,6	3,5	3,4	3,2	3	2,8
		in.lb	31,9	31,0	30,1	28,3	26,6	24,8
Max. torsional backlash	j_t	arcmin	≤3					
Torsional rigidity	C_{t21}	Nm/arcmin	113					
		in.lb/arcmin	1000					
Max. axial force [b]	F_{2AMax}	N	13900					
		lb_f	3128					
Max. radial force [b]	F_{2RMax}	N	9000					
		lb_f	2025					
Max. tilting moment	M_{2KMax}	Nm	1544					
		in.lb	13664					
Tilting rigidity	C_{2K}	Nm/arcmin	1178					
		in.lb/arcmin	10425					
Service life (For calculation see "Information")	L_h	h	> 20000					
Weight (without motor attechment parts)	m	kg	31					
		lb_m	68,5					
Operating noise (with n_1 = 3000 rpm no load)	L_{PA}	dB(A)	≤ 66					
Max. permitted housing temperature		°C	+90					
		F	194					
Ambient temperature		°C	-15 to +40					
		F	5 to 104					
Lubrication			Synthetic transmission oil					
Paint			None					
Direction of rotation			See drawing					
Protection class			IP 65					
Moment of inertia (relates to the drive)	J_1	kgcm²	23,99	18,64	18,23	16,54	16,32	16,94
		10^{-3} in.lb.s²	21,23	16,49	16,13	14,64	14,44	14,99

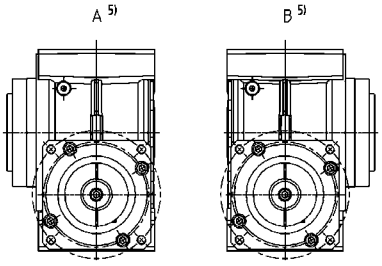
[a] Idling torques decrease during operation

[b] Refers to center of the output shaft or flange









Non-tolerated dimensions ± 1 mm

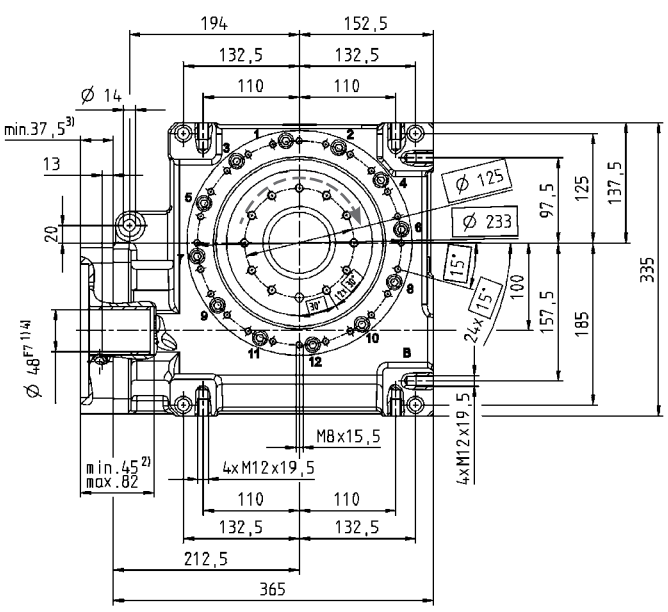
1) Check motor shaft fit.
2) Min./Max. permissible motor shaft length.
   Longer motor shafts are adaptable, please contact us.
3) The dimensions depend on the motor.
4) Smaller motor shaft diameter is compensated by a bushing with a minimum thickness of 1 mm.
5) Output side

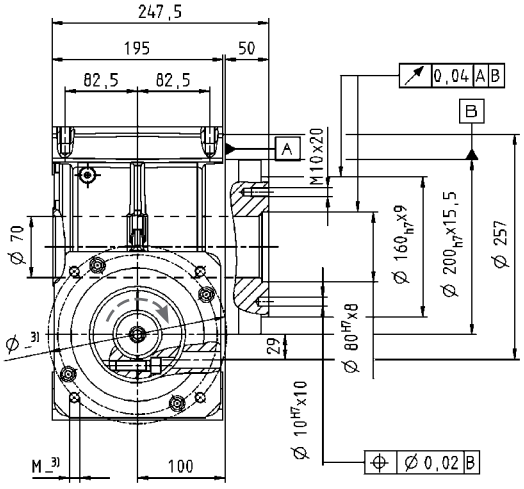
CAD data is available under www.wittenstein-alpha.com

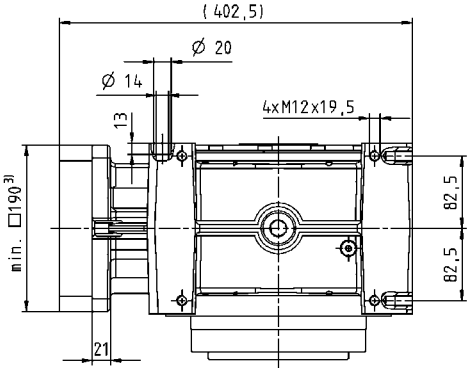
Motor mounting according to operating manual

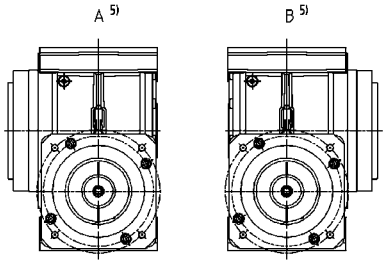
			1-stage					
Ratio	***i***		**4**	**7**	**10**	**16**	**28**	**40**
n_{1N}=500 rpm	T_{2Max}	Nm	1184	1336	1377	1392	1505	1376
		in.lb	10478	11824	12186	12319	13319	12178
	T_{2Servo}	Nm	1155	1304	1343	1359	1469	1343
		in.lb	10222	11540	11886	12027	13001	11886
	η	%	95	93	91	87	80	76
n_{1N}=1000 rpm	T_{2Max}	Nm	905	1070	1122	1140	1251	1162
		in.lb	8009	9470	9930	10089	11071	10284
	T_{2Servo}	Nm	883	1044	1095	1113	1221	1134
		in.lb	7815	9239	9691	9850	10806	10036
	η	%	95	94	92	88	82	79
n_{1N}=2000 rpm	T_{2Max}	Nm	595	748	807	830	930	883
		in.lb	5266	6620	7142	7346	8231	7815
	T_{2Servo}	Nm	581	730	788	810	908	862
		in.lb	5142	6461	6974	7169	8036	7629
	η	%	96	95	94	91	86	82
n_{1N}=3000 rpm [c]	T_{2Max}	Nm	430	564	621	644	735	709
		in.lb	3806	4991	5496	5699	6505	6275
	T_{2Servo}	Nm	420	551	606	629	718	692
		in.lb	3717	4876	5363	5567	6354	6124
	η	%	97	96	95	92	87	84
n_{1N}=3500 rpm	T_{2Max}	Nm in.lb	–	–	–	–	–	–
	T_{2Servo}	Nm in.lb	–	–	–	–	–	–
	η	%	–	–	–	–	–	–
Emergency stop torque	T_{2Not}	Nm	1819	1932	1940	1955	2073	1856
		in.lb	16098	17098	17169	17302	18346	16426
Max. input speed	n_{1Max}	rpm	3500					
Mean no load running torque [a] (With n_1=3000 min^{-1} and 20° C gear temperature)	T_{012}	Nm	9,8	8,1	7,4	6,7	5,8	5
		in.lb	86,7	71,7	65,5	59,3	51,3	44,3
Max. torsional backlash	j_t	arcmin	≤3					
Torsional rigidity	C_{t21}	Nm/arcmin	213					
		in.lb/arcmin	1885					
Max. axial force [b]	F_{2AMax}	N	19500					
		lb_f	4388					
Max. radial force [b]	F_{2RMax}	N	14000					
		lb_f	3150					
Max. tilting moment	M_{2KMax}	Nm	3059					
		in.lb	27072					
Tilting rigidity	C_{2K}	Nm/arcmin	2309					
		in.lb/arcmin	20435					
Service life (For calculation see "Information")	L_h	h	> 20000					
Weight (without motor attechment parts)	*m*	kg	62					
		lb_m	137					
Operating noise (with n_1 = 3000 rpm no load)	L_{PA}	dB(A)	≤ 70					
Max. permitted housing temperature		°C	+90					
		F	194					
Ambient temperature		°C	-15 to +40					
		F	5 to 104					
Lubrication			Synthetic transmission oil					
Paint			None					
Direction of rotation			See drawing					
Protection class			IP 65					
Moment of inertia (relates to the drive)	J_1	kgcm²	83,51	64,27	59,95	59,40	56,32	56,49
		10^{-3} in.lb.s²	73,90	56,88	53,06	52,56	49,85	50,00

[a] Idling torques decrease during operation
[b] Refers to center of the output shaft or flange
[c] Reduced by 20% in S1 operation









Non-tolerated dimensions ± 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 with a minimum thickness of 1 mm.
5) Output side

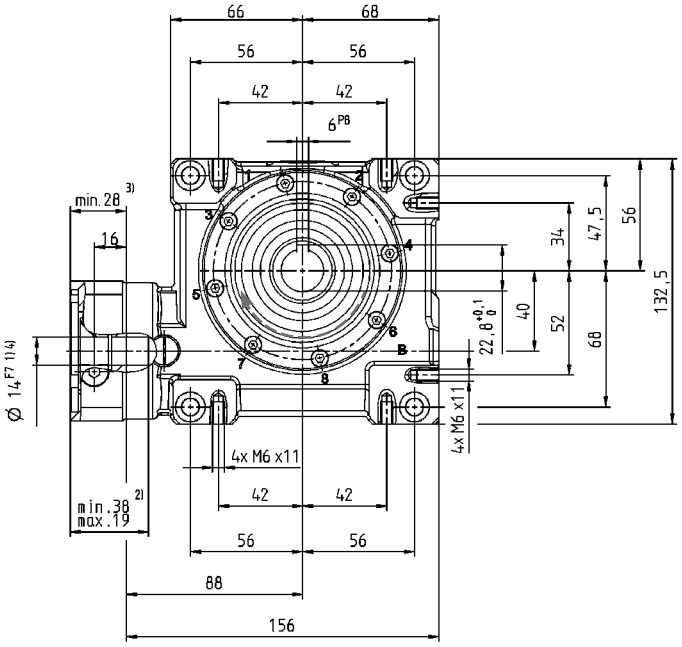
CAD data is available under www.wittenstein-alpha.com

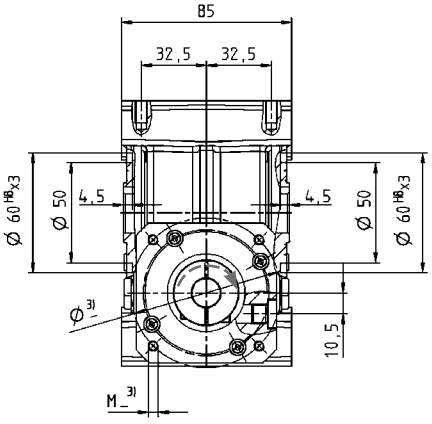
Motor mounting according to operating manual

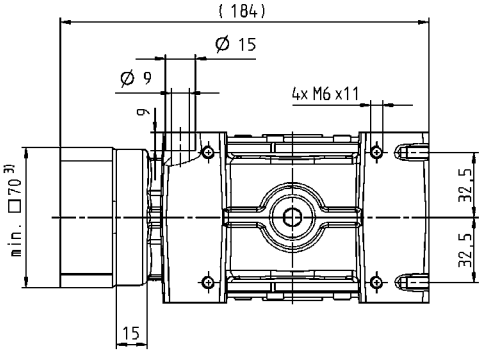
			1-stage					
Ratio	***i***		**4**	**7**	**10**	**16**	**28**	**40**
n_{1N}=500 rpm	T_{2Max}	Nm	60	75	83	86	91	83
		in.lb	531	664	735	761	805	735
	T_{2Servo}	Nm	17	24	25	26	29	25
		in.lb	150	212	221	230	257	221
	η	%	93	90	88	82	73	67
n_{1N}=1000 rpm	T_{2Max}	Nm	45	60	68	75	75	76
		in.lb	398	531	602	664	664	673
	T_{2Servo}	Nm	19	26	28	29	32	28
		in.lb	168	230	248	257	283	248
	η	%	94	92	90	86	77	73
n_{1N}=2000 rpm	T_{2Max}	Nm	35	50	54	59	63	65
		in.lb	310	443	478	522	558	575
	T_{2Servo}	Nm	19	26	28	29	33	29
		in.lb	168	230	248	257	292	257
	η	%	96	94	92	88	81	77
n_{1N}=3000 rpm	T_{2Max}	Nm	30	42	46	51	53	56
		in.lb	266	372	407	451	469	496
	T_{2Servo}	Nm	19	26	28	29	32	28
		in.lb	168	230	248	257	283	248
	η	%	96	95	93	90	83	79
n_{1N}=4000 rpm	T_{2Max}	Nm	28	38	43	44	47	50
		in.lb	248	336	381	389	416	443
	T_{2Servo}	Nm	19	25	27	28	31	27
		in.lb	168	221	239	248	274	239
	η	%	96	95	94	91	84	81
Emergency stop torque	T_{2Not}	Nm	118	126	125	129	134	122
		in.lb	1044	1115	1106	1142	1186	1080
Max. input speed	n_{1Max}	rpm	6000					
Mean no load running torque [a] (With n_1=3000 min^{-1} and 20° C gear temperature)	T_{012}	Nm	0,8	0,7	0,5	0,5	0,4	0,4
		in.lb	7,1	6,2	4,4	4,4	3,5	3,5
Max. torsional backlash	j_t	arcmin	≤3					
Torsional rigidity	C_{t21}	Nm/arcmin	4,5					
		in.lb/arcmin	40					
Max. axial force [b]	F_{2AMax}	N	3000					
		lb_f	675					
Max. radial force [b]	F_{2RMax}	N	2400					
		lb_f	540					
Max. tilting moment	M_{2KMax}	Nm	205					
		in.lb	1814					
Service life (For calculation see "Information")	L_h	h	> 20000					
Weight (without motor attechment parts)	m	kg	4,0					
		lb_m	8,8					
Operating noise (with n_1 = 3000 rpm no load)	L_{PA}	dB(A)	≤ 54					
Max. permitted housing temperature		°C	+90					
		F	194					
Ambient temperature		°C	-15 to +40					
		F	5 to 104					
Lubrication			Synthetic transmission oil					
Paint			None					
Direction of rotation			See drawing					
Protection class			IP 65					
Moment of inertia (relates to the drive)	J_1	kgcm²	0,52	0,38	0,34	0,32	0,32	0,31
		10^{-3} in.lb.s²	0,46	0,34	0,30	0,28	0,28	0,27

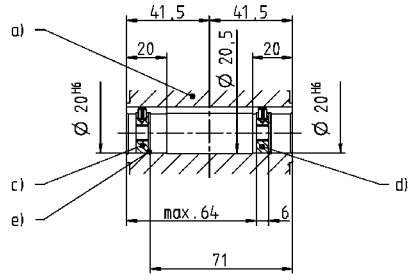
[a] Idling torques decrease during operation

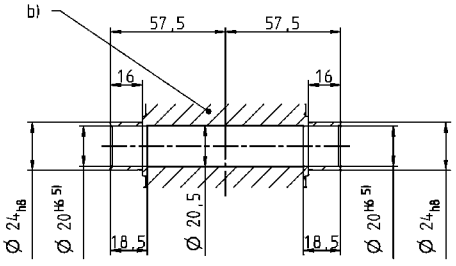
[b] Refers to center of the output shaft or flange











a) Hollow shaft, keywayed
b) Hollow shaft, smooth
c) End disc for screw M6
d) End disc as forcing washer for screw M8
e) Locking ring – DIN 472

Non-tolerated dimensions ± 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 with a minimum thickness of 1 mm. Motor shaft diameters up to 19 mm available – please contact WITTENSTEIN alpha.
5) Tolerance h6 for mounted shaft.

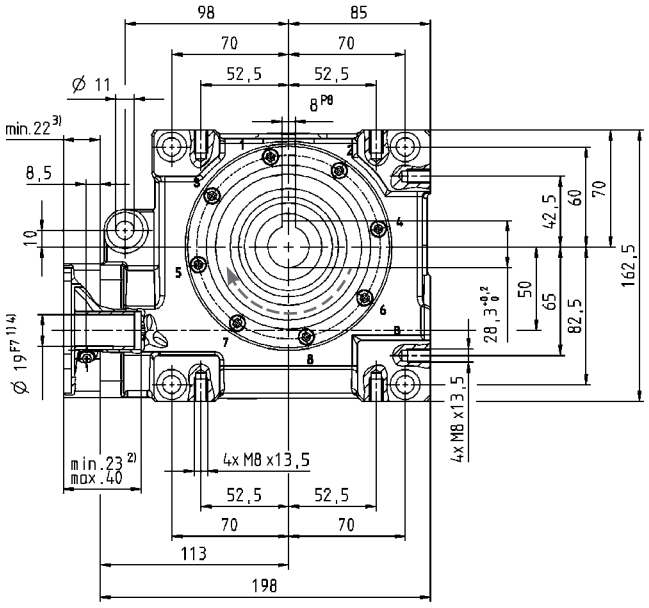
CAD data is available under www.wittenstein-alpha.com

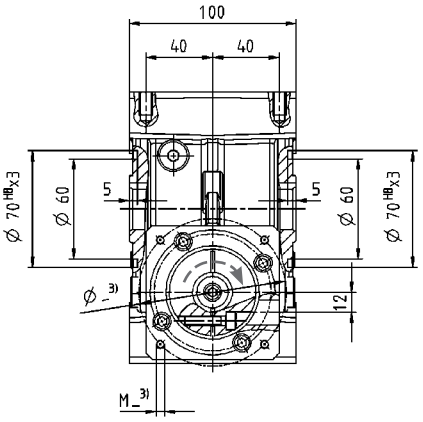
Motor mounting according to operating manual

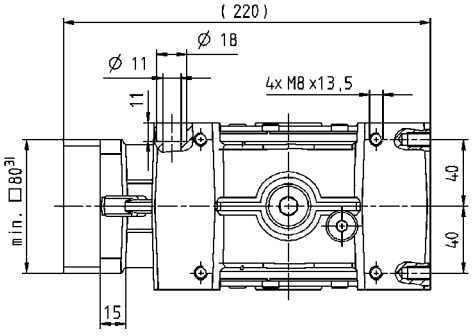
			1-stage					
Ratio	***i***		**4**	**7**	**10**	**16**	**28**	**40**
n_{1N}=500 rpm	T_{2Max}	Nm	124	132	148	154	165	158
		in.lb	1097	1168	1310	1363	1460	1398
	T_{2Servo}	Nm	54	71	74	81	90	74
		in.lb	478	628	655	717	797	655
	η	%	92	89	86	82	72	64
n_{1N}=1000 rpm	T_{2Max}	Nm	124	130	136	140	151	142
		in.lb	1097	1151	1204	1239	1336	1257
	T_{2Servo}	Nm	58	76	80	88	97	81
		in.lb	513	673	708	779	858	717
	η	%	94	91	89	85	77	69
n_{1N}=2000 rpm	T_{2Max}	Nm	88	106	112	120	134	122
		in.lb	779	938	991	1062	1186	1080
	T_{2Servo}	Nm	60	78	82	89	99	83
		in.lb	531	690	726	788	876	735
	η	%	95	93	91	88	75	75
n_{1N}=3000 rpm	T_{2Max}	Nm	72	86	95	106	112	108
		in.lb	637	761	841	938	991	956
	T_{2Servo}	Nm	59	77	81	88	97	81
		in.lb	522	681	717	779	858	717
	η	%	96	94	93	90	83	78
n_{1N}=4000 rpm	T_{2Max}	Nm	62	77	83	92	102	95
		in.lb	549	681	735	814	903	841
	T_{2Servo}	Nm	58	76	79	87	96	80
		in.lb	513	673	699	770	850	708
	η	%	96	95	93	91	85	80
Emergency stop torque	T_{2Not}	Nm	230	242	242	250	262	236
		in.lb	2036	2142	2142	2213	2319	2089
Max. input speed	n_{1Max}	rpm	6000					
Mean no load running torque [a] (With n_1=3000 min^{-1} and 20° C gear temperature)	T_{012}	Nm	1,3	1,2	1,2	1,1	1	0,9
		in.lb	11,5	10,6	10,6	9,7	8,9	8,0
Max. torsional backlash	j_t	arcmin	≤3					
Torsional rigidity	C_{t21}	Nm/arcmin	8					
		in.lb/arcmin	71					
Max. axial force [b]	F_{2AMax}	N	5000					
		lb_f	1125					
Max. radial force [b]	F_{2RMax}	N	3800					
		lb_f	855					
Max. tilting moment	M_{2KMax}	Nm	409					
		in.lb	3620					
Service life (For calculation see "Information")	L_h	h	> 20000					
Weight (without motor attechment parts)	m	kg	7,4					
		lb_m	16,4					
Operating noise (with n_1 = 3000 rpm no load)	L_{PA}	dB(A)	≤ 62					
Max. permitted housing temperature		°C	+90					
		F	194					
Ambient temperature		°C	-15 to +40					
		F	5 to 104					
Lubrication			Synthetic transmission oil					
Paint			None					
Direction of rotation			See drawing					
Protection class			IP 65					
Moment of inertia (relates to the drive)	J_1	kgcm²	2,31	2,02	1,93	1,84	1,81	1,86
		10^{-3} in.lb.s²	2,04	1,79	1,71	1,63	1,60	1,64

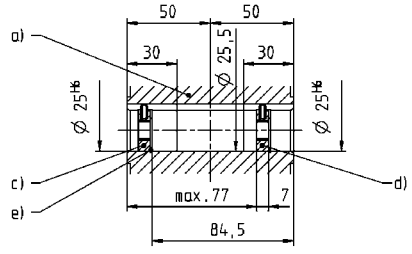
[a] Idling torques decrease during operation

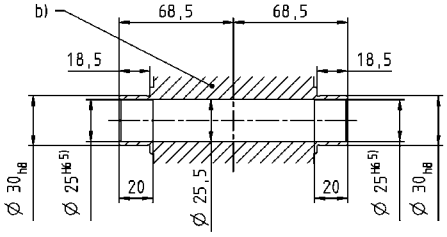
[b] Refers to center of the output shaft or flange











a) Hollow shaft, keywayed
b) Hollow shaft, smooth
c) End disc for screw M10
d) End disc as forcing washer for screw M12
e) Locking ring – DIN 472

Non-tolerated dimensions ± 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 with a minimum thickness of 1 mm.
5) Tolerance h6 for mounted shaft.

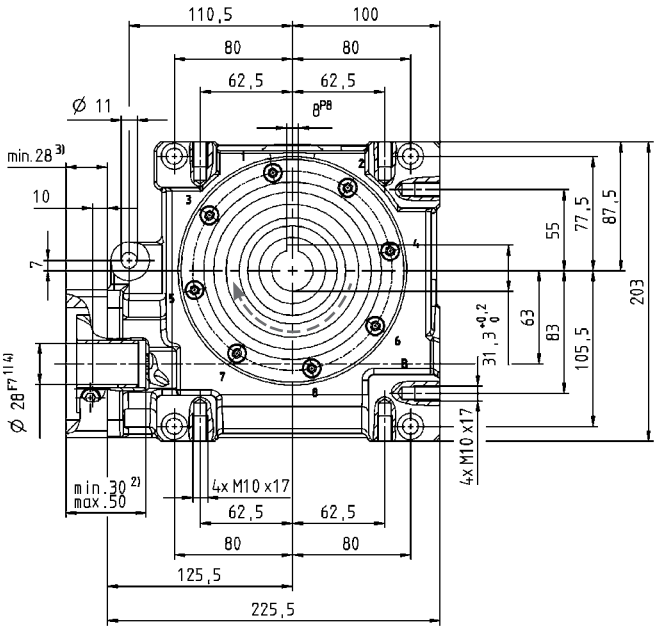
CAD data is available under www.wittenstein-alpha.com

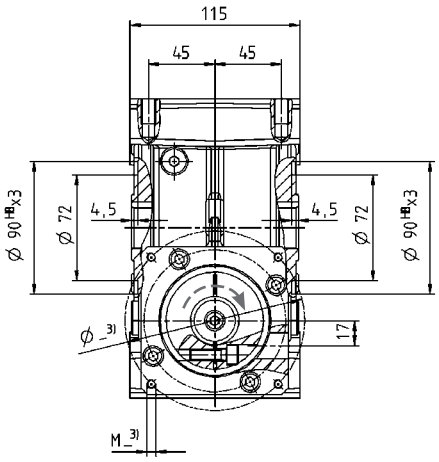
Motor mounting according to operating manual

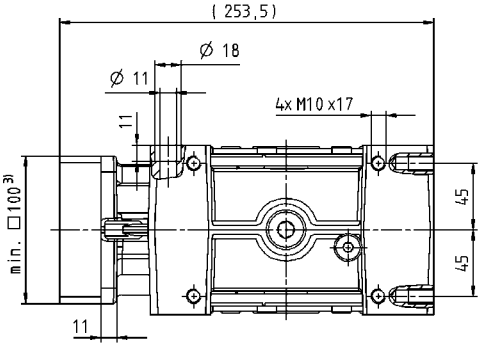
			1-stage					
Ratio	***i***		**4**	**7**	**10**	**16**	**28**	**40**
n_{1N}=500 rpm	T_{2Max}	Nm	302	314	315	320	328	324
		in.lb	2673	2779	2788	2832	2903	2867
	T_{2Servo}	Nm	198	210	225	221	229	226
		in.lb	1752	1859	1991	1956	2027	2000
	η	%	93	91	88	83	74	68
n_{1N}=1000 rpm	T_{2Max}	Nm	264	284	290	298	304	301
		in.lb	2336	2513	2567	2637	2690	2664
	T_{2Servo}	Nm	192	228	240	238	245	241
		in.lb	1699	2018	2124	2106	2168	2133
	η	%	94	93	91	86	78	73
n_{1N}=2000 rpm	T_{2Max}	Nm	202	243	262	271	282	278
		in.lb	1788	2151	2319	2398	2496	2460
	T_{2Servo}	Nm	174	212	230	238	248	243
		in.lb	1540	1876	2036	2106	2195	2151
	η	%	96	94	93	89	83	78
n_{1N}=3000 rpm	T_{2Max}	Nm	164	190	202	209	235	231
		in.lb	1451	1682	1788	1850	2080	2044
	T_{2Servo}	Nm	128	166	184	209	198	194
		in.lb	1133	1469	1628	1850	1752	1717
	η	%	96	95	94	91	85	81
n_{1N}=4000 rpm	T_{2Max}	Nm	128	148	164	175	201	198
		in.lb	1133	1310	1451	1549	1779	1752
	T_{2Servo}	Nm	104	132	152	175	165	162
		in.lb	920	1168	1345	1549	1460	1434
	η	%	97	96	94	92	86	83
Emergency stop torque	T_{2Not}	Nm	460	484	491	494	518	447
		in.lb	4071	4283	4345	4372	4584	3956
Max. input speed	n_{1Max}	rpm	4500					
Mean no load running torque [a] (With n_1=3000 min^{-1} and 20° C gear temperature)	T_{012}	Nm	2,1	1,9	1,8	1,7	1,6	1,4
		in.lb	18,6	16,8	15,9	15,0	14,2	12,4
Max. torsional backlash	j_t	arcmin	≤3					
Torsional rigidity	C_{t21}	Nm/arcmin	28					
		in.lb/arcmin	248					
Max. axial force [b]	F_{2AMax}	N	8250					
		lb_f	1856					
Max. radial force [b]	F_{2RMax}	N	6000					
		lb_f	1350					
Max. tilting moment	M_{2KMax}	Nm	843					
		in.lb	7461					
Service life (For calculation see "Information")	L_h	h	> 20000					
Weight (without motor attechment parts)	m	kg	12					
		lb_m	26,5					
Operating noise (with n_1 = 3000 rpm no load)	L_{PA}	dB(A)	≤ 64					
Max. permitted housing temperature		°C	+90					
		F	194					
Ambient temperature		°C	-15 to +40					
		F	5 to 104					
Lubrication			Synthetic transmission oil					
Paint			None					
Direction of rotation			See drawing					
Protection class			IP 65					
Moment of inertia (relates to the drive)	J_1	kgcm²	6,68	5,77	5,53	5,44	5,40	5,35
		10^{-3} in.lb.s²	5,91	5,11	4,89	4,81	4,78	4,74

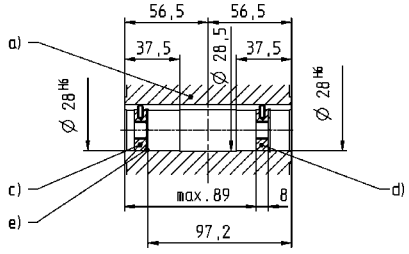
[a] Idling torques decrease during operation

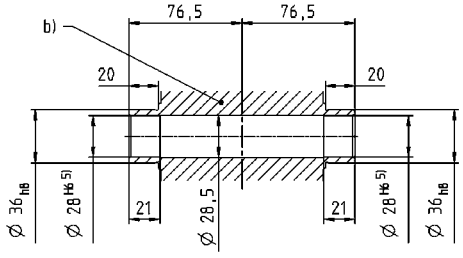
[b] Refers to center of the output shaft or flange











a) Hollow shaft, keywayed
b) Hollow shaft, smooth
c) End disc for screw M10
d) End disc as forcing washer for screw M12
e) Locking ring – DIN 472

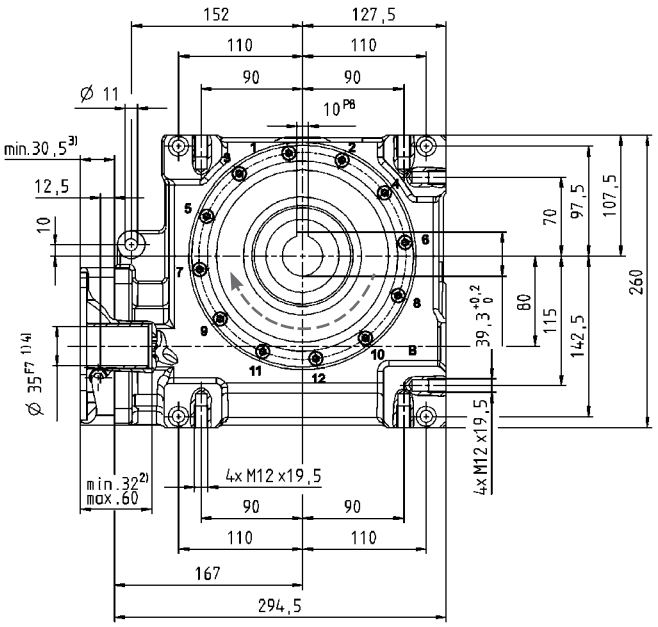
Non-tolerated dimensions ± 1 mm
1) Check motor shaft fit.
2) Min./Max. permissible motor shaft length.
Longer motor shafts are adaptable, please contact us.
3) The dimensions depend on the motor.
4) Smaller motor shaft diameter is compensated by a bushing with a minimum thickness of 1 mm.
5) Tolerance h6 for mounted shaft.

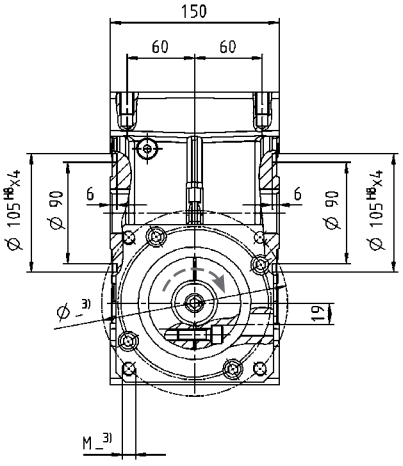
CAD data is available under www.wittenstein-alpha.com

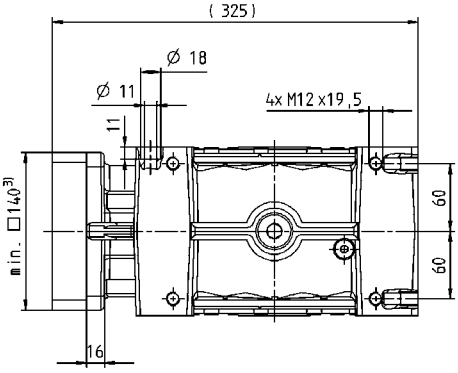
Motor mounting according to operating manual

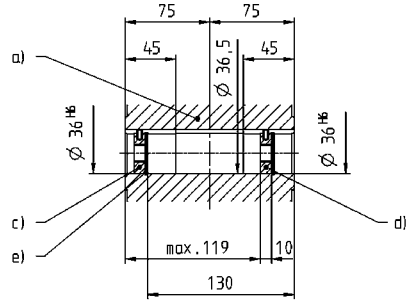
			1-stage					
Ratio	***i***		**4**	**7**	**10**	**16**	**28**	**40**
n_{1N}=500 rpm	T_{2Max}	Nm	578	646	672	702	785	676
		in.lb	5115	5717	5947	6213	6947	5983
	T_{2Servo}	Nm	469	601	613	677	764	631
		in.lb	4151	5319	5425	5991	6761	5584
	η	%	94	92	89	86	77	70
n_{1N}=1000 rpm	T_{2Max}	Nm	514	602	588	656	698	613
		in.lb	4549	5328	5204	5806	6177	5425
	T_{2Servo}	Nm	491	574	561	625	665	584
		in.lb	4345	5080	4965	5531	5885	5168
	η	%	95	93	91	88	81	74
n_{1N}=2000 rpm	T_{2Max}	Nm	350	435	431	500	536	470
		in.lb	3098	3850	3814	4425	4744	4160
	T_{2Servo}	Nm	335	415	411	476	511	448
		in.lb	2965	3673	3637	4213	4522	3965
	η	%	96	95	93	89	84	79
n_{1N}=3000 rpm	T_{2Max}	Nm	259	336	334	400	433	380
		in.lb	2292	2974	2956	3540	3832	3363
	T_{2Servo}	Nm	247	320	319	381	413	362
		in.lb	2186	2832	2823	3372	3655	3204
	η	%	97	96	94	92	86	81
n_{1N}=3500 rpm	T_{2Max}	Nm	227	299	300	362	394	346
		in.lb	2009	2646	2655	3204	3487	3062
	T_{2Servo}	Nm	217	285	286	345	376	330
		in.lb	1920	2522	2531	3053	3328	2921
	η	%	97	96	94	92	87	82
Emergency stop torque	T_{2Not}	Nm	938	993	963	1005	1064	941
		in.lb	8301	8788	8523	8894	9416	8328
Max. input speed	n_{1Max}	rpm	4000					
Mean no load running torque [a] (With n_1=3000 min^{-1} and 20° C gear temperature)	T_{012}	Nm	3,6	3,5	3,4	3,2	3	2,8
		in.lb	31,9	31,0	30,1	28,3	26,6	24,8
Max. torsional backlash	j_t	arcmin	≤3					
Torsional rigidity	C_{t21}	Nm/arcmin	78					
		in.lb/arcmin	690					
Max. axial force [b]	F_{2AMax}	N	13900					
		lb_f	3128					
Max. radial force [b]	F_{2RMax}	N	9000					
		lb_f	2025					
Max. tilting moment	M_{2KMax}	Nm	1544					
		in.lb	13664					
Service life (For calculation see "Information")	L_h	h	> 20000					
Weight (without motor attechment parts)	m	kg	26					
		lb_m	57,5					
Operating noise (with n_1 = 3000 rpm no load)	L_{PA}	dB(A)	≤ 66					
Max. permitted housing temperature		°C	+90					
		F	194					
Ambient temperature		°C	-15 to +40					
		F	5 to 104					
Lubrication			Synthetic transmission oil					
Paint			None					
Direction of rotation			See drawing					
Protection class			IP 65					
Moment of inertia (relates to the drive)	J_1	kgcm²	21,31	17,76	17,80	16,38	16,27	16,91
		10^{-3} in.lb.s²	18,86	15,72	15,75	14,49	14,40	14,97

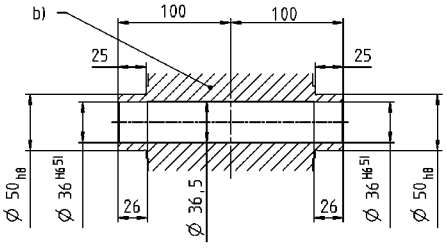
[a] Idling torques decrease during operation
[b] Refers to center of the output shaft or flange











a) Hollow shaft, keywayed
b) Hollow shaft, smooth
c) End disc for screw M12
d) End disc as forcing washer for screw M16
e) Locking ring – DIN 472

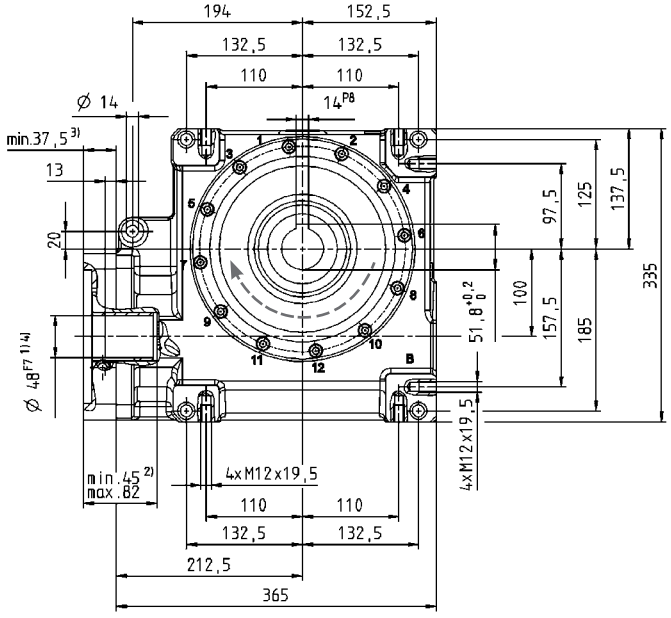
Non-tolerated dimensions ± 1 mm
1) Check motor shaft fit.
2) Min./Max. permissible motor shaft length.
Longer motor shafts are adaptable, please contact us.
3) The dimensions depend on the motor.
4) Smaller motor shaft diameter is compensated by a bushing with a minimum thickness of 1 mm.
5) Tolerance h6 for mounted shaft.

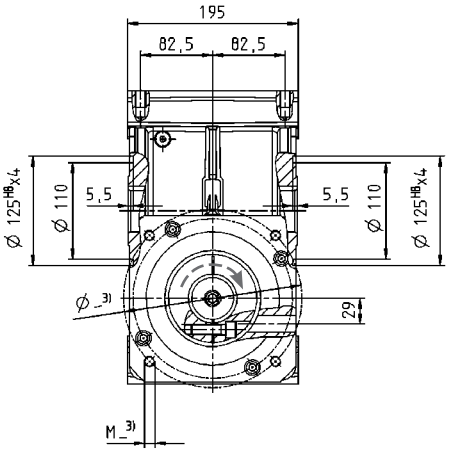
CAD data is available under www.wittenstein-alpha.com

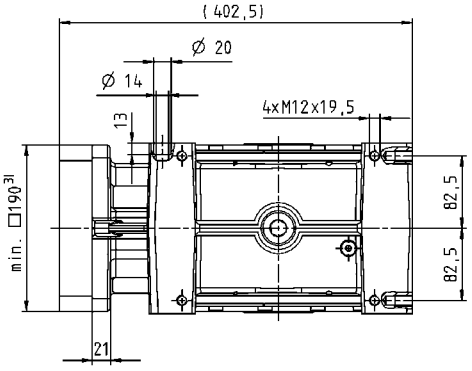
Motor mounting according to operating manual

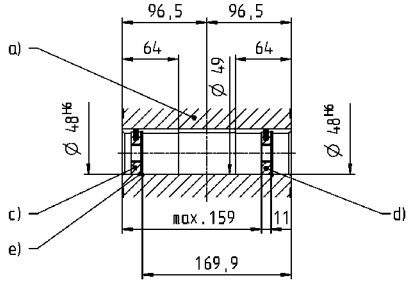
			1-stage					
Ratio	***i***		**4**	**7**	**10**	**16**	**28**	**40**
n_{1N}=500 rpm	T_{2Max}	Nm	1184	1336	1377	1392	1505	1376
		in.lb	10478	11824	12186	12319	13319	12178
	T_{2Servo}	Nm	1155	1304	1343	1359	1469	1343
		in.lb	10222	11540	11886	12027	13001	11886
	η	%	95	93	91	87	80	76
n_{1N}=1000 rpm	T_{2Max}	Nm	905	1070	1122	1140	1251	1162
		in.lb	8009	9470	9930	10089	11071	10284
	T_{2Servo}	Nm	883	1044	1095	1113	1221	1134
		in.lb	7815	9239	9691	9850	10806	10036
	η	%	95	94	92	88	82	79
n_{1N}=2000 rpm	T_{2Max}	Nm	595	748	807	830	930	883
		in.lb	5266	6620	7142	7346	8231	7815
	T_{2Servo}	Nm	581	730	788	810	908	862
		in.lb	5142	6461	6974	7169	8036	7629
	η	%	96	95	94	91	86	82
n_{1N}=3000 rpm [c]	T_{2Max}	Nm	430	564	621	644	735	709
		in.lb	3806	4991	5496	5699	6505	6275
	T_{2Servo}	Nm	420	551	606	629	718	692
		in.lb	3717	4876	5363	5567	6354	6124
	η	%	97	96	95	92	87	84
n_{1N}=3500 rpm	T_{2Max}	Nm in.lb	–	–	–	–	–	–
	T_{2Servo}	Nm in.lb	–	–	–	–	–	–
	η	%	–	–	–	–	–	–
Emergency stop torque	T_{2Not}	Nm	1819	1932	1940	1955	2073	1856
		in.lb	16098	17098	17169	17302	18346	16426
Max. input speed	n_{1Max}	rpm	3500					
Mean no load running torque [a] (With n_1=3000 min^{-1} and 20° C gear temperature)	T_{012}	Nm	9,8	8,1	7,4	6,7	5,8	5
		in.lb	86,7	71,7	65,5	59,3	51,3	44,3
Max. torsional backlash	j_t	arcmin	≤3					
Torsional rigidity	C_{t21}	Nm/arcmin	153					
		in.lb/arcmin	1354					
Max. axial force [b]	F_{2AMax}	N	19500					
		lb_f	4388					
Max. radial force [b]	F_{2RMax}	N	14000					
		lb_f	3150					
Max. tilting moment	M_{2KMax}	Nm	3059					
		in.lb	27072					
Service life (For calculation see "Information")	L_h	h	> 20000					
Weight (without motor attechment parts)	*m*	kg	50					
		lb_m	110,5					
Operating noise (with n_1 = 3000 rpm no load)	L_{PA}	dB(A)	≤ 70					
Max. permitted housing temperature		°C	+90					
		F	194					
Ambient temperature		°C	-15 to +40					
		F	5 to 104					
Lubrication			Synthetic transmission oil					
Paint			None					
Direction of rotation			See drawing					
Protection class			IP 65					
Moment of inertia (relates to the drive)	J_1	kgcm²	65,82	56,27	54,34	55,19	52,72	53,04
		10^{-3} in.lb.s²	58,25	49,80	48,09	48,84	46,66	46,94

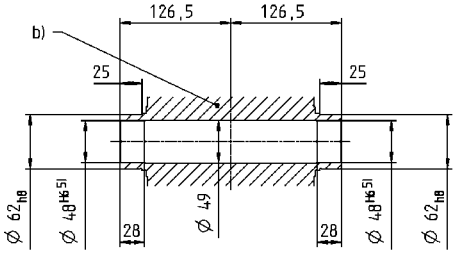
[a] Idling torques decrease during operation
[b] Refers to center of the output shaft or flange
[c] Reduced by 20% in S1 operation











a) Hollow shaft, keywayed
b) Hollow shaft, smooth
c) End disc for screw M16
d) End disc as forcing washer for screw M20
e) Locking ring – DIN 472

Non-tolerated dimensions ± 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 with a minimum thickness of 1 mm.
5) Tolerance h6 for mounted shaft.

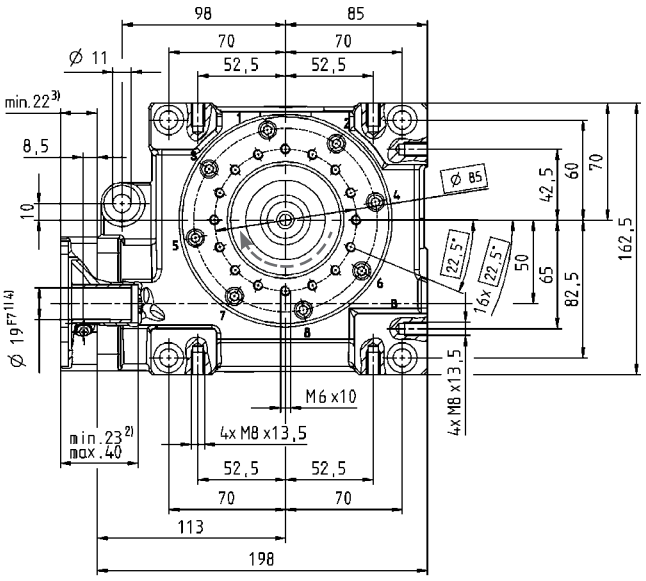
CAD data is available under www.wittenstein-alpha.com

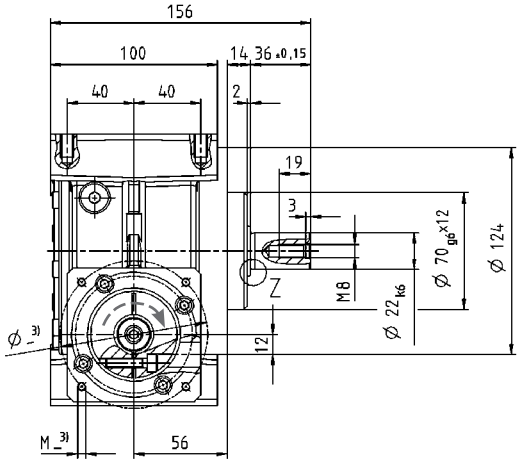
Motor mounting according to operating manual

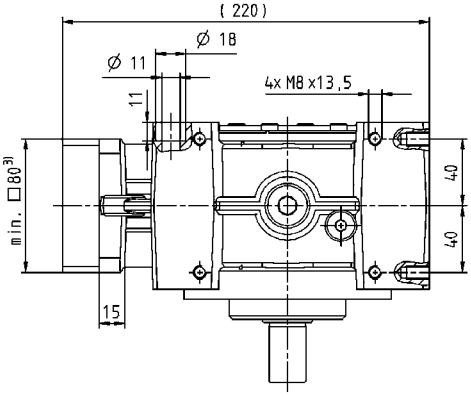
			1-stage					
Ratio	***i***		**4**	**7**	**10**	**16**	**28**	**40**
n_{1N}=500 rpm	T_{2Max}	Nm	124	132	148	154	165	158
		in.lb	1097	1168	1310	1363	1460	1398
	T_{2Servo}	Nm	54	71	74	81	90	74
		in.lb	478	628	655	717	797	655
	η	%	92	89	86	82	72	64
n_{1N}=1000 rpm	T_{2Max}	Nm	124	130	136	140	151	142
		in.lb	1097	1151	1204	1239	1336	1257
	T_{2Servo}	Nm	58	76	80	88	97	81
		in.lb	513	673	708	779	858	717
	η	%	94	91	89	85	77	69
n_{1N}=2000 rpm	T_{2Max}	Nm	88	106	112	120	134	122
		in.lb	779	938	991	1062	1186	1080
	T_{2Servo}	Nm	60	78	82	89	99	83
		in.lb	531	690	726	788	876	735
	η	%	95	93	91	88	75	75
n_{1N}=3000 rpm	T_{2Max}	Nm	72	86	95	106	112	108
		in.lb	637	761	841	938	991	956
	T_{2Servo}	Nm	59	77	81	88	97	81
		in.lb	522	681	717	779	858	717
	η	%	96	94	93	90	83	78
n_{1N}=4000 rpm	T_{2Max}	Nm	62	77	83	92	102	95
		in.lb	549	681	735	814	903	841
	T_{2Servo}	Nm	58	76	79	87	96	80
		in.lb	513	673	699	770	850	708
	η	%	96	95	93	91	85	80
Emergency stop torque	T_{2Not}	Nm	230	242	242	250	262	236
		in.lb	2036	2142	2142	2213	2319	2089
Max. input speed	n_{1Max}	rpm	6000					
Mean no load running torque [a] (With n_1=3000 min^{-1} and 20° C gear temperature)	T_{012}	Nm	1,3	1,2	1,2	1,1	1	0,9
		in.lb	11,5	10,6	10,6	9,7	8,9	8,0
Max. torsional backlash	j_t	arcmin	≤3					
Torsional rigidity	C_{t21}	Nm/arcmin	8					
		in.lb/arcmin	71					
Max. axial force [b]	F_{2AMax}	N	5000					
		lb_f	1125					
Max. radial force [b]	F_{2RMax}	N	3800					
		lb_f	855					
Max. tilting moment	M_{2KMax}	Nm	409					
		in.lb	3620					
Service life (For calculation see "Information")	L_h	h	> 20000					
Weight (without motor attechment parts)	m	kg	8,5					
		lb_m	18,8					
Operating noise (with n_1 = 3000 rpm no load)	L_{PA}	dB(A)	≤ 62					
Max. permitted housing temperature		°C	+90					
		F	194					
Ambient temperature		°C	-15 to +40					
		F	5 to 104					
Lubrication			Synthetic transmission oil					
Paint			None					
Direction of rotation			See drawing					
Protection class			IP 65					
Moment of inertia (relates to the drive)	J_1	kgcm²	2,27	2,03	1,94	1,84	1,81	1,86
		10^{-3} in.lb.s²	2,01	1,80	1,72	1,63	1,60	1,64

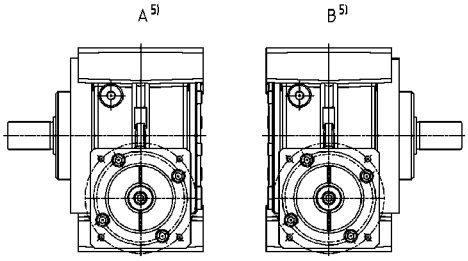
[a] Idling torques decrease during operation

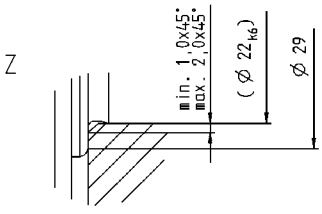
[b] Refers to center of the output shaft or flange

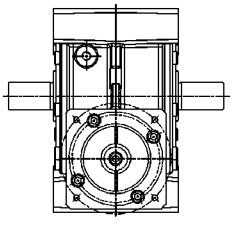








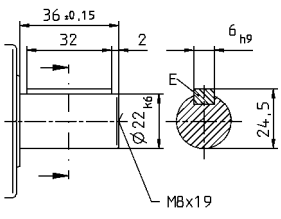




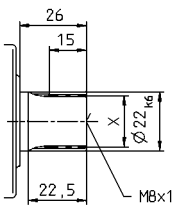
Optional dual-shaft output. Drawings available upon request.
Involute gearing is not possible.

Alternatives: Output shaft variants

Keywayed output shaft in mm
E = key as per DIN 6885, sheet 1, form A



Involute gearing DIN 5480 in mm
X = W 22 x 1.25 x 30 x 16 x 6m



Non-tolerated dimensions ± 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 with a minimum thickness of 1 mm.
5) Output side

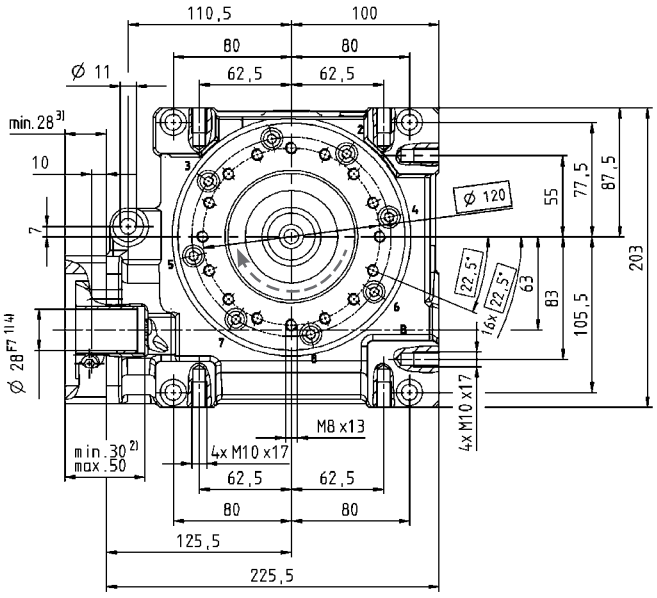
CAD data is available under www.wittenstein-alpha.com

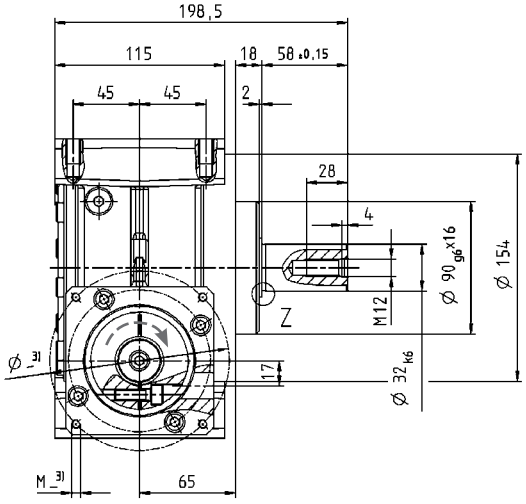
Motor mounting according to operating manual

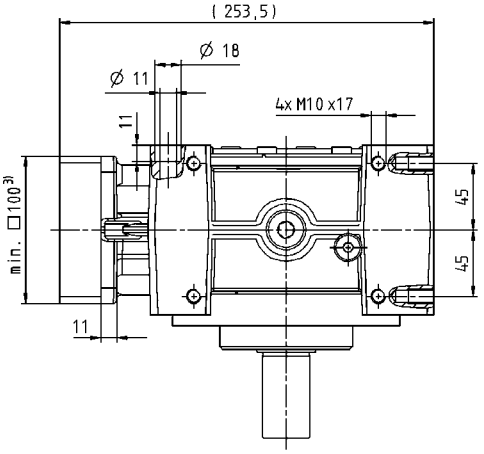
			1-stage					
Ratio	***i***		**4**	**7**	**10**	**16**	**28**	**40**
n_{1N}=500 rpm	T_{2Max}	Nm	302	314	315	320	328	324
		in.lb	2673	2779	2788	2832	2903	2867
	T_{2Servo}	Nm	198	210	225	221	229	226
		in.lb	1752	1859	1991	1956	2027	2000
	η	%	93	91	88	83	74	68
n_{1N}=1000 rpm	T_{2Max}	Nm	264	284	290	298	304	301
		in.lb	2336	2513	2567	2637	2690	2664
	T_{2Servo}	Nm	192	228	240	238	245	241
		in.lb	1699	2018	2124	2106	2168	2133
	η	%	94	93	91	86	78	73
n_{1N}=2000 rpm	T_{2Max}	Nm	202	243	262	271	282	278
		in.lb	1788	2151	2319	2398	2496	2460
	T_{2Servo}	Nm	174	212	230	238	248	243
		in.lb	1540	1876	2036	2106	2195	2151
	η	%	96	94	93	89	83	78
n_{1N}=3000 rpm	T_{2Max}	Nm	164	190	202	209	235	231
		in.lb	1451	1682	1788	1850	2080	2044
	T_{2Servo}	Nm	128	166	184	209	198	194
		in.lb	1133	1469	1628	1850	1752	1717
	η	%	96	95	94	91	85	81
n_{1N}=4000 rpm	T_{2Max}	Nm	128	148	164	175	201	198
		in.lb	1133	1310	1451	1549	1779	1752
	T_{2Servo}	Nm	104	132	152	175	165	162
		in.lb	920	1168	1345	1549	1460	1434
	η	%	97	96	94	92	86	83
Emergency stop torque	T_{2Not}	Nm	460	484	491	494	518	447
		in.lb	4071	4283	4345	4372	4584	3956
Max. input speed	n_{1Max}	rpm	4500					
Mean no load running torque [a] (With n_1=3000 min^{-1} and 20° C gear temperature)	T_{012}	Nm	2,1	1,9	1,8	1,7	1,6	1,4
		in.lb	18,6	16,8	15,9	15,0	14,2	12,4
Max. torsional backlash	j_t	arcmin	≤3					
Torsional rigidity	C_{t21}	Nm/arcmin	28					
		in.lb/arcmin	248					
Max. axial force [b]	F_{2AMax}	N	8250					
		lb_f	1856					
Max. radial force [b]	F_{2RMax}	N	6000					
		lb_f	1350					
Max. tilting moment	M_{2KMax}	Nm	843					
		in.lb	7461					
Service life (For calculation see "Information")	L_h	h	> 20000					
Weight (without motor attechment parts)	m	kg	15					
		lb_m	33,2					
Operating noise (with n_1 = 3000 rpm no load)	L_{PA}	dB(A)	≤ 64					
Max. permitted housing temperature		°C	+90					
		F	194					
Ambient temperature		°C	-15 to +40					
		F	5 to 104					
Lubrication			Synthetic transmission oil					
Paint			None					
Direction of rotation			See drawing					
Protection class			IP 65					
Moment of inertia (relates to the drive)	J_1	kgcm²	6,72	5,79	5,54	5,44	5,41	5,35
		10^{-3} in.lb.s²	5,95	5,12	4,90	4,82	4,78	4,74

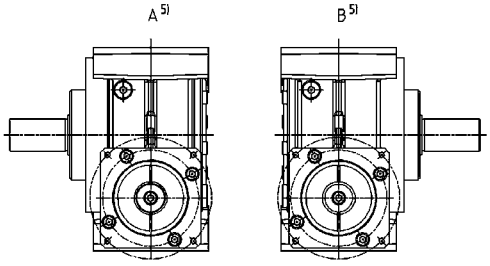
[a] Idling torques decrease during operation

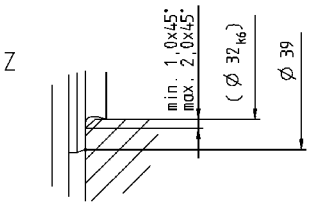
[b] Refers to center of the output shaft or flange

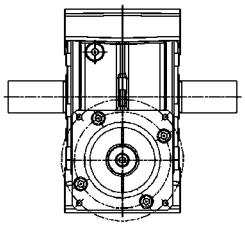










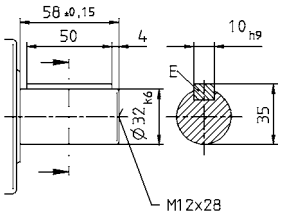


Optional dual-shaft output. Drawings available upon request.
Involute gearing is not possible.

Alternatives: Output shaft variants

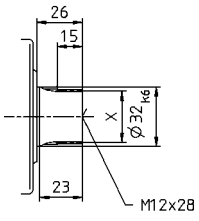
Keywayed output shaft in mm

E = key as per DIN 6885, sheet 1, form A



Involute gearing DIN 5480

X = W 32 x 1.25 x 30 x 24 x 6m



Non-tolerated dimensions ± 1 mm

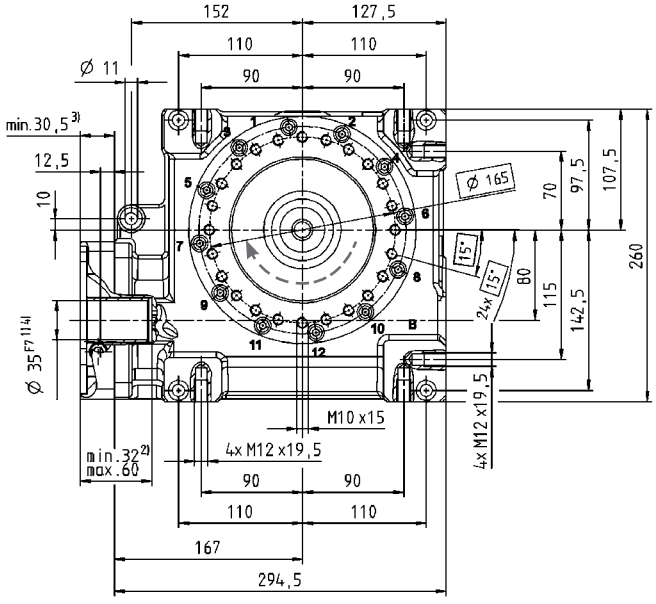
1) Check motor shaft fit.
2) Min./Max. permissible motor shaft length.
   Longer motor shafts are adaptable, please contact us.
3) The dimensions depend on the motor.
4) Smaller motor shaft diameter is compensated by a bushing with a minimum thickness of 1 mm.
5) Output side

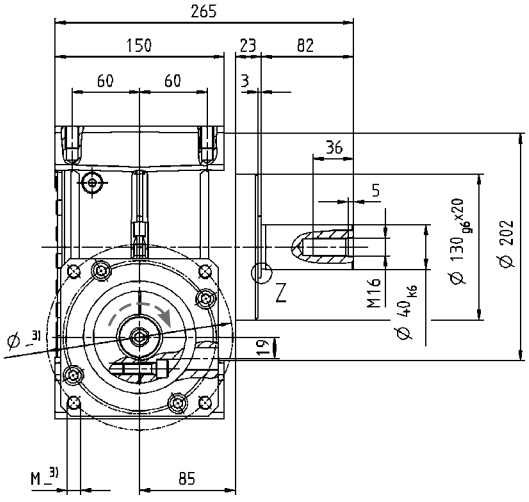
CAD data is available under www.wittenstein-alpha.com

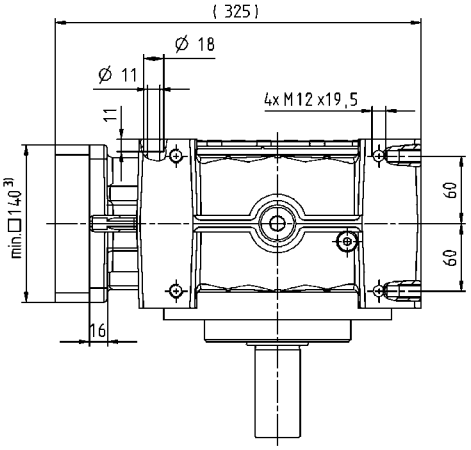
Motor mounting according to operating manual

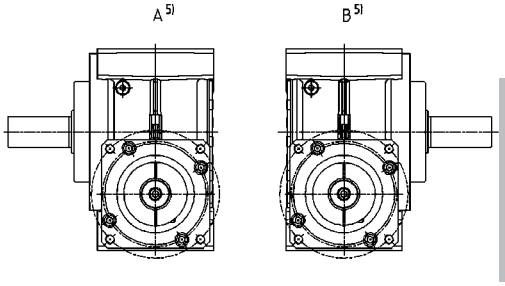
			1-stage					
Ratio	***i***		**4**	**7**	**10**	**16**	**28**	**40**
n_{1N}=500 rpm	T_{2Max}	Nm	578	646	672	702	785	676
		in.lb	5115	5717	5947	6213	6947	5983
	T_{2Servo}	Nm	469	601	613	677	764	631
		in.lb	4151	5319	5425	5991	6761	5584
	η	%	94	92	89	86	77	70
n_{1N}=1000 rpm	T_{2Max}	Nm	514	602	588	656	698	613
		in.lb	4549	5328	5204	5806	6177	5425
	T_{2Servo}	Nm	491	574	561	625	665	584
		in.lb	4345	5080	4965	5531	5885	5168
	η	%	95	93	91	88	81	74
n_{1N}=2000 rpm	T_{2Max}	Nm	350	435	431	500	536	470
		in.lb	3098	3850	3814	4425	4744	4160
	T_{2Servo}	Nm	335	415	411	476	511	448
		in.lb	2965	3673	3637	4213	4522	3965
	η	%	96	95	93	89	84	79
n_{1N}=3000 rpm	T_{2Max}	Nm	259	336	334	400	433	380
		in.lb	2292	2974	2956	3540	3832	3363
	T_{2Servo}	Nm	247	320	319	381	413	362
		in.lb	2186	2832	2823	3372	3655	3204
	η	%	97	96	94	92	86	81
n_{1N}=3500 rpm	T_{2Max}	Nm	227	299	300	362	394	346
		in.lb	2009	2646	2655	3204	3487	3062
	T_{2Servo}	Nm	217	285	286	345	376	330
		in.lb	1920	2522	2531	3053	3328	2921
	η	%	97	96	94	92	87	82
Emergency stop torque	T_{2Not}	Nm	938	993	963	1005	1064	941
		in.lb						
Max. input speed	n_{1Max}	rpm	4000					
Mean no load running torque [a] (With n_1=3000 min^{-1} and 20° C gear temperature)	T_{012}	Nm	3,6	3,5	3,4	3,2	3	2,8
		in.lb	31,9	31,0	30,1	28,3	26,6	24,8
Max. torsional backlash	j_t	arcmin	≤3					
Torsional rigidity	C_{t21}	Nm/arcmin	78					
		in.lb/arcmin	690					
Max. axial force [b]	F_{2AMax}	N	13900					
		lb_f	3128					
Max. radial force [b]	F_{2RMax}	N	9000					
		lb_f	2025					
Max. tilting moment	M_{2KMax}	Nm	1544					
		in.lb	13664					
Service life (For calculation see "Information")	L_h	h	> 20000					
Weight (without motor attechment parts)	m	kg	32					
		lb_m	70,7					
Operating noise (with n_1 = 3000 rpm no load)	L_{PA}	dB(A)	≤ 66					
Max. permitted housing temperature		°C	+90					
		F	194					
Ambient temperature		°C	-15 to +40					
		F	5 to 104					
Lubrication			Synthetic transmission oil					
Paint			None					
Direction of rotation			See drawing					
Protection class			IP 65					
Moment of inertia (relates to the drive)	J_1	kgcm²	20,74	17,57	17,70	16,34	16,25	16,91
		10^{-3} in.lb.s²	18,36	15,55	15,67	14,46	14,38	14,96

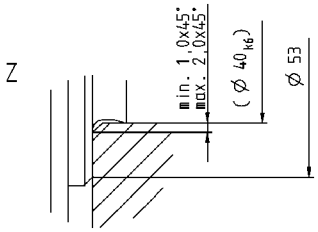
[a] Idling torques decrease during operation
[b] Refers to center of the output shaft or flange

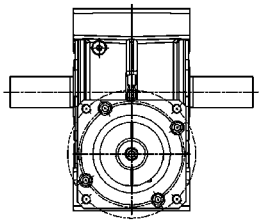








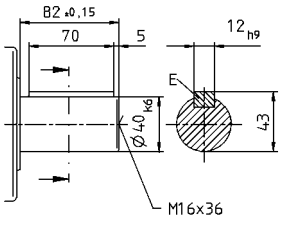




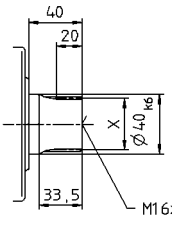
Optional dual-shaft output. Drawings available upon request.
Involute gearing is not possible.

Alternatives: Output shaft variants

Keywayed output shaft in mm
E = key as per DIN 6885, sheet 1, form A



Involute gearing DIN 5480
X = W 40 x 2 x 30 x 18 x 6m



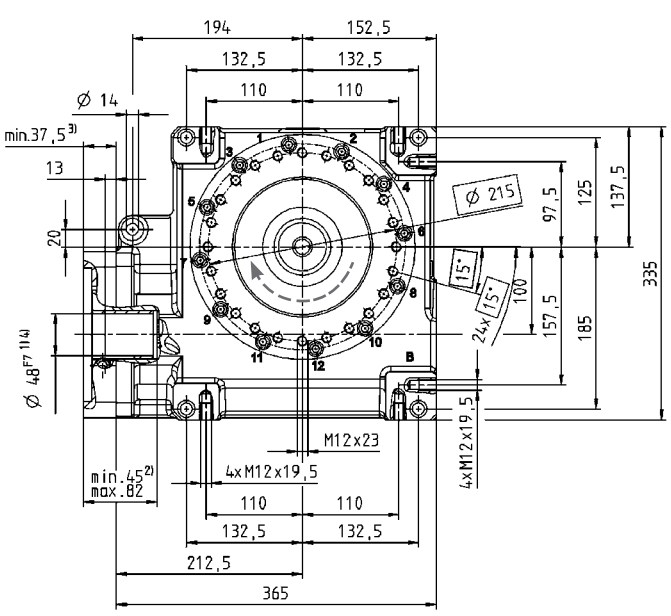
Non-tolerated dimensions ± 1 mm
1) Check motor shaft fit.
2) Min./Max. permissible motor shaft length.
Longer motor shafts are adaptable, please contact us.
3) The dimensions depend on the motor.
4) Smaller motor shaft diameter is compensated by a bushing with a minimum thickness of 1 mm.
5) Output side

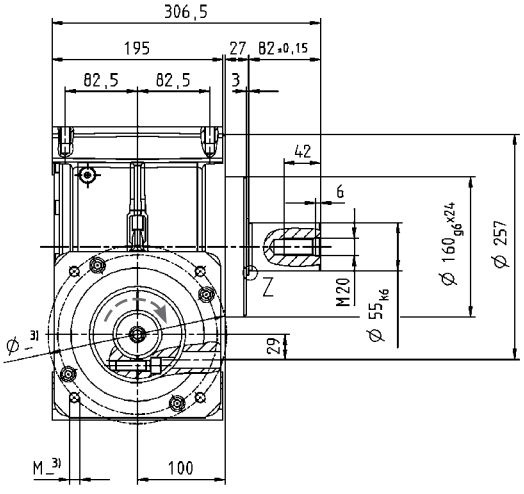
CAD data is available under www.wittenstein-alpha.com

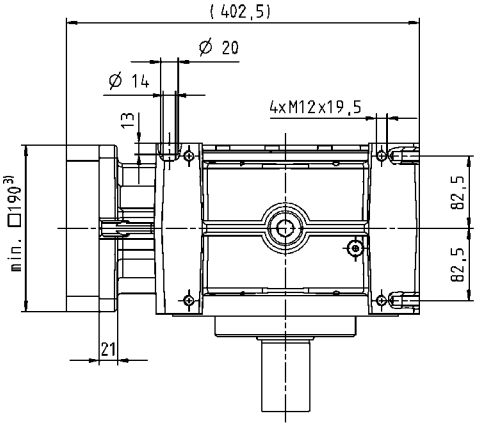
Motor mounting according to operating manual

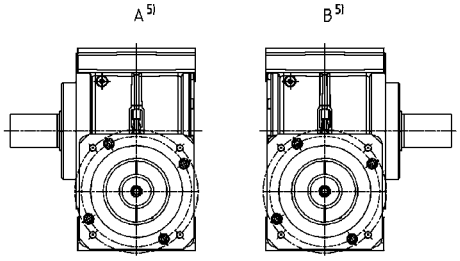
			1-stage					
Ratio	***i***		**4**	**7**	**10**	**16**	**28**	**40**
n_{1N}=500 rpm	T_{2Max}	Nm	1184	1336	1377	1392	1505	1376
		in.lb	10478	11824	12186	12319	13319	12178
	T_{2Servo}	Nm	1155	1304	1343	1359	1469	1343
		in.lb	10222	11540	11886	12027	13001	11886
	η	%	95	93	91	87	80	76
n_{1N}=1000 rpm	T_{2Max}	Nm	905	1070	1122	1140	1251	1162
		in.lb	8009	9470	9930	10089	11071	10284
	T_{2Servo}	Nm	883	1044	1095	1113	1221	1134
		in.lb	7815	9239	9691	9850	10806	10036
	η	%	95	94	92	88	82	79
n_{1N}=2000 rpm	T_{2Max}	Nm	595	748	807	830	930	883
		in.lb	5266	6620	7142	7346	8231	7815
	T_{2Servo}	Nm	581	730	788	810	908	862
		in.lb	5142	6461	6974	7169	8036	7629
	η	%	96	95	94	91	86	82
n_{1N}=3000 rpm [c]	T_{2Max}	Nm	430	564	621	644	735	709
		in.lb	3806	4991	5496	5699	6505	6275
	T_{2Servo}	Nm	420	551	606	629	718	692
		in.lb	3717	4876	5363	5567	6354	6124
	η	%	97	96	95	92	87	84
n_{1N}=3500 rpm	T_{2Max}	Nm in.lb	–	–	–	–	–	–
	T_{2Servo}	Nm in.lb	–	–	–	–	–	–
	η	%	–	–	–	–	–	–
Emergency stop torque	T_{2Not}	Nm	1819	1932	1940	1955	2073	1856
		in.lb	16098	17098	17169	17302	18346	16426
Max. input speed	n_{1Max}	rpm	3500					
Mean no load running torque [a] (With n_1=3000 min^{-1} and 20° C gear temperature)	T_{012}	Nm	9,8	8,1	7,4	6,7	5,8	5
		in.lb	86,7	71,7	65,5	59,3	51,3	44,3
Max. torsional backlash	j_t	arcmin	≤3					
Torsional rigidity	C_{t21}	Nm/arcmin	153					
		in.lb/arcmin	1354					
Max. axial force [b]	F_{2AMax}	N	19500					
		lb_f	4388					
Max. radial force [b]	F_{2RMax}	N	14000					
		lb_f	3150					
Max. tilting moment	M_{2KMax}	Nm	3059					
		in.lb	27072					
Service life (For calculation see "Information")	L_h	h	> 20000					
Weight (without motor attechment parts)	m	kg	61					
		lb_m	134,8					
Operating noise (with n_1 = 3000 rpm no load)	L_{PA}	dB(A)	≤ 70					
Max. permitted housing temperature		°C	+90					
		F	194					
Ambient temperature		°C	-15 to +40					
		F	5 to 104					
Lubrication			Synthetic transmission oil					
Paint			None					
Direction of rotation			See drawing					
Protection class			IP 65					
Moment of inertia (relates to the drive)	J_1	kgcm²	65,59	56,20	54,30	55,17	52,71	53,04
		10^{-3} in.lb.s²	58,05	49,73	48,06	48,83	46,65	46,94

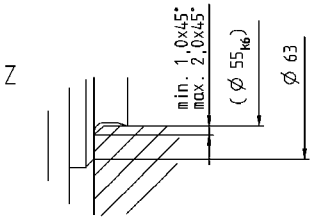
[a] Idling torques decrease during operation
[b] Refers to center of the output shaft or flange
[c] Reduced by 20% in S1 operation

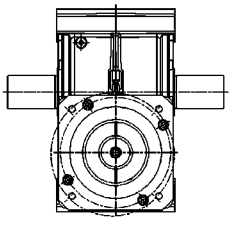








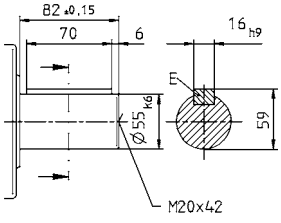




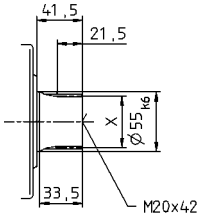
Optional dual-shaft output. Drawings available upon request.
Involute gearing is not possible.

Alternatives: Output shaft variants

Keywayed output shaft in mm
E = key as per DIN 6885, sheet 1, form A



Involute gearing DIN 5480
X = W 55 x 2 x 30 x 26 x 6m



Non-tolerated dimensions ± 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 with a minimum thickness of 1 mm.
5) Output side

CAD data is available under www.wittenstein-alpha.com

Motor mounting according to operating manual

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, hollow shaft and hollow shaft flange outputs.

Output type:
VDHe: hollow shaft, smooth/keywayed
VDSe: solid shaft, smooth/keywayed

Maximum durability

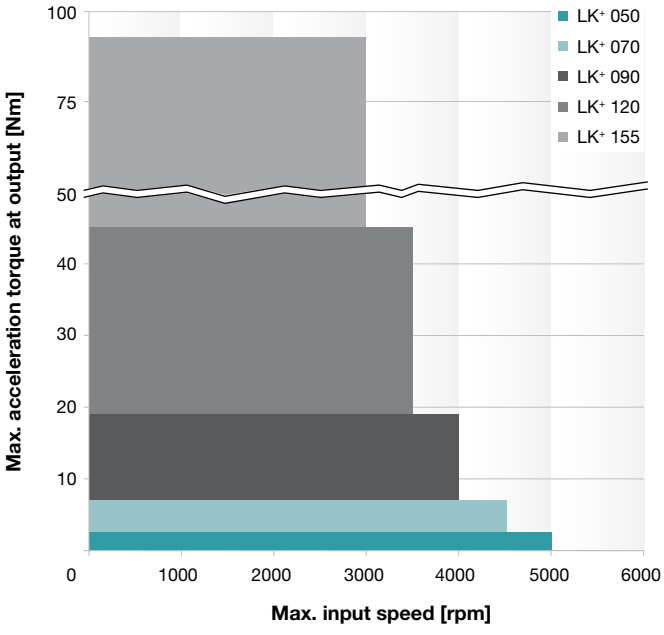
Your WITTENSTEIN alpha right-angle gearhead is extremely reliable due to the overall design and 100% WITTENSTEIN alpha inspections: **"mount and forget"**. A length compensation feature integrated in your WITTENSTEIN alpha right-angle gearhead as standard maximizes the lifespan of your servo motor during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

LK+/LPK+/LPBK+ – The economical bevel gears

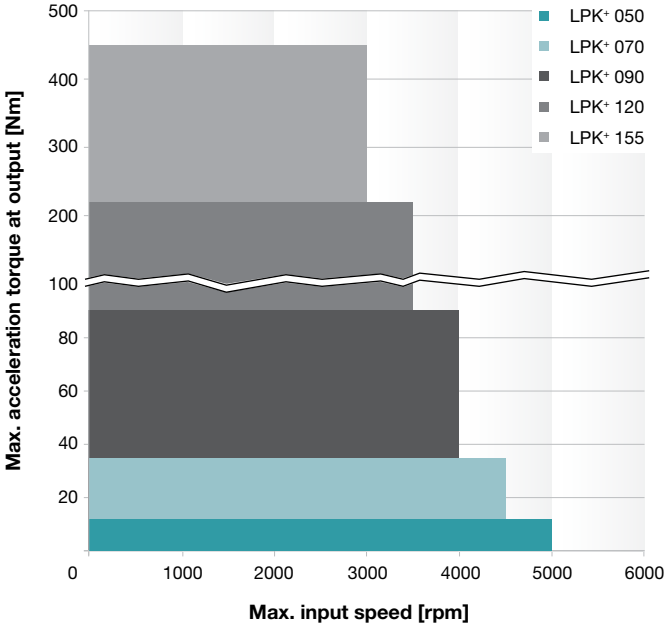
The flexible LK+/LPK+/LPBK+ all-round talent with an excellent price/performance ratio is ideal for all applications where economical precision is required. Thanks to their perfectly-matched bevel gear toothing, the LK+/LPK+ and LPBK+ right-angle gearheads achieve a level of economic precision which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

Quick size selection

LK+ (example for i = 1)
For applications in cyclic operation (ED ≥ 60%)



LPK+/LPBK+ (example for i = 5)
For applications in cyclic operation (ED ≥ 60%)



Versions and Applications

LK+

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

LPK+

- High power density
- High positioning accuracy
- Compact design

LPBK+

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

Comparison

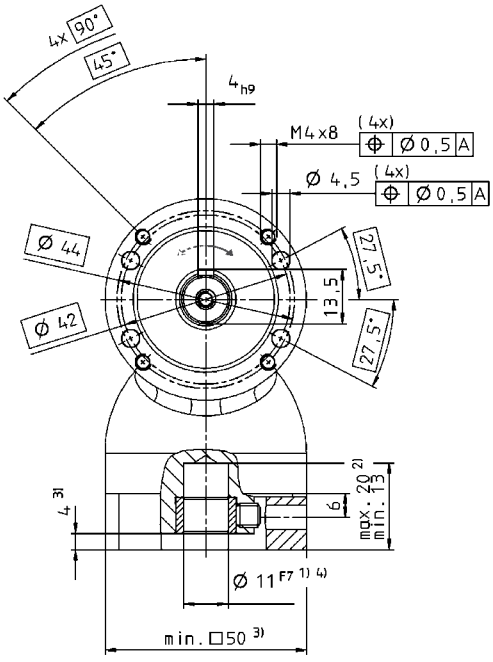
Features		**LK+** from page 280	**LPK+** from page 290	**LPBK+** from page 300
Ratios [c]		1 – 1	3 – 100	3 – 100
Torsional backlash [arcmin] [c]	Standard	≤ 15	≤ 12	≤ 12
	Reduced	–	–	–
Output type				
Smooth output shaft			•	
Keywayed output shaft		•	•	
Output flange				•
Input type				
Motor mounted version		•	•	•
Type				
Food-grade lubrication [a] [b]		•	•	•
Accessories				
Coupling		•	•	
Rack		•	•	
Belt pulley				•
NEMA flange		•	•	•

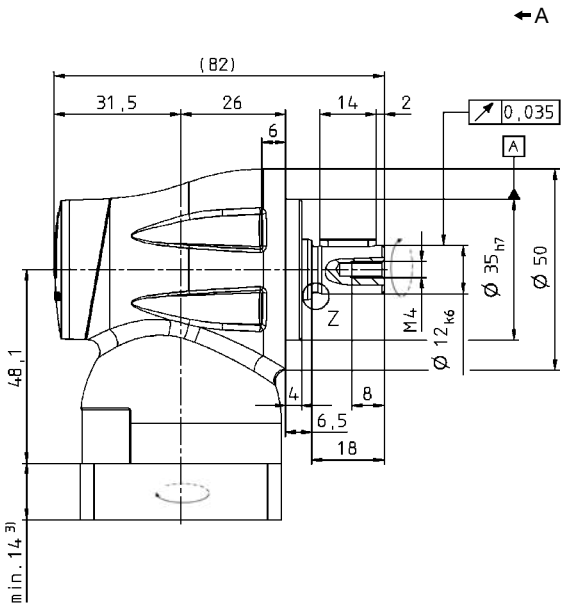
[a] Power reduction: technical data available upon request [b] Please contact WITTENSTEIN alpha [c] In relation to reference sizes

			1-stage
Ratio	i		**1**
Max. acceleration torque (max. 1000 cycles per hour)	T_{2B}	Nm	2.5
		in.lb	22
Nominal output torque (with n_{1N})	T_{2N}	Nm	1.2
		in.lb	11
Emergency stop torque (permitted 1000 times during the service life of the gearhead)	T_{2Not}	Nm	5
		in.lb	44
Nominal input speed (with T_{2N} and 20°C ambient temperature) [a]	n_{1N}	rpm	3200
Max. input speed	n_{1Max}	rpm	5000
Mean no load running torque (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_{t21}	Nm/ arcmin	–
		in.lb/ arcmin	
Max. axial force [b]	F_{2AMax}	N	100
		lb_f	23
Max. radial force [b]	F_{2RMax}	N	650
		lb_f	146
Efficiency at full load	η	%	95
Service life (For calculation, see the Chapter “Information”)	L_h	h	> 20000
Weight incl. standard adapter plate	m	kg	0.7
		lb_m	1.5
Operating noise (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 (relates to the drive)	J_1	$kgcm^2$	0.14
		10^{-3} in.lb.s²	0.12

[a] For higher ambient temperatures, please reduce input speed
[b] Refers to center of the output shaft, if n_2 = 1000 rpm

1-stage:





Non-tolerated dimensions ±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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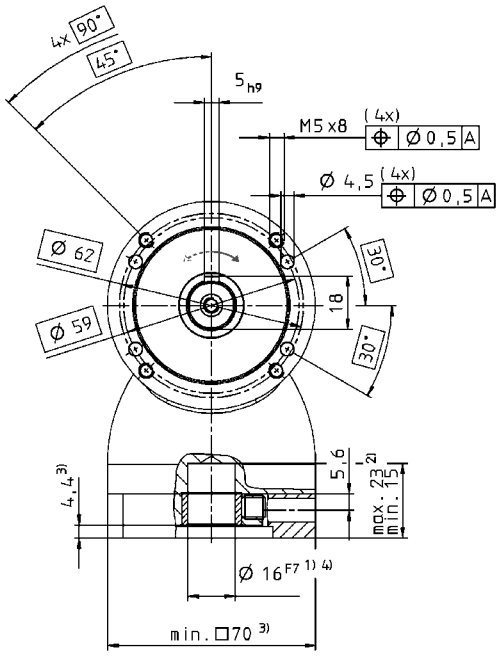
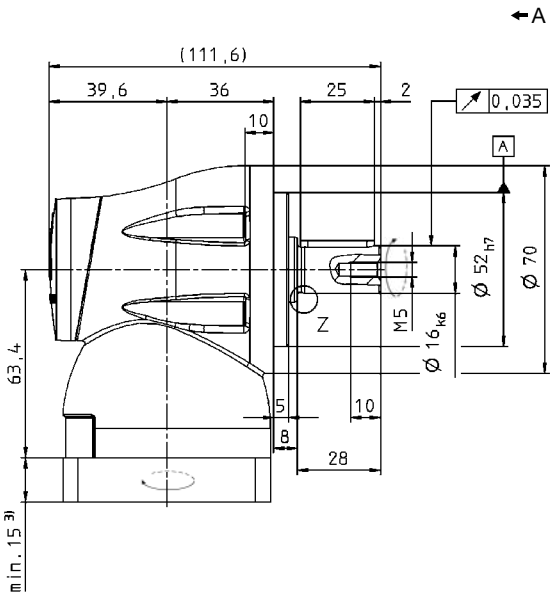
Motor mounting according to operating manual

			1-stage
Ratio	***i***		**1**
Max. acceleration torque (max. 1000 cycles per hour)	T_{2B}	Nm	7
		in.lb	60
Nominal output torque (with n_{1N})	T_{2N}	Nm	3.7
		in.lb	33
Emergencye stop torque (permitted 1000 times during the service life of the gearhead)	T_{2Not}	Nm	15
		in.lb	130
Nominal input speed (with T_{2N} and 20°C ambient temperature) [a]	n_{1N}	rpm	3000
Max. input speed	n_{1Max}	rpm	4500
Mean no load running torque (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_{t21}	Nm/ arcmin	–
		in.lb/ arcmin	
Max. axial force [b]	F_{2AMax}	N	200
		lb_f	45
Max. radial force [b]	F_{2RMax}	N	1450
		lb_f	330
Efficiency at full load	η	%	95
Service life (For calculation, see the Chapter “Information”)	L_h	h	> 20000
Weight incl. standard adapter plate	*m*	kg	1.9
		lb_m	4.2
Operating noise (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 (relates to the drive)	J_1	$kgcm^2$	0.7
		10^{-3} in.lb.s²	0.6

[a] For higher ambient temperatures, please reduce input speed
[b] Refers to center of the output shaft, if n_2 = 1000 rpm

1-stage:





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3) The dimensions depend on the motor.
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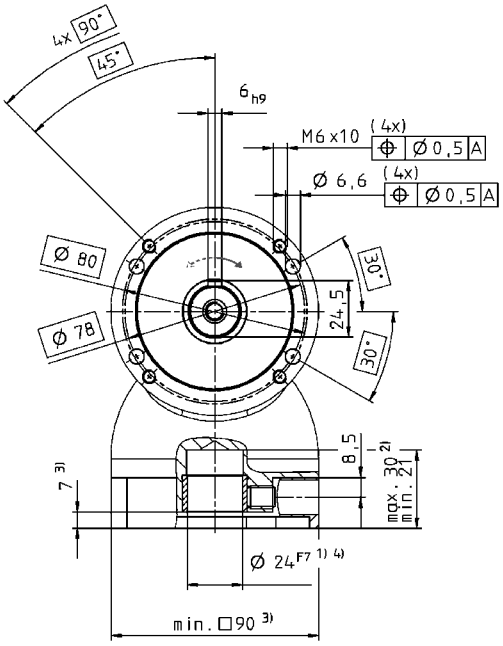
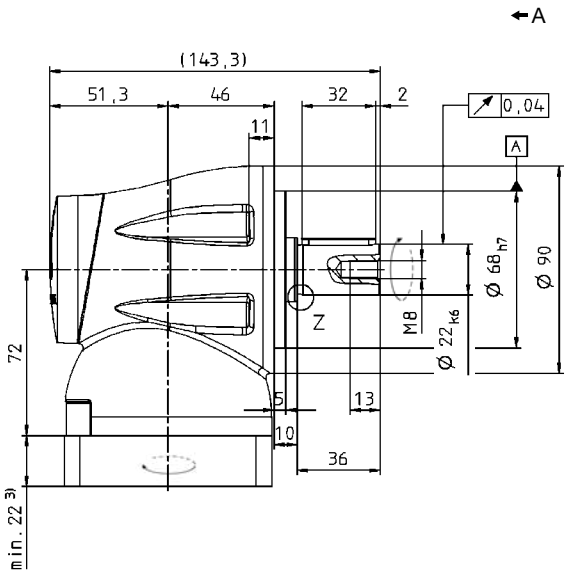
Motor mounting according to operating manual

			1-stage
Ratio	***i***		**1**
Max. acceleration torque (max. 1000 cycles per hour)	T_{2B}	Nm	19
		in.lb	170
Nominal output torque (with n_{1N})	T_{2N}	Nm	9.3
		in.lb	82
Emergencye stop torque (permitted 1000 times during the service life of the gearhead)	T_{2Not}	Nm	37
		in.lb	330
Nominal input speed (with T_{2N} and 20°C ambient temperature) [a]	n_{1N}	rpm	2700
Max. input speed	n_{1Max}	rpm	4000
Mean no load running torque (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_{t21}	Nm/ arcmin	1.3
		in.lb/ arcmin	11
Max. axial force [b]	F_{2AMax}	N	450
		lb_f	100
Max. radial force [b]	F_{2RMax}	N	2400
		lb_f	540
Efficiency at full load	η	%	95
Service life (For calculation, see the Chapter “Information”)	L_h	h	> 20000
Weight incl. standard adapter plate	m	kg	3.2
		lb_m	7.1
Operating noise (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 (relates to the drive)	J_1	$kgcm^2$	3.3
		10^{-3} in.lb.s²	2.9

[a] For higher ambient temperatures, please reduce input speed
[b] Refers to center of the output shaft, if n_2 = 1000 rpm

1-stage:





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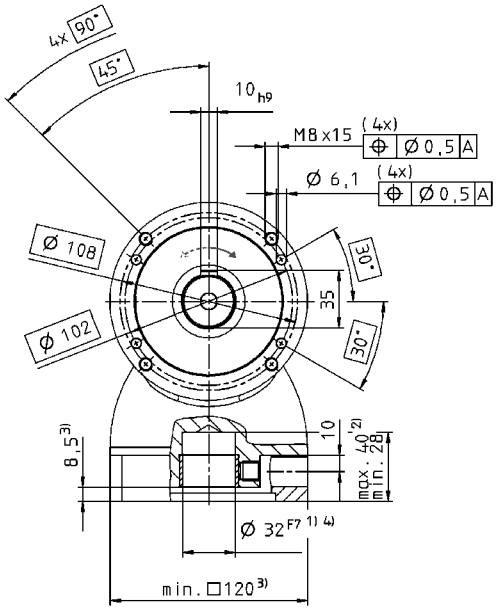
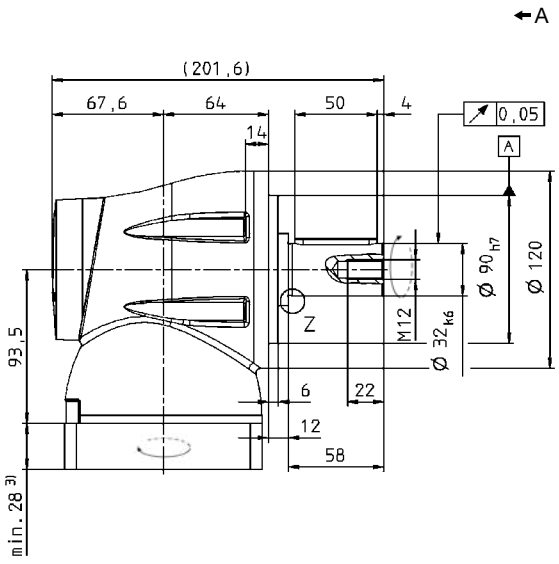
Motor mounting according to operating manual

			1-stage
Ratio	i		**1**
Max. acceleration torque (max. 1000 cycles per hour)	T_{2B}	Nm	45
		in.lb	400
Nominal output torque (with n_{1N})	T_{2N}	Nm	23
		in.lb	200
Emergency stop torque (permitted 1000 times during the service life of the gearhead)	T_{2Not}	Nm	93
		in.lb	820
Nominal input speed (with T_{2N} and 20°C ambient temperature) [a]	n_{1N}	rpm	2100
Max. input speed	n_{1Max}	rpm	3500
Mean no load running torque (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_{t21}	Nm/ arcmin	–
		in.lb/ arcmin	
Max. axial force [b]	F_{2AMax}	N	750
		lb_f	170
Max. radial force [b]	F_{2RMax}	N	4600
		lb_f	1040
Efficiency at full load	η	%	95
Service life (For calculation, see the Chapter “Information”)	L_h	h	> 20000
Weight incl. standard adapter plate	m	kg	8.9
		lb_m	20
Operating noise (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 (relates to the drive)	J_1	$kgcm^2$	14
		10^{-3} in.lb.s²	12

[a] For higher ambient temperatures, please reduce input speed
[b] Refers to center of the output shaft, if n_2 = 1000 rpm

1-stage:





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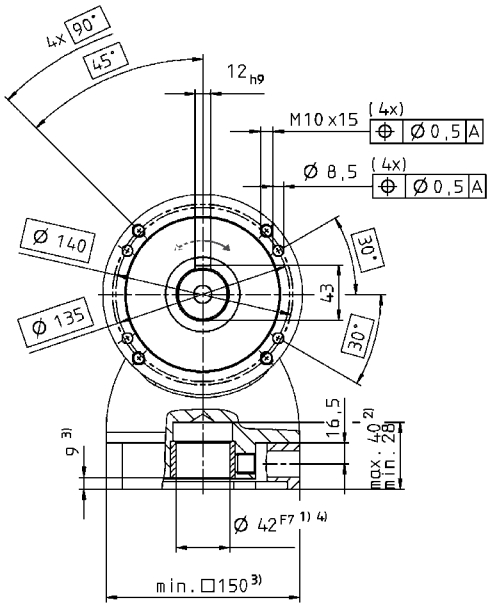
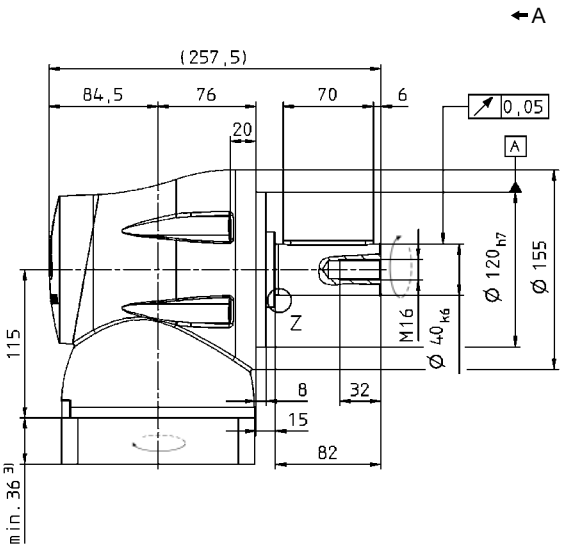
Motor mounting according to operating manual

			1-stage
Ratio	i		**1**
Max. acceleration torque (max. 1000 cycles per hour)	T_{2B}	Nm	93
		in.lb	820
Nominal output torque (with n_{1N})	T_{2N}	Nm	66
		in.lb	580
Emergency stop torque (permitted 1000 times during the service life of the gearhead)	T_{2Not}	Nm	194
		in.lb	1720
Nominal input speed (with T_{2N} and 20°C ambient temperature) [a]	n_{1N}	rpm	1600
Max. input speed	n_{1Max}	rpm	3000
Mean no load running torque (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_{t21}	Nm/ arcmin	–
		in.lb/ arcmin	
Max. axial force [b]	F_{2AMax}	N	1000
		lb_f	225
Max. radial force [b]	F_{2RMax}	N	7500
		lb_f	1690
Efficiency at full load	η	%	95
Service life (For calculation, see the Chapter “Information”)	L_h	h	> 20000
Weight incl. standard adapter plate	m	kg	19
		lb_m	42
Operating noise (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 (relates to the drive)	J_1	$kgcm^2$	57
		10^{-3} in.lb.s²	51

[a] For higher ambient temperatures, please reduce input speed
[b] Refers to center of the output shaft, if n_2 = 1000 rpm

1-stage:





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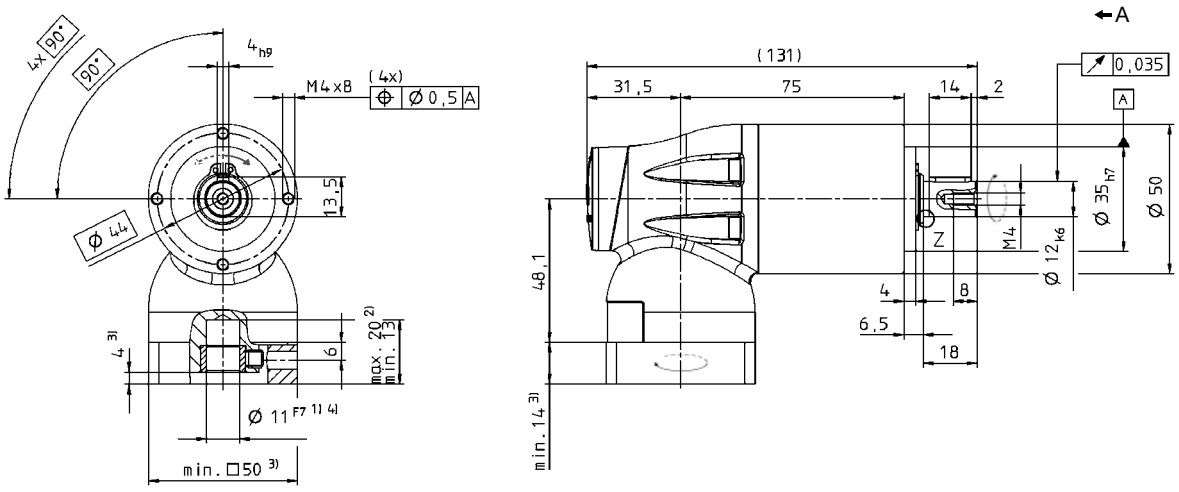
Motor mounting according to operating manual

			2-stage				3-stage						
Ratio	***i***		**4**	**5**	**7**	**10**	**16**	**20**	**25**	**35**	**50**	**70**	**100**
Max. acceleration torque (max. 1000 cycles per hour)	T_{2B}	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 (with n_{1N})	T_{2N}	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 (permitted 1000 times during the service life of the gearhead)	T_{2Not}	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 (with T_{2N} and 20°C ambient temperature) [a]	n_{1N}	rpm	3200	3200	3200	3200	3200	3200	3200	3200	3200	3200	3200
Max. input speed	n_{1Max}	rpm	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000
Mean no load running torque (with n_1 = 3000 rpm and 20°C gearhead temperature)	T_{012}	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	j_t	arcmin	≤ 16				≤ 15						
Torsional rigidity	C_{t21}	Nm/ arcmin	–				–						
		in.lb/ arcmin											
Max. axial force [b]	F_{2AMax}	N	700				700						
		lb_f	160				160						
Max. radial force [b]	F_{2RMax}	N	650				650						
		lb_f	150				150						
Efficiency at full load	η	%	92				90						
Service life (For calculation. see the Chapter "Information")	L_h	h	> 20000				> 20000						
Weight incl. standard adapter plate	*m*	kg	1.4				1.6						
		lb_m	3.1				3.5						
Operating noise (for i = 10 and n_1 = 3000 rpm without 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			Blue RAL 5002										
Direction of rotation			Motor and gearhead same direction										
Protection class			IP 64										
Moment of inertia (relates to the drive)	J_1	kgcm²	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16
		10^{-3} in.lb.s²	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14

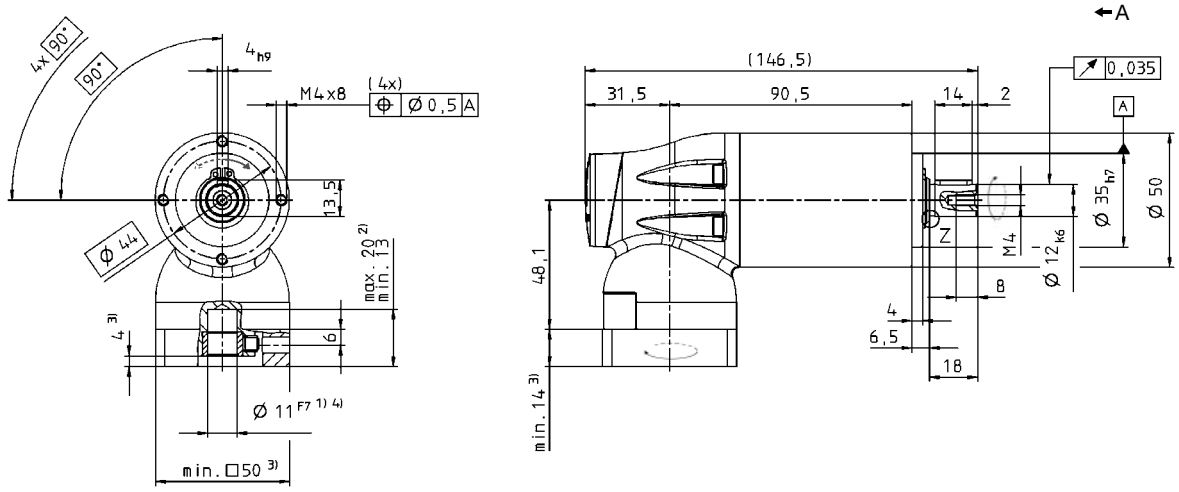
[a] For higher ambient temperatures, please reduce input speed

[b] Refers to center of the output shaft, if n_2 = 100 rpm

2-stage:



3-stage:



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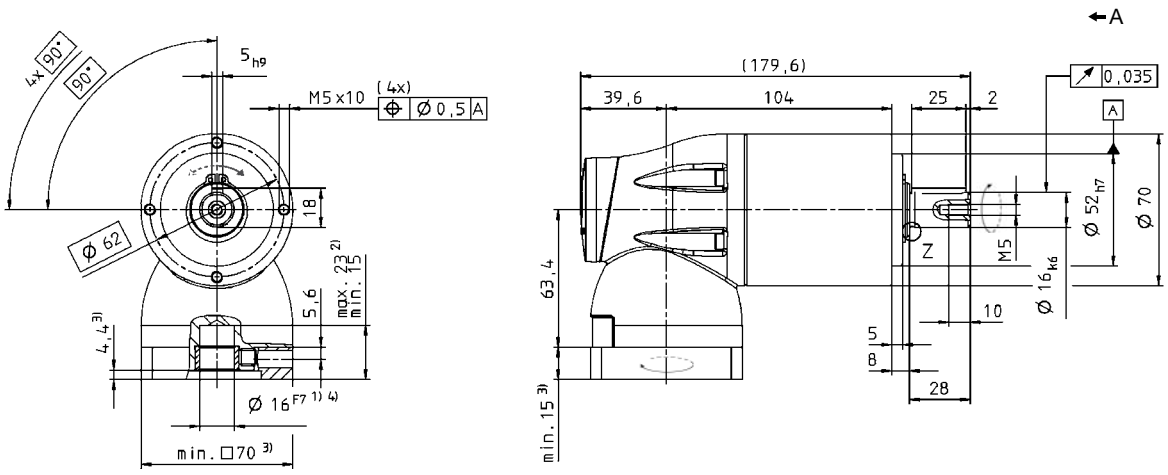
Motor mounting according to operating manual

			2-stage					3-stage						
Ratio	***i***		**3**	**4**	**5**	**7**	**10**	**16**	**20**	**25**	**30**	**50**	**70**	**100**
Max. acceleration torque (max. 1000 cycles per hour)	T_{2B}	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 (with n_{1N})	T_{2N}	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 (permitted 1000 times during the service life of the gearhead)	T_{2Not}	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 (with T_{2N} and 20°C ambient temperature) [a]	n_{1N}	rpm	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000
Max. input speed	n_{1Max}	rpm	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500
Mean no load running torque (with n_1 = 3000 rpm and 20°C gearhead temperature)	T_{012}	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	j_t	arcmin	≤ 14					≤ 12						
Torsional rigidity	C_{t21}	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 [b]	F_{2AMax}	N	1550					1550						
		lb_f	350					350						
Max. radial force [b]	F_{2RMax}	N	1450					1450						
		lb_f	330					330						
Efficiency at full load	η	%	92					90						
Service life (For calculation, see the Chapter "Information")	L_h	h	> 20000					> 20000						
Weight incl. standard adapter plate	*m*	kg	3.8					4.2						
		lb_m	8.4					9.3						
Operating noise (for i = 10 and n_1 = 3000 rpm without 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			Blue RAL 5002											
Direction of rotation			Motor and gearhead same direction											
Protection class			IP 64											
Moment of inertia (relates to the drive)	J_1	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^{-3} 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

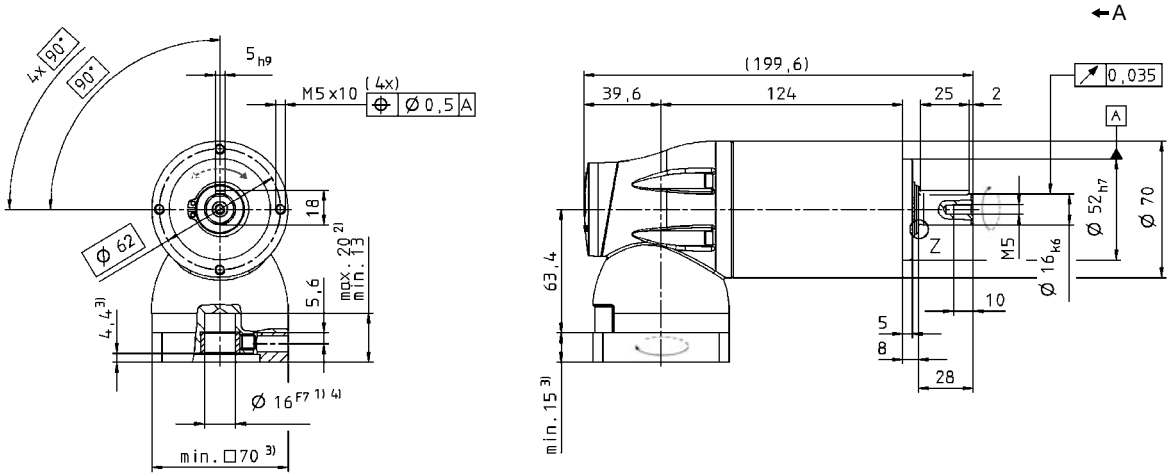
[a] For higher ambient temperatures, please reduce input speed

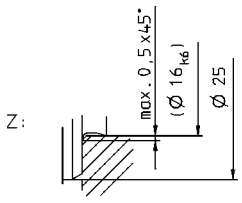
[b] Refers to center of the output shaft, if n_2 = 100 rpm

2-stage:



3-stage:





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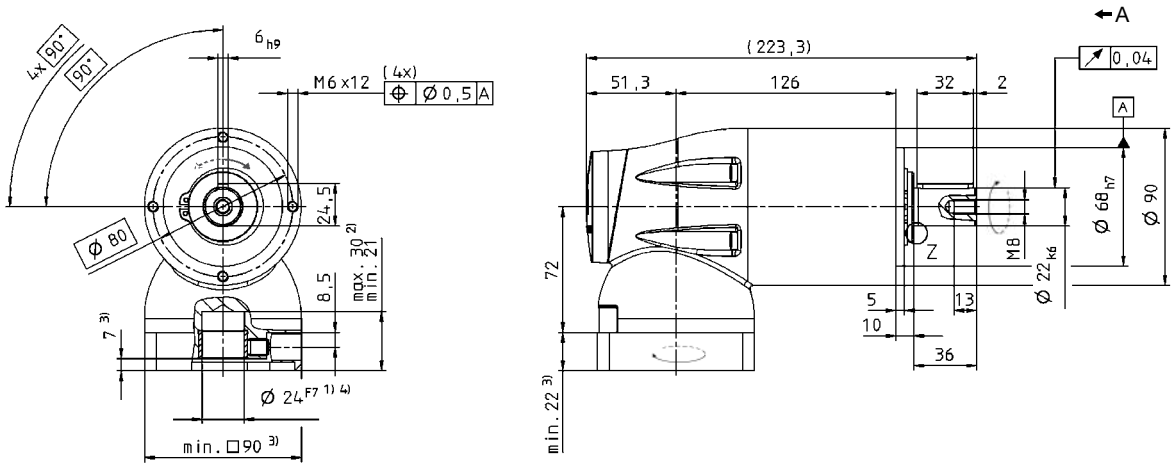
Motor mounting according to operating manual

			2-stage					3-stage						
Ratio	i		**3**	**4**	**5**	**7**	**10**	**16**	**20**	**25**	**30**	**50**	**70**	**100**
Max. acceleration torque (max. 1000 cycles per hour)	T_{2B}	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 (with n_{1N})	T_{2N}	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 (permitted 1000 times during the service life of the gearhead)	T_{2Not}	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 (with T_{2N} and 20°C ambient temperature) [a]	n_{1N}	rpm	2700	2700	2700	2700	2700	2700	2700	2700	2700	2700	2700	2700
Max. input speed	n_{1Max}	rpm	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000	4000
Mean no load running torque (with n_1 = 3000 rpm and 20°C gearhead temperature)	T_{012}	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	j_t	arcmin	≤ 12					≤ 11						
Torsional rigidity	C_{t21}	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 [b]	F_{2AMax}	N	1900					1900						
		lb_f	430					430						
Max. radial force [b]	F_{2RMax}	N	2400					2400						
		lb_f	540					540						
Efficiency at full load	η	%	92					90						
Service life (For calculation, see the Chapter "Information")	L_h	h	> 20000					> 20000						
Weight incl. standard adapter plate	m	kg	6.9					7.9						
		lb_m	15					17						
Operating noise (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 (relates to the drive)	J_1	$kgcm^2$	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^{-3} 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

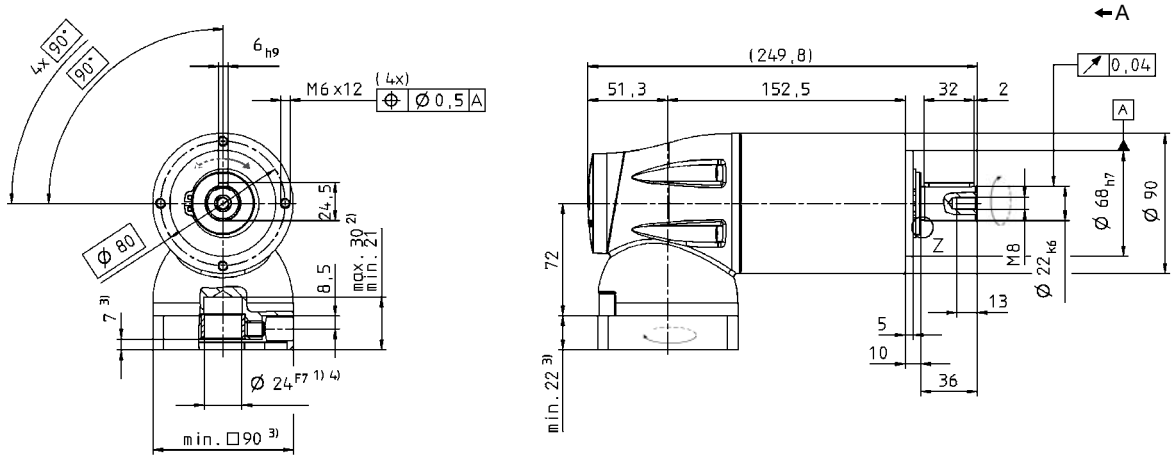
[a] For higher ambient temperatures, please reduce input speed

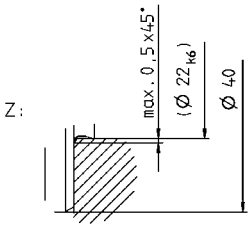
[b] Refers to center of the output shaft, if n_2 = 100 rpm

2-stage:



3-stage:





Non-tolerated dimensions ±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

Motor mounting according to operating manual

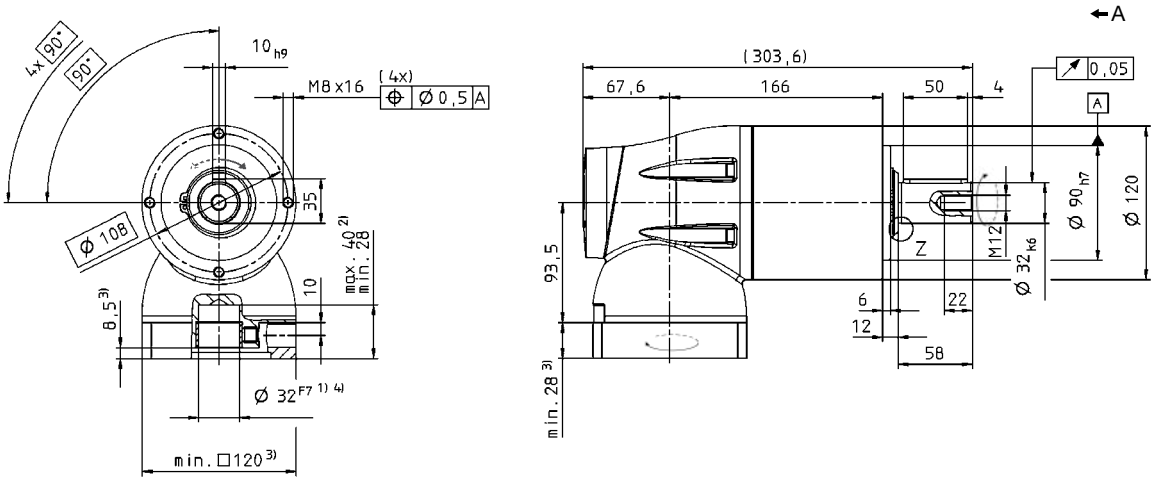
			2-stage					3-stage						
Ratio	***i***		**3**	**4**	**5**	**7**	**10**	**16**	**20**	**25**	**30**	**50**	**70**	**100**
Max. acceleration torque (max. 1000 cycles per hour)	T_{2B}	Nm	136	181	220	220	200	220	220	220	200	220	220	200
		in.lb	1200	1600	1950	1950	1770	1950	1950	1950	1770	1950	1950	1770
Nominal output torque (with n_{1N})	T_{2N}	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 (permitted 1000 times during the service life of the gearhead)	T_{2Not}	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 (with T_{2N} and 20°C ambient temperature) [a]	n_{1N}	rpm	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100
Max. input speed	n_{1Max}	rpm	3500	3500	3500	3500	3500	3500	3500	3500	3500	3500	3500	3500
Mean no load running torque (with n_1 = 3000 rpm and 20°C gearhead temperature)	T_{012}	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	j_t	arcmin	≤ 11					≤ 11						
Torsional rigidity	C_{t21}	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 [b]	F_{2AMax}	N	4000					4000						
		lb_f	900					900						
Max. radial force [b]	F_{2RMax}	N	4600					4600						
		lb_f	1040					1040						
Efficiency at full load	η	%	92					90						
Service life (For calculation, see the Chapter "Information")	L_h	h	> 20000					> 20000						
Weight incl. standard adapter plate	*m*	kg	17					19						
		lb_m	37					42						
Operating noise (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 (relates to the drive)	J_1	$kgcm^2$	17	17	17	17	17	17	17	17	17	17	17	17
		10^{-3} in.lb.s²	15	15	15	15	15	15	15	15	15	15	15	15

[a] For higher ambient temperatures, please reduce input speed

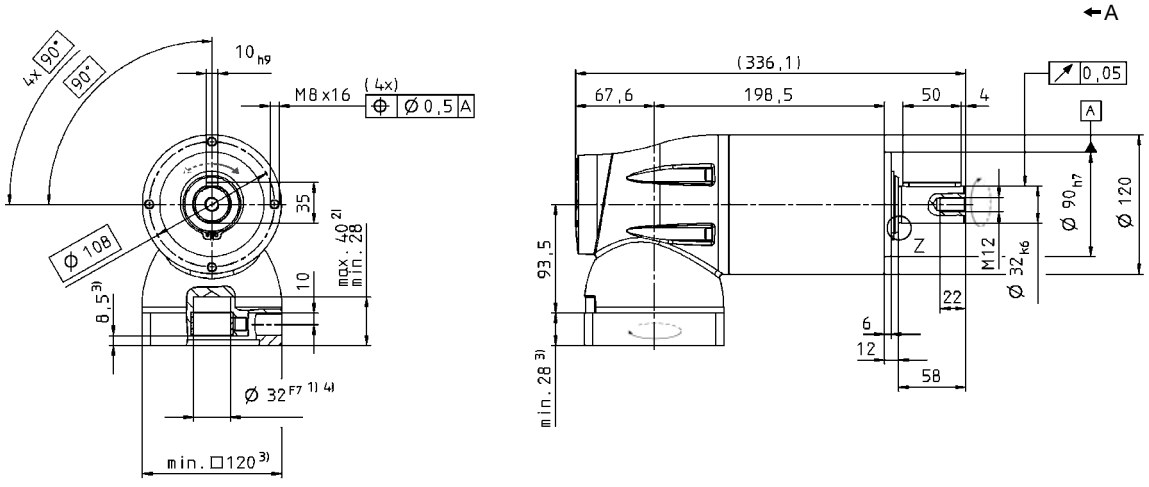
[b] Refers to center of the output shaft, if n_2 = 100 rpm

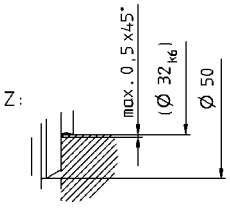
View A

2-stage:



3-stage:





Non-tolerated dimensions ±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.

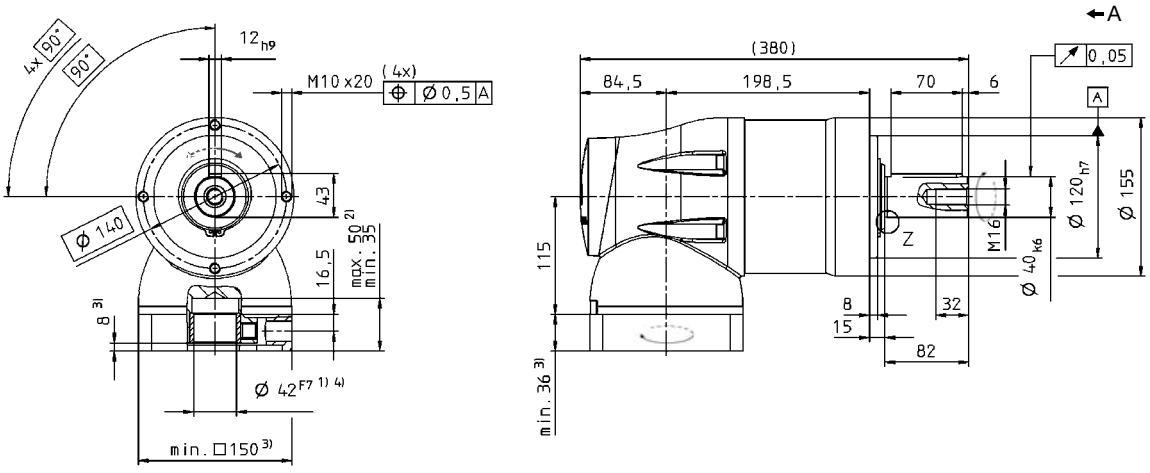
CAD data is available under www.wittenstein-alpha.com

Motor mounting according to operating manual

			2-stage		3-stage		
Ratio	***i***		**5**	**10**	**25**	**50**	**100**
Max. acceleration torque (max. 1000 cycles per hour)	T_{2B}	Nm	450	350	450	450	350
		in.lb	4000	3100	4000	4000	3100
Nominal output torque (with n_{1N})	T_{2N}	Nm	320	190	320	320	190
		in.lb	2800	1700	2800	2800	1700
Emergency stop torque (permitted 1000 times during the service life of the gearhead)	T_{2Not}	Nm	1000	1000	1000	1000	1000
		in.lb	8850	8850	8850	8850	8850
Nominal input speed (with T_{2N} and 20°C ambient temperature) [a]	n_{1N}	rpm	1600	1600	1600	1600	1600
Max. input speed	n_{1Max}	rpm	3000	3000	3500	3500	3500
Mean no load running torque (with n_1 = 3000 rpm and 20°C gearhead temperature)	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 [b]	F_{2AMax}	N	6000		6000		
		lb_f	1350		1350		
Max. radial force [b]	F_{2RMax}	N	7500		7500		
		lb_f	1690		1690		
Efficiency at full load	η	%	92		90		
Service life (For calculation, see the Chapter “Information”)	L_h	h	> 20000		> 20000		
Weight incl. standard adapter plate	*m*	kg	35		39		
		lb_m	77		86		
Operating noise (for i = 10 and n_1 = 3000 rpm without 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			Blue RAL 5002				
Direction of rotation			Motor and gearhead same direction				
Protection class			IP 64				
Moment of inertia (relates to the drive)	J_1	$kgcm^2$	75	75	17	17	17
		10^{-3} in.lb.s²	66	66	15	15	15

[a] For higher ambient temperatures, please reduce input speed
[b] Refers to center of the output shaft, if = 100 rpm

2-stage:



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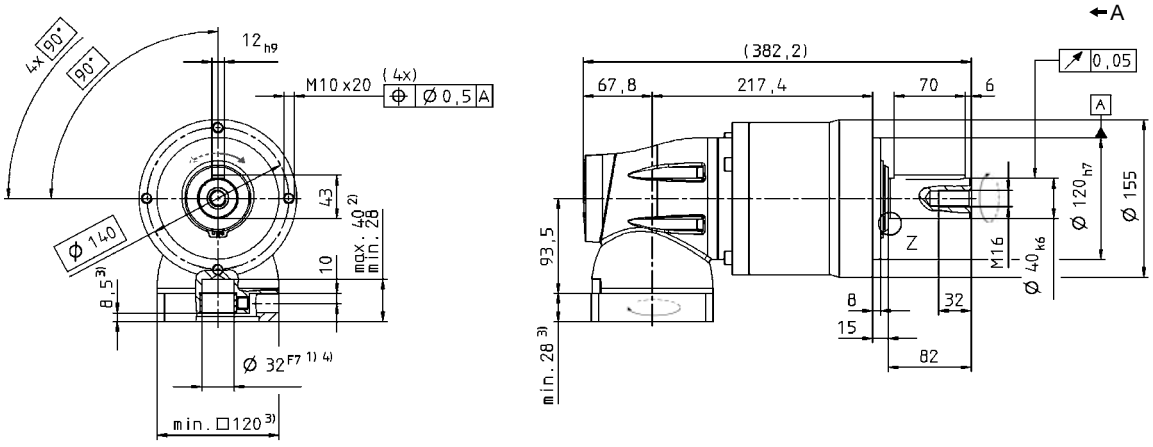
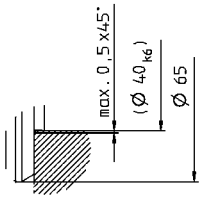


Z:



Non-tolerated dimensions ±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.

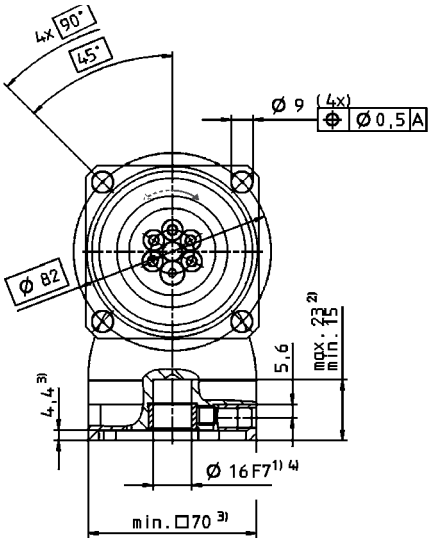
CAD data is available under www.wittenstein-alpha.com

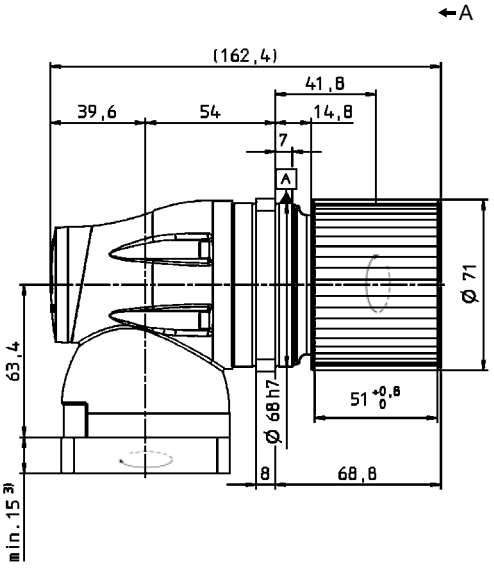
Motor mounting according to operating manual

			2-stage				
Ratio	***i***		**3**	**4**	**5**	**7**	**10**
Max. acceleration torque (max. 1000 cycles per hour)	T_{2B}	Nm	22	29	35	35	32
		in.lb	190	260	310	310	280
Nominal output torque (with n_{1N})	T_{2N}	Nm	11	15	18	18	16.5
		in.lb	100	130	160	160	150
Emergency stop torque (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 (with T_{2N} and 20°C ambient temperature) [a]	n_{1N}	rpm	3000	3000	3000	3000	3000
Max. input speed	n_{1Max}	rpm	4500	4500	4500	4500	4500
Mean no load running torque (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	≤ 14				
Torsional rigidity	C_{t21}	Nm/ arcmin	–	–	–	–	–
		in.lb/ arcmin	–	–	–	–	–
Max. axial force [b]	F_{2AMax}	N	1550				
		lb_f	350				
Max. radial force [c]	F_{2RMax}	N	3000				
		lb_f	680				
Efficiency at full load	η	%	92				
Service life (For calculation, see the Chapter "Information")	L_h	h	> 20000				
Weight incl. standard adapter plate	*m*	kg	3.4				
		lb_m	7.5				
Operating noise (for i = 10 and n_1 = 3000 rpm without 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			Blue RAL 5002				
Direction of rotation			Motor and gearhead same direction				
Protection class			IP 64				
Moment of inertia (relates to the drive)	J_1	$kgcm^2$	0.85	0.85	0.85	0.85	0.85
		10^{-3} in.lb.s²	0.75	0.75	0.75	0.75	0.75

[a] For higher ambient temperatures, please reduce input speed
[b] Refers to center of the output shaft, if n_2 = 100 rpm
[c] With mounted PLPB+ belt pulley and 100 rpm

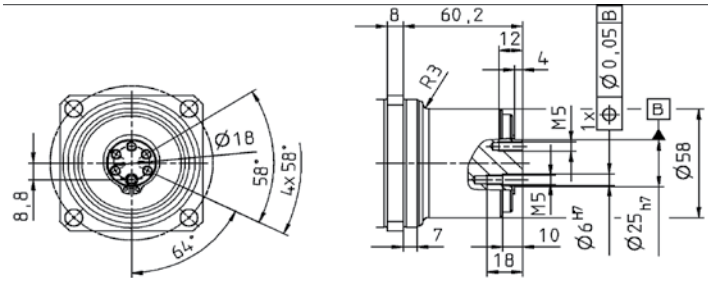
2-stage:





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

Illustration: Output flange without belt pulley



Belt Pulley PLPB+ 070 Profile AT5-0			
Pitch	*p*	mm	5
Number of teeth	*z*		43
Circumference	*z* * *p*	mm/rotation	215
Inertia	*J*	kgcm²	3.86
Mass	*m*	kg	0.48

Non-tolerated dimensions ±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.

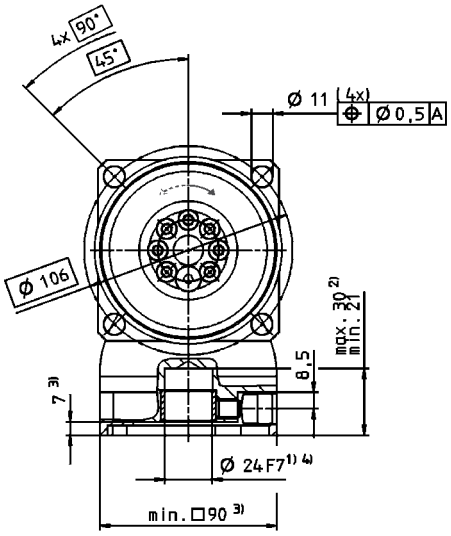
CAD data is available under www.wittenstein-alpha.com

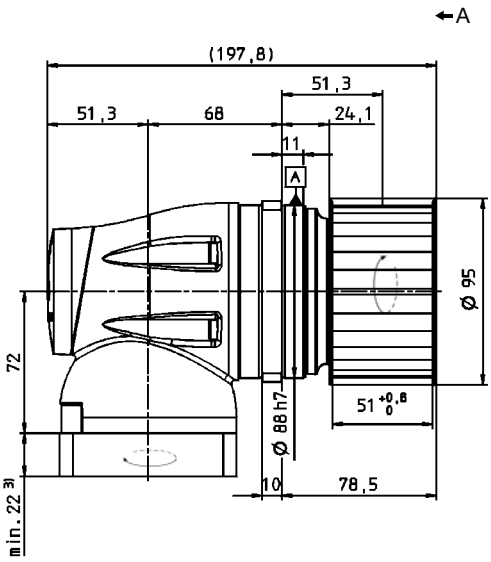
Motor mounting according to operating manual

			2-stage				
Ratio	***i***		**3**	**4**	**5**	**7**	**10**
Max. acceleration torque (max. 1000 cycles per hour)	T_{2B}	Nm	56	74	90	90	80
		in.lb	500	650	800	800	710
Nominal output torque (with n_{1N})	T_{2N}	Nm	28	37	45	45	40
		in.lb	250	330	400	400	350
Emergency stop torque (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 (with T_{2N} and 20°C ambient temperature) [a]	n_{1N}	rpm	2700	2700	2700	2700	2700
Max. input speed	n_{1Max}	rpm	4000	4000	4000	4000	4000
Mean no load running torque (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	≤ 12				
Torsional rigidity	C_{t21}	Nm/ arcmin	–	–	–	–	–
		in.lb/ arcmin	–	–	–	–	–
Max. axial force [b]	F_{2AMax}	N	1900				
		lb_f	430				
Max. radial force [c]	F_{2RMax}	N	4300				
		lb_f	970				
Efficiency at full load	η	%	92				
Service life (For calculation, see the Chapter “Information”)	L_h	h	> 20000				
Weight incl. standard adapter plate	*m*	kg	6.2				
		lb_m	14				
Operating noise (for i = 10 and n_1 = 3000 rpm without load)	L_{PA}	dB(A)	≤ 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 (relates to the drive)	J_1	$kgcm^2$	4.1	4.1	4.1	4.1	4.1
		10^{-3} in.lb.s²	3.6	3.6	3.6	3.6	3.6

[a] For higher ambient temperatures, please reduce input speed
[b] Refers to center of the output shaft, if n_2 = 100 rpm
[c] With mounted PLPB+ belt pulley and 100 rpm

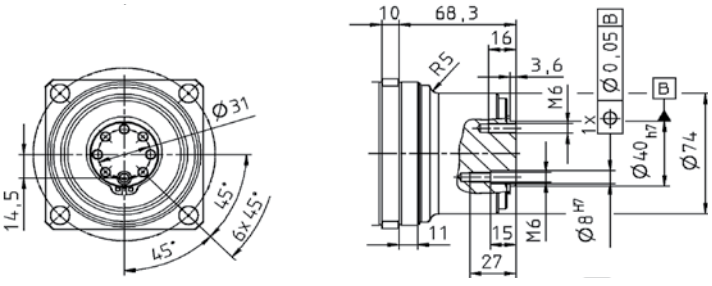
2-stage:





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* * *p*	mm/rotation	280
Inertia	*J*	kgcm²	10.95
Mass	*m*	kg	0.82

Non-tolerated dimensions ±1 mm

1) Check motor shaft fit.
2) Min./Max. permissible motor shaft length. Longer motor shafts are adaptable, please contact us.
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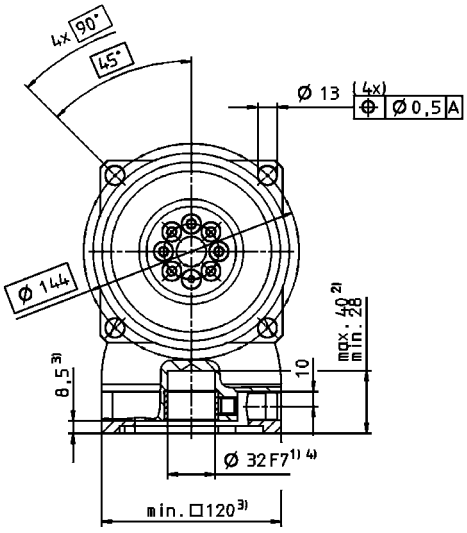
CAD data is available under www.wittenstein-alpha.com

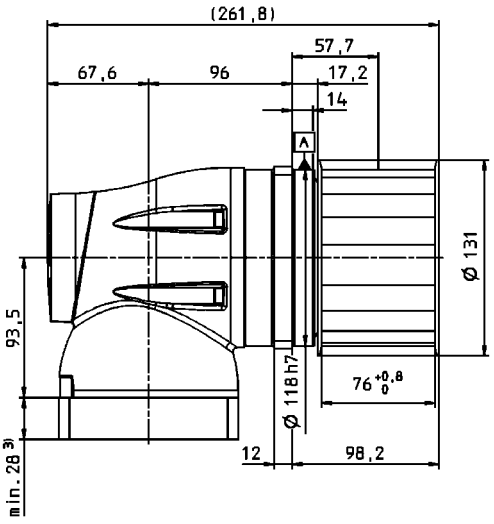
Motor mounting according to operating manual

			2-stage				
Ratio	***i***		**3**	**4**	**5**	**7**	**10**
Max. acceleration torque (max. 1000 cycles per hour)	T_{2B}	Nm	136	181	220	220	200
		in.lb	1200	1600	1950	1950	1770
Nominal output torque (with n_{1N})	T_{2N}	Nm	68	91	110	110	100
		in.lb	600	810	970	970	890
Emergency stop torque (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 (with T_{2N} and 20°C ambient temperature) [a]	n_{1N}	rpm	2100	2100	2100	2100	2100
Max. input speed	n_{1Max}	rpm	3500	3500	3500	3500	3500
Mean no load running torque (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_{t21}	Nm/ arcmin	–	–	–	–	–
		in.lb/ arcmin	–	–	–	–	–
Max. axial force [b]	F_{2AMax}	N	4000				
		lb_f	900				
Max. radial force [c]	F_{2RMax}	N	9500				
		lb_f	2100				
Efficiency at full load	η	%	92				
Service life (For calculation, see the Chapter "Information")	L_h	h	> 20000				
Weight incl. standard adapter plate	*m*	kg	16				
		lb_m	34				
Operating noise (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 (relates to the drive)	J_1	$kgcm^2$	17	17	17	17	17
		10^{-3} in.lb.s²	15	15	15	15	15

[a] For higher ambient temperatures, please reduce input speed
[b] Refers to center of the output shaft, if n_2 = 100 rpm
[c] With mounted PLPB+ belt pulley and 100 rpm

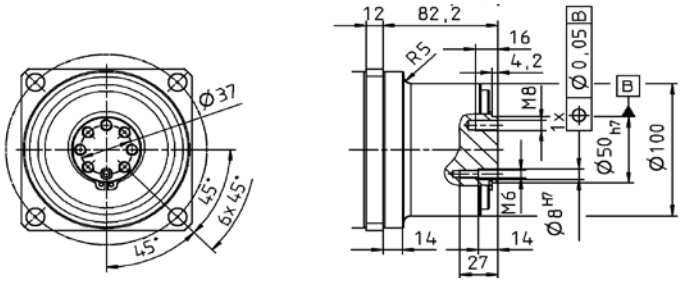
2-stage:





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* * *p*	mm/rotation	380
Inertia	*J*	kgcm²	50.62
Mass	*m*	kg	2.61

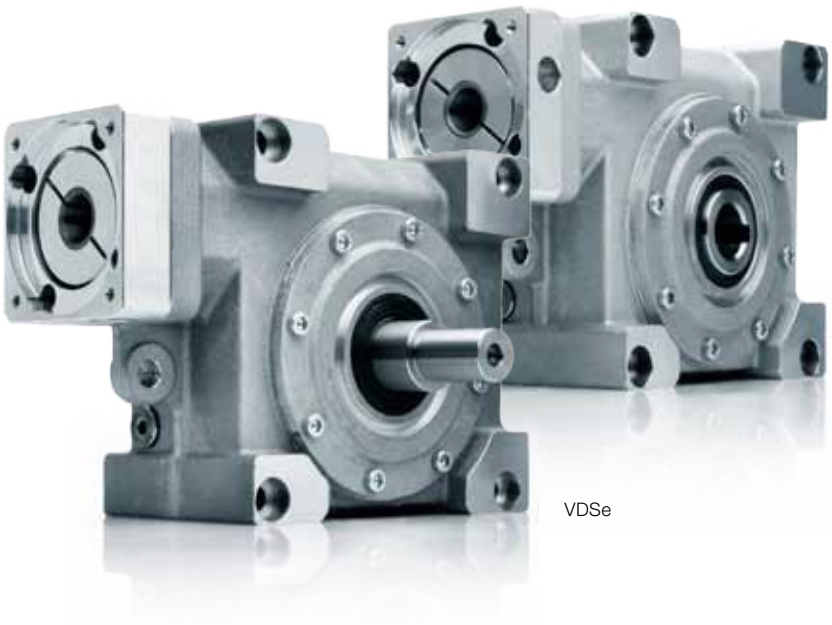
Non-tolerated dimensions ±1 mm

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

Motor mounting according to operating manual

V-Drive economy –
Highest quality with maximum efficiency



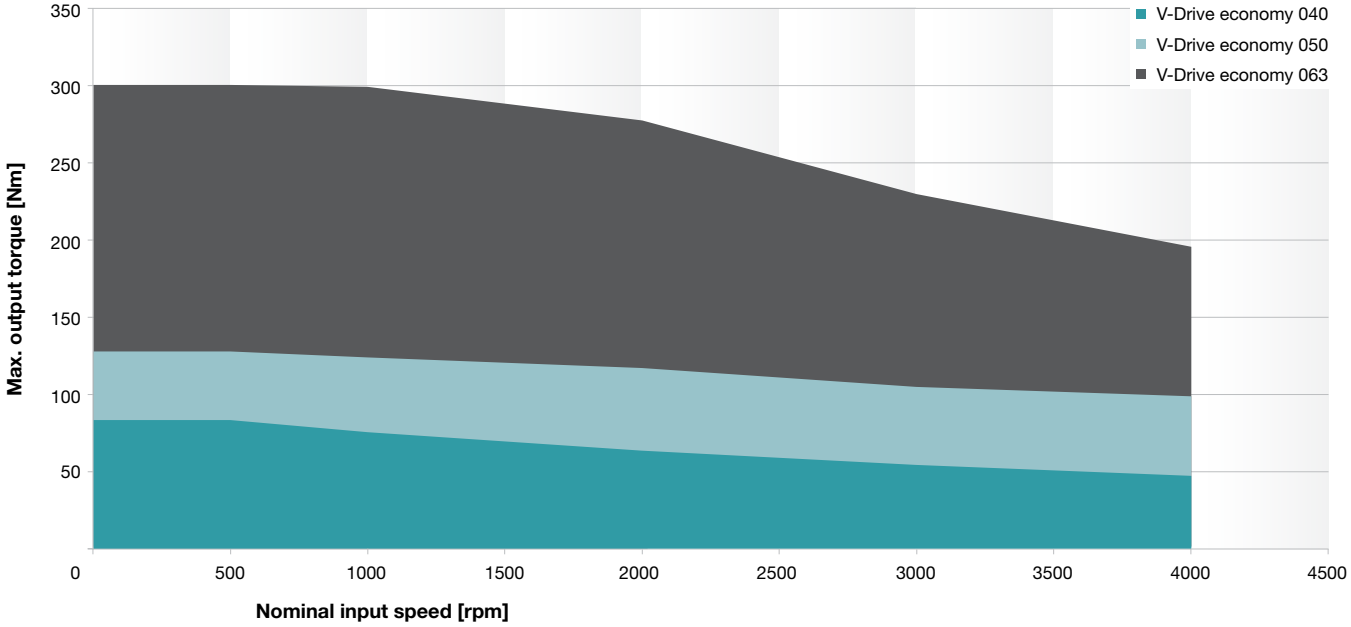
VDSe

VDHe

With the V-Drive economy, an economical solution has been created for low-duty applications. WITTENSTEIN quality combined with optimized hollow-flank teeth provide more torque and power density than comparable products.

Quick size selection

V-Drive economy (example for i = 28)
For applications in cyclic operation (ED ≥ 60%)



Versions and Applications

VDH economy
with hollow shaft smooth/keywayed

- Applications in continuous operation (ED ≥ 60%)
- High power density
- Very low noise level

VDS economy
with solid shaft smooth/keywayed

- Applications in continuous operation (ED ≥ 60%)
- High power density
- Very low noise level

Comparison

Features	**VDHe** from page 314	**VDSe** from page 308
Ratios	4 – 40	4 – 40
Torsional backlash [arcmin]	≤ 8	≤ 8
Output type		
Smooth output shaft		•
Keywayed output shaft		•
Hollow shaft interface Connected via shrink disc	•	
Hollow shaft interface, rear side Connected via shrink disc	•	
Shaft on both sides		•
Input type		
Motor mounted version	•	•
Type		
Food-grade lubrication [a) b)]	•	•
Corrosion resistant [a) b)]	•	•
Accessories		
Coupling		•
Rack		•
Pinion		•
Shrink disc	•	

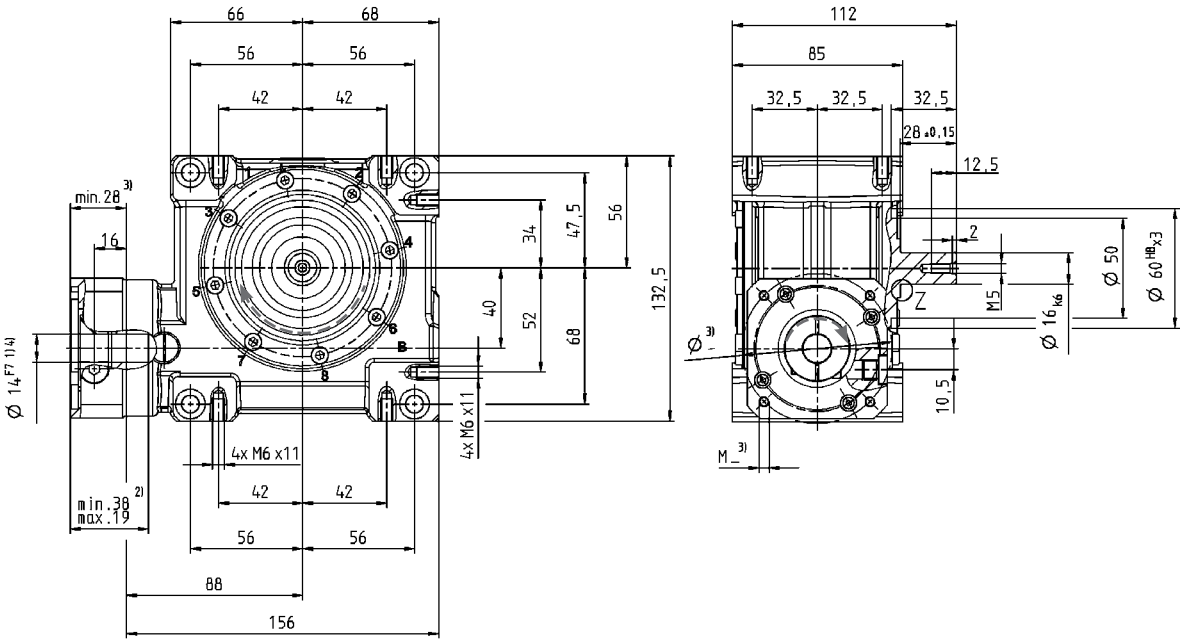
[a)] Power reduction: technical data available upon request [b)] Please contact WITTENSTEIN alpha

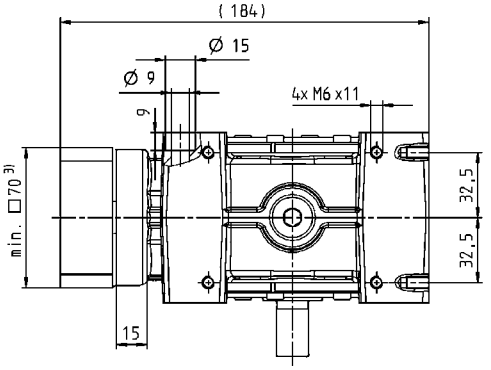
VDS economy 040 1-stage

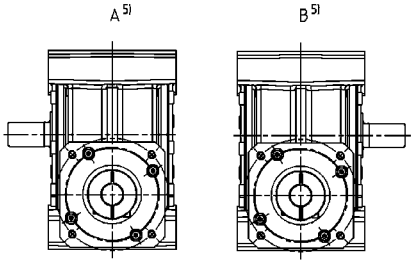
			1-stage					
Ratio	***i***		**4**	**7**	**10**	**16**	**28**	**40**
n_{1N}=500 rpm	T_{2Max}	Nm	45	60	68	72	75	70
		in.lb	398	531	602	637	664	620
	T_{2Servo}	Nm	19	26	28	29	32	28
		in.lb	168	230	248	257	283	248
	η	%	93	90	88	82	73	67
n_{1N}=1000 rpm	T_{2Max}	Nm	45	60	68	72	75	70
		in.lb	398	531	602	637	664	620
	T_{2Servo}	Nm	19	26	28	29	32	28
		in.lb	168	230	248	257	283	248
	η	%	94	92	90	86	77	73
n_{1N}=2000 rpm	T_{2Max}	Nm	35	50	54	59	63	60
		in.lb	310	443	478	522	558	531
	T_{2Servo}	Nm	19	26	28	29	33	29
		in.lb	168	230	248	257	292	257
	η	%	96	94	92	88	81	77
n_{1N}=3000 rpm	T_{2Max}	Nm	30	42	46	51	53	52
		in.lb	266	372	407	451	469	460
	T_{2Servo}	Nm	19	26	28	29	32	28
		in.lb	168	230	248	257	283	248
	η	%	96	95	93	90	83	79
n_{1N}=4000 rpm	T_{2Max}	Nm	28	36	40	44	47	46
		in.lb	248	319	354	389	416	407
	T_{2Servo}	Nm	19	25	27	28	31	27
		in.lb	168	221	239	248	274	239
	η	%	96	95	94	91	84	81
Emergency stop torque	T_{2Not}	Nm	118	126	125	129	134	122
		in.lb	1044	1115	1106	1142	1186	1080
Max. input speed	n_{1Max}	rpm	6000					
Mean no load running torque [a] (With n_1=3000 min^{-1} and 20° C gear temperature)	T_{012}	Nm	0,8	0,7	0,5	0,5	0,4	0,4
		in.lb	7,1	6,2	4,4	4,4	3,5	3,5
Max. torsional backlash	j_t	arcmin	≤8					
Torsional rigidity	C_{t21}	Nm/arcmin	4,5					
		in.lb/arcmin	40					
Max. axial force [b]	F_{2AMax}	N	3000					
		lb_f	675					
Max. radial force [b]	F_{2RMax}	N	2400					
		lb_f	540					
Max. tilting moment	M_{2KMax}	Nm	205					
		in.lb	1814					
Service life (For calculation see "Information")	L_h	h	> 20000					
Weight (without motor attechment parts)	m	kg	4,1					
		lb_m	9,1					
Operating noise (with n_1 = 3000 rpm no load)	L_{PA}	dB(A)	≤ 54					
Max. permitted housing temperature		°C	+90					
		F	194					
Ambient temperature		°C	-15 to +40					
		F	5 to 104					
Lubrication			Synthetic transmission oil					
Paint			None					
Direction of rotation			See drawing					
Protection class			IP 65					
Moment of inertia (relates to the drive)	J_1	kgcm²	0,52	0,38	0,34	0,32	0,32	0,31
		10^{-3} in.lb.s²	0,46	0,34	0,30	0,28	0,28	0,27

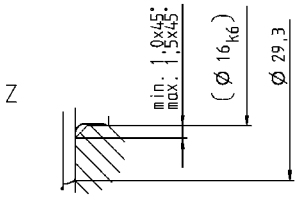
[a] Idling torques decrease during operation

[b] Refers to center of the output shaft or flange





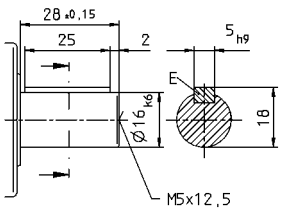




Alternatives: Output shaft variants

Keywayed output shaft in mm

E = key as per DIN 6885, sheet 1, form A



Non-tolerated dimensions ± 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 with a minimum thickness of 1 mm. Motor shaft diameters up to 19 mm available – please contact WITTENSTEIN alpha
5) Output side

CAD data is available under www.wittenstein-alpha.com

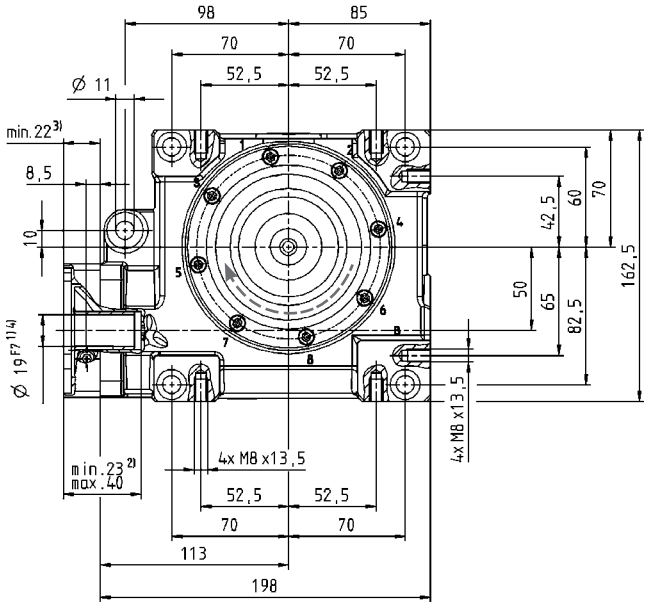
Motor mounting according to operating manual

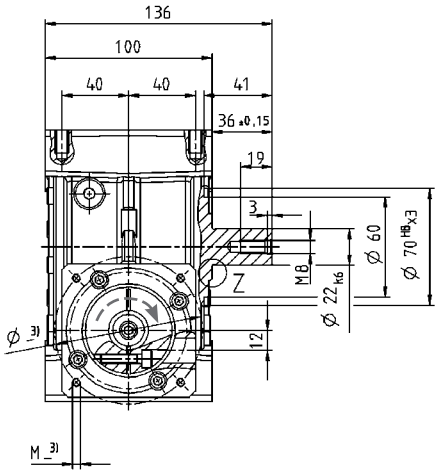
VDS economy 050 1-stage

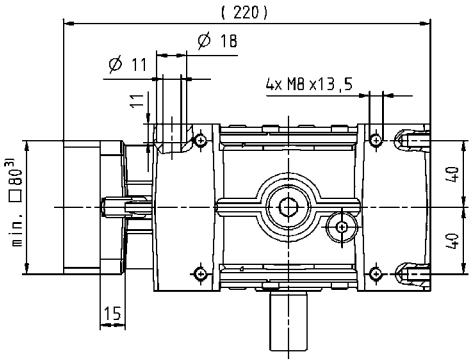
			1-stage					
Ratio	***i***		**4**	**7**	**10**	**16**	**28**	**40**
n_{1N}=500 rpm	T_{2Max}	Nm	–	102	111	118	128	116
		in.lb	–	903	982	1044	1133	1027
	T_{2Servo}	Nm	–	62	64	70	78	64
		in.lb	–	549	566	620	690	566
	η	%	–	89	86	82	72	64
n_{1N}=1000 rpm	T_{2Max}	Nm	–	103	108	114	124	112
		in.lb	–	912	956	1009	1097	991
	T_{2Servo}	Nm	–	66	70	76	84	70
		in.lb	–	584	620	673	743	620
	η	%	–	91	89	85	77	69
n_{1N}=2000 rpm	T_{2Max}	Nm	–	92	97	105	117	103
		in.lb	–	814	858	929	1035	912
	T_{2Servo}	Nm	–	68	71	77	86	72
		in.lb	–	602	628	681	761	637
	η	%	–	93	91	88	75	75
n_{1N}=3000 rpm	T_{2Max}	Nm	–	82	88	97	105	95
		in.lb	–	726	779	858	929	841
	T_{2Servo}	Nm	–	67	70	76	84	70
		in.lb	–	593	620	673	743	620
	η	%	–	94	93	90	83	78
n_{1N}=4000 rpm	T_{2Max}	Nm	–	77	81	90	99	88
		in.lb	–	681	717	797	876	779
	T_{2Servo}	Nm	–	64	69	75	83	69
		in.lb	–	566	611	664	735	611
	η	%	–	95	93	91	85	80
Emergency stop torque	T_{2Not}	Nm	–	242	242	250	262	236
		in.lb	–	2142	2142	2213	2319	2089
Max. input speed	n_{1Max}	rpm	6000					
Mean no load running torque [a] (With n_1=3000 min^{-1} and 20° C gear temperature)	T_{012}	Nm	–	1,2	1,2	1,1	1	0,9
		in.lb	–	10,6	10,6	9,7	8,9	8,0
Max. torsional backlash	j_t	arcmin	≤8					
Torsional rigidity	C_{t21}	Nm/arcmin	8					
		in.lb/arcmin	71					
Max. axial force [b]	F_{2AMax}	N	5000					
		lb_f	1125					
Max. radial force [b]	F_{2RMax}	N	3800					
		lb_f	855					
Max. tilting moment	M_{2KMax}	Nm	409					
		in.lb	3620					
Service life (For calculation see "Information")	L_h	h	> 20000					
Weight (without motor attechment parts)	m	kg	7,7					
		lb_m	17,0					
Operating noise (with n_1 = 3000 rpm no load)	L_{PA}	dB(A)	≤ 62					
Max. permitted housing temperature		°C	+90					
		F	194					
Ambient temperature		°C	-15 to +40					
		F	5 to 104					
Lubrication			Synthetic transmission oil					
Paint			None					
Direction of rotation			See drawing					
Protection class			IP 65					
Moment of inertia (relates to the drive)	J_1	kgcm²	–	2,01	1,93	1,84	1,81	1,86
		10^{-3} in.lb.s²	–	1,78	1,71	1,63	1,60	1,64

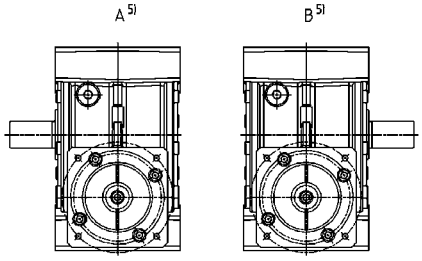
[a] Idling torques decrease during operation

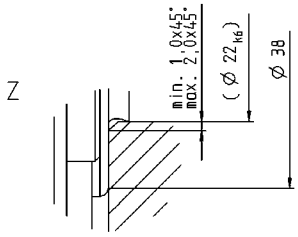
[b] Refers to center of the output shaft or flange

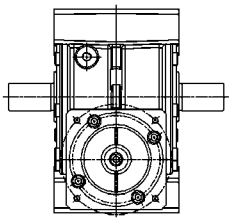










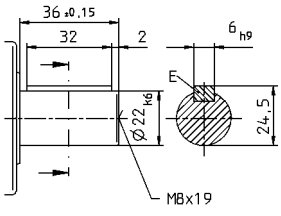


Optional dual-shaft output. Drawings available upon request.

Alternatives: Output shaft variants

Keywayed output shaft in mm

E = key as per DIN 6885, sheet 1, form A



Non-tolerated dimensions ± 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 with a minimum thickness of 1 mm.
5) Output side

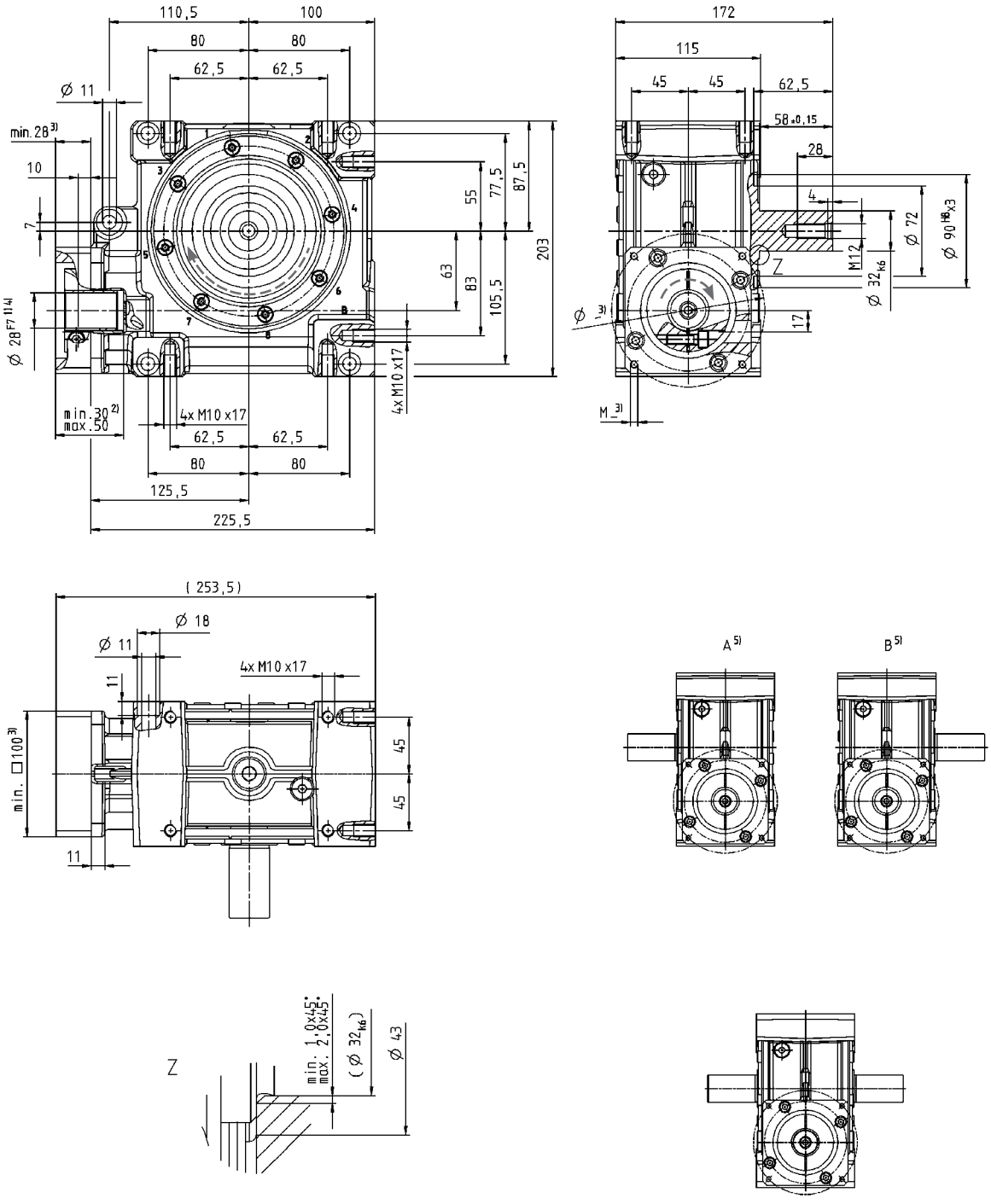
CAD data is available under www.wittenstein-alpha.com

Motor mounting according to operating manual

			1-stage					
Ratio	***i***		**4**	**7**	**10**	**16**	**28**	**40**
n_{1N}=500 rpm	T_{2Max}	Nm	–	264	270	279	301	282
		in.lb	–	2336	2390	2469	2664	2496
	T_{2Servo}	Nm	–	183	195	198	215	201
		in.lb	–	1620	1726	1752	1903	1779
	η	%	–	91	88	83	74	68
n_{1N}=1000 rpm	T_{2Max}	Nm	–	256	265	276	299	280
		in.lb	–	2266	2345	2443	2646	2478
	T_{2Servo}	Nm	–	197	208	212	230	215
		in.lb	–	1743	1841	1876	2036	1903
	η	%	–	93	91	86	78	73
n_{1N}=2000 rpm	T_{2Max}	Nm	–	234	252	263	277	269
		in.lb	–	2071	2230	2328	2451	2381
	T_{2Servo}	Nm	–	188	203	212	224	217
		in.lb	–	1664	1797	1876	1982	1920
	η	%	–	94	93	89	83	78
n_{1N}=3000 rpm	T_{2Max}	Nm	–	183	198	209	230	224
		in.lb	–	1620	1752	1850	2036	1982
	T_{2Servo}	Nm	–	145	163	181	182	177
		in.lb	–	1283	1443	1602	1611	1566
	η	%	–	95	94	91	85	81
n_{1N}=4000 rpm	T_{2Max}	Nm	–	146	162	175	196	193
		in.lb	–	1292	1434	1549	1735	1708
	T_{2Servo}	Nm	–	114	134	152	152	149
		in.lb	–	1009	1186	1345	1345	1319
	η	%	–	96	94	92	86	83
Emergency stop torque	T_{2Not}	Nm	–	484	491	494	518	447
		in.lb	–	4283	4345	4372	4584	3956
Max. input speed	n_{1Max}	rpm	4500					
Mean no load running torque [a] (With n_1=3000 min^{-1} and 20° C gear temperature)	T_{012}	Nm	–	1,9	1,8	1,7	1,6	1,4
		in.lb	–	16,8	15,9	15,0	14,2	12,4
Max. torsional backlash	j_t	arcmin	≤8					
Torsional rigidity	C_{t21}	Nm/arcmin	28					
		in.lb/arcmin	248					
Max. axial force [b]	F_{2AMax}	N	8250					
		lb_f	1856					
Max. radial force [b]	F_{2RMax}	N	6000					
		lb_f	1350					
Max. tilting moment	M_{2KMax}	Nm	843					
		in.lb	7461					
Service life (For calculation see "Information")	L_h	h	> 20000					
Weight (without motor attechment parts)	m	kg	12,5					
		lb_m	27,6					
Operating noise (with n_1 = 3000 rpm no load)	L_{PA}	dB(A)	≤ 64					
Max. permitted housing temperature		°C	+90					
		F	194					
Ambient temperature		°C	-15 to +40					
		F	5 to 104					
Lubrication			Synthetic transmission oil					
Paint			None					
Direction of rotation			See drawing					
Protection class			IP 65					
Moment of inertia (relates to the drive)	J_1	kgcm²	–	5,78	5,53	5,44	5,40	5,35
		10^{-3} in.lb.s²	–	5,12	4,90	4,82	4,78	4,74

[a] Idling torques decrease during operation

[b] Refers to center of the output shaft or flange

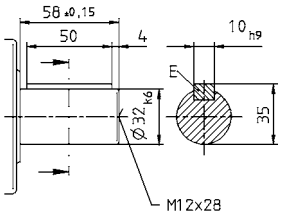


Optional dual-shaft output. Drawings available upon request.

Alternatives: Output shaft variants

Keywayed output shaft in mm

E = key as per DIN 6885, sheet 1, form A



Non-tolerated dimensions ± 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 with a minimum thickness of 1 mm.
5) Output side

CAD data is available under www.wittenstein-alpha.com

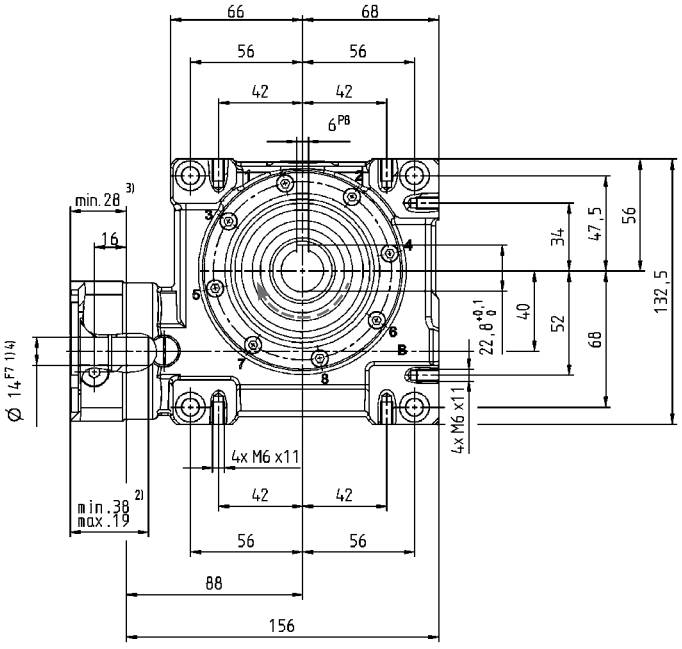
Motor mounting according to operating manual

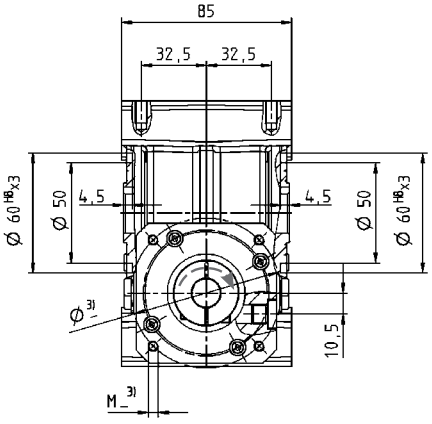
VDH economy 040 1-stage

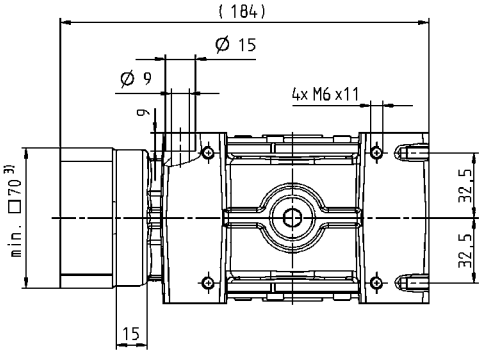
			1-stage					
Ratio	***i***		**4**	**7**	**10**	**16**	**28**	**40**
n_{1N}=500 rpm	T_{2Max}	Nm	60	75	76	79	83	76
		in.lb	531	664	673	699	735	673
	T_{2Servo}	Nm	17	24	25	26	29	25
		in.lb	150	212	221	230	257	221
	η	%	93	90	88	82	73	67
n_{1N}=1000 rpm	T_{2Max}	Nm	45	60	68	72	75	70
		in.lb	398	531	602	637	664	620
	T_{2Servo}	Nm	19	26	28	29	32	28
		in.lb	168	230	248	257	283	248
	η	%	94	92	90	86	77	73
n_{1N}=2000 rpm	T_{2Max}	Nm	35	50	54	59	63	60
		in.lb	310	443	478	522	558	531
	T_{2Servo}	Nm	19	26	28	29	33	29
		in.lb	168	230	248	257	292	257
	η	%	96	94	92	88	81	77
n_{1N}=3000 rpm	T_{2Max}	Nm	30	42	46	51	53	52
		in.lb	266	372	407	451	469	460
	T_{2Servo}	Nm	19	26	28	29	32	28
		in.lb	168	230	248	257	283	248
	η	%	96	95	93	90	83	79
n_{1N}=4000 rpm	T_{2Max}	Nm	28	36	40	44	47	46
		in.lb	248	319	354	389	416	407
	T_{2Servo}	Nm	19	25	27	28	31	27
		in.lb	168	221	239	248	274	239
	η	%	96	95	94	91	84	81
Emergency stop torque	T_{2Not}	Nm	118	126	125	129	134	122
		in.lb	1044	1115	1106	1142	1186	1080
Max. input speed	n_{1Max}	rpm	6000					
Mean no load running torque [a] (With n_1=3000 min^{-1} and 20° C gear temperature)	T_{012}	Nm	0,8	0,7	0,5	0,5	0,4	0,4
		in.lb	7,1	6,2	4,4	4,4	3,5	3,5
Max. torsional backlash	j_t	arcmin	≤8					
Torsional rigidity	C_{t21}	Nm/arcmin	4,5					
		in.lb/arcmin	40					
Max. axial force [b]	F_{2AMax}	N	3000					
		lb_f	675					
Max. radial force [b]	F_{2RMax}	N	2400					
		lb_f	540					
Max. tilting moment	M_{2KMax}	Nm	205					
		in.lb	1814					
Service life (For calculation see "Information")	L_h	h	> 20000					
Weight (without motor attechment parts)	m	kg	4,0					
		lb_m	8,8					
Operating noise (with n_1 = 3000 rpm no load)	L_{PA}	dB(A)	< 54					
Max. permitted housing temperature		°C	+90					
		F	194					
Ambient temperature		°C	-15 to +40					
		F	5 to 104					
Lubrication			Synthetic transmission oil					
Paint			None					
Direction of rotation			See drawing					
Protection class			IP 65					
Moment of inertia (relates to the drive)	J_1	kgcm²	0,52	0,38	0,34	0,32	0,32	0,31
		10^{-3} in.lb.s²	0,46	0,34	0,30	0,28	0,28	0,27

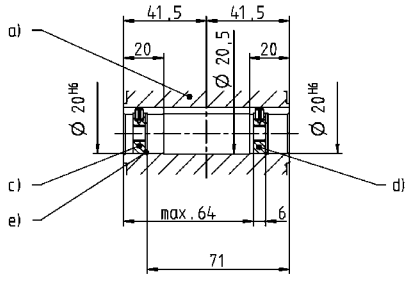
[a] Idling torques decrease during operation

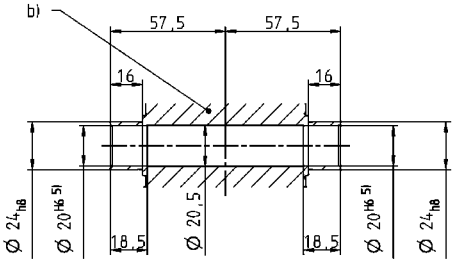
[b] Refers to center of the output shaft or flange











a) Hollow shaft, keywayed
b) Hollow shaft, smooth
c) End disc for screw M6 (on request)
d) End disc as forcing washer for screw M8 (on request)
e) Locking ring – DIN 472

Non-tolerated dimensions ± 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 with a minimum thickness of 1 mm. Motor shaft diameters up to 19 mm available – please contact WITTENSTEIN alpha.
5) Tolerance h6 for mounted shaft.

CAD data is available under www.wittenstein-alpha.com

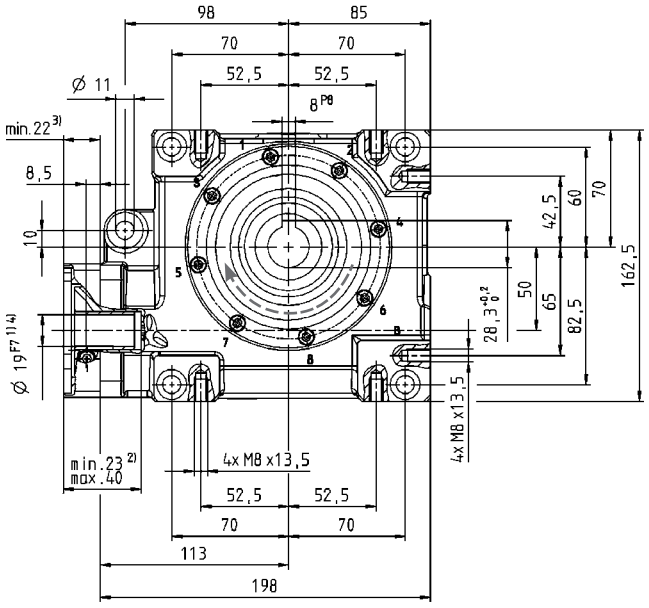
Motor mounting according to operating manual

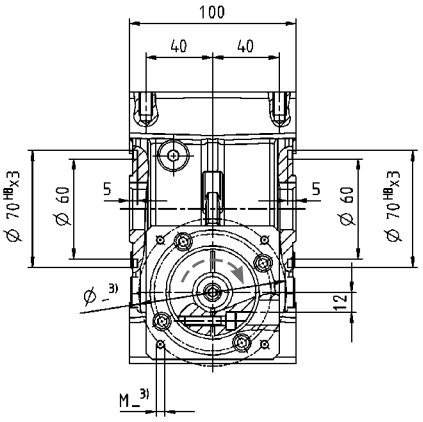
VDH economy 050 1-stage

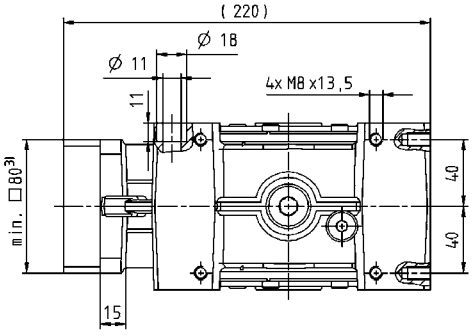
			1-stage					
Ratio	***i***		**4**	**7**	**10**	**16**	**28**	**40**
n_{1N}=500 rpm	T_{2Max}	Nm	–	102	111	118	128	116
		in.lb	–	903	982	1044	1133	1027
	T_{2Servo}	Nm	–	62	64	70	78	64
		in.lb	–	549	566	620	690	566
	η	%	–	89	86	82	72	64
n_{1N}=1000 rpm	T_{2Max}	Nm	–	103	108	114	124	112
		in.lb	–	912	956	1009	1097	991
	T_{2Servo}	Nm	–	66	70	76	84	70
		in.lb	–	584	620	673	743	620
	η	%	–	91	89	85	77	69
n_{1N}=2000 rpm	T_{2Max}	Nm	–	92	97	105	117	103
		in.lb	–	814	858	929	1035	912
	T_{2Servo}	Nm	–	68	71	77	86	72
		in.lb	–	602	628	681	761	637
	η	%	–	93	91	88	75	75
n_{1N}=3000 rpm	T_{2Max}	Nm	–	82	88	97	105	95
		in.lb	–	726	779	858	929	841
	T_{2Servo}	Nm	–	67	70	76	84	70
		in.lb	–	593	620	673	743	620
	η	%	–	94	93	90	83	78
n_{1N}=4000 rpm	T_{2Max}	Nm	–	77	81	90	99	88
		in.lb	–	681	717	797	876	779
	T_{2Servo}	Nm	–	64	69	75	83	69
		in.lb	–	566	611	664	735	611
	η	%	–	95	93	91	85	80
Emergency stop torque	T_{2Not}	Nm	–	242	242	250	262	236
		in.lb	–	2142	2142	2213	2319	2089
Max. input speed	n_{1Max}	rpm	6000					
Mean no load running torque [a] (With n_1=3000 min^{-1} and 20° C gear temperature)	T_{012}	Nm	–	1,2	1,2	1,1	1	0,9
		in.lb	–	10,6	10,6	9,7	8,9	8,0
Max. torsional backlash	j_t	arcmin	≤8					
Torsional rigidity	C_{t21}	Nm/arcmin	8					
		in.lb/arcmin	71					
Max. axial force [b]	F_{2AMax}	N	5000					
		lb_f	1125					
Max. radial force [b]	F_{2RMax}	N	3800					
		lb_f	855					
Max. tilting moment	M_{2KMax}	Nm	409					
		in.lb	3620					
Service life (For calculation see "Information")	L_h	h	> 20000					
Weight (without motor attechment parts)	m	kg	7,4					
		lb_m	16,4					
Operating noise (with n_1 = 3000 rpm no load)	L_{PA}	dB(A)	≤ 62					
Max. permitted housing temperature		°C	+90					
		F	194					
Ambient temperature		°C	-15 to +40					
		F	5 to 104					
Lubrication			Synthetic transmission oil					
Paint			None					
Direction of rotation			See drawing					
Protection class			IP 65					
Moment of inertia (relates to the drive)	J_1	kgcm²	–	2,02	1,93	1,84	1,81	1,86
		10^{-3} in.lb.s²	–	1,79	1,71	1,63	1,60	1,64

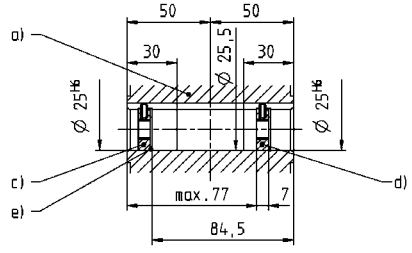
[a] Idling torques decrease during operation

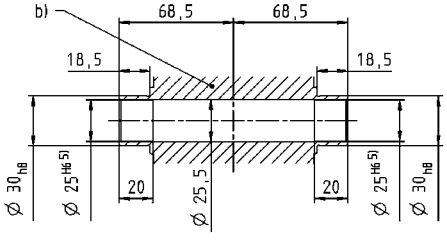
[b] Refers to center of the output shaft or flange











a) Hollow shaft, keywayed
b) Hollow shaft, smooth
c) End disc for screw M10 (on request)
d) End disc as forcing washer for screw M12 (on request)
e) Locking ring – DIN 472 (on request)

Non-tolerated dimensions ± 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 with a minimum thickness of 1 mm.
5) Tolerance h6 for mounted shaft.

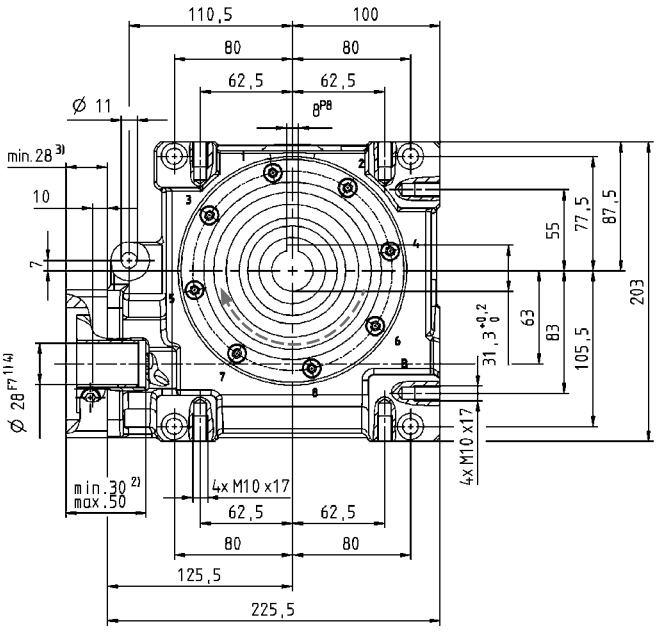
CAD data is available under www.wittenstein-alpha.com

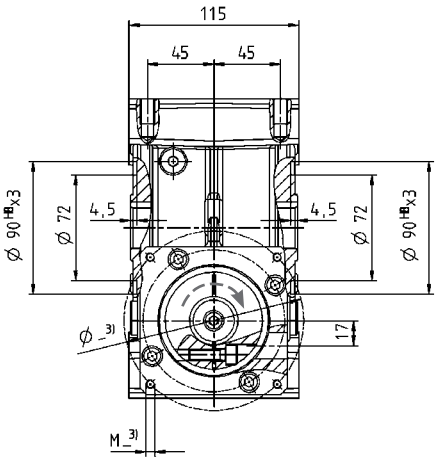
Motor mounting according to operating manual

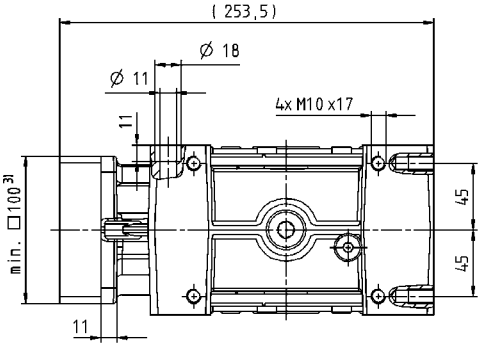
			1-stage					
Ratio	***i***		**4**	**7**	**10**	**16**	**28**	**40**
n_{1N}=500 rpm	T_{2Max}	Nm	–	264	270	279	301	282
		in.lb	–	2336	2390	2469	2664	2496
	T_{2Servo}	Nm	–	183	195	198	215	201
		in.lb	–	1620	1726	1752	1903	1779
	η	%	–	91	88	83	74	68
n_{1N}=1000 rpm	T_{2Max}	Nm	–	256	265	276	299	280
		in.lb	–	2266	2345	2443	2646	2478
	T_{2Servo}	Nm	–	197	208	212	230	215
		in.lb	–	1743	1841	1876	2036	1903
	η	%	–	93	91	86	78	73
n_{1N}=2000 rpm	T_{2Max}	Nm	–	234	252	263	277	269
		in.lb	–	2071	2230	2328	2451	2381
	T_{2Servo}	Nm	–	188	203	212	224	217
		in.lb	–	1664	1797	1876	1982	1920
	η	%	–	94	93	89	83	78
n_{1N}=3000 rpm	T_{2Max}	Nm	–	183	198	209	230	224
		in.lb	–	1620	1752	1850	2036	1982
	T_{2Servo}	Nm	–	145	163	181	182	177
		in.lb	–	1283	1443	1602	1611	1566
	η	%	–	95	94	91	85	81
n_{1N}=4000 rpm	T_{2Max}	Nm	–	146	162	175	196	193
		in.lb	–	1292	1434	1549	1735	1708
	T_{2Servo}	Nm	–	114	134	152	152	149
		in.lb	–	1009	1186	1345	1345	1319
	η	%	–	96	94	92	86	83
Emergency stop torque	T_{2Not}	Nm	–	484	491	494	518	447
		in.lb	–	4283	4345	4372	4584	3956
Max. input speed	n_{1Max}	rpm	4500					
Mean no load running torque [a] (With n_1=3000 min^{-1} and 20° C gear temperature)	T_{012}	Nm	–	1,9	1,8	1,7	1,6	1,4
		in.lb	–	16,8	15,9	15,0	14,2	12,4
Max. torsional backlash	j_t	arcmin	≤8					
Torsional rigidity	C_{t21}	Nm/arcmin	28					
		in.lb/arcmin	248					
Max. axial force [b]	F_{2AMax}	N	8250					
		lb_f	1856					
Max. radial force [b]	F_{2RMax}	N	6000					
		lb_f	1350					
Max. tilting moment	M_{2KMax}	Nm	843					
		in.lb	7461					
Service life (For calculation see "Information")	L_h	h	> 20000					
Weight (without motor attechment parts)	*m*	kg	12					
		lb_m	26,5					
Operating noise (with n_1 = 3000 rpm no load)	L_{PA}	dB(A)	≤ 64					
Max. permitted housing temperature		°C	+90					
		F	194					
Ambient temperature		°C	-15 to +40					
		F	5 to 104					
Lubrication			Synthetic transmission oil					
Paint			None					
Direction of rotation			See drawing					
Protection class			IP 65					
Moment of inertia (relates to the drive)	J_1	kgcm²	–	5,77	5,53	5,44	5,40	5,35
		10^{-3} in.lb.s²	–	5,11	4,89	4,81	4,78	4,74

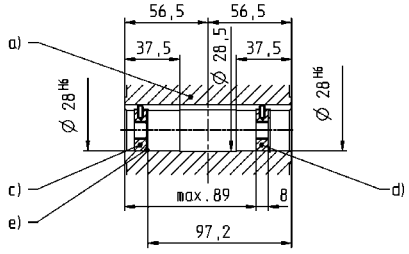
[a] Idling torques decrease during operation

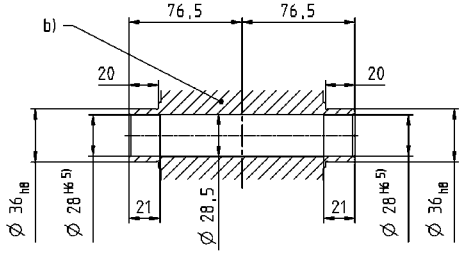
[b] Refers to center of the output shaft or flange











a) Hollow shaft, keywayed
b) Hollow shaft, smooth
c) End disc for screw M10 (on request)
d) End disc as forcing washer for screw M12 (on request)
e) Locking ring – DIN 472 (on request)

Non-tolerated dimensions ± 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 with a minimum thickness of 1 mm.
5) Tolerance h6 for mounted shaft.

CAD data is available under www.wittenstein-alpha.com

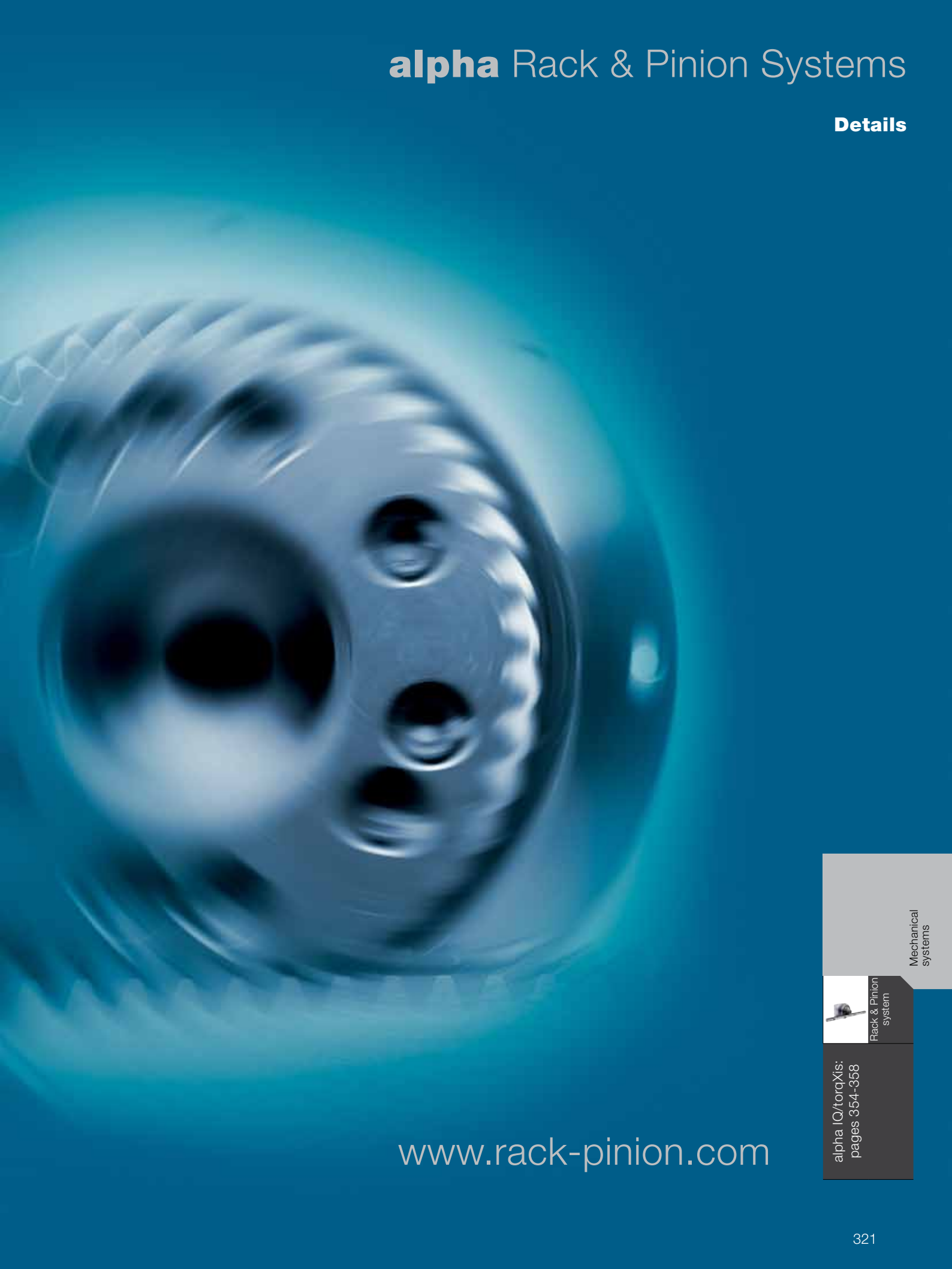
Motor mounting according to operating manual

alpha rack and pinion system – Precise rack and pinion drives tailored to your applications

We provide you with an optimum system solution comprising a gear-head, rack and pinion precisely tailored to your requirements. Three components – complete system from a single source!

alpha Rack & Pinion Systems

Details



www.rack-pinion.com

alpha Rack & Pinion System –
a **perfect symbiosis** of **state-of-the-art technology** and **many years of experience**.
alpha is the next generation of rack and pinion systems. Our specialist knowledge extends from the separate coupling of gearhead, motor, pinion and rack to complete system solutions.

For further informations please visit our website: **www.rack-pinion.com**

The alternative – not only for long distances

Rack and pinion combinations do not only excel in applications involving long, precise movement paths.
The WITTENSTEIN alpha technology achieves an excellent degree of precision using an **electronic tensioning** system. The **high-precision manufacture** of individual components is an essential aspect here because manufacturers and users must be able to rely on the installed drives to achieve the level of accuracy required.

We offer the **highest levels of** precision, dynamics and rigidity as well as an extended service life that more than satisfy the demanding requirements of machine and system manufacturers. The result of our efforts is maximum performance across the board. WITTENSTEIN alpha has managed to move the old established system of rack and pinion **back into the fast lane**.

Always there for you.

If you are striving to achieve your objectives quickly and implement solutions efficiently and individually, then WITTENSTEIN alpha is the perfect partner for you.

Make a decision in favor of world-class technology that will give your customers a leading edge and help further consolidate your partnership together.

The **systems** and **applications**

Machine precision *

1 µm

Master/Slave: TP System output
with Premium Class+ pinion and Premium Class rack

5 µm

The right gearhead, rack and pinion **for every application** – from low-cost to high-end solutions. The positioning accuracy required in the application, the existing measuring system and the machine design essentially determine the configuration of linear systems and system combinations.

TP System output
with Premium Class+ pinion and Premium Class rack

20 µm

TP output
with Premium Class RTP pinion and Premium/Smart Class rack

50 µm

A real powerhouse with **a compact design**. Constant **rigidity** and outstanding **dynamics**. Easy to operate, quickly becomes indispensable. **Customized** to suit your specific application areas.

SP System output
with Premium Class+ pinion and Premium/Smart Class rack

100 µm

SP involute output
with Standard Class RSP pinion and Value/Smart Class rack

200 µm

Key output
with Value Class pinion and Value/Smart Class rack

>300 µm

* depending on other components.

Competent consultation

Staff at our **Technical Office** will be glad to answer any questions you may have about alpha Rack & Pinion Systems and your specific configurations. Give us a call!

HSC (High Speed Cutting) portal milling machines
Source: F. Zimmermann GmbH

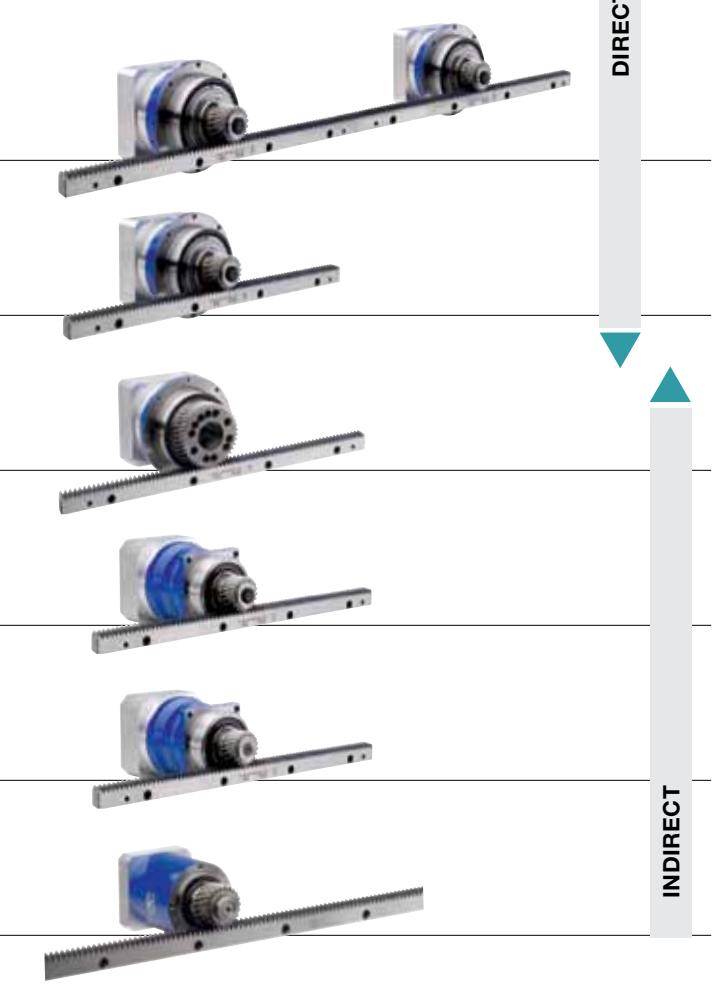
Profile machining centers
Source: Handtmann A-Punkt Automation GmbH

Laser machines
Source: TRUMPF Werkzeug-maschinen GmbH + Co. KG

Precision System

Eroding machines · Grinding machines · HSC portal milling machines · Turning machines · Machining centers · Boring machines · Laser machines · Punching machines

Measuring System



Precision⁺ System/ Precision System

P

for demanding requirements with regard to dynamics and accuracy in high-end applications.

Smart System

S

for positioning options with **more design freedom** in flexible applications.

Economy⁺ System/ Economy System

E

for standard linear applications in mid-range/ low-cost applications.

Wood, plastic/composite machining centers
Source: MAKA – Max Mayer Maschinenbau GmbH © MAKA

Gas cutting machines
Source: LIND GmbH Industrial Equipment

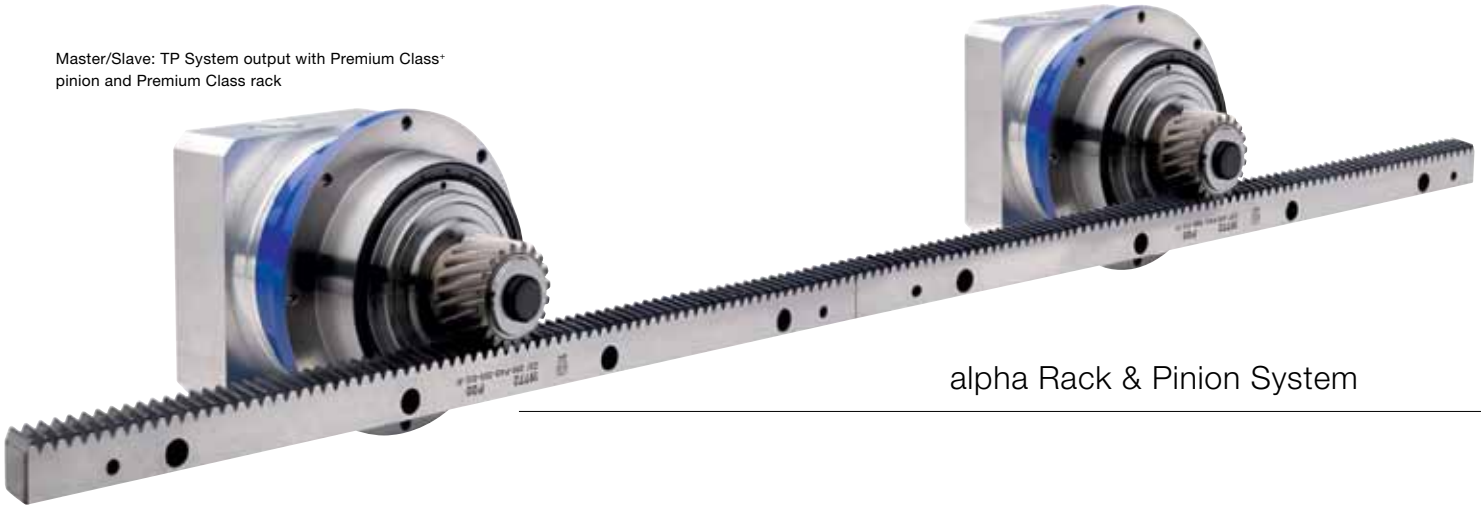
Robot arms in automation engineering
Source: MOTOMAN Robotics Europe AB

Smart System

Economy System

Water jet cutting machines · CNC wood/plastic processing machines · Gas cutting machines · Pipe bending machines · Foam cutting machines · Automation engineering

Master/Slave: TP System output with Premium Class+ pinion and Premium Class rack



alpha Rack & Pinion System – **the benefits for you**

Dynamic

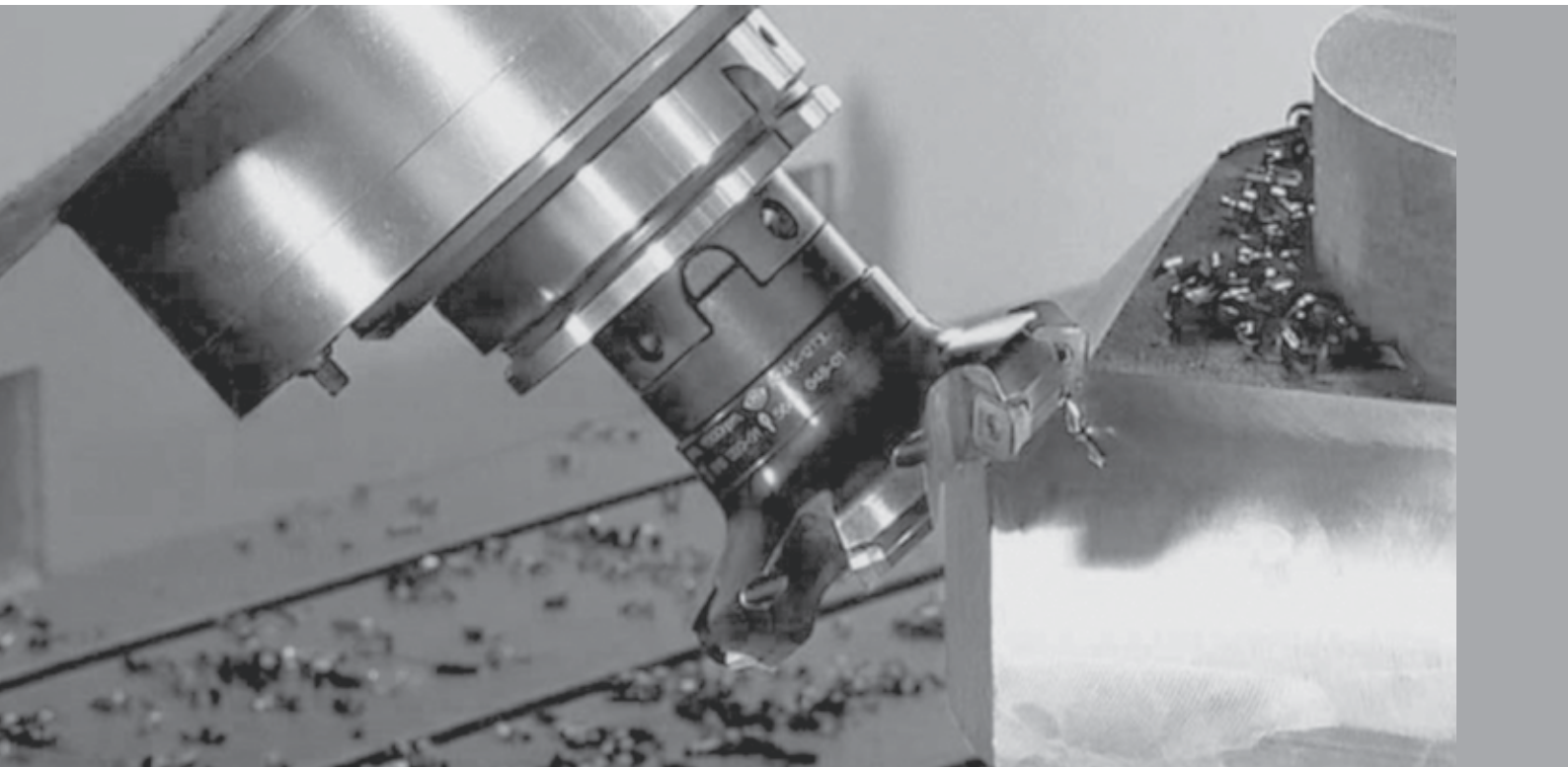
- Maximum movement speed and acceleration with low moments of inertia.
- Extremely good control characteristics due to constant linear rigidity along the entire movement path.

Precise

- New drive solutions with unique true running accuracy.
- Maximum positioning accuracy due to precision alignment of components.

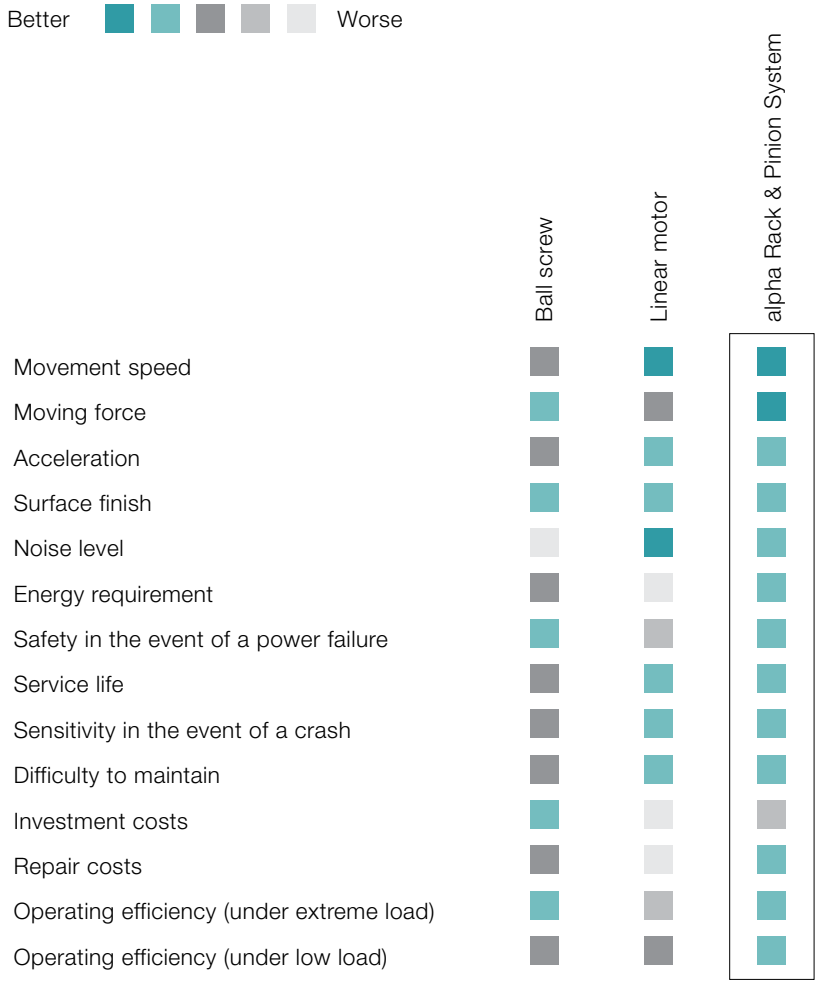
Efficient

- Effortless operation.
- Minimal mounting space and high power density.
- Enormous savings potential due to high level of energy efficiency.



The right gearhead, rack and pinion for every application.

A direct comparison



The comparison is based on typical processes involved in machining large workpieces and machines with long movement paths.

In detail

Feel the dynamics.
Experience the precision.
Maximize efficiency.

Solution-oriented concepts, sophisticated development phases and perfect results. Helping you become a top performer.

alpha Rack & Pinion Systems will optimize your applications. Find out for yourself. Help your company **take giant strides towards achieving its goals.**

Three classes of rack – **unlimited possibilities**

The correct rack is an essential component in realizing your machine concepts. WITTENSTEIN alpha offers three classes of rack Premium Class, Value Class and Smart Class to find the right solution for your application requirements.

Have the freedom to implement your ideas!

Precision System

Premium Class

Solution for **extremely dynamic, precision high-end** applications.

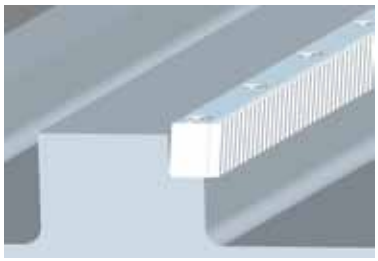
For greater precision: linear and gantry sorting possible.
Contact us!

Economy System

Value Class

Solution for **mid-range and economy** applications.

Standard installation concept:
permanent connection to mounting edge



Smart System

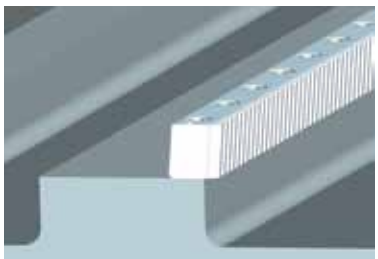
New feature: free connection option

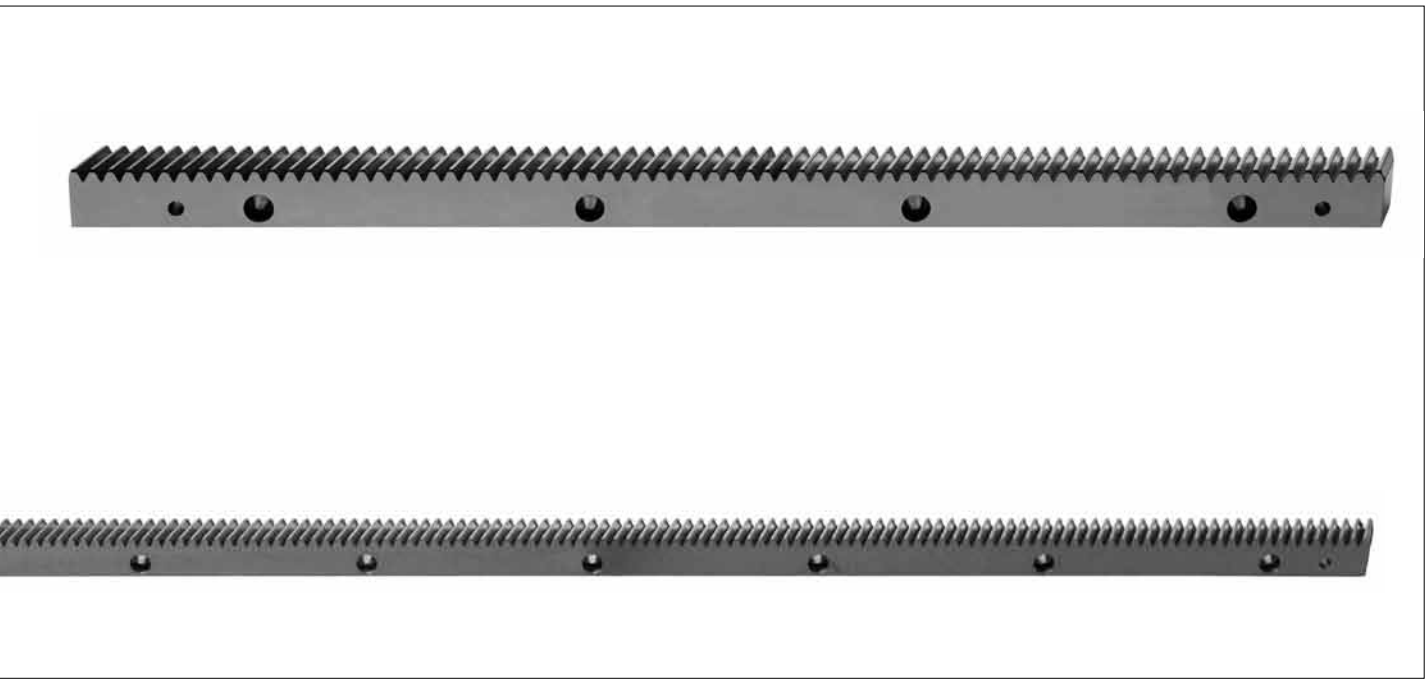
Smart Class

The flexible rack for applications **with no available mounting edge in the economy to mid-range** sector.

The flexible modular assembly concept makes the Smart Class rack a versatile all-rounder.

New: free connection
without mounting edge





Extremely flexible concept

Free connection concept:
The absence of the mounting edge allows simple and uncomplicated mounting of the rack parallel to the machine guide.

Modular machine concept:
The 60 mm hole pattern and length of 480 mm **are compatible with the hole patterns on linear guides** produced by well-known manufacturers and enable the implementation of modular machine concepts.

Clearing the way for **unlimited movement paths.**

Premium Class rack

Module	p_t	L	z	a [a)]	a_1	B	d	d_1 [b)]	D	$f^{+0.5}$	h	h_B	h_D	H	l	l_1	L_1
2	6.67	500	75	31.7	436.6	24	7	5.7	11	2	22	8	7	24	62.5	125.0	8.5
2	6.67	333	50	31.7	269.9	24	7	5.7	11	2	22	8	7	24	62.5	104.2	8.5
2	6.67	167	25	31.7	103.3	24	7	5.7	11	2	22	8	7	24	62.5	41.7	8.5
3	10	500	50	35.0	430	29	10	7.7	15	2	26	9	9	29	62.5	125.0	10.3
3	10	250	25	35.0	180	29	10	7.7	15	2	26	9	9	29	62.5	125.0	10.3
4	13.33	507	38	18.3	460	39	12	9.7	18	3	35	12	11	39	62.5	125.0 [c)]	13.8
5	16.67	500	30	37.5	425	49	14	11.7	20	3	34	12	13	39	62.5	125.0	17.4
6	20	500	25	37.5	425	59	18	15.7	26	3	43	16	17	49	62.5	125.0	20.9

All dimensions in [mm]
Cumulative pitch error Fp: 12 µm for m2 (500 mm) and m3 (250 mm in length); Fp: 15 µm for m > 2
Single pitch error fp: 3 µm
[b)] Recommended tolerance dimension: $6^{H7}/8^{H7}/10^{H7}/12^{H7}/16^{H7}$
[c)] Hole spacing between two racks on module 4 is 131.67 mm.

p_t = Reference circle pitch
z = Number of teeth
m = Module

Value Class rack

Module	p_t	L	z	a [a)]	a_1	B	d	d_1 [b)]	D	$f^{+0.5}$	h	h_B	h_D	H	l	l_1	L_1
2	6.67	1000	150	31.7	936.6	24	7	5.7	11	2	22	8	7	24	62.5	125	8.5
3	10	1000	100	35	930	29	10	7.7	15	2	26	9	9	29	62.5	125	10.3
4	13.33	1000	75	33.3	933.4	39	10	7.7	15	3	35	12	9	39	62.5	125	13.8
5	16.67	1000	60	37.5	925	49	14	11.7	20	3	34	12	13	39	62.5	125	17.4
6	20	1000	50	37.5	925	59	18	15.7	26	3	43	16	17	49	62.5	125	20.9

All dimensions in [mm]
Cumulative pitch error Fp: 35 µm/1000 mm
Single pitch error fp: 8 µm; 10 µm at m5 and m6
[b)] Recommended tolerance dimension: $6^{H7}/8^{H7}/10^{H7}/12^{H7}/16^{H7}$

p_t = Reference circle pitch
z = Number of teeth
m = Module

New feature: free connection option

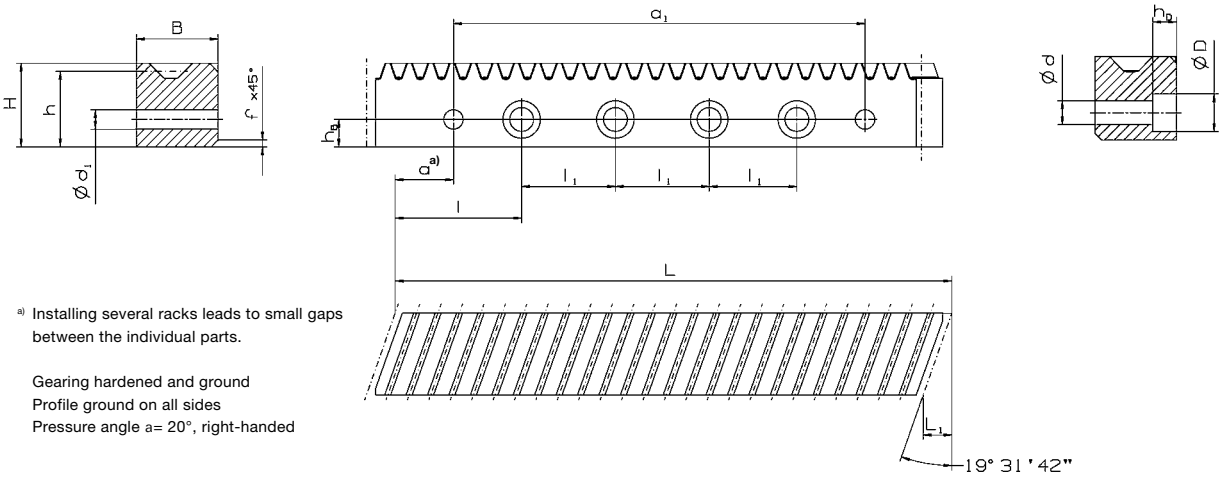
Smart Class rack

Module	p_t	L	z	a [a)]	a_1	B	d	d_1 [b)]	D	$f^{+0.5}$	h	h_B	h_D	H	l	l_1	L_1
2	6.67	480	72	12	453	24	9	7.7	15	2	2	15.5	8.5	24.2	30	60	8.5
3	10	480	48	10.2	453	29	11	7.7	17	2	3	19.5	10.5	29.2	28.2	60	10.3
4	13.33	480	36	7	452	39	14	9.7	20	3	4	28	13	39.2	23	60	13.8

All dimensions in [mm]
Cumulative pitch error Fp: 30 µm/500 mm
Single pitch error fp: 6 µm
[b)] Recommended tolerance dimension: 8^{H7}, 10^{H7}

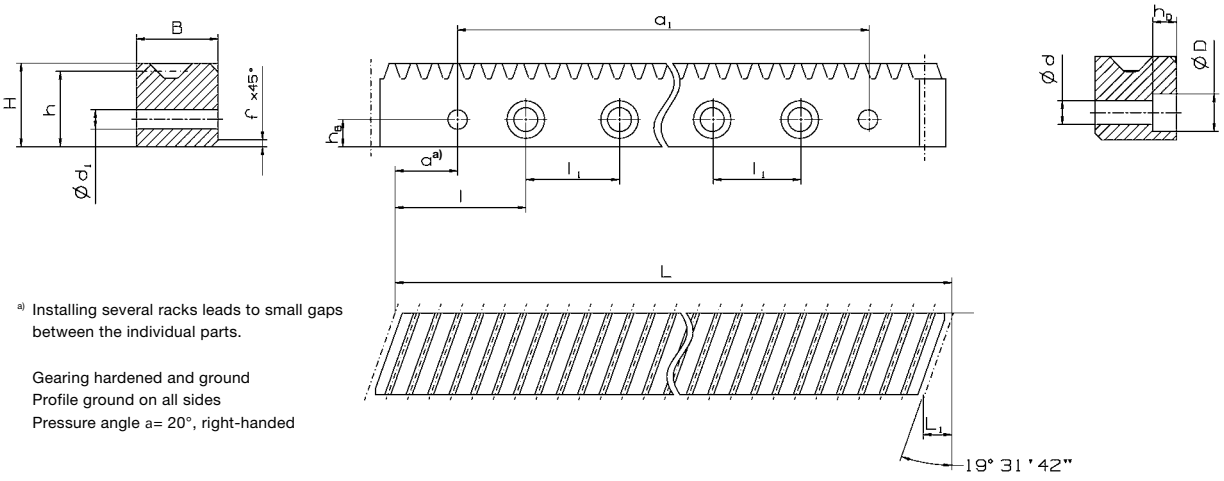
p_t = Reference pitch circle
z = Number of teeth
m = Module

Please refer to the operating instructions available at **www.wittenstein-alpha.com** for instructions on assembly and design of the machine bed



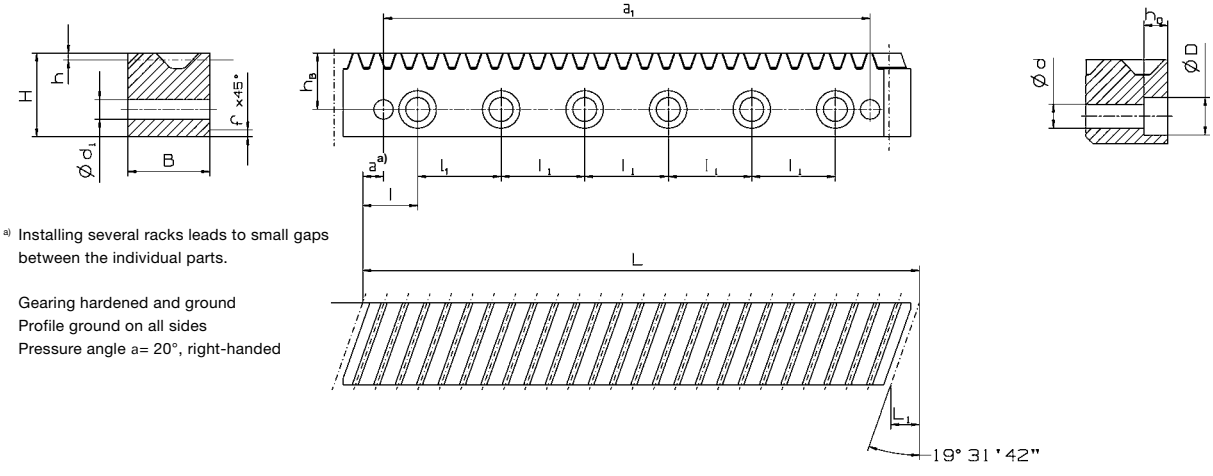
a) Installing several racks leads to small gaps between the individual parts.

Gearing hardened and ground
Profile ground on all sides
Pressure angle a= 20°, right-handed



a) Installing several racks leads to small gaps between the individual parts.

Gearing hardened and ground
Profile ground on all sides
Pressure angle a= 20°, right-handed



a) Installing several racks leads to small gaps between the individual parts.

Gearing hardened and ground
Profile ground on all sides
Pressure angle a= 20°, right-handed

Premium Class+ pinion on **TP system output** with **Premium Class rack**

(all pinions, pressure angle α=20°, inclination angle β=19,5283° left-handed)

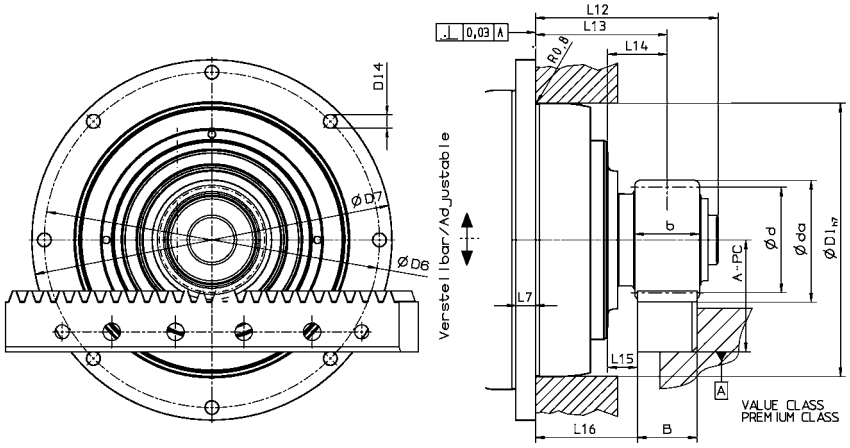
TP System output	Module	z	A-PC ±0.3 a)	b	B	d_a	d	x	$D1_{h7}$	D6	D7	D14	L7	L12	L13	L14	L15	L16
TP+ 010 (MA, MF)	2	20	44.0	26	24	48.3	42.441	0.4	90	109	118	5.5	7	71.0	50.5	20.5	8.5	38.5
TP+ 025 (MA, MF)	2	20	44.0	26	24	48.3	42.441	0.4	110	135	145	5.5	8	73.5	53.0	24.0	12.0	41.0
	2	40	64.4	26	24	89.2	84.883	0						73.5	53.0	24.0	12.0	41.0
	3	20	59.0	31	29	72.3	63.662	0.4						76.0	52.5	23.5	9.0	38.0
TP+ 050 (MA, MF)	2	40	64.4	26	24	89.2	84.883	0	140	168	179	6.6	10	87.0	66.5	28.5	16.5	54.5
	3	20	59.0	31	29	72.3	63.662	0.4						89.5	66.0	28.0	13.5	51.5
	3	34	80.1	31	29	114.5	108.226	0						90.5	66.0	28.0	13.5	51.5
	4	20	78.2	41	39	94.8	84.882	0.2						97.0	67.5	29.5	10.0	48.0
TP+ 110 (MA, MF)	3	34	80.1	31	29	114.5	108.226	0	200	233	247	9	12	106.0	81.5	31.5	17.0	67.0
	4	20	78.2	41	39	94.8	84.882	0.2						112.5	83.0	33.0	13.5	63.5
	4	30	98.7	41	39	135.6	127.324	0						112.5	83.0	33.0	13.5	63.5
	5	19	86.4	51	49	115.1	100.798	0.4						120.0	85.0	35.0	10.5	60.5
TP+ 300 (MA, MF)	4	30	98.7	41	39	135.6	127.324	0	255	280	300	13.5	18	131.5	102.0	36.0	16.5	82.5
	5	19	86.4	51	49	115.1	100.798	0.4						139.0	104.0	38.0	13.5	79.5
	5	30	113.6	51	49	169.4	159.155	0						135.0	104.0	38.0	13.5	79.5
	6	19	105.9	61	59	138.0	120.958	0.4						142.5	106.0	40.0	10.5	76.5
TP+ 500 (MA, MF)	5	30	113.6	51	49	169.4	159.155	0	285	310	330	13.5	20	147.5	116.5	41.5	17.0	92.0
	6	19	105.9	61	59	138.0	120.958	0.4						155.0	118.5	43.5	14.0	89.0
	6	28	132.1	61	59	190.5	178.254	0						154.0	118.5	43.5	14.0	89.0

All dimensions in [mm]

a) please contact us for precise dimensions; align mechanism recommended (alignment dimension ±0.3 mm)

z = Number of teeth
d_a = Tip diameter
d = Partial circle diameter
x = Profile correction

MA = HIGH TORQUE
MF = Standard



TP+ gearhead with **Premium Class+ pinion** on **TP system output** with **Premium Class rack**

Technical data for the smallest available ratio

	Module	z	F_{2T} [N] (lb_f) MF i = 4	F_{2T} [N] (lb_f) MA i = 22	T_{2B} [Nm] (in.lb) MF i = 4	T_{2B} [Nm] (in.lb) MA i = 22	V_{Max} [m/min] (in/sec.) MF i = 4	V_{Max} [m/min] (in/sec) MA i = 22	m_{pinion} [kg] (lb_m)
TP+ 010	**2**	20	2400 (540)	2400 (540)	51 (452)	51 (452)	200 (132)	36 (24)	0.4 (0.9)
TP+ 025	**2**	20	3400 (765)	3400 (765)	72 (638)	72 (638)	150 (99)	36 (24)	0.4 (0.9)
	2	40	3400 (765)	3400 (765)	144 (1275)	144 (1275)	300 (197)	72 (48)	1.3 (2.9)
	3	20	3400 (765)	3400 (765)	108 (956)	108 (956)	225 (148)	54 (36)	1.0 (2.3)
TP+ 050	**2**	40	7100 (1598)	7100 (1598)	301 (2664)	301 (2664)	267 (176)	60 (40)	1.3 (2.9)
	3	20	11100 (2498)	11100 (2498)	353 (3125)	353 (3125)	200 (132)	45 (30)	1.0 (2.3)
	3	34	10800 (2430)	10800 (2430)	584 (5169)	584 (5169)	340 (224)	77 (51)	2.4 (5.4)
	4	20	10800 (2430)	10800 (2430)	458 (4054)	458 (4054)	267 (176)	60 (40)	2.0 (4.5)
TP+ 110	**3**	34	13000 (2925)	13000 (2925)	703 (6222)	703 (6222)	298 (196)	69 (46)	2.4 (5.3)
	4	20	21000 (4725)	21000 (4725)	891 (7886)	891 (7886)	233 (153)	54 (36)	2.0 (4.5)
	4	30	22000 (4950)	22000 (4950)	1401 (12399)	1401 (12399)	350 (230)	81 (54)	3.9 (8.7)
	5	19	21000 (4725)	21000 (4725)	1058 (9364)	1058 (9364)	277 (182)	64 (42)	3.1 (6.9)
	Module	**z**	**i = 20**	**i = 22**	**i = 20**	**i = 22**	**i = 20**	**i = 22**	
TP+ 300	**4**	30	22000 (4950)	22000 (4950)	1401 (12399)	1401 (12399)	70 (46)	54 (36)	3.9 (8.7)
	5	19	31000 (6975)	32000 (7200)	1562 (13824)	1646 (14568)	55 (36)	43 (29)	3.1 (6.9)
	5	30	30300 (6818)	30800 (6930)	2411 (21338)	2501 (22136)	88 (58)	68 (45)	10.4 (23)
	6	19	30500 (6863)	30800 (6930)	1845 (16329)	1901 (16825)	67 (44)	51 (34)	5.8 (12.9)
TP+ 500	**5**	30	34000 (7650)	34000 (7650)	2706 (23949)	2706 (23949)	88 (58)	68 (45)	10.4 (23)
	6	19	41000 (9225)	41600 (9360)	2480 (21948)	2570 (22747)	67 (44)	51 (34)	5.8 (12.9)
	6	28	41000 (9225)	41000 (9225)	3654 (32338)	3654 (32338)	98 (64)	76 (50)	14.5 (32.1)

Technical data based on 1000 load cycles per hour.
More combinations possible with cymex®

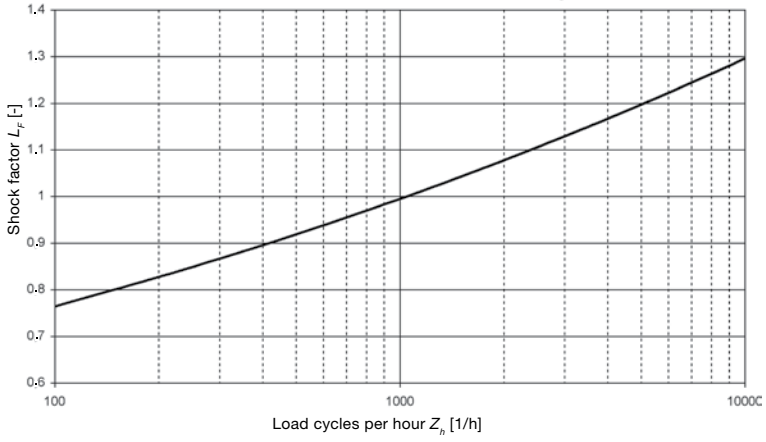
F_{2T} = Max. moving force
T_{2B} = Max. acceleration torque

MA = HIGH TORQUE
MF = Standard

In Z-axis without a balancing weight additional load changes can be caused due to additional movements in other axes.

Calculation including shock factor:
$F_{2t} * L_F = F_{2t,\,LF} < F_{2T}$

Shock factor for rack moving force



Premium Class RTP pinion on **TP output** with **Premium** and **Smart Class rack**

(all pinions, pressure angle α=20°, inclination angle β=19,5283° left-handed)

TP output	Module	z	A-PC ±0,3 [b]	A-SC ±0,3 [b]	b	B	d_a	d	x	$D5_{h7}$	D6	D7	D14	L4	L5	L7	L12	L16
TP+/TK+ 004	2	26	50.4	41.9	26	24	60.7	55.173	0.4	64	79	86	4.5	19.5	8	4	7.2	20.5
TP+/TK+/ TPK+ 010	2	29 [a]	53.4	44.9	26	24	66.6	61.539	0.3	90	109	118	5.5	40	11	7	8.3	41
	2	33	57.6	49.1	26	24	75.1	70.028	0.3	90	109	118	5.5	30	11	7	8.3	31
	2	37	61.9	53.4	26	24	83.6	78.516	0.3	90	109	118	5.5	30	11	7	8.3	31
TP+/TK+/ TPK+ 025	2	35 [a]	59.7	51.2	26	24	79.4	74.272	0.3	110	135	145	5.5	39	10	8	8.6	40
	2	40 [c]	65.0	56.5	26	24	90.0	84.882	0.3	110	135	145	5.5	29	10	8	8.6	30
	2	45	70.2	61.7	26	24	100.2	95.493	0.22	110	135	145	5.5	29	10	8	8.6	30
TP+/TK+/ TPK+ 050	3	31 [a]	76.2	66.7	31	29	106.4	98.676	0.3	140	168	179	6.6	51	14.5	10	11.3	52
	3	35 [c]	82.6	73.1	31	29	119.1	111.409	0.3	140	168	179	6.6	38	14.5	10	11.3	39
	3	40 [c]	90.6	81.1	31	29	135.0	127.324	0.3	140	168	179	6.6	38	14.5	10	11.3	39
TP+/TK+/ TPK+ 110	4	38	116.6	105.6	41	39	171.3	161.277	0.25	200	233	247	9	50	17.5	12	14.5	51
	4	40 [d]	119.9	108.9	41	39	177.9	169.766	0	200	233	247	9	50	17.5	12	14.5	51
TP+ 300	5	32 [a] [c]	120.3	–	51	49	182.6	169.766	0.285	255	280	300	13.5	91	20	18	20	92
TP+ 500	6	31 [a]	143.4	–	61	59	212.8	197.352	0.295	285	310	330	13.5	110	20	20	20	111

All dimensions in [mm]

[a] with adapter flange

[b] please contact us for precise dimensions; align mechanism recommended (alignment dimension ±0.3 mm)

[c] also in combination with TP+ HIGH TORQUE

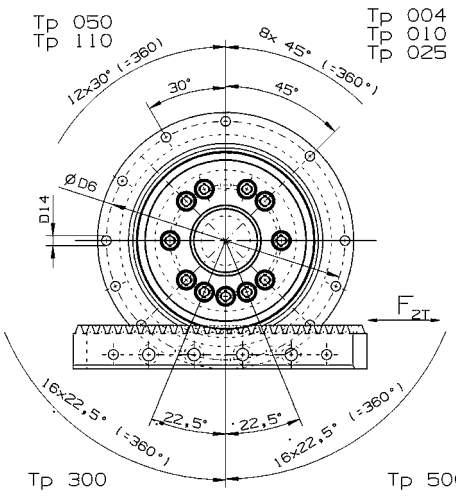
[d] only in combination with TP+ HIGH TORQUE

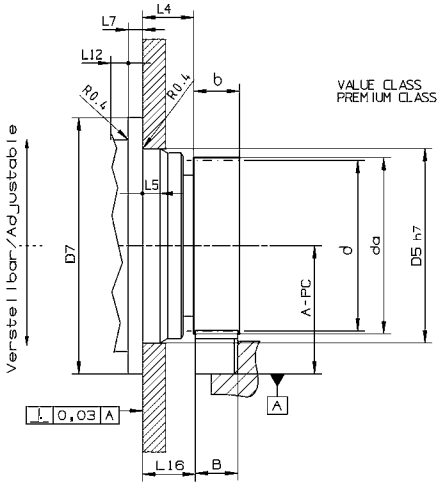
z = Number of teeth

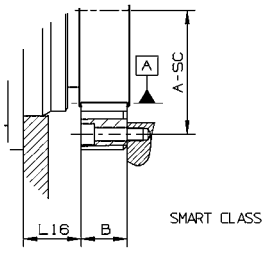
d_a = Tip diameter

d = Partial circle diameter

x = Profile correction







TP+ gearhead with **Premium Class RTP pinion** on **TP output** with **Premium** and **Smart Class rack** · Technical data for the smallest available ratio

	Module	z	F_{2T} [N] (lb_f) MF i = 4 (PC)	F_{2T} [N] (lb_f) MF i = 4 (SC)	F_{2T} [N] (lb_f) MA i = 22 (PC)	F_{2T} [N] (lb_f) MA i = 22 (SC)	T_{2B} [Nm] (in.lb) MF i = 4 (PC)	T_{2B} [Nm] (in.lb) MF i = 4 (SC)	T_{2B} [Nm] (in.lb) MA i = 22 (PC)	T_{2B} [Nm] (in.lb) MA i = 22 (SC)	V_{Max} [m/min] (in/sec) MF i = 4	V_{Max} [m/min] (in/sec) MA i = 22	m_{pinion} [kg] (lb_m)
TP+ 004	**2**	26	1400 (315)	1400 (315)	–	–	39 (346)	39 (346)	–	–	255 (168)	–	0.41 (0.91)
TP+ 010	**2**	29	2300 (518)	2300 (518)	–	–	71 (629)	71 (629)	–	–	290 (191)	–	0.45 (1)
	2	33	2550 (574)	2550 (574)	–	–	89 (788)	89 (788)	–	–	330 (217)	–	0.60 (1.33)
	2	37	2500 (563)	2500 (563)	–	–	98 (868)	98 (868)	–	–	370 (243)	–	0.80 (1.77)
TP+ 025	**2**	35	3400 (765)	3400 (765)	–	–	126 (1116)	126 (1116)	–	–	260 (171)	–	0.62 (1.38)
	2	40 [a]	3700 (833)	3700 (833)	3700 (833)	3700 (833)	157 (1390)	157 (1390)	157 (1390)	157 (1390)	300 (197)	72 (48)	0.85 (1.88)
	2	45	3600 (810)	3600 (810)	–	–	172 (1523)	172 (1523)	–	–	335 (220)	–	1.15 (2.55)
TP+ 050	**3**	31	10800 (24230)	9000 (2025)	–	–	533 (4718)	444 (3930)	–	–	310 (204)	–	1.40 (3.1)
	3	35 [a]	12000 (2700)	9000 (2025)	12000 (2700)	9000 (2025)	668 (5912)	501 (4434)	668 (5912)	501 (4434)	340 (224)	78 (52)	1.77 (3.92)
	3	40 [a]	12000 (2700)	9000 (2025)	12000 (2700)	9000 (2025)	764 (6762)	573 (5072)	764 (6762)	573 (5072)	390 (256)	90 (60)	2.50 (5.53)
TP+ 110	**4**	38	22000 (4950)	16000 (3600)	–	–	1774 (15700)	1290 (11417)	–	–	440 (289)	–	5.55 (12.27)
	4	40 [b]	–	–	22000 (4950)	16000 (3600)	–	–	1867 (16523)	1358 (12019)	–	108 (71)	5.24 (11.59)
	Module	**z**	**i = 20**		**i = 22**		**i = 20**		**i = 22**		**i = 20**	**i = 22**	
TP+ 300	**5**	32 [a]	28300 (6368)	–	28300 (6368)	–	2402 (21258)	–	2402 (21258)	–	93 (61)	72 (48)	6.47 (14.30)
TP+ 500	**6**	31	36400 (8190)	–	–	–	3592 (31790)	–	–	–	108 (71)	–	12.3 (27.19)

Technical data based on 1000 load cycles per hour.
More combinations possible with cymex®
[a] also in combination with TP+ HIGH TORQUE
[d] only in combination with TP+ HIGH TORQUE

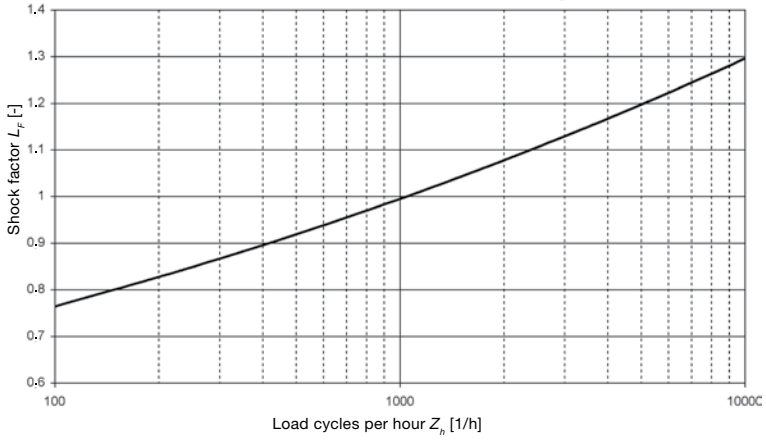
F_{2T} = Max. moving force
T_{2B} = Max. acceleration torque
SC = Smart Class
PC = Premium Class

MA = HIGH TORQUE
MF = Standard

In Z-axis without a balancing weight additional load changes can be caused due to additional movements in other axes.

Calculation including shock factor:
$F_{2t} * L_F = F_{2t,\,LF} < F_{2T}$

Shock factor for rack moving force



Premium Class⁺ pinion on **SP⁺ System output** with **Premium** and **Smart Class rack**

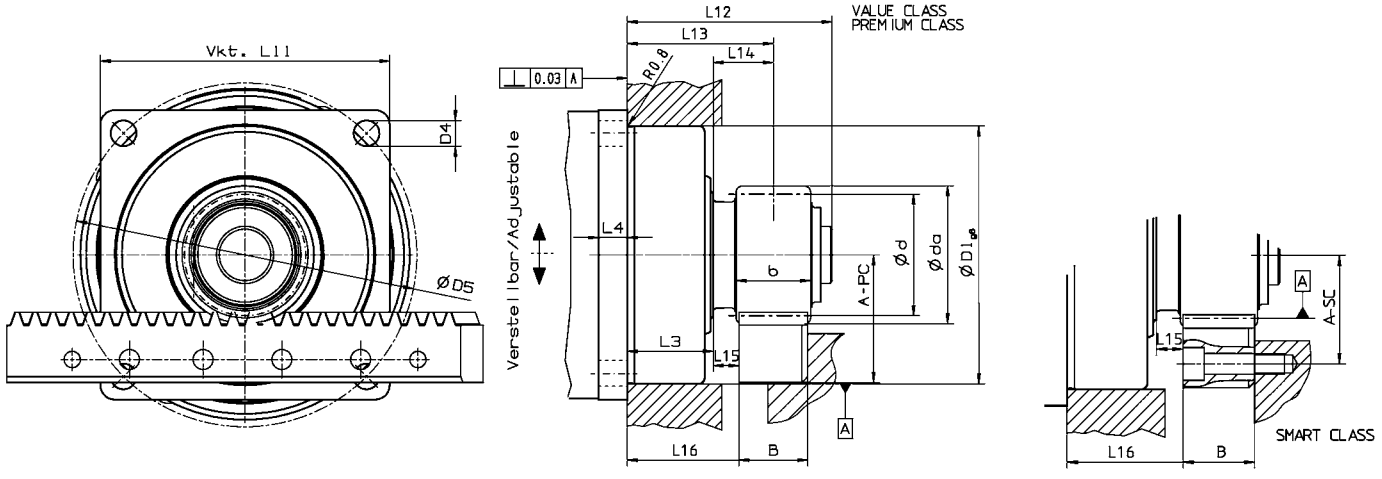
(all pinions, pressure angle α=20°, inclination angle β=19,5283° left-handed)

SP system output	Module	z	A-PC ±0,3[a]	A-SC ±0,3[a]	b	B	d_a	d	x	$D1_{g6}$	D4	D5	L3	L4	L11 ±1	L12	L13	L14	L15	L16
SP⁺ 075	**2**	20	44.0	35.5	26	24	48.3	42.441	0.4	70	6.6	85	20	7	76	61.0	40.5	20.5	8.5	28.5
SP⁺ 100	**2**	20	44.0	35.5	26	24	48.3	42.441	0.4	90	9	120	30	10	101	71.5	51.0	21.0	9	39
	2	40	64.4	55.9	26	24	89.2	84.883	0							71.0	51.0	21.0	9	39
	3	20	59.0	49.5	31	29	72.3	63.662	0.4							73.5	54.0	24.0	9.5	39.5
SP⁺ 140	**2**	40	64.4	55.9	26	24	89.2	84.883	0	130	11	165	30	12	141	75.0	54.5	24.5	12.5	42.5
	3	20	59.0	49.5	31	29	72.3	63.662	0.4							77.5	54.0	24.0	9.5	39.5
	3	34	80.1	70.6	31	29	114.5	108.226	0							77.0	54.0	24.0	9.5	39.5
	4	20	78.2	67.2	41	39	94.8	84.882	0.2							83.5	59.0	29.0	9.5	39.5
SP⁺ 180	**3**	34	80.1	70.6	31	29	114.5	108.226	0	160	13.5	215	30	15	182	82.0	57.5	27.5	13	43
	4	20	78.2	67.2	41	39	94.8	84.882	0.2							88.5	59.0	29.0	9.5	39.5
	4	30	98.7	87.7	41	39	135.6	127.324	0							87.0	59.0	29.0	9.5	39.5
	5	19	86.4	–	51	49	115.1	100.798	0.4							94.5	64.5	34.5	10	40
SP⁺ 210	**4**	30	98.7	87.7	41	39	135.6	127.324	0	180	17	250	38	17	215	99.9	70.4	32.5	13	50.9
	5	19	86.4	–	51	49	115.1	100.798	0.4							107.4	72.4	34.5	10	47.9
	5	30	113.6	–	51	49	169.4	159.155	0							105.9	72.4	34.5	10	47.9
	6	19	105.9	–	61	59	138.0	120.958	0.4							113.4	77.9	40.0	10.5	48.4
SP⁺ 240	**5**	30	113.6	–	51	49	169.4	159.155	0	200	17	290	40	20	242	109.9	78.9	39.0	14.5	54.4
	6	19	105.9	–	61	59	138.0	120.958	0.4							120.9	80.9	41.0	11.5	51.4
	6	28	132.1	_	61	59	190.5	178.254	0							119.9	80.9	41.0	11.5	51.4

All dimensions in [mm]

[a] please contact us for precise dimensions;
align mechanism recommended (alignment dimension ± 0.3 mm)

z = Number of teeth
d_a = Tip diameter
d = Partial circle diameter
x = Profile correction



SP+ gearhead with **Premium+ pinion on SP+ system output** with **Premium and Smart Class rack** · Technical data for the smallest available ratio

	Module	z	F_{2T} [N] (lb_f) i = 4 (PC)	F_{2T} [N] (lb_f) i = 4 (SC)	F_{2T} [N] (lb_f) i = 16 (PC)	F_{2T} [N] (lb_f) i = 16 (SC)	T_{2B} [Nm] (in.lb) i = 4 (PC)	T_{2B} [Nm] (in.lb) i = 4 (SC)	T_{2B} [Nm] (in.lb) i = 16 (PC)	T_{2B} [Nm] (in.lb) i = 16 (SC)	V_{Max} [m/min] (in/sec) i = 4	V_{Max} [m/min] (in/sec) i = 16	m_{pinion} [kg] (lb_m)
SP+ 075	**2**	20	3300 (743)	3300 (743)	3300 (743)	3300 (743)	68 (602)	68 (602)	68 (602)	68 (602)	200 (132)	50 (33)	0.4 (0.89)
SP+ 100	**2**	20	6400 (1440)	5000 (1125)	6400 (1440)	5000 (1125)	136 (1204)	106 (939)	136 (1204)	106 (939)	150 (99)	37 (25)	0.4 (0.89)
	2	40	6100 (1373)	5000 (1125)	6100 (1373)	5000 (1125)	259 (2293)	212 (1877)	259 (2293)	212 (1877)	300 (197)	75 (50)	1.3 (2.88)
	3	20	6000 (1350)	6000 (1350)	6000 (1350)	6000 (1350)	191 (1691)	191 (1691)	191 (1691)	191 (1691)	225 (148)	56 (37)	1.0 (2.21)
SP+ 140	**2**	40	7100 (1598)	5000 (1125)	7100 (1598)	5000 (1125)	301 (2664)	212 (1877)	301 (2664)	212 (1877)	266 (175)	66 (44)	1.3 (2.88)
	3	20	10000 (2250)	9000 (2025)	10000 (2250)	9000 (2025)	318 (2815)	286 (2532)	318 (2815)	286 (2532)	200 (132)	50 (33)	1.0 (2.21)
	3	34	9800 (2205)	9000 (2025)	9800 (2205)	9000 (2025)	530 (4691)	487 (4310)	530 (4691)	487 (4310)	340 (224)	85 (56)	2.4 (5.31)
	4	20	9400 (2115)	9400 (2115)	9400 (2115)	9400 (2115)	399 (3532)	399 (3532)	399 (3532)	399 (3532)	266 (175)	66 (44)	2.0 (4.42)
SP+ 180	**3**	34	13600 (3060)	9000 (2025)	13600 (3060)	9000 (2025)	736 (6514)	487 (4310)	736 (6514)	487 (4310)	297 (195)	85 (56)	2.4 (5.31)
	4	20	13600 (3060)	13600 (3060)	13600 (3060)	13600 (3060)	577 (5107)	577 (5107)	577 (5107)	577 (5107)	233 (153)	66 (44)	2.0 (4.42)
	4	30	13200 (2970)	13200 (2970)	13200 (2970)	13200 (2970)	840 (7434)	840 (7434)	840 (7434)	840 (7434)	350 (230)	100 (66)	3.9 (8.62)
	5	19	12800 (2880)	–	12800 (2880)	–	645 (5709)	–	645 (5709)	–	277 (182)	78 (52)	3.1 (6.86)
SP+ 210	**4**	30	21700 (4883)	16000 (3600)	21700 (4883)	16000 (3600)	1381 (1222)	1019 (9019)	1381 (12222)	1019 (9019)	250 (164)	87 (58)	2.0 (4.42)
	5	19	21800 (4905)	–	21800 (4905)	–	1099 (9727)	–	1099 (9727)	–	197 (130)	69 (46)	3.9 (8.62)
	5	30	21000 (4725)	–	21000 (4725)	–	1671 (14789)	–	1671 (14789)	–	312 (205)	109 (72)	3.1 (6.86)
	6	19	20600 (4635)	–	20600 (4635)	–	1246 (11028)	–	1246 (11028)	–	237 (156)	83 (55)	10.4 (22.99)
SP+ 240	**5**	30	31700 (7133)	–	31700 (7133)	–	2523 (22329)	–	2523 (22329)	–	275 (181)	109 (72)	10.4 (22.99)
	6	19	32000 (7200)	–	32000 (7200)	–	1935 (17125)	–	1935 (17125)	–	209 (138)	83 (55)	5.8 (12.82)
	6	28	31000 (697)	–	31000 (6975)	–	2763 (24453)	–	2763 (24453)	–	308 (203)	122 (81)	14.5 (32.05)

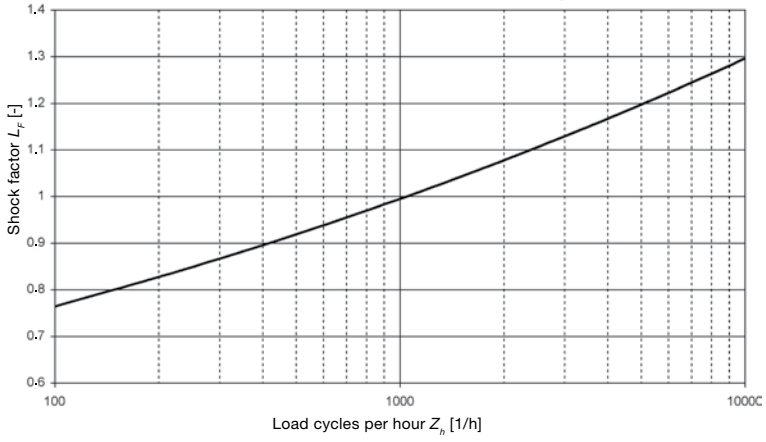
Technical data based on 1000 load cycles per hour.
More combinations possible with cymex®

F_{2T} = Max. moving force
T_{2B} = Max. acceleration torque

In Z-axis without a balancing weight additional load changes can be caused due to additional movements in other axes.

Calculation including shock factor:
$F_{2t} * L_F = F_{2t,\,LF} < F_{2T}$

Shock factor for rack moving force



Standard Class RSP pinion with **SP involute output** with **Value** and **Smart Class rack**

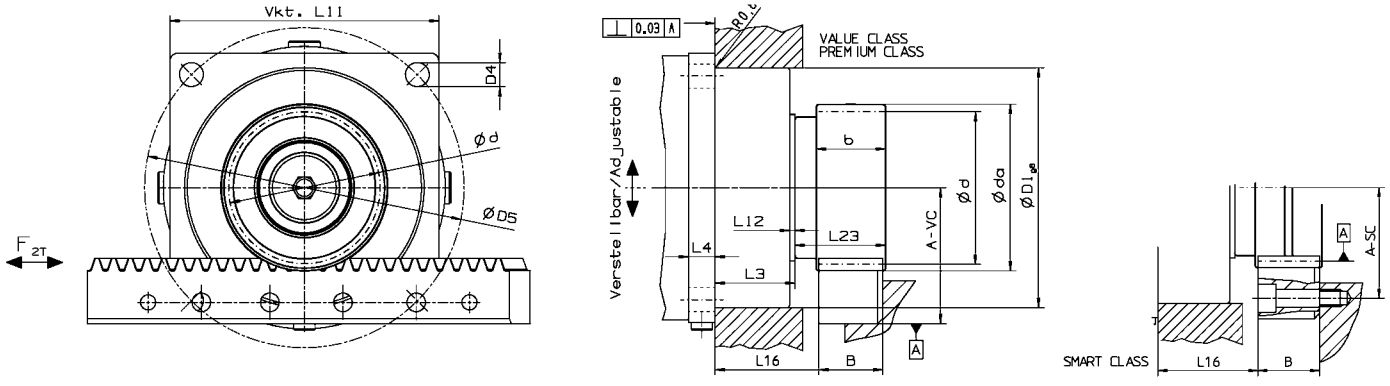
(all pinions, pressure angle α=20°, inclination angle β=19,5283° left-handed)

Output with SP involute toothing DIN5480	Module	z	A-VC ±0.3 a)	A-SC ±0.3 a)	b	B	d_a	d	x	$D1_{g6}$	D4	D5	L3	L4	L11 ± 1	L12	L16	L23
SP+/ SK+ 060	2	15	38.9	30.4	26	24	37.8	31.831	0.5	60	5.5	68	20	6	62	2	27	32
	2	16	40.0	31.5	26	24	40.0	33.953	0.5	60	5.5	68	20	6	62	2	27	32
	2	18	41.9	33.4	26	24	43.8	38.197	0.4	60	5.5	68	20	6	62	2	27	32
SP+/SK+/ SPK+ 075 VDS 050	2	18	41.9	33.4	26	24	43.8	38.197	0.4	70	6.6	85	20	7	76	2.5	28	33
	2	20	44.0	35.5	26	24	48.1	42.441	0.4	70	6.6	85	20	7	76	2.5	28	33
	2	22	46.1	37.6	26	24	52.3	46.686	0.4	70	6.6	85	20	7	76	2.5	28	33
SP+/SK+/ SPK+ 100 VDS 063	2	23	47.2	38.7	26	24	54.4	48.808	0.4	90	9	120	30	10	101	3	39	34
	2	25	49.3	40.8	26	24	58.6	53.052	0.4	90	9	120	30	10	101	3	39	34
	2	27	51.2	42.7	26	24	62.5	57.296	0.3	90	9	120	30	10	101	3	39	34
SP+/SK+/ SPK+ 140 VDS 080	3	20	59.0	49.5	31	29	71.7	63.662	0.4	130	11	165	30	12	141	3	51	51
	3	22	62.2	52.7	31	29	78.3	70.028	0.4	130	11	165	30	12	141	3	51	51
	3	24	65.4	55.9	31	29	84.7	76.394	0.4	130	11	165	30	12	141	3	51	51
SP+/SK+/ SPK+ 180 VDS 100	4	20	79.0	68.0	41	39	96.1	84.883	0.4	160	13.5	215	30	15	182	3	44	54
SP+ 210	4	25	89.4	78.4	41	39	116.8	106.103	0.34	180	17	250	38	17	215	3	63	65
SP+ 240	5	24	99.4	–	51	49	140.8	127.324	0.35	200	17	290	40	20	242	3	63	73

All dimensions in [mm]

a) please contact us for precise dimensions;
align mechanism recommended (alignment dimension ± 0.3 mm)

z = Number of teeth
d_a = Tip diameter
d = Partial circle diameter
x = Profile correction



SP+ gearhead with **Standard Class RSP pinion** on **SP involute output** with **Value** and **Smart Class rack** · Technical data for the smallest available ratio

	Module	z	F_{2T} [N] (lb_f) i = 3 (VC)	F_{2T} [N] (lb_f) i = 3 (SC)	F_{2T} [N] (lb_f) i = 16 (VC)	F_{2T} [N] (lb_f) i = 16 (SC)	T_{2B} [Nm] (in.lb) i = 3 (VC)	T_{2B} [Nm] (in.lb) i = 3 (SC)	T_{2B} [Nm (in.lb)] i = 16 (VC)	T_{2B} [Nm] (in.lb) i = 16 (SC)	V_{Max} [m/min] (in/sec) i = 3	V_{Max} [m/min] (in/sec) i = 16	m_{pinion} [kg] (lb_m)
SP+ 060	**2**	15	1800 (405)	1800 (405)	2300 (518)	2300 (518)	29 (257)	29 (257)	37 (328)	37 (328)	200 (132)	37 (25)	0.18 (0.4)
	2	16	1700 (383)	1700 (383)	2300 (518)	2300 (518)	29 (257)	29 (257)	39 (346)	39 (346)	210 (138)	40 (27)	0.19 (0.42)
	2	18	1500 (338)	1500 (338)	2300 (518)	2300 (518)	29 (257)	29 (257)	44 (390)	44 (390)	240 (158)	45 (30)	0.23 (0.51)
SP+ 075	**2**	18	3300 (743)	3300 (743)	3300 (743)	3300 (743)	63 (558)	63 (558)	63 (558)	63 (558)	240 (158)	45 (30)	0.20 (0.45)
	2	20	3300 (743)	3300 (743)	3300 (743)	3300 (743)	70 (620)	70 (620)	70 (620)	70 (620)	260 (171)	50 (33)	0.26 (0.58)
	2	22	3300 (743)	3300 (743)	3300 (743)	3300 (743)	77 (682)	77 (682)	77 (682)	77 (682)	290 (191)	55 (37)	0.32 (0.71)
SP+ 100	**2**	23	4300 (968)	5000 (1125)	4300 (968)	5000 (1125)	105 (930)	122 (1080)	105 (930)	122 (1080)	230 (151)	43 (29)	0.29 (0.65)
	2	25	4300 (968)	5000 (1125)	4300 (968)	5000 (1125)	114 (1009)	133 (1178)	114 (1009)	133 (1178)	250 (164)	47 (31)	0.31 (0.69)
	2	27	4300 (968)	5000 (1125)	4300 (968)	5000 (1125)	123 (1089)	143 (1266)	123 (1089)	143 (1266)	270 (178)	51 (34)	0.46 (1.02)
SP+ 140	**3**	20	8000 (1800)	9000 (2025)	8000 (1800)	9000 (2025)	255 (2257)	286 (2532)	255 (2257)	286 (2532)	260 (171)	50 (33)	0.72 (1.60)
	3	22	8000 (1800)	9000 (2025)	8000 (1800)	9000 (2025)	280 (2478)	315 (2788)	280 (2478)	315 (2788)	290 (191)	55 (37)	0.98 (2.17)
	3	24	8000 (1800)	9000 (2025)	8000 (1800)	9000 (2025)	306 (2709)	344 (3045)	306 (2709)	344 (3045)	320 (210)	60 (40)	1.26 (2.79)
SP+ 180	**4**	20	13000 (2925)	13000 (2925)	13000 (2925)	13000 (2925)	552 (4886)	552 (4886)	552 (4886)	552 (4886)	310 (204)	66 (44)	1.38 (3.05)
SP+ 210	**4**	25	14000 (3150)	16000 (3600)	14000 (3150)	16000 (3600)	743 (6576)	849 (7514)	743 (6576)	849 (7514)	270 (178)	72 (48)	2.24 (4.96)
SP+ 240	**5**	24	22000 (4950)	–	22000 (4950)	–	1401 (12399)	–	1401 (12399)	–	290 (191)	87 (58)	3.96 (8.76)

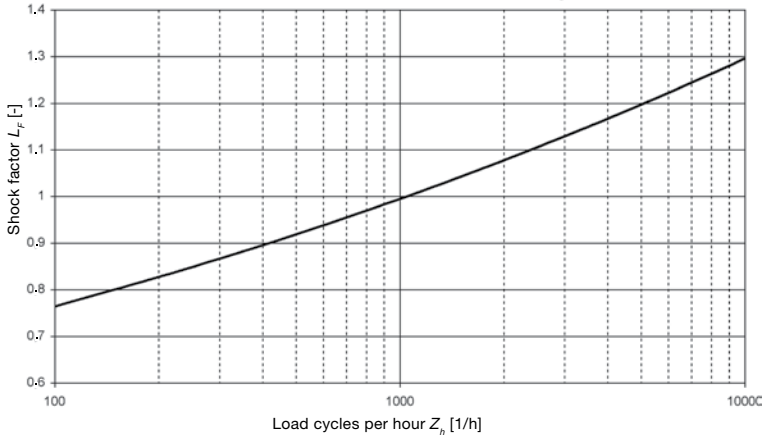
Technical data based on 1000 load cycles per hour.
More combinations possible with cymex®

F_{2T} = Max. moving force
T_{2B} = Max. acceleration torque
SC = Smart Class
VC = Value Class

In Z-axis without a balancing weight additional load changes can be caused due to additional movements in other axes.

Calculation including shock factor:
$F_{2t} * L_F = F_{2t,\,LF} < F_{2T}$

Shock factor for rack moving force



Value Class pinion (shrunk/bonded) on **shaft key** with **Value** and **Smart Class rack**

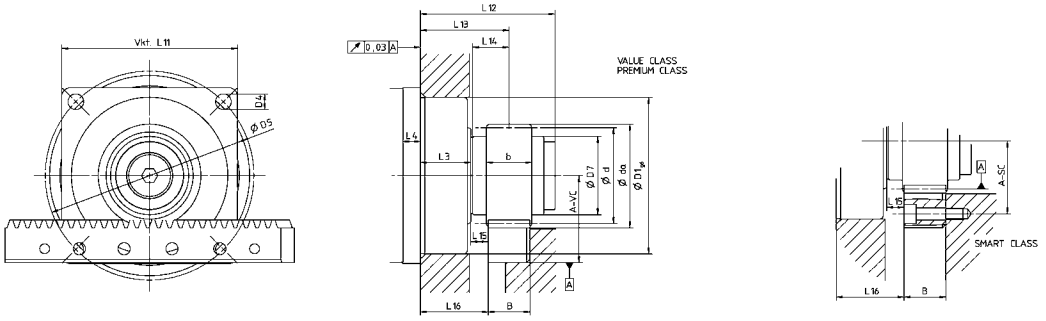
(all pinions, pressure angle α=20°, inclination angle β=19,5283° left-handed)

Key output	Module	z	A-VC ±0.3 a)	A-SC ±0.3 a)	b	B	d_a	d	x	$D1_{g6}$	D4	D5	D7	L3	L4	L11	L12	L13	L14	L15	L16
SP⁺/SK⁺ 060	**2**	18	41.9	33.4	26	24	43.7	38.197	0.4	60	5.5	68	0	20	6	62	54	39	19	7	27
SP⁺/SK⁺/ SPK⁺ 075 VDS 050	**2**	22	45.7	37.2	26	24	51.4	46.686	0.2	70	6.6	85	40	20	7	76	62	40	20	8	28
SP⁺/SK⁺/ SPK⁺ 100 VDS 063	**2**	26	49.6	41.1	26	24	59.1	55.174	0	90	9	120	45	30	10	101	95.5	51	21	9	39
SP⁺/SK⁺/ SPK⁺ 140 VDS 080	**3**	24	64.2	54.7	31	29	82.3	76.395	0	130	11	165	58	30	12	141	122	65.5	35.5	21	51

All dimensions in [mm]

a) please contact us for precise dimensions; align mechanism recommended (alignment dimension ± 0.3 mm)

z = Number of teeth
d_a = Tip diameter
d = Partial circle diameter
x = Profile correction



Value Class pinion (shrunk/bonded) on **shaft key** with **Value** and **Smart Class rack**

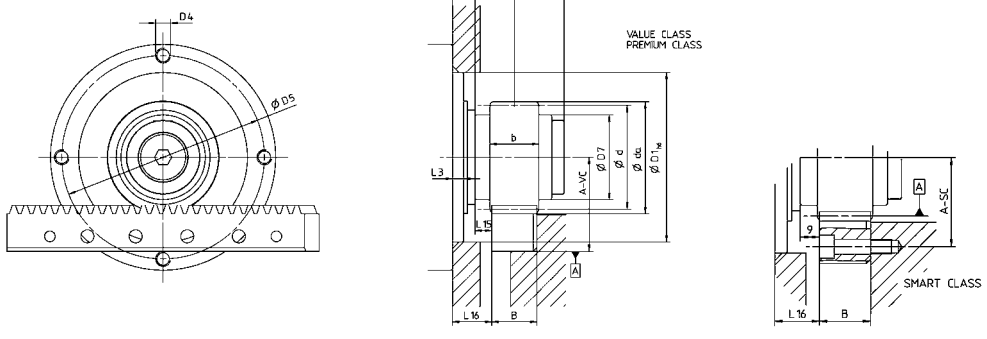
(all pinions, pressure angle α=20°, inclination angle β = 19,5283° left-handed)

Key output	Module	z	A-VC ±0.3 a)	A-SC ±0.3 a)	b	B	d_a	d	x	$D1_{h6}$	D4	D5	D7	L3	L12	L13	L14	L15	L16
LP⁺/LK⁺/ LPK⁺ 070	**2**	18	41.9	33.4	26	24	43.7	38.197	0.4	52	M5	62	0	5	42	27	19	7	15
LP⁺/LK⁺/ LPK⁺ 090	**2**	22	45.7	37.2	26	24	51.4	46.686	0.2	68	M6	80	40	5	52	30	20	8	18
LP⁺/LK⁺/ LPK⁺ 120	**2**	26	49.6	41.1	26	24	59.1	55.174	0	90	M8	108	45	6	77.5	33	21	9	21
LP⁺/LK⁺/ LPK⁺ 155	**3**	24	64.2	54.7	31	29	82.3	76.395	0	120	M10	140	58	8	107	50.5	35.5	21	36

All dimensions in [mm]

a) please contact us for precise dimensions; align mechanism recommended (alignment dimension ± 0.3 mm)

z = Number of teeth
d_a = Tip diameter
d =Partial circle diameter
x = Profile correction



SP+ gearhead with Value Class pinion on shaft key with Value and Smart Class rack

	Ratio	Module	z	F_{2T} [N] (lb_f) (VC)	F_{2T} [N] (lb_f) (SC)	T_{2B} [Nm] (in.lb) (VC)	T_{2B} [Nm] (in.lb) (SC)	$F_{2T\,Not}$ [N] (lb_f)	$T_{2\,Not}$ [Nm] (lb_f)	V_{Max} [m/min] (in/sec) i = 5	V_{Max} [m/min] (in/sec) i = 25	m_{pinion} [kg] (lb_m)
SP+ 060	3	2	18	1550 (338)	1550 (349)	30 (266)	30 (266)	3000 (675)	57 (505)	–	–	0.3 (0.67)
	10, 100	2	18	1650 (372)	1650 (372)	32 (284)	32 (284)	3000 (675)	57 (505)	–	–	0.3 (0.67)
	4–7 / 16–70	2	18	2000 (450)	2000 (450)	38 (337)	38 (337)	3000 (675)	57 (505)	144 (95)	29 (20)	0.3 (0.67)
SP+ 075	All	2	22	3500 (788)	3500 (788)	82 (726)	82 (726)	5000 (1125)	117 (1036)	176 (116)	35 (23)	0.4 (0.89)
SP+ 100	All	2	26	4300 (968)	5000 (1125)	119 (1054)	138 (1222)	8500 (1913)	234 (2071)	156 (103)	31 (21)	0.6 (1.33)
SP+ 140	All	3	24	8000 (1800)	9000 (2025)	306 (2709)	344 (3045)	16000 (3600)	611 (5408)	192 (126)	38 (25)	1.6 (3.54)

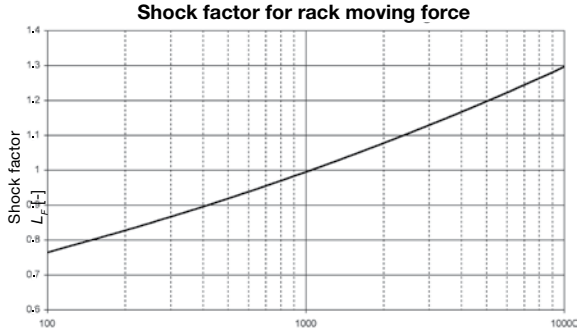
Technical data based on 1000 load cycles per hour.
More combinations possible with cymex®

F_{2T} = Max. moving force
T_{2B} = Max. acceleration torque
SC = Smart Class
VC = Value Class

In Z -axis without a balancing weight additional load changes can be caused due to additional movements in other axes.

Calculation including shock factor:
$F_{2t} * L_F = F_{2t,\,LF} < F_{2T}$

Shock factor for rack moving force



LP+ gearhead with Value Class pinion on shaft key with Value and Smart Class rack

	Ratio	Module	z	F_{2T} [N] (lb_f) (VC)	F_{2T} [N] (lb_f) (SC)	T_{2B} [Nm] (in.lb) (VC)	T_{2B} [Nm] (in.lb) (SC)	$F_{2T\,Not}$ [N] (lb_f)	$T_{2\,Not}$ [Nm] (lb_f)	V_{Max} [m/min] (in/sec) i = 5	V_{Max} [m/min] (in/sec) i = 25	m_{pinion} [kg] (lb_m)
LP+ 070	3, 10, 15, 30, 100	2	18	1700 (383)	1700 (383)	32 (284)	32 (284)	2700 (608)	52 (461)	–	–	0.3 (0.67)
	5, 7, 25, 50	2	18	1850 (417)	1850 (417)	35 (310)	35 (310)	2700 (608)	52 (461)	144 (95)	29 (20)	0.3 (0.67)
LP+ 090	3, 10, 15, 30, 100	2	22	3400 (765)	3400 (765)	79 (700)	79 (700)	4800 (1080)	112 (992)	–	–	0.4 (0.89)
	5, 7, 25, 50	2	22	3500 (788)	3500 (788)	82 (726)	82 (726)	4800 (1080)	112 (992)	176 (116)	35 (23)	0.4 (0.89)
LP+ 120	All	2	26	4100 (923)	4500 (1013)	113 (1001)	124 (1098)	7800 (1755)	215 (1903)	156 (103)	31 (21)	0.6 (1.33)
LP+ 155	All	3	24	6500 (1463)	7000 (1575)	248 (2195)	267 (2363)	14000 (3150)	535 (4735)	192 (126)	38 (25)	1.6 (3.54)

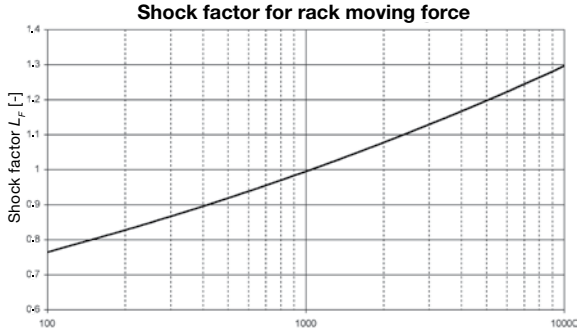
Technical data based on 1000 load cycles per hour.
More combinations possible with cymex®

F_{2T} = Max. moving force
T_{2B} = Max. acceleration torque
SC = Smart Class
VC = Value Class

In Z-axis without a balancing weight additional load changes can be caused due to additional movements in other axes.

Calculation including shock factor:
$F_{2t} * L_F = F_{2t,\,LF} < F_{2T}$

Shock factor for rack moving force



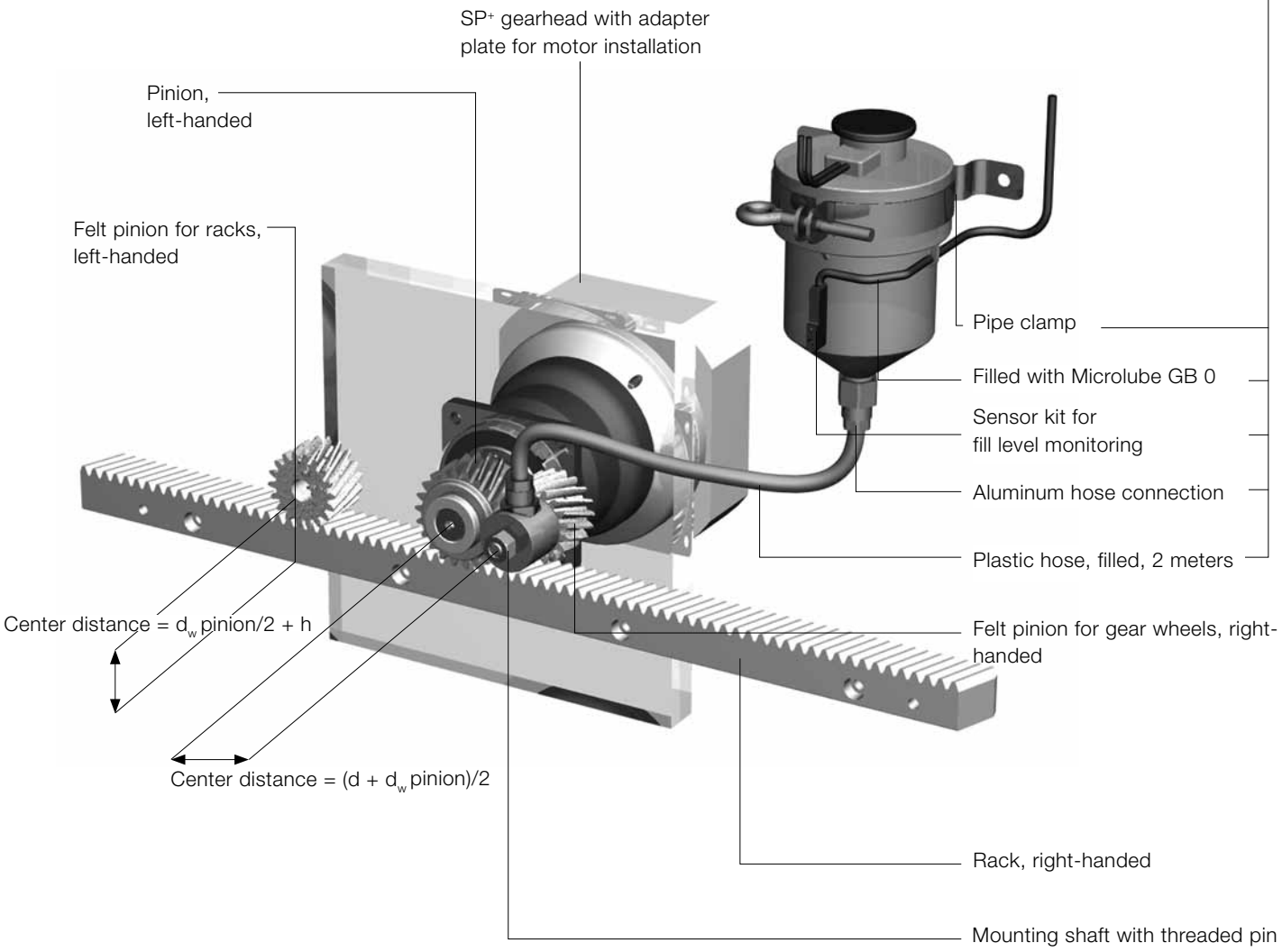
Perfect lubrication – **for a perfect system**

Efficient lubrication systems are essential in guaranteeing **a long service life** for our pinion and rack systems.
We offer you suitable **lubricating pinions**, **fastening axles and lubricator sets**, adapted perfectly to our components. The lubricator supplies a preset quantity of grease to the lubricating pinion and guarantees a constant film of lubrication on the rack and pinion.

Complete lubrication system

Complete lubricator

Kit order number	Size
20021555	125
20022531	475



Replacement sensor for fill level monitoring

Lubricator type	Order number
125	20021557
475	20022535

The **sensor kit for fill level monitoring** included in the lubricator set enables your machine to permanently monitor the fill level in the lubricator so you utilize it more efficiently.

Lubricating pinion, helical-toothed

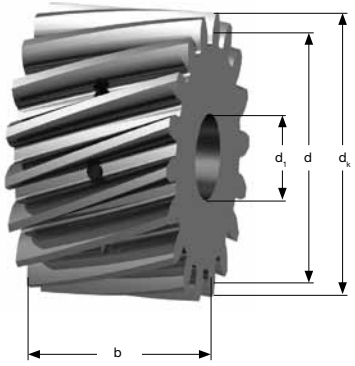
	Lubricating pinion							Fastening axle C					
	Module	Number of teeth	Order no.	d	d_1	d_k	b	Order no.	D	S	b	l	L
A	2	18 LH	20022364	38.2	12	42	25	20017836	30	M8	25.5	10	60
B	2	18 RH	20017681										
A	3	18 LH	20022359	57.3	12	63	30	20021477	30	M8	30.5	10	65
B	3	18 RH	20021473										
A	4	18 LH	20023115	76.4	12	84.4	40	20023119	30	M8	40.5	10	75
B	4	18 RH	20023106										
A	5	17 LH	20023116	90.2	20	100.2	50	20023120	50	M12	50.5	15	90
B	5	17 RH	20023111										
A	6	17 LH	20023117	108.2	20	120.2	60	20023121	50	M12	60.5	15	100
B	6	17 RH	20023113										

All dimensions in [mm]

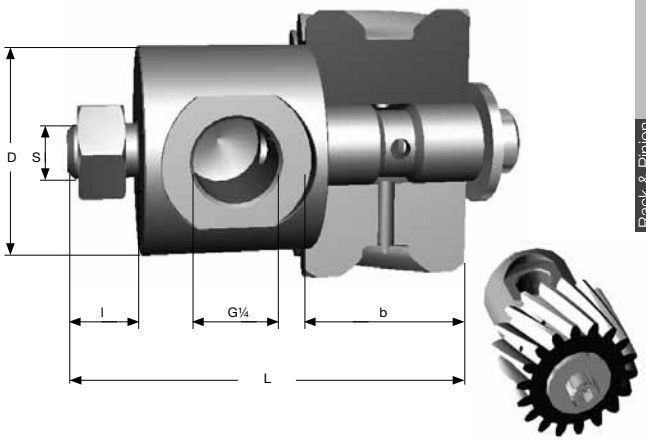
New generation of lubricating pinion and fastening axle available! New material in conjunction with a design free of interference contours makes the new lubricating pinion more versatile and more durable.
Further information is available under www.rack-pinion.com or contact us.

B Lubricating pinion for gear wheels, right-handed RH

A Lubricating pinion for racks, left-handed LH



C Fastening axle for lubricating pinions

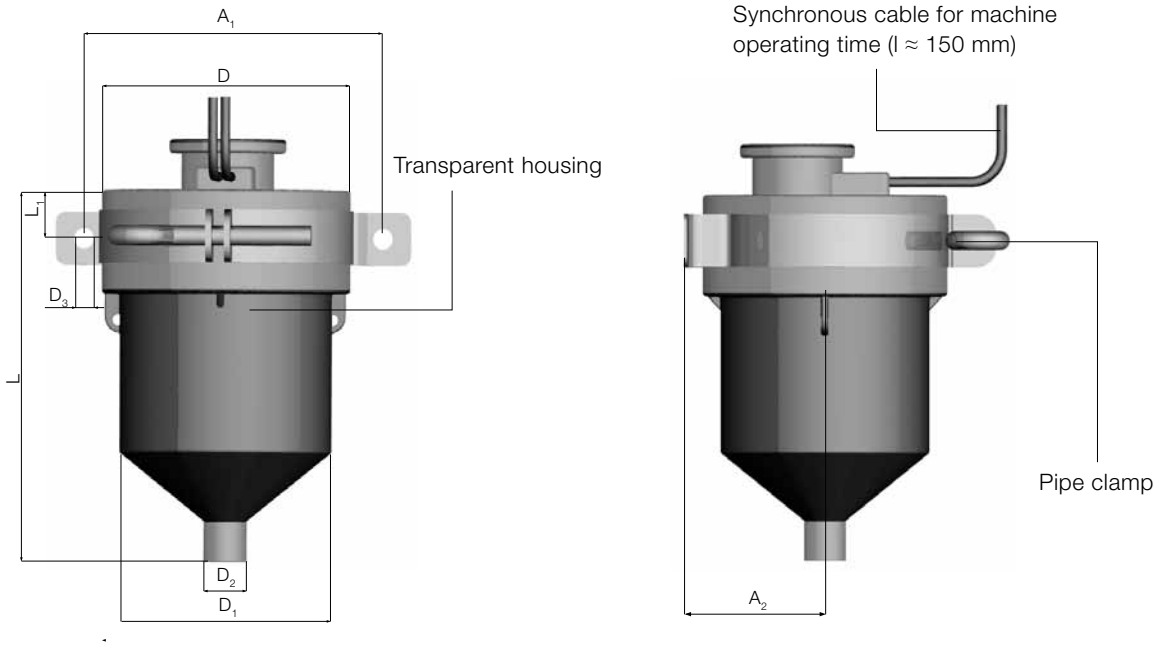


Dimensions of the lubricator

Kit order number	Size	D	D_1	D_2 [a)]	D_3 [a)]	L	L_1	A_1	A_2	Replacement lubricator [b)]
20021555	125	80	68	G ¼″	6,5	114	13,5	95	48	20021556
20022531	475	115	103	G ½″	8,5	155	20	105	70	20022533

All dimensions in [mm]
[a)] Lubricator connector
[b)] No pipe clamp, hose, screw connection, synchronous cable or sensor kit

Nitrogen gas is generated in the electronically controlled lubricator. When the micro switches initiate the required dose, the nitrogen gas generated moves the piston continually. An emptying time of 1, 2, 3, 6, 12 or 18 months and individual lubricant quantities can be selected. Each product is supplied with detailed operating instructions.



Technical data of lubricator

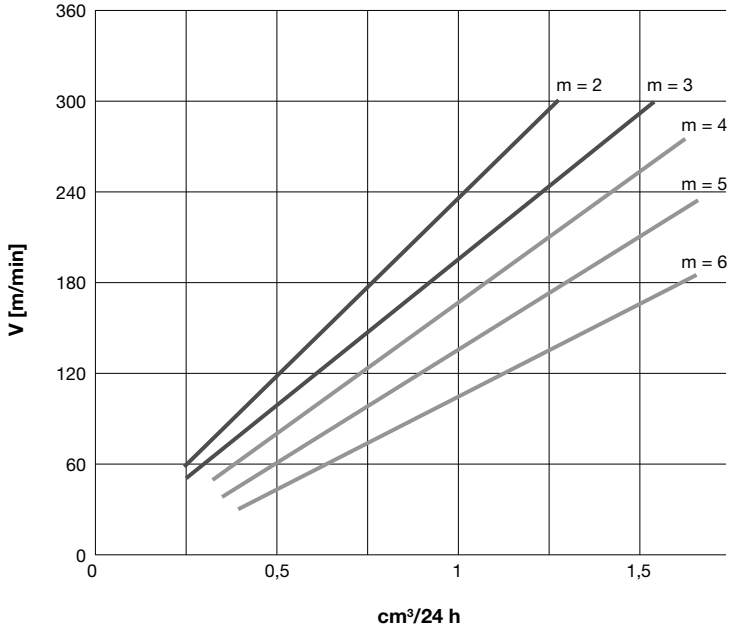
Lubricator type	125	475
Approx. capacity cm³	100	460
Connection thread	G ¼″	G ½″
Setting time	1, 2, 3, 6, 12 or 18 months	
Weight	370 g	1000 g
Pressure	0.2 to 3 bar	
Drive	2 x 1.5 V	4 x 1.5 V
Temperature range	10°C to 50°C	
Battery capacity	about 2000 mAh	about 4000 mAh
Battery consumption after 1 year	about 285 mAh	about 800 mAh
Grease filling	Klüber Microlube GB 0	
Accessories	Sensor, replacement lubricator	
Mounting position	Any	

Recommended lubrication

Depending on the conditions of use, it is possible to set the lubricator to various emptying times with a micro switch (1, 2, 3, 6,12 or 18 months).

Our recommendation for a constant movement speed of 90 m/min: for example, module 2: 0.175 to 0.35 cm³/day or module 3: 0.35 to 0.7 cm³/day

Grease dosing for felt pinion lubrication



Assembly accessories

You will need an assembly jig to align the transfers between the individual racks. You will also need a needle roller when making a final check with the dial gauge.

Assembly jig

Module	L	z	B	H	h
2	100	14	24	24	22
3	100	9	29	29	26
4	156	8	46	46	41
5	156	7	46	46	41
6	156	7	46	46	40

Needle roller

Module	Order number
2	20001001
3	20000049
4	20038001
5	20038002
6	20038003

Bolts and cylinder pins

(not included in the scope of delivery)

To fasten each rack, you will need bolts and cylinder pins specified in the table below. The length of the bolts and pins depends on the design of the machine bed.

Module	Length	Class			Bolt DIN EN ISO 4762–12.9 (quantity x thread)	Tightening torque		Cylinder pin with inner thread DIN7979 / DIN EN ISO 8735, form A
		Premium	Smart	Value		(Nm)	(in.lb)	
2	1000			x	8 x M6	16.5	(147)	2 x 6 m6
2	500	x			4 x M6	16.5	(147)	2 x 6 m6
2	480		x		8 x M8	40	(354)	2 x 8 m6
2	333	x			4 x M6	16.5	(147)	2 x 6 m6
2	167	x			2 x M6	16.5	(147)	2 x 6 m6
3	1000			x	8 x M8	40	(354)	2 x 8 m6
3	500	x			4 x M8	40	(354)	2 x 8 m6
3	480		x		8 x M10	81	(717)	2 x 10 m6
3	250	x			2 x M8	40	(354)	2 x 8 m6
4	1000			x	8 x M8	40	(354)	2 x 8 m6
4	507	x			4 x M10	81	(717)	2 x 10 m6
4	480		x		8 x M12	140	(1239)	2 x 10 m6
5	1000			x	8 x M12	140	(1239)	2 x 12 m6
5	500	x			4 x M12	140	(1239)	2 x 12 m6
6	1000			x	8 x M16	220	(1947)	2 x 16 m6
6	500	x			4 x M16	220	(1947)	2 x 16 m6

Intelligence in mechatronic drive technology

Low backlash planetary gearheads with integrated sensor technology

alpha IQ

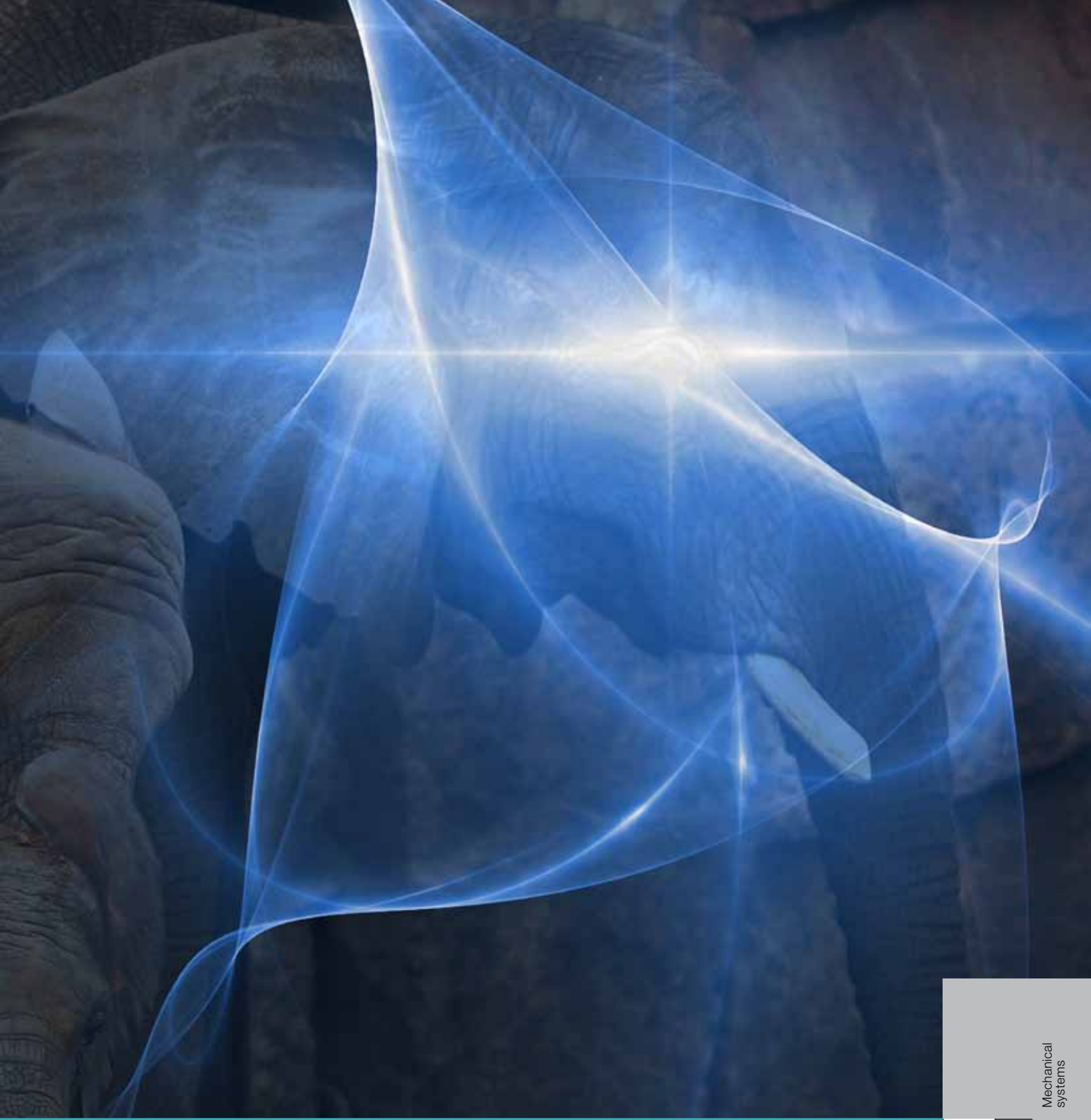
Achieving compatibility.
Utilizing intelligence.
Increasing efficiency.

WITTENSTEIN alpha gearhead with integrated sensors – helping you better understand your processes.

Modular sensor systems

torqXis sensors

Modular sensor solution
for measuring mechanical
parameters in the drive train.



Today, intelligence is an absolute must in industrial applications. Particularly in mechatronic drive technology, revolutionary solutions have been implemented thanks to state-of-the-art sensor technology.

From high-quality sensors for drive components and custom-specific sensor solutions, through to engineering services.

Use and benefits of sensors

For further information, please visit:
www.wittenstein-sensors.com

Understanding processes
Intelligent sensor systems

Whether integrated in the gearhead or as modular solutions, sensors permit the direct measurement, diagnosis and evaluation of process parameters, i. e. all mechanical loads processed by the gearhead can be measured at the output.

Diagnosis

Process monitoring

Process control

Cost savings – drive design

Thanks to this innovative technology it has now become possible to take real values into account during drive design. This not only saves costs, but also enables a compact design.

Enhancing machine availability

Intelligent systems continuously monitor the drive status, allow maintenance measures to be planned more effectively and shorten the response time for maintenance deployments to a minimum.

Controlling the forces in the drive train

Unforeseen failures in the drive train result in enormous costs. The acting load spectra are measured, analyzed and diagnosed using innovative sensors.

Efficient drive control

Load-dependent process control is made possible through online calculation of the torque and lateral force. Innovative sensors used as an active control element not only improves process quality, but also helps in understanding and improving the process.

Preventive tool wear warning system

With the aid of sensor technology, conclusions can be drawn regarding the condition of the driven tools based on changes in the applied torque or the lateral force in the drive train.

Quality verification in the drive train

The top priority is of course to prevent faults. However, when a fault does arise, it is just as important to analyze it as accurately as possible! In many cases, this can be achieved with the aid of sensor technology.

alpha iQ / torqXis
Measured parameters

Torque

X direction

Y direction

Temperature

Our services

- Customer-specific sensor solutions
- Empirical drive design
- On-site service
- Rental systems
- Measurement service

Product overview

	alpha IQ				torqXis				
Solution	Integrated solution – intelligent sensors and low backlash gearhead in one unit				Modular solution – the sensor can simply installed like a flange between the output and the machine bed.				
	1-3 measured parameters Simultaneous measurement of torque and/or lateral forces				**Standard version (S)** Simultaneous measurement of torque and lateral forces in X and Y directions				
					Light version (L) Measurement of torque or lateral force in one direction				
Size	TP+ 025 IQ	TP+ 050 IQ	TP+ 110 IQ	TP+ 300 IQ	SFR 004 for TP+ 004	SFR 010 for TP+ 010	SFR 025 for TP+ 025	SFR 050 for TP+ 050	SFR 110 for TP+ 110
Torque measurement range	250 Nm	500 Nm	1,500 Nm	3,000 Nm	50 Nm	100 Nm	250 Nm	500 Nm	1,500 Nm
	800 Nm	1,500 Nm	3,000 Nm	8,750 Nm		300 Nm	800 Nm	1,500 Nm	3,000 Nm
Lateral force measurement range (X/Y)	2,500 N	5,000 N	10,000 N	15,000 N	850 N	1,500 N	2,500 N	5,000 N	10,000 N
	10,000 N	15,000 N	30,000 N	44,000 N		4,500 N	10,000 N	15,000 N	30,000 N
Type of measurement	Reaction forces / reaction torques – sensors not corotating								
Absolute accuracy	< 2%								
Repeat accuracy	< 0.5%								
Evaluation	torqXis software for measurement, storage and evaluation of data / configuration of sensor system								
Analog interfaces	Voltage interface, current interface								
Digital interfaces	RS 232, USB, Ethernet/IP								

Shrink discs – Clamping element for attachment of our shaft-mount gearhead with your load shaft

Highly loadable shaft/hub connection: whether for continuous hollow shafts or load shafts, always perfectly adapted to your drive.

Couplings – High-tech components for the harmonious transmission of power and movement. – in all applications where improved performance means progress.

Accessories

Details

Shrink disc

Our shrink discs ensure a frictional hub/shaft connection between the hollow shaft and your load shaft. Perfectly matched to our gearheads, they enable the transmission of high torques.

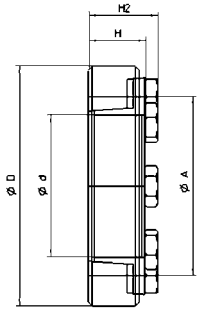
The shrink disc is not included in the scope of delivery for the gearhead (except V-Drive, see order code) and must be ordered separately as an accessory (see table).

Gearhead type	Article code			d	D	A	H*	H2*	J [kgcm²]
	Standard	Chemically nickel plated	Stainless steel						
SP+ 060 SPK+ 060 HG+ 060	20000744	20048496	20048491	18	44	30	15	19	0,393
SP+ 075 SPK+ 075 HG+ 075	20001389	20047957	20043198	24	50	36	18	22	0,753
SP+ 100 SPK+ 100 HG+ 100	20001391	20048497	20035055	36	72	52	22	27,3	3,94
SP+ 140 SPK+ 140 HG+ 140	20001394	20048498	20047937	50	90	68	26	31,3	11,1
SP+ 180 SPK+ 180 HG+ 180	20001396	20048499	20048492	68	115	86	29	35,4	31,1

* in unclamped state

Gearhead type	Article code			d	D	A	H*	H2*	J [kgcm²]
	Standard	Chemically nickel plated	Stainless steel						
VDH 040	20001389	20047957	20043198	24	50	36	18	22	0,753
VDH 050	20020687	20047934	20047885	30	60	44	20	24	1,82
VDH 063	20020688	20047530	20035055	36	72	52	22	27,3	3,94
VDH 080	20020689	20047935	20047937	50	90	68	26	31,3	11,1
VDH 100	20020690	20047927	20047860	62	110	80	29	34,3	27

* in unclamped state



One shrink disc per gearhead is sufficient.

Please refer to the operating instructions for information on correct shrink disc installation. The instructions are enclosed with the order.

Recommendation for the load shaft:
Tolerance h6
Surface roughness ≤ Rz 10
Minimum yield strength Rp 0,2 ≥ 360 N/mm²

Couplings portfolio – Always well connected

Wherever high demands need to be met regarding precision, reliability, balance and safety.

Metal bellows couplings

Precision transmission of torques
- 2-10,000 Nm
- Shaft diameter: 4-180 mm

For precise, backlash-free and torsionally-rigid torque transmission and simultaneous compensation of lateral, angular and axial misalignment.

Elastomer couplings

Backlash-free and vibration-damping torque transmission
- 2-2,150 Nm
- Shaft diameter: 3-80 mm

For the damping of torque peaks and vibration in the drive system and simultaneous compensation of lateral, angular and axial misalignment Plug-in and electrically insulating couplings with selectable elastomer rings to maintain the required damping and torsional rigidity.

Torque limiters

Safe torque limitation
- 0.1-2,800 Nm
- Shaft diameter: 3-100 mm
- 4 available function systems: single position, multi-position, load holding, full disengagement

Separation of input and output in the event of unexpected overload. Precisely-adjustable disengagement torque for protection of drive and application

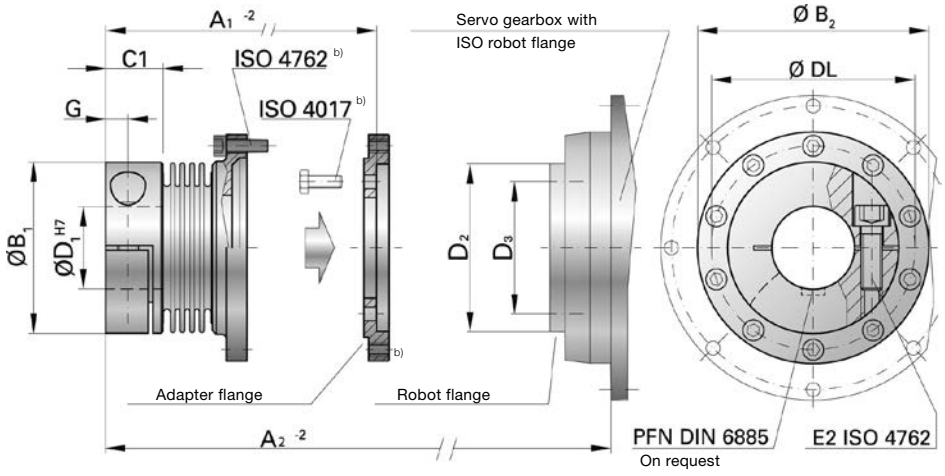
BCT – Bellows coupling

			Series				
			15	**60**	**150**	**300**	**1500**
Gearhead output type			TP+ 004	TP+ 010	TP+ 025	TP+ 050	TP+ 110
Centering diameter	D_2	mm	40 h7	63 h7	80 h7	100 h7	160 h7
TP flange hole circle diameter / thread	D_3	mm	31.5 8 x M5	50 8 x M6	63 12 x M6	80 12 x M8	125 12 x M10
Nominal torque	T_{KN}	Nm	40	140	220	400	1570
		in.lb	354	1239	1947	3540	13895
Max. torque [a]	T_{Kmax}	Nm	50	210	380	750	2600
		in.lb	443	1859	3363	6638	23010
Length [-2]	A_1	mm	49	67	72	90	140
Length installation space [-2]	A_2	mm	68	97	101	128	190
Hub diameter	B_1	mm	49	66	82	110	157
Flange diameter	B_2	mm	63.5	86.5	108	132	188
Fit length	C_1	mm	16.5	23	27.5	34	55
Possible inner diameter from Ø to Ø H7	D_1	mm	12 - 28	14 - 35	19 - 42	24 - 60	50 - 80
Hole circle diameter / Thread	DL	mm	56.5 10 x M4	76 10 x M5	97 10 x M6	120 12 x M6	170 16 x M8
Screws to ISO 4762 [b]	E		1 x M5	1 x M8	1 x M10	1 x M12	2 x M20
Tightening torque of fastening screw	E	Nm	8	45	80	120	470
		in.lb	71	399	708	1062	4160
Distance	G	mm	6.5	9.5	11	13	22.5
Approx. weight	I	kg	0.3	0.7	1	2.8	10
		lb	0.67	1.55	2.21	6.18	22.05
Torsional rigidity	C_T	Nm/arcmin	6,7	21	41	156	379
		in.lb/arcmin	59	185	363	1380	3357
Moment of inertia	J	10^{-3} kgm²	0.15	0.65	1.3	5.5	45
		10^{-3} in.lb.s²	0.14	0.58	1.16	4.87	39.83
Axial misalignment 	Max. values	mm	1	1.5	2	2.5	3
Lateral misalignment 	Max. values	mm	0.25	0.25	0.25	0.25	0.2

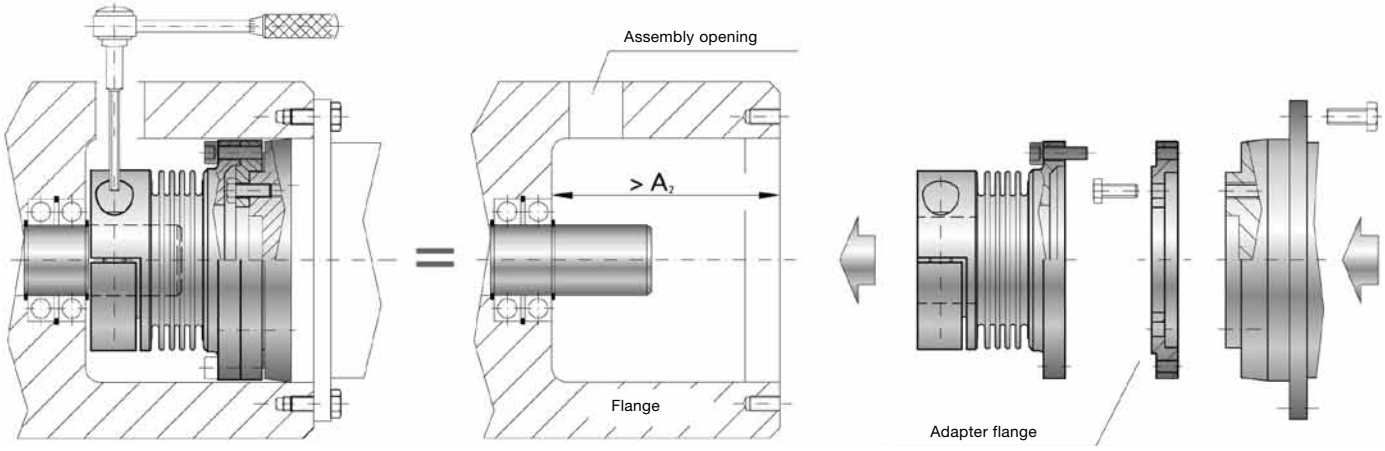
a) Maximum torque transmitted briefly in case of large bore diameters
b) Included in scope of delivery

Max. angular misalignment 1°

Low backlash metal bellows coupling BCT
With flange connection



Installation and removal



Bellows coupling for direct drives

Material:
Hub: Series 15-150 high-strength alu,
Series: 300-1500 steel,
Bellows: High-strength stainless steel,
Adapter flange: Steel
Stainless steel version available on request.

Design:
Load side: With clamping hubs and a single lateral screw to ISO 4762.
Gearbox side: With flange connection and separate adapter flange.

Temperature range: -30 °C to +120°C, (-22 °F to 248°F)

Fit tolerance:
Tolerance between shaft and hub 0.01 – 0.05 mm

Speeds:
Up to 10000 rpm

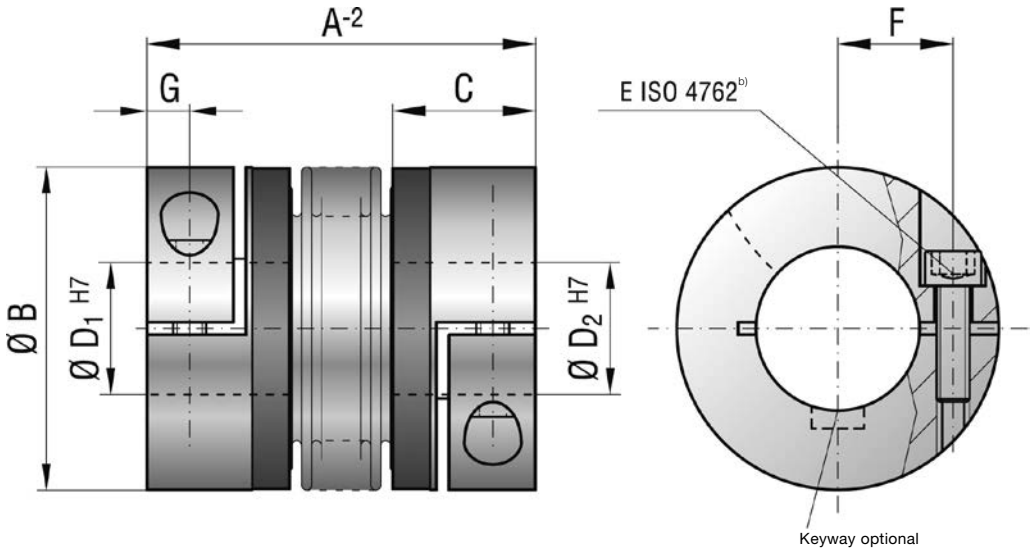
Non-standard applications:
Custom designs with different tolerances, keyways, non-standard material, bellows are available at short notice. High-torque connection available on request.

BC2 – Bellows coupling

			Series																			
			15		30		60		80		150		200		300		500		800	1500
Length options (see ordering code)			A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	A
Rated torque	T_{KN}	Nm	15		30		60		80		150		200		300		500		800	1500
		in.lb	133		266		531		708		1328		1770		2655		4425		7080	13275
Overall length	A	mm	59	66	69	77	83	93	94	106	95	107	105	117	111	125	133	146	140	166
Outer diameter	B	mm	49		55		66		81		81		90		110		124		134	157
Fit length	C	mm	22		27		31		36		36		41		43		51		45	55
Inner diameter from Ø to Ø H7	D_1/D_2	mm	8–28		10–30		12–32		14–42		19–42		22–45		24–60		35–60		40–75	50–80
Fastening screws to ISO 4762	E		M5		M6		M8		M10		M10		M12		M12		M16		2xM16[a)]	2xM20[a)]
Tightening torque of fastening screws	E	Nm	8		15		40		50		70		120		130		200		250	470
		in.lb	71		133		354		443		620		1062		1151		1770		2213	4160
Distance between centers	F	mm	17		19		23		27		27		31		39		41		2x48	2x55
Distance	G	mm	6.5		7.5		9.5		11		11		12.5		13		16.5		18	22.5
Moment of inertia	J	10^{-3} kgm²	0.05	0.07	0.12	0.13	0.32	0.35	0.8	0.85	1.9	2	3.2	3.4	7.6	7.9	14.3	14.6	16.2	43.5
		10^{-3} in.lb.s²	0.0443	0.0620	0.1062	0.1151	0.2832	0.3098	0.7081	0.7523	1.68	1.77	2.83	3.01	6.73	6.99	12.66	12.92	14.34	38.50
Hub material (standard) (steel on request)			Al		Al		Al		Al		Steel		Steel		Steel		Steel		Steel	Steel
Approx. weight		kg	0.16		0.26		0.48		0.8		1.85		2.65		4		6.3		5.7	11.5
		lb	0.353		0.573		1.764		1.764		4.079		5.842		8.818		13.889		12.566	25.353
Torsional rigidity	C_T	Nm/arcmin	5,8	4,4	11	8,1	22	16	38	25	51	32	56	41	131	102	148	145	227	379
		in.lb/arcmin	51	39	100	72	196	142	332	219	451	283	492	360	1158	901	1313	1287	2008	3357
Axial misalignment 	*max. values*	mm	1	2	1	2	1.5	2	2	3	2	3	2	3	2.5	3.5	2.5	3.5	3.5	3.5
Lateral misalignment 	*max. values*	mm	0.15	0.2	0.2	0.25	0.2	0.25	0.2	0.25	0.2	0.25	0.25	0.3	0.25	0.3	0.3	0.35	0.35	0.35
Axial spring stiffness	C_a	N/mm	25	15	50	30	72	48	48	32	82	52	90	60	105	71	70	48	100	320
Lateral spring stiffness	C_r	N/mm	475	137	900	270	1200	420	920	290	1550	435	2040	610	3750	1050	2500	840	2000	3600

b) Included in scope of delivery

Bellows coupling BC2
With clamping hub



Bellows coupling for direct drives

Material:
Bellows made of highly flexible stainless steel.
Hub material: see table below.
Stainless steel version available on request.

Design:
With clamping hubs and a single lateral screw to ISO 4762.
Any imbalance of the clamping hubs due to the design is compensated by balancing bores located on the hub interior.

Temperature range:
-30 °C to +120°C (-22 °F to 248 °F)

Backlash:
Completely backlash-free as a result of the frictional clamp connection.

Service life:
These torque limiters are permanent and maintenance-free as long as the performance limits are not exceeded.

Fit tolerance:
Tolerance between shaft and hub 0.01 – 0.05 mm

Speeds:
Up to 10,000 rpm / in excess of 10,000 rpm with finely balanced version.

Brief overload:
Acceptable up to 1.5 times the value specified.

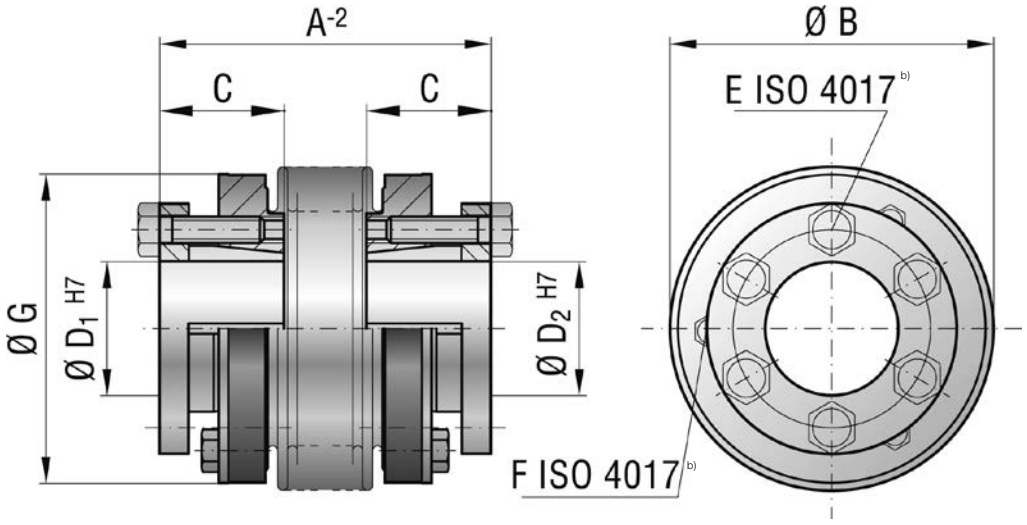
BC3 – Bellows coupling

			Series																			
			15		30		60		150		200		300		500		800	1500	4000	6000	10000
Length options (see ordering code)			A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	A	A	A	A
Rated torque	T_{KN}	Nm	15		30		60		150		200		300		500		800	1500	4000	6000	10000
		in.lb	133		266		531		1328		1770		2655		4425		7080	13275	35400	53100	88500
Overall length without screw head	*A*	mm	48	55	57	65	66	76	75	87	78	90	89	103	97	110	114	141	195	210	217
Outer diameter	*B*	mm	49		55		66		81		90		110		124		133	157	200	253	303
Fit length	*C*	mm	19		22		27		32		32		41		41		50	61	80	85	92
Inner diameter from Ø to Ø H7	D_1/D_2	mm	10–22		12–23		12–29		15–38		15–44		24–56		24–60		30–60	35–70	50–100	60–140	70–180
6 x fastening screws to ISO 4017	*E*		M4		M5		M5		M6		M6		M8		M8		M10	M12	M16	M16	8xM16
Tightening torque of fastening screws	*E*	Nm	4		6		8		12		14		18		25		40	70	120	150	160
		in.lb	36		54		71		107		124		160		222		354	620	1062	1328	1416
3 x jack screws to ISO 4017	*F*		M4		M4		M5		M5		M6		M6		M6		M6	6xM8	6xM10	6xM10	8xM10
Outer diameter of hub	*G*	mm	49		55		66		81		90		110		122		116	135	180	246	295
Moment of inertia	*J*	10^{-3} kgm²	0.08	0.08	0.15	0.16	0.39	0.41	1.2	1.6	1.7	2.5	5.1	5.9	9.1	9.9	13.2	34.9	85.5	254	629
		10^{-3} in.lb.s²	0.071	0.073	0.13	0.14	0.35	0.36	1.06	1.42	1.5	2.21	4.51	5.22	8.05	8.76	11.7	30.9	75.7	224.8	556.7
Approx. weight		kg	0.26	0.27	0.42	0.44	0.71	0.74	1.2		1.8		3		4.2		5.6	8.2	23	32.6	45.5
		lb	0.57	0.60	0.93	0.97	1.57	1.63	2.65		3.97		6.61		9.33		12.3	18.1	50.7	71.9	100.3
Torsional rigidity	C_T	Nm/arcmin	5,8	4,4	11	8,1	22	16	51	32	56	41	131	102	148	145	227	379	989	1658	3185
		in.lb/arcmin	51	39	100	72	196	142	451	283	492	360	1158	901	1313	1287	2008	3357	8753	14674	28189
Axial misalignment 	*max. values*	mm	1	2	1	2	1.5	2	2	3	2	3	2.5	3.5	2.5	3.5	3.5	3.5	3.5	3	3
Lateral misalignment 	*max. values*	mm	0.15	0.2	0.2	0.25	0.2	0.25	0.2	0.25	0.25	0.3	0.25	0.3	0.3	0.35	0.35	0.35	0.4	0.4	0.4
Axial spring stiffness	C_a	N/mm	25	15	50	30	72	48	82	52	90	60	105	71	70	48	100	320	565	1030	985
Lateral spring stiffness	C_r	N/mm	475	137	900	270	1200	420	1500	435	2040	610	3750	1050	2500	840	2000	3600	6070	19200	21800

b) Included in scope of delivery

Max. angular misalignment 1.5°

Bellows coupling BC3
With conical connection



Bellows coupling for direct drives

Material:
Bellows made of highly flexible stainless steel.
Hub material: steel.
Stainless steel version available on request.

Design:
With split conical clamping hubs and strong, captive jack screws to ISO 4017.

Temperature range:
-30 °C to +120°C (-22 °F to 248°F)

Backlash:
Completely backlash-free as a result of the frictional clamp connection.

Service life:
These torque limiters are permanent and maintenance-free as long as the performance limits are not exceeded.

Fit tolerance:
Tolerance between shaft and hub 0.01-0.05 mm

Speeds:
Up to 10000 rpm / in excess of 10000 rpm with finely balanced version.

Brief overload:
Acceptable up to 1.5 times the value specified.

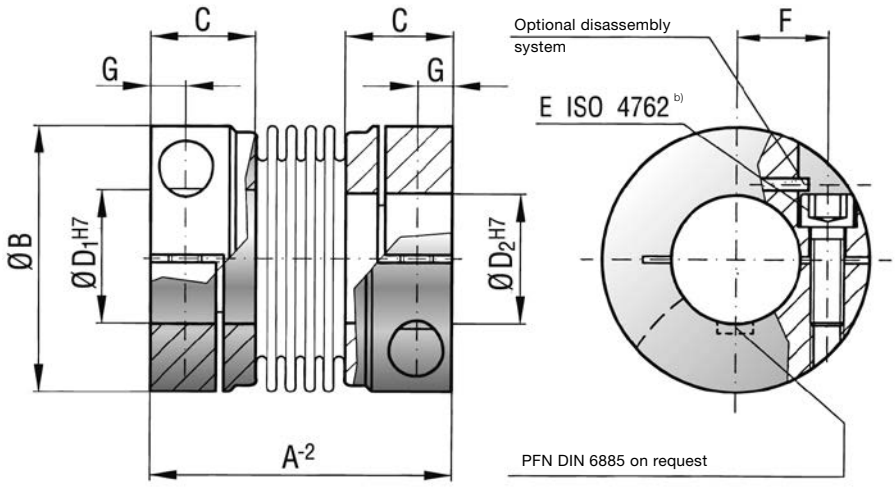
EC2 – Bellows coupling

			Series													
			2	4.5	10	15	30	60	80	150		300		500	
Length options see ordering code			A	A	A	A	A	A	A	A	B	A	B	A	B
Rated torque	T_{KN}	Nm	2	4.5	10	15	30	60	80	150		300		500	
		in.lb	18	40	89	133	266	531	708	1328		2655		4425	
Overall length	A	mm	30	40	44	58	68	79	92	92		109		114	
Outer diameter	B	mm	25	32	40	49	56	66	82	82		110		123	
Fit length	C	mm	10.5	13	13	21.5	26	28	32.5	32.5		41		42.5	
Inner diameter from Ø to Ø H7	D_1/D_2	mm	4–12.7	6–16	6–24	8–28	12–32	14–35	16–42	19–42		24–60		35–62	
Fastening screws to ISO 4762	E		M3	M4	M4	M5	M6	M8	M10	M10		M12		M16	
Tightening torque of fastening screw	E	Nm	2.3	4	4.5	8	15	40	70	85		120		200	
		in.lb	21	36	40	71	133	354	620	753		1062		1770	
Distance between centers	F	mm	8	11	14	17	20	23	27	27		39		41	
Distance	G	mm	4	5	5	6.5	7.5	9.5	11	11		13		17	
Moment of inertia	J	10^{-3} kgm²	0.002	0.007	0.016	0.065	0.12	0.3	0.75	1.8	0.8	7.5	3.8	11.7	4.9
		10^{-3} in.lb.s²	0.0018	0.0062	0.0142	0.0575	0.1062	0.2655	0.6638	1.59	0.71	6.64	3.36	10.36	4.34
Hub material			Al	Al	Al	Al	Al	Al	Al	Steel	Al	Steel	Al	Steel	Al
Approx. weight		kg	0.02	0.05	0.06	0.16	0.25	0.4	0.7	1.7	0.75	3.8	1.6	4.9	2.1
		lb	0.044	0.110	0.132	0.353	0.551	0.882	1.54	3.75	1.65	8.38	3.53	10.80	4.63
Torsional rigidity	C_T	Nm/arcmin	0,44	2,0	2,6	6,7	9,0	21	23	41		46		84	
		in.lb/arcmin	3,9	18	23	59	80	185	206	363		404		747	
Axial misalignment	*max. values*	mm	0.5	1	1	1	1	1.5	2	2		2		2.5	
Lateral misalignment	*max. values*	mm	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2		0.2		0.2	
Axial spring stiffness	C_a	N/mm	8	35	30	30	50	67	44	77		112		72	
Lateral spring stiffness	C_r	N/mm	50	350	320	315	366	679	590	960		2940		1450	

b) Included in scope of delivery

Max. angular misalignment 1°

Bellows coupling EC2
With clamping hub



Bellows coupling for direct drives

Material:
Bellows made of highly flexible stainless steel.
Hub material: see table below.

Design:
With clamping hubs and a single lateral screw to ISO 4762.

Temperature range: -30 °C to +100°C (-22 °F to 212 °F)

Backlash:
Completely backlash-free as a result of the frictional clamp connection.

Service life:
These torque limiters are permanent and maintenance-free as long as the performance limits are not exceeded.

Fit tolerance: Tolerance between shaft and hub 0.01 – 0.05 mm

Optional self-opening clamp system:
For expanding the bore hole during assembly or dismantling.

ELC — Elastomer coupling

ELC model			Series																									
			2			5			10			20			60			150			300			450			800		
Type (elastomer ring)			A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
Rated torque	T_{KN}	Nm	2	2.4	0.5	9	12	2	12.5	16	4	17	21	6	60	75	20	160	200	42	325	405	84	530	660	95	950	1,100	240
Max. torque**	T_{Kmax}	Nm	4	4.8	1	18	24	4	25	32	6	34	42	12	120	150	35	320	400	85	650	810	170	1,060	1,350	190	1,900	2,150	400
Installation length	A	mm	20			26			32			50			58			62			86			94			123		
Outer diameter	B	mm	16			25			32			42			56			66.5			82			102			136.5		
Outer diameter of screw head	B_S	mm	17			25			32			44.5			57			68			85			105			139		
Fit length	C	mm	6			8			10.3			17			20			21			31			34			46		
Possible inner diameter from Ø to Ø H7	$D_{1/2}$	mm	3 to 8			4 to 12.7			4 to 16			8 to 25			12 to 32			19 to 36			20 to 45			28 to 60			35 to 80		
Max. inner diameter (elastomer ring)	D_E	mm	6.2			10.2			14.2			19.2			26.2			29.2			36.2			46.2			60.5		
Fastening screw (ISO 4762/12.9)	E		M2			M3			M4			M5			M6			M8			M10			M12			M16		
Tightening torque of fastening screw	E	Nm	0.6			2			4			8			15			35			70			120			290		
Distance between centers	F	mm	5.5			8			10.5			15.5			21			24			29			38			50.5		
Distance	G	mm	3			4			5			8.5			10			11			15			17.5			23		
Hub length	H	mm	12			16.7			20.7			31			36			39			52			57			74		
Moment of inertia per hub	J1/J2	10^{-3} kgm²	0.0003			0.002			0.003			0.01			0.04			0.08			0.3			0.66			8		
Coupling weight		kg	0.008			0.02			0.05			0.12			0.3			0.5			0.9			1.5			8.5		
Speed*		rpm	28,000			22,000			20,000			19,000			14,000			11,500			9,500			8,000			4,000		

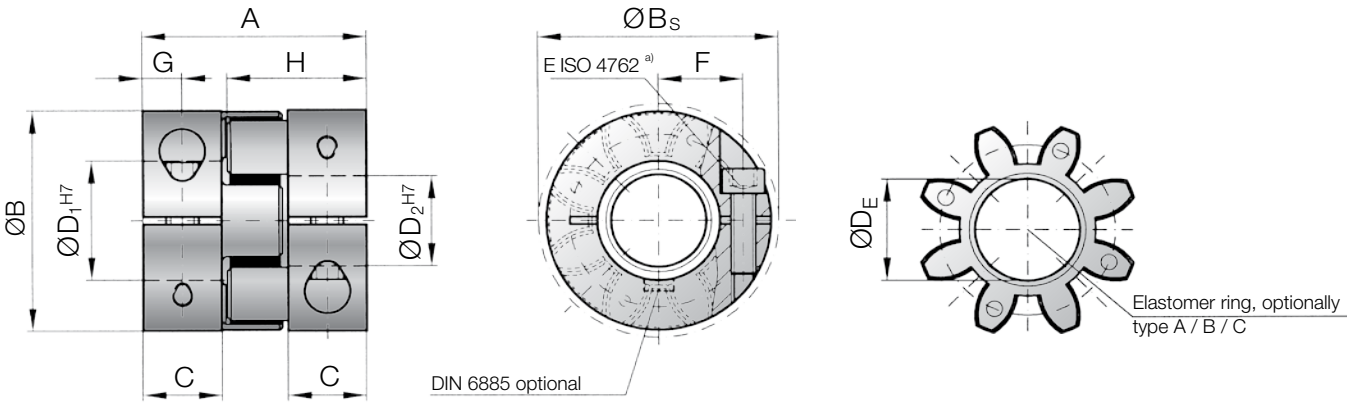
** Maximum torque transmitted T_{Kmax} by clamping hub dependent upon bore diameter

Model series EL			Series																									
			2			5			10			20			60			150			300			450			800		
Elastomer ring type			A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
Static torsional rigidity	C_T	Nm/arcmin	0.015	0.033	0.0049	0.044	0.10	0.015	0.076	0.17	0.026	0.33	0.73	0.15	0.96	2.8	0.41	1.4	3.1	0.33	3.6	5.2	0.37	4.4	7.9	1.2	12	19	3.0
Dynamic torsional rigidity	C_{Tdy}	Nm/arcmin	0.029	0.067	0.010	0.087	0.20	0.031	0.16	0.48	0.065	0.74	1.3	0.25	2.3	3.5	0.39	3.9	8.5	1.0	6.9	12	1.8	16	24	3.4	24	52	8.3
Lateral		Max. values mm	0.08	0.06	0.1	0.08	0.06	0.1	0.1	0.08	0.12	0.1	0.08	0.15	0.12	0.1	0.15	0.15	0.12	0.2	0.18	0.14	0.25	0.2	0.18	0.25	0.25	0.2	0.3
Angular		Max. values Degrees	1	0.8	1.2	1	0.8	1.2	1	0.8	1.2	1	0.8	1.2	1	0.8	1.2	1	0.8	1.2	1	0.8	1.2	1	0.8	1.2	1	0.8	1.2
Axial		Max. values mm	±1			±1			±1			±2			±2			±2			±2			±2			±2		

Static torsional rigidity at 50% T_{KN} Dynamic torsional rigidity at T_{KN}

Series	dia. 3	dia. 4	dia. 5	dia. 8	dia. 16	dia. 19	dia. 25	dia. 30	dia. 32	dia. 35	dia. 45	dia. 50	dia. 55	dia. 60	dia. 65	dia. 70	dia. 75	dia. 80
2	0.2	0.8	1.5	2.5														
5		1.5	2	8														
10			4	12	32													
20				20	35	45	60											
60					50	80	100	110	120									
150						120	160	180	200	220								
300						200	230	300	350	380	420							
450								420	480	510	600	660	750	850				
800										700	750	800	835	865	900	925	950	1,000

Higher torques possible by means of additional keys.



a) included in scope of delivery

Features:
· Short design
· Easy installation
· Vibration damping
· Backlash-free
· Plug-in

Material:
Coupling hubs: up to series 450 high-strength aluminum, from series 800 and up steel
Elastomer ring: precision molded, wear-resistant, and thermally-stable polymer

Design:
Two coupling hubs are concentrically machined with concave driving jaws

*Speeds:
Over 4,000 rpm, a finely balanced version is available

Tolerance:
On the hub/shaft connection, 0.01 to 0.05 mm

Function of elastomer ring

The equalizing element of an EK coupling is the elastomer ring. It transmits the torque without backlash or vibration. The elastomer ring defines the features of the entire coupling and/or of the entire drive train.

The backlash-free nature of the coupling is due to pre-tensioning of the elastomer ring between the two coupling halves. The alpha coupling compensates for lateral, angular and axial misalignment.

Version A
Shore hardness 98 Sh A

Version B
Shore hardness 64 Sh D

Version C
Shore hardness 80 Sh A

Specification of the elastomer rings

Version	Shore hardness	Color	Material	Relative damping (ψ)	Temperature range	Features
A	98 Sh A	Red	TPU	0.4-0.5	-30°C to +100°C	Good damping
B	64 Sh D	Green	TPU	0.3-0.45	-30°C to +120°C	High torsional rigidity
C	80 Sh A	Yellow	TPU	0.3-0.4	-30°C to +100°C	Very good damping

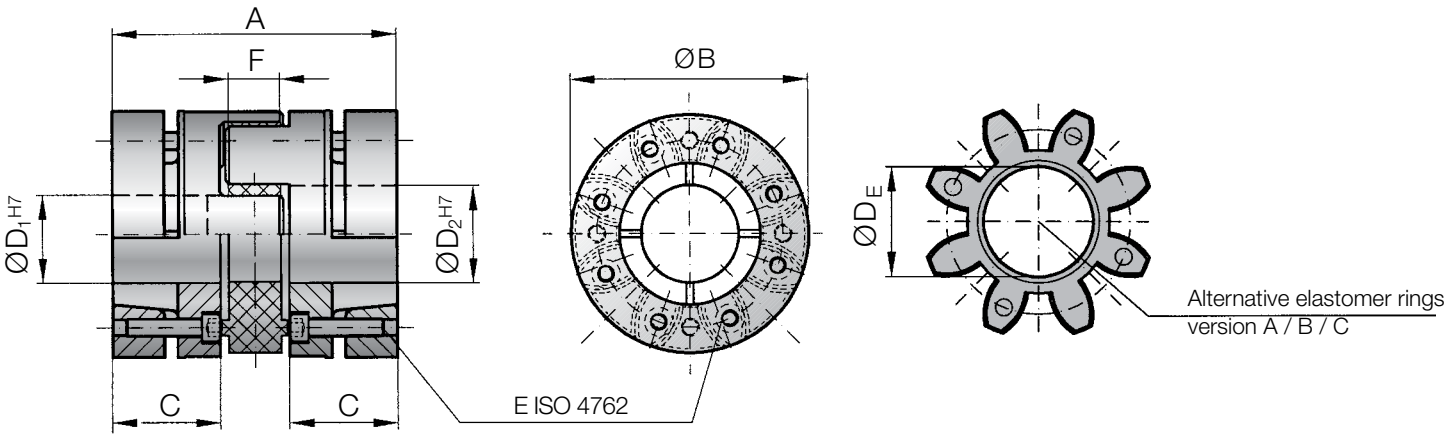
The values for proportional damping were determined at 10 Hz and +20°C.

EL6 – Elastomer coupling

EL6 model			Series																				
			10			20			60			150			300			450			800		
Type (elastomer ring)			A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
Rated torque	T_{KN}	Nm	12.6	16	4	17	21	6	60	75	20	160	200	42	325	405	84	530	660	95	950	1,100	240
Max. torque	T_{Kmax}	Nm	25	32	6	34	42	12	120	150	35	320	400	85	650	810	170	1,060	1,350	190	1,900	2,150	400
Installation length	A	mm	42			56			64			76			96			110			138		
Outer diameter	B	mm	32			43			56			66			82			102			136.5		
Fit length	C	mm	15			20			23			28			36			42			53		
Possible inner diameter from Ø to Ø H7	$D_{1/2}$	mm	6 to 16			8 to 24			12 to 32			19 to 35			20 to 45			28 to 55			32 to 80		
Max. inner diameter (elastomer ring)	D_E	mm	14.2			19.2			26.2			29.2			36.2			46.2			60.5		
Fastening screw (ISO 4762/12.9)	E		3x M3			6x M4			4x M5			8x M5			8x M6			8x M8			8x M10		
Tightening torque of fastening screw		Nm	2			3			6			7			12			35			55		
Elastomer ring width	F	mm	9.5			12			14			15			18			20			25		
Moment of inertia per hub	J1/J2 10^{-3}	kgm^2	0.004			0.015			0.05			0.1			0.3			0.85			9.2		
Coupling weight		kg	0.08			0.12			0.3			0.5			0.9			1.5			9.6		
Speed		rpm	20,000			19,000			14,000			11,500			9,500			8,000			4,000		

Model series EL			Series																				
			10			20			60			150			300			450			800		
Elastomer ring type			A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
Static torsional rigidity	C_T	Nm/arcmin	0.076	0.17	0.026	0.33	0.73	0.15	0.96	2.8	0.41	1.4	3.1	0.33	3.6	5.2	0.37	4.4	7.9	1.2	12	19	3.0
Dynamic torsional rigidity	C_{Tdyn}	Nm/arcmin	0.16	0.48	0.065	0.74	1.3	0.25	2.3	3.5	0.39	3.9	8.5	1.0	6.9	12	1.8	16	24	3.4	24	52	8.3
Lateral	Max. values	mm	0.1	0.08	0.12	0.1	0.08	0.15	0.12	0.1	0.15	0.15	0.12	0.2	0.18	0.14	0.25	0.2	0.18	0.25	0.25	0.2	0.3
Angular	Max. values	Degrees	1	0.8	1.2	1	0.8	1.2	1	0.8	1.2	1	0.8	1.2	1	0.8	1.2	1	0.8	1.2	1	0.8	1.2
Axial	Max. values	mm	±1			±2			±2			±2			±2			±2			±2		

Static torsional rigidity at 50% T_{KN} Dynamic torsional rigidity at T_{KN}



Features:

- High clamping force
- Very high true-running accuracy
- Easy installation
- Vibration damping
- Backlash free
- Plug in
- Axial installation

Material:

Coupling hubs and conical clamping ring: up to series 450 high-strength aluminum, from series 800 and up steel
Elastomer ring: precision molded, wear-resistant, and thermally-stable polymer

Design:

Two coupling hubs are concentrically machined with concave driving jaws

Tolerance:

On the hub/shaft connection, 0.01 to 0.05 mm

Function of elastomer ring

The equalizing element of an EK coupling is the elastomer ring. It transmits the torque without backlash or vibration. The elastomer ring defines the features of the entire coupling and/or of the entire drive train.

The backlash-free nature of the coupling is due to pre-tensioning of the elastomer ring between the two coupling halves. The alpha coupling compensates for lateral, angular and axial misalignment.

Version A
Shore hardness 98 Sh A

Version B
Shore hardness 64 Sh D

Version C
Shore hardness 80 Sh A

Specification of the elastomer rings

Version	Shore hardness	Color	Material	Relative damping (ψ)	Temperature range	Features
A	98 Sh A	Red	TPU	0.4-0.5	-30°C to +100°C	Good damping
B	64 Sh D	Green	TPU	0.3-0.45	-30°C to +120°C	High torsional rigidity
C	80 Sh A	Yellow	TPU	0.3-0.4	-30°C to +100°C	Very good damping

The values for proportional damping were determined at 10 Hz and +20°C.

Safe torque limitation

Single position re-engagement – standard version

After the overload has been removed, the torque limiter can be re-engaged precisely 360 degrees from the original disengagement position.
A proven principle that guarantees synchronism. Signal in the event of an overload. Suitable for use in machine tools, packaging machines and automation systems.

Order code: W

Load holding version

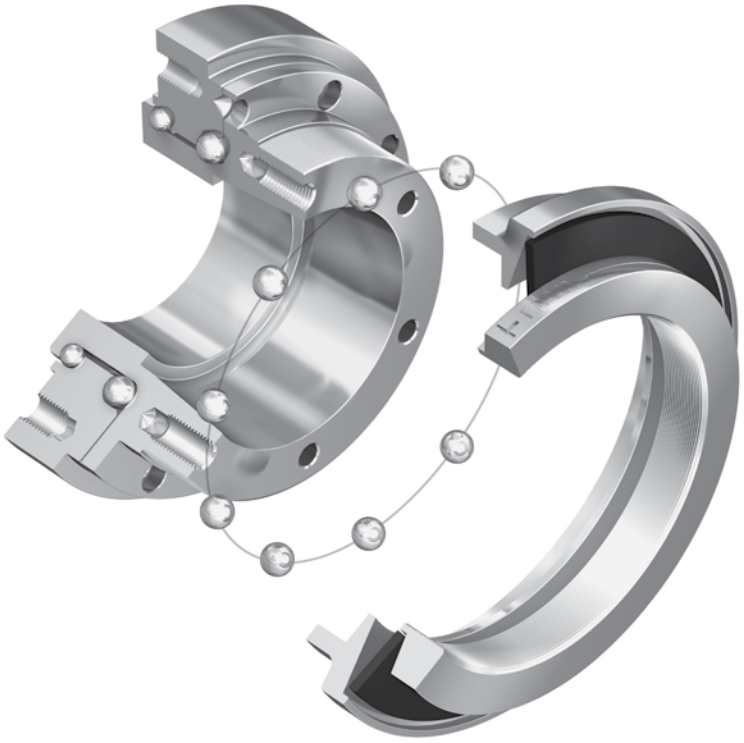
In the event of an overload, the drive and the drive elements are not separated or are only allowed limited rotation. Guaranteed load safety. Automatic engagement of the torque limiter after the torque level has dropped. Signal in the event of an overload. Suitable for use on presses or load-lifting equipment.

Order code: G

Multi-position version

Coupling re-engages automatically at the very next ball detent. The coupling is immediately ready for operation again at several points after an overload. Immediate availability of the machine or plant as soon as the overload has been removed. Signal in the event of an overload. Standard engagement after 60 degrees. Optional engagement after 30, 45, 60, 90 and 120 degrees.

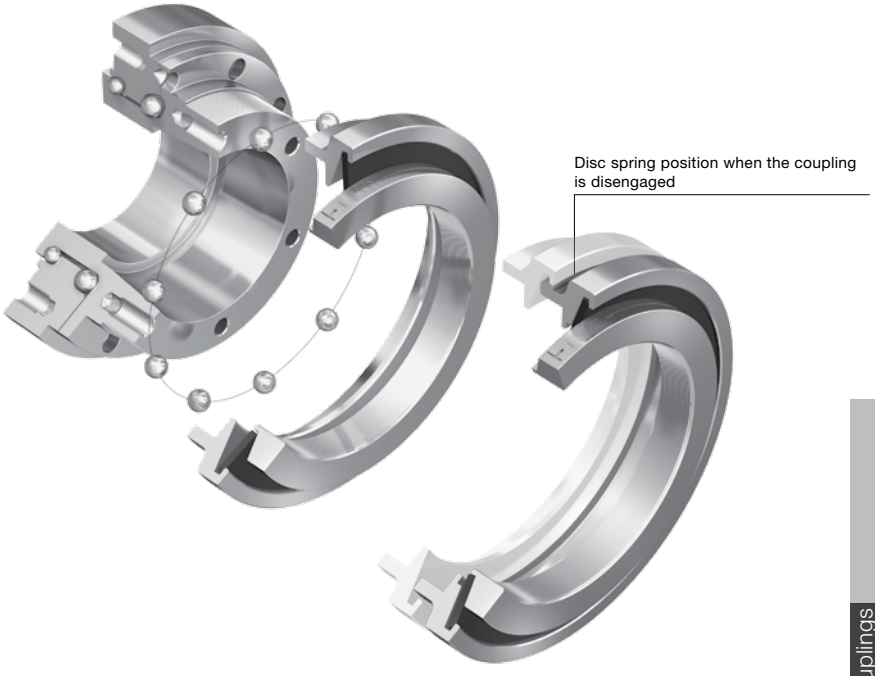
Order code: D



Full disengagement version

Permanent separation of the drive and the drive elements in the event of an overload. Spring flips over completely. No residual friction. Torque limiter can be re-engaged manually (re-engagement possible every 60 degrees).

Order code: F

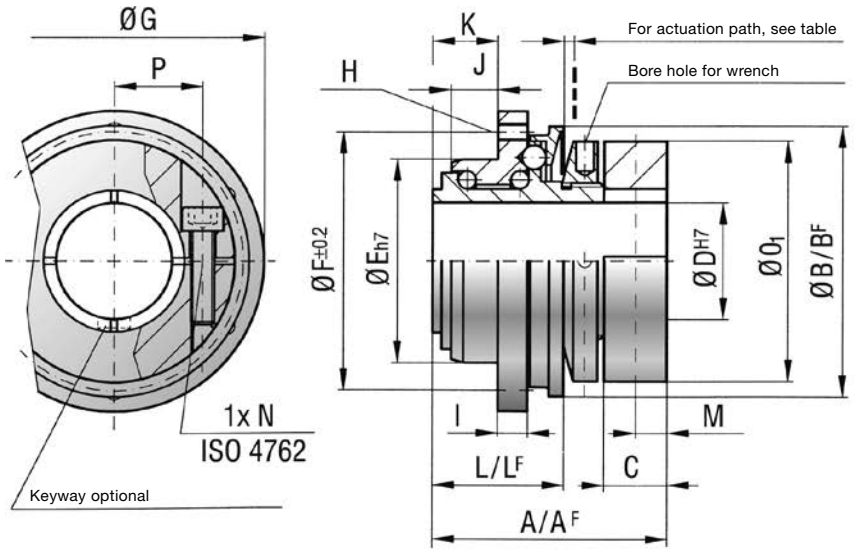


TL1 – Torque limiter

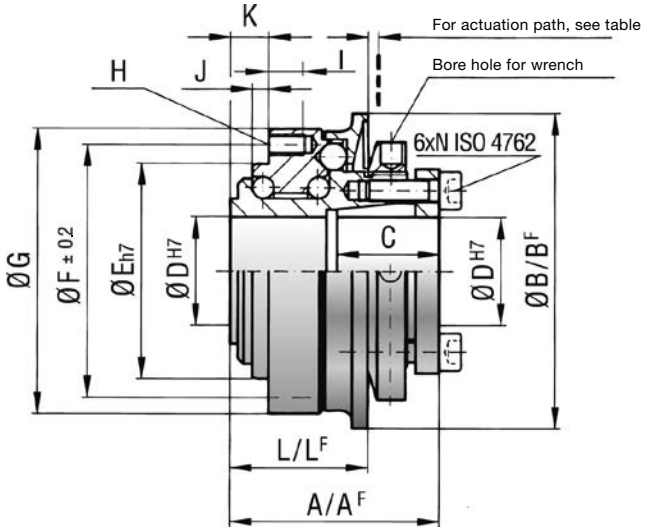
				Series													
				Miniature design series													
				1.5	2	4.5	10	15	30	60	150	200	300	500	800	1500	2500
Adjustment range from – to (approx. values)	T_{KN}	Nm	A	0.1–0.6	0.2–1.5	1–3	2–6	5–15	5–20	10–30	20–70	30–90	100–200	80–200	400–650	600–800	1500–2000
		in.lb		1-6	2-14	9-27	18-54	45-133	45-177	89-266	177-620	266-797	885-1770	708-1770	3540-5753	5310-7080	13275-17700
		Nm	B	0.4–1	0.5–2.2	2–4.5	4–12	12–25	10–30	25–80	45–150	60–160	150–240	200–350	500–800	700–1200	2000–2500
		in.lb		4-9	5-20	18-40	36-107	107-222	89-266	222-708	399-1328	531-1416	1328-2124	1770-3098	4425-7080	6195-10620	17700-22125
		Nm	C	0.8–2	1.5–3.5	3–7	7–18	20–40	20–60	50–115	80–225	140–280	220–440	320–650	650–950	1000–1800	2300–2800
		in.lb		8-18	14-31	27-62	62-160	177-354	177-531	443-1018	708-1992	1239-2478	1947-3894	2832-5753	5753-8408	8850-15930	20355-24780
		Nm	D	–	–	–	–	35–70	50–100	–	–	250–400	–	–	–	–	–
		in.lb						310-620	443-885			222-3540					
Adjustment range from – to (approx. values), full disengagement	T_{KN}	Nm	A	0.3–0.8	0.5–2	2.5–4.5	2–5	7–15	8–20	10–30	20–60	80–140	120–180	50–150	200–400	1000–1250	1400–2200
		in.lb		3-8	5-18	23-40	18-45	62-133	71-177	89-266	177-531	708-1239	1062-1593	443-1328	1770-3540	8850-11063	12390-19470
		Nm	B	0.6–1.3	–	–	4–10	–	16–30	20–40	40–80	130–200	160–300	100–300	450–850	1250–1500	1800–2700
		in.lb		6-12			36-89		142-266	177-354	354-708	1151-1770	1416-2655	885-2655	3983-7523	11063-13275	15930-23895
		Nm	C	–	–	–	8–15	–	–	30–60	80–150	–	–	250–500	–	–	–
		in.lb					71-133			266-531	708-1328			2213-4425			
Overall length	A	mm		23	28	32	39	40	50	54	58	63	70	84	95	109	146
Overall length, full disengagement	A^F	mm		23	28	32	39	40	50	54	58	66	73	88	95	117	152
Outer diameter of actuation ring	B	mm		23	29	35	45	55	65	73	92	99	120	135	152	174	242
Actuation ring Ø, full disengagement	B^F	mm		24	32	42	51.5	62	70	83	98	117	132	155	177	187	258
Clamping fit length	C	mm		7	8	11	11	19	22	27.5	32	32	41	41	49	61	80
Inner diameter from Ø to Ø H7	D	mm		4–8	4–12	5–14	6–20	8–22	12–22	12–29	15–37	20–44	25–56	25–56	30–60	35–70	50–100
Centering diameter h7	E	mm		14	22	25	34	40	47	55	68	75	82	90	100	125	168
Hole circle diameter ±0.2	F	mm		22	28	35	43	47	54	63	78	85	98	110	120	148	202
Flange diameter – 0.2	G	mm		26	32	40	50	53	63	72	87	98	112	128	140	165	240
Thread	H			4xM2	4xM2.5	6xM2.5	6xM3	6xM4	6xM5	6xM5	6xM6	6xM6	6xM8	6xM8	6xM10	6xM12	6xM16
Thread length	I	mm		3	4	4	5	6	8	9	10	10	10	12	15	16	24
Centering length – 0.2	J	mm		2.5	3.5	5	8	3	5	5	5	5	6	9	10	13.5	20
Distance	K	mm		5	6	8	11	8	11	11	12	12	15	21	19	25	34
Distance	L	mm		11	15	17	22	27	35	37	39	44	47	59	67	82	112
Distance, full disengagement	L^F	mm		11.5	16	18	24	27	37	39	41.5	47	51.5	62	75	91	120
Distance	M			2.5	4	4	5	–	–	–	–	–	–	–	–	–	–
Screws to ISO 4762	N			M2.5	M3	M4	M4	M4	M5	M5	M6	M6	M8	M8	M10	M12	M16
Tightening torque	N	Nm		1	2	4	4.5	4	6	8	12	14	18	25	40	70	120
		in.lb		9	18	36	40	36	54	71	107	124	160	222	354	620	1062
Outer diameter of clamping ring	O_1	mm		20	25	32	40	–	–	–	–	–	–	–	–	–	–
Diameter	O_2	mm		13	18	21	30	35	42	49	62	67	75	84	91	112	154
Diameter h7	O_3	mm		11	14	17	24	27	32	39	50	55	65	72	75	92	128
Distance between centers	P	mm		6.5	8	10	15	–	–	–	–	–	–	–	–	–	–
Distance	R	mm		1	1.3	1.5	1.5	2.5	2.5	2.5	2.5	3	3	4	4	4.5	6
Moment of inertia	J	10^3 kgm²		0.01	0.02	0.05	0.07	0.15	0.25	0.50	1.60	2.70	5.20	8.60	20	31.5	210
		in.lb.s².10^3		0.0089	0.0177	0.0443	0.0620	0.1328	0.2213	0.4425	1.4161	2.3897	4.6024	7.6116	17.7014	27.8797	185.86
Approx. weight		kg		0.03	0.065	0.12	0.22	0.4	0.7	1.0	1.3	2.0	3.0	4.0	5.5	10	28
		lb		0.066	0.143	0.265	0.485	0.882	1.543	2.205	2.866	4.409	6.614	8.818	12.125	22.046	61.729
Actuation path		mm		0.7	0.8	0.8	1.2	1.5	1.5	1.7	1.9	2.2	2.2	2.2	2.2	3.0	3.0

A^F, B^F, L^F = Full disengagement version

Torque limiter TL1 (1.5 – 10)
With clamping hub



Torque limiter TL1 (15 – 2500)
With conical clamping hub



Torque limiter for timing belt and sprocket applications

Material:
High-strength, hardened steel.

Design:
Model TL1: 1.5 – 10 Nm (13.3 – 88.5 in.lb)
with split clamping hub.
Model TL1: 15 – 2500 Nm (132.8 – 22125 in.lb)
with conical clamping hub.

Temperature range: -30 °C to +120°C (-22 °F to 248°F)

Temperature peaks:
up to +150°C (302°F)

Backlash:
Completely backlash-free as a result of the frictional clamp connection and patented preload.

Service life:
These torque limiters are permanent and maintenance-free as long as the performance limits are not exceeded.

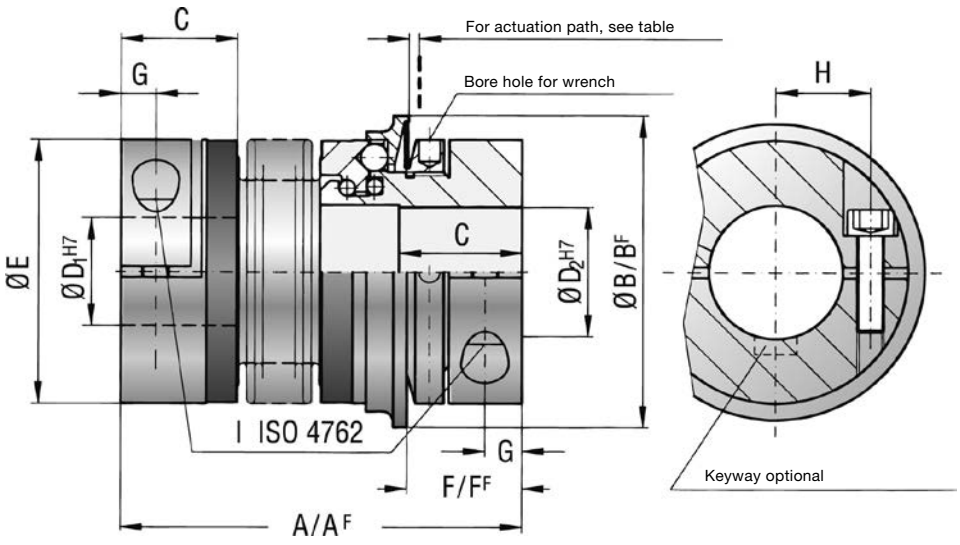
Fit tolerance:
Tolerance between shaft and hub 0.01 – 0.05 mm

TL2 – Torque limiter

				Series																											
				1.5	2		4.5		10		15		30		60		80		150		200		300		500		800	1500
Length options (see ordering code)				A	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	A
Adjustment range from – to (approx. values)	T_{KN}	Nm	A	0.1–0.6	0.2–1.5		1–3		2–6		5–10		10–25		10–30		20–70		20–70		30–90		100–200		80–200		400–650	650–800
		in.lb		1-6	2-14		9-27		18-54		45-89		89-222		89-266		177-620		177-620		266-797		885-1770		708-1770		3540-5753	5753-7080
		Nm	B	0.4–1	0.5–2		3–6		4–12		8–20		20–40		25–28		30–90		45–150		60–160		150–240		200–350		500–800	700–1200
		in.lb		4-9	5-18		27-54		36-107		71-177		177-354		222-248		266-797		399-1328		531-1416		1328-2124		1770-3098		4425-7080	6195-10620
		Nm	C	0.8–1.5	–		–		–		–		–		–		–		80–180		120–240		200–320		300–500		650–850	1000–1800
		in.lb		8-14															708-1593		1062-2124		1770-2832		2655-4425		5753-7523	8850-15930
Adjustment range from – to (approx. values), full disengagement	T_{KN}	Nm	A	0.3–0.8	0.5–2		2.5–4.5		2–5		7–15		8–20		20–40		20–60		20–60		80–140		120–180		60–150		200–400	1000–1250
		in.lb		3-8	5-18		23-40		18-45		62-133		71-177		177-354		177-531		177-531		708-1239		1062-1593		531-1328		1770-3540	8850-11063
		Nm	B	0.6–1.3	–		–		5–10		–		16–30		30–60		40–80		40–80		130–200		180–300		100–300		450–800	1250–1500
		in.lb		6-12					45-89				142-266		266-531		354-708		354-708		1151-1770		1593-2655		885-2655		3983-7080	11063-13275
		Nm	C	–	–		–		–		–		–		–		–		80–150		–		–		250–500		–	–
		in.lb																	708-1328						2213-4425			
Overall length	A	mm		42	46	51	57	65	65	74	75	82	87	95	102	112	115	127	116	128	128	140	139	153	163	177	190	223
Overall length, full disengagement	A^F	mm		42	46	51	57	65	65	74	75	82	87	95	102	112	117	129	118	130	131	143	142	156	167	181	201	232
Actuation ring Ø	B	mm		23	29		35		45		55		65		73		92		92		99		120		135		152	174
Actuation ring Ø, full disengagement	B^F	mm		24	32		42		51.5		62		70		83		98		98		117		132		155		177	187
Fit length	C	mm		11	13		16		16		22		27		31		35		35		40		42		51		48	67
Inner diameter from Ø to Ø H7	D_1/D_2	mm		3–8	4–12		5–14		6–20		10–26		12–30		15–32		19–42		19–42		24–45		30–60		35–60		40–75	50–80
Outer diameter of coupling	E	mm		19	25		32		40		49		55		66		81		81		90		110		123		134	157
Distance	F	mm		12	13		15		17		19		24		30		31		31		35		35		45		50	65
Distance, full disengagement	F^F	mm		11.5	12		14		16		19		22		29		31		30		33		35		43		54	61
Distance	G	mm		3.5	4		5		5		6.5		7.5		9.5		11		11		12.5		13		17		18	22.5
Distance between centers	H	mm		6	8		10		15		17		19		23		27		27		31		39		41		2x48	2x55
Screws to ISO 4762	I			M2.5	M3		M4		M4		M5		M6		M8		M10		M10		M12		M12		M16		2xM16	2xM20
Tightening torque	I	Nm		1	2		4		4.5		8		15		40		50		70		120		130		200		250	470
		in.lb		9	18		36		40		71		133		354		443		620		1062		1151		1770		2213	4160
Approx. weight		kg		0.035	0.07		0.2		0.3		0.4		0.6		1.0		2.0		2.4		4.0		5.9		9.6		14	21
		lb		0.08	0.15		0.44		0.66		0.88		1.32		2.21		4.41		5.30		8.82		13.1		21.2		30.9	46.3
Moment of inertia	J	10^{-3} kgm²		0.01	0.01	0.01	0.02	0.02	0.06	0.07	0.10	0.15	0.27	0.32	0.75	0.80	1.80	1.90	2.50	2.80	5.10	5.30	11.5	11.8	22.8	23.0	42.0	83.0
		10^{-3} in.lb.s²		0.0089	0.0089	0.0089	0.0177	0.0177	0.0531	0.0620	0.0885	0.1328	0.2390	0.2832	0.6638	0.7081	1.59	1.68	2.21	2.48	45.1	46.9	10.2	10.4	20.2	20.4	37.2	73.5
Torsional rigidity	C_T	Nm/arcmin		0,20	0,35	0,38	2,0	1,5	2,6	2,3	5,8	4,4	11	8,1	22	16	38	25	51	32	56	41	122	102	148	145	227	379
Lateral misalignment		mm		0.15	0.15	0.20	0.20	0.25	0.20	0.30	0.15	0.20	0.20	0.25	0.20	0.25	0.20	0.25	0.20	0.25	0.25	0.30	0.25	0.30	0.30	0.35	0.35	0.35
Angular misalignment		degrees		1	1	1.5	1.5	2	1.5	2	1	1.5	1	1.5	1	1.5	1	1.5	1	1.5	1.5	2	1.5	2	2	2.5	2.5	2.5
Lateral spring stiffness		N/mm		70	40	30	290	45	280	145	475	137	900	270	1200	420	920	255	1550	435	2040	610	3750	1050	2500	840	2000	3600
Actuation path		mm		0.7	0.8		0.8		1.2		1.5		1.5		1.7		1.9		1.9		2.2		2.2		2.2		2.2	3.0

A^F, B^F, L^F = Full disengagement version
Smaller sizes on request

Torque limiter TL2
With clamping hub



Torque limiter for direct drives

Material:
Bellows made of highly flexible stainless steel. Safety section made of high-strength, hardened steel. Clamping hub material: up to series 80 aluminum and from series 150 steel.

Design:
With clamping hubs and a single lateral screw to ISO 4762.

Temperature range:
-30 °C to +120°C (-22 °F to 248 °F)

Backlash:
Completely backlash-free as a result of the frictional clamp connection and patented preload.

Service life:
These torque limiters are permanent and maintenance-free as long as the performance limits are not exceeded.

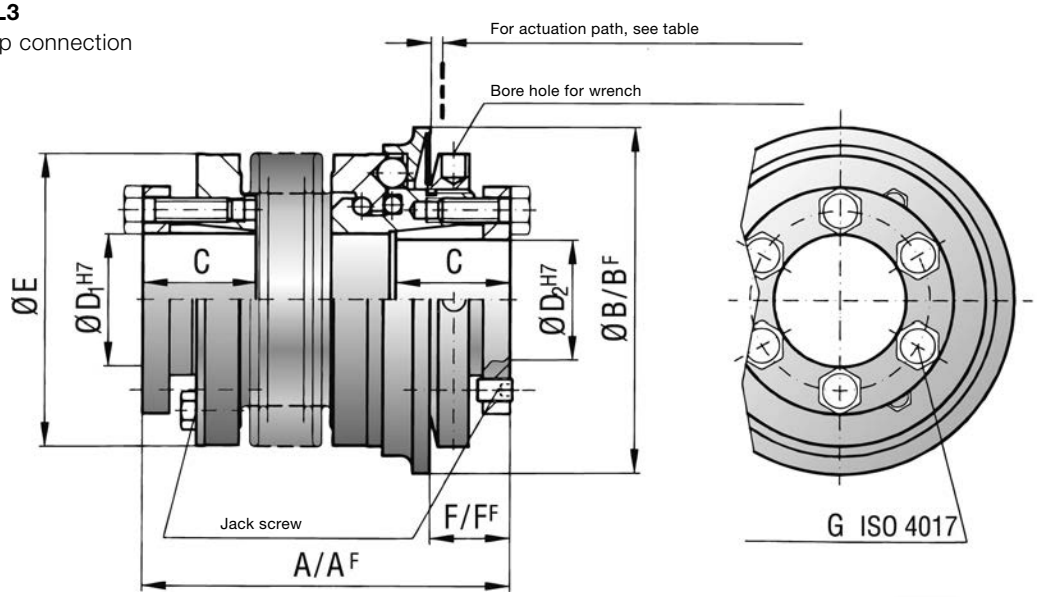
Fit tolerance:
Tolerance between shaft and hub 0.01 – 0.05 mm

TL3 – Torque limiter

				Series																			
				15		30		60		150		200		300		500		800		1500	2500		
Length options (see ordering code)				A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	A		
Adjustment range from – to (approx. values)	T_{KN}	Nm	A	5–10		10–25		10–30		20–70		30–90		100–200		80–200		400–650		650–850	1500–2000		
		in.lb		45-89		89-222		89-266		177-620		266-797		885-1770		708-1770		3540-5753		5753-7523	13275-17700		
		Nm	B	8–20		20–40		25–80		45–150		60–160		150–240		200–350		500–800		700–1200	2000–2500		
		in.lb		71-177		177-354		222-708		399-1328		531-1416		1328-2124		1770-3098		4425-7080		6195-10620	17700-22125		
		Nm	C	–		–		–		80–200		140–280		220–400		300–500		600–900		1000–1800	2300–2800		
		in.lb								708-1770		1239-2478		1947-3540		2655-4425		5310-7965		8850-15930	20355-24780		
Adjustment range from to (approx. values), full engagement	T_{KN}	Nm	A	7–15		8–20		20–40		20–60		80–140		120–180		60–150		200–400		1000–1250	1400–2200		
		in.lb		62-133		71-177		177-354		177-531		708-1239		1062-1593		531-1328		1770-3540		8850-11063	12390-19470		
		Nm	B	–		16–30		30–60		40–80		130–200		180–300		100–300		450–800		1250–1500	1800–2700		
		in.lb				142-266		266-531		354-708		1151-1770		1593-2655		885-2655		3983-7080		11063-13275	15930-23895		
		Nm	C	–		–		–		80–150		–		–		250–500		–		–	–		
		in.lb								708-1328						2213-4425							
Overall length	A	mm		62	69	72	80	84	94	93	105	99	111	114	128	123	136	151		175	246		
Overall length, full disengagement	A^F	mm		62	69	72	80	84	94	93	105	102	114	117	131	127	140	151		184	252		
Actuation ring Ø	B	mm		55		65		73		92		99		120		135		152		174	243		
Actuation ring Ø, full disengagement	B^F	mm		62		70		83		98		117		132		155		177		187	258		
Fit length	C	mm		19		22		27		32		32		41		41		49		61	80		
Inner diameter from Ø to Ø H7	D_1/D_2	mm		10–22		12–23		12–29		15–37		20–44		25–56		25–60		30–60		35–70	50–100		
Outer diameter of coupling	E	mm		49		55		66		81		90		110		123		133		157	200		
Distance	F	mm		13		16		18		19		19		23		25		31		30	34		
Distance, full disengagement	F^F	mm		13		14		17		18		17		20		22		20		26	31		
6 x screws to ISO 4017	I			M4		M5		M5		M6		M6		M8		M8		M10		M12	M16		
Tightening torque	I	Nm		4		6		8		12		14		18		25		40		70	120		
		in.lb		36		54		71		107		124		160		222		354		620	1062		
Approx. weight		kg		0.3		0.4		1.2		2.3		3.0		5.0		6.5		9.0		16.3	35		
		lb		0.66		0.88		2.65		5.07		6.61		11.0		14.3		19.8		35.9	77.2		
Moment of inertia	J	10^{-3} kgm²		0.10	0.15	0.28	0.30	0.75	0.80	1.90	2.00	2.80	3.00	5.50	6.00	11.0	12.8	20.00		42.00	257		
		10^{-3} in.lb.s²		0.0885	0.1328	0.2478	0.2655	0.6638	0.7081	1.68	1.77	2.48	2.66	4.87	5.31	9.74	11.3	17.7		37.2	227.5		
Torsional rigidity	C_T	Nm/arcmin		5,8	4,4	11	8,1	22	16	51	32	56	41	122	102	148	145	227		379	989		
		in.lb/arcmin		51	39	100	72	196	142	451	283	492	360	1081	901	1313	1287	2008		3357	8753		
Lateral misalignment		mm		0.15	0.20	0.20	0.25	0.20	0.25	0.20	0.25	0.25	0.30	0.25	0.30	0.30	0.35	0.35		0.35	0.35		
Angular misalignment		degrees		1	1.5	1	1.5	1	1.5	1	1.5	1.5	2	1.5	2	2	2.5	2.5		2.5	2.5		
Lateral spring stiffness		N/mm		475	137	900	270	1200	380	1550	435	2040	610	3750	1050	2500	840	2000		3600	6070		
Actuation path		mm		1.5		1.5		1.7		1.9		2.2		2.2		2.2		2.2		3	3		

A^F, B^F, F^F = Full disengagement version

Torque limiter TL3
With conical clamp connection



Torque limiter for direct drives

Material:
Bellows made of highly flexible stainless steel. Safety section made of high-strength, hardened steel. Hub material: steel.

Design:
With split conical clamping hubs and captive jack screws.

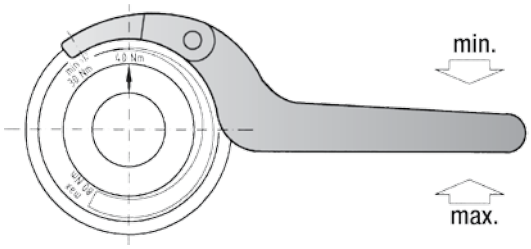
Temperature range: -30 °C to +120°C (-22 °F to 248 °F)

Backlash:
Completely backlash-free as a result of the frictional clamp connection and patented preload.

Service life:
These torque limiters are permanent and maintenance-free as long as the performance limits are not exceeded.

Fit tolerance: Tolerance between shaft and hub 0.01 – 0.05 mm

Torque adjusting wrench for DIN 1816 nuts

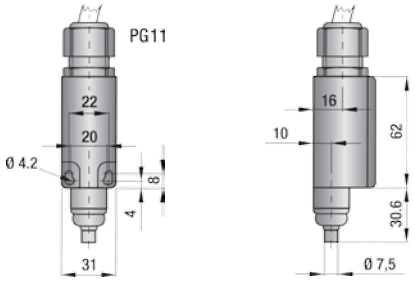


Smaller coupling sizes do not require a torque adjusting wrench. The adjusting nuts for the 1.5 / 2 / 4.5 / 10 series can be adjusted with a bolt or pin.

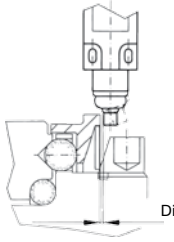
Series	Torque adjusting wrench	
	Standard version	Full disengagement version
15	AC 20047730	AC 20047730
30	AC 20047731	AC 20047731
60	AC 20047732	AC 20047749
80/150	AC 20047733	AC 20047733
200	AC 20047734	AC 20047750
300	AC 20047735	AC 20047735
500	AC 20047736	AC 20047736
800	AC 20047737	AC 20047751
1500	AC 20047738	AC 20047738
2500	AC 20047739	AC 20047752

Mechanical limit switch (emergency cut-off)

Dimension drawings

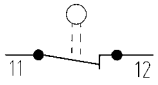


Important:
Always carry out a 100 % test of the switch function after assembly.



The actuation tappet should be positioned as close as possible to the actuation ring of the torque limiter (approx. 0.1 – 0.2 mm).

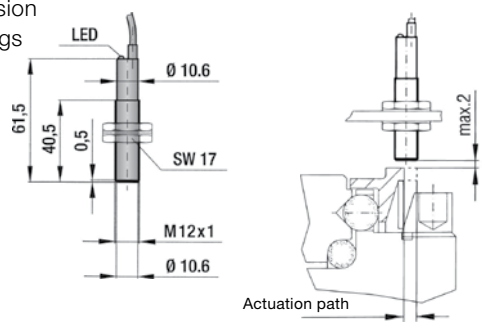
Distance approx. 0.1 – 0.2 mm

Technical data	
Max. voltage:	500 V AC
Max. constant current:	10 A
Degree of protection:	IP 65
Contact type:	NC contact (positive opening)
Ambient temperature:	-30 °C to +80 ‹C
Actuation:	Tappet (metal)
Circuit symbol:	

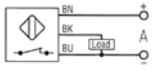
The mechanical limit switch is suitable for size 30 and above.

Proximity switch (emergency cut-off)

Dimension drawings



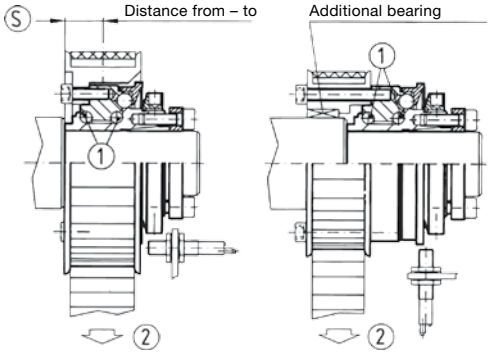
Important:
Always carry out a 100 % test of the switch function after assembly.

Technical data	
Voltage range:	10 to 30 V DC
Max. output current:	200 mA
Max. switching frequency:	800 Hz
Temperature range:	-25 °C to +70 °C
Degree of protection:	IP 67
Switch type:	PNP NC contact
Detection gap:	max. 2 mm
Circuit symbol:	

Assembly instructions for low backlash **torque limiters**

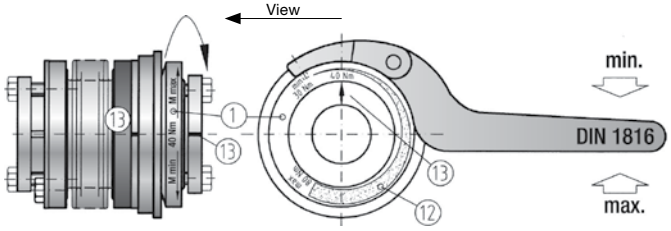
For the TL 1 – TL 3 models, the fit tolerance between the shaft and hub must be between 0.01 and 0.05 mm. Ensure that the coupling hub mounts smoothly on the shaft prior to assembly. Lightly oil the shaft prior to assembly. Do not use oils or grease with sliding additives (for example, MoS_2). Any keyways in the shaft will not affect the functioning of the clamp connection.

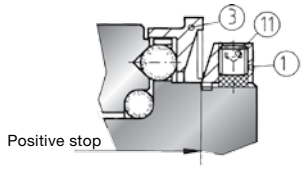
Model TL1 has an integrated **bearing (1)** for the attached component (for example, a pulley or sprocket wheel). Do not exceed the **maximum radial force (2)**, (see table). By centering the load between the **dimension (S)**, sufficient force is applied between the two balls and no separate bearings are required. Additional bearings are required for offset mounting. This is recommended, for example, if the attached component has a very small diameter or a very large width. Ball bearings, needle bearings or bushings can be used depending on the installation situation.



Series	1.5	2	4.5	10	15	30	60	150	200	300	500	800	1500	2500
Max. radial load capacity (N)	50	100	200	500	1400	1800	2300	3000	3500	4500	5600	8000	12000	20000
(S) from – to	3–6	5–8	5–11	6–14	7–17	10–24	10–24	12–24	12–26	12–28	16–38	16–42	20–50	28–60

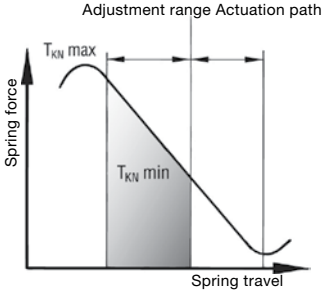
Adjustment of the disengagement torque





1 Adjustment nut
11 Locking screw
3 Steel actuation ring
12 Adjustment range
13 Marking

WITTENSTEIN alpha torque limiters are factory adjusted to the specified disengagement torque, which is marked on the coupling. The adjustment range (min./max.) is indicated on the **adjustment nut (1)**. The customer can adjust the disengagement torque infinitely within the **adjustment range (12)** by varying the pretension of the disc springs. The adjustment range must not be exceeded during the adjustment process. After loosening the **lock screw (11)**, the disengagement torque can be adjusted using a suitable tool, e.g. a torque adjusting wrench to DIN 1816. The three locking screws **(11)** should then be tightened again.



Important!

WITTENSTEIN alpha torque limiters incorporate disc springs with special spring characteristics. Never exceed the max./min. range of the disengagement torque, which is located along the downward slope of this characteristic curve.

Important information

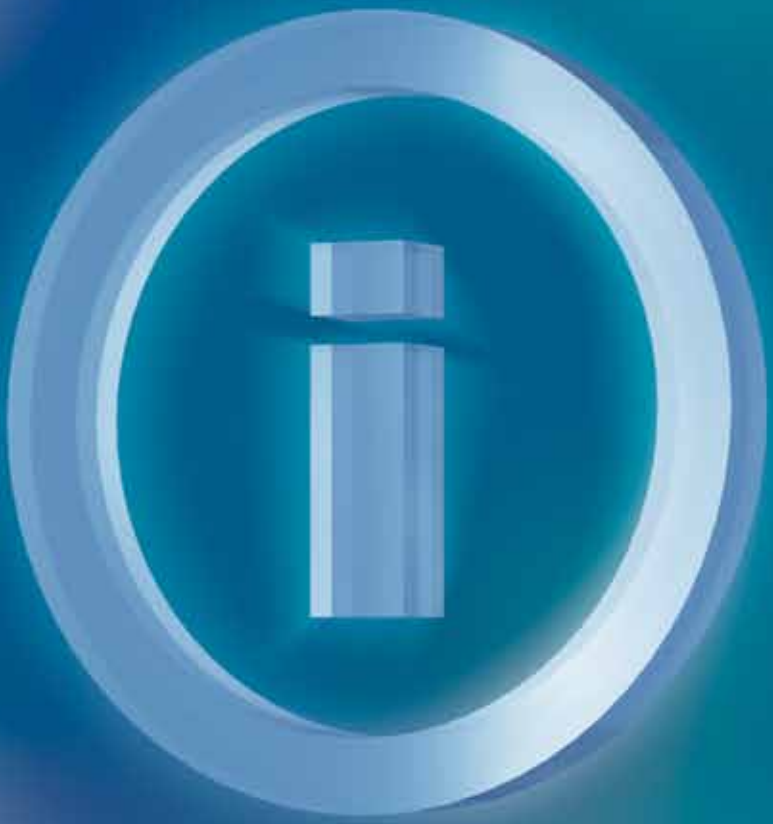
$$T_{aN} \geq \alpha \cdot J_L + T_{AN} \geq \left[\frac{J_L}{J_A + J_L} \cdot (T_{AS} - T_{AR}) + T_{AN}\right] \cdot S_A \text{ [Nm]}$$

$$T_{2m} = \sqrt[1]{\frac{|n_{2b}| \cdot t_b \cdot |T_{2b}|^3 + \ldots + |n_{2n}| \cdot t_n \cdot |T_{2n}|^3}{|n_{2b}| \cdot t_b + \ldots + |n_{2n}| \cdot t_n}}$$

Read the following pages for information on quick selection, configuration, design and handling of your WITTENSTEIN alpha gearhead.

Information

Details



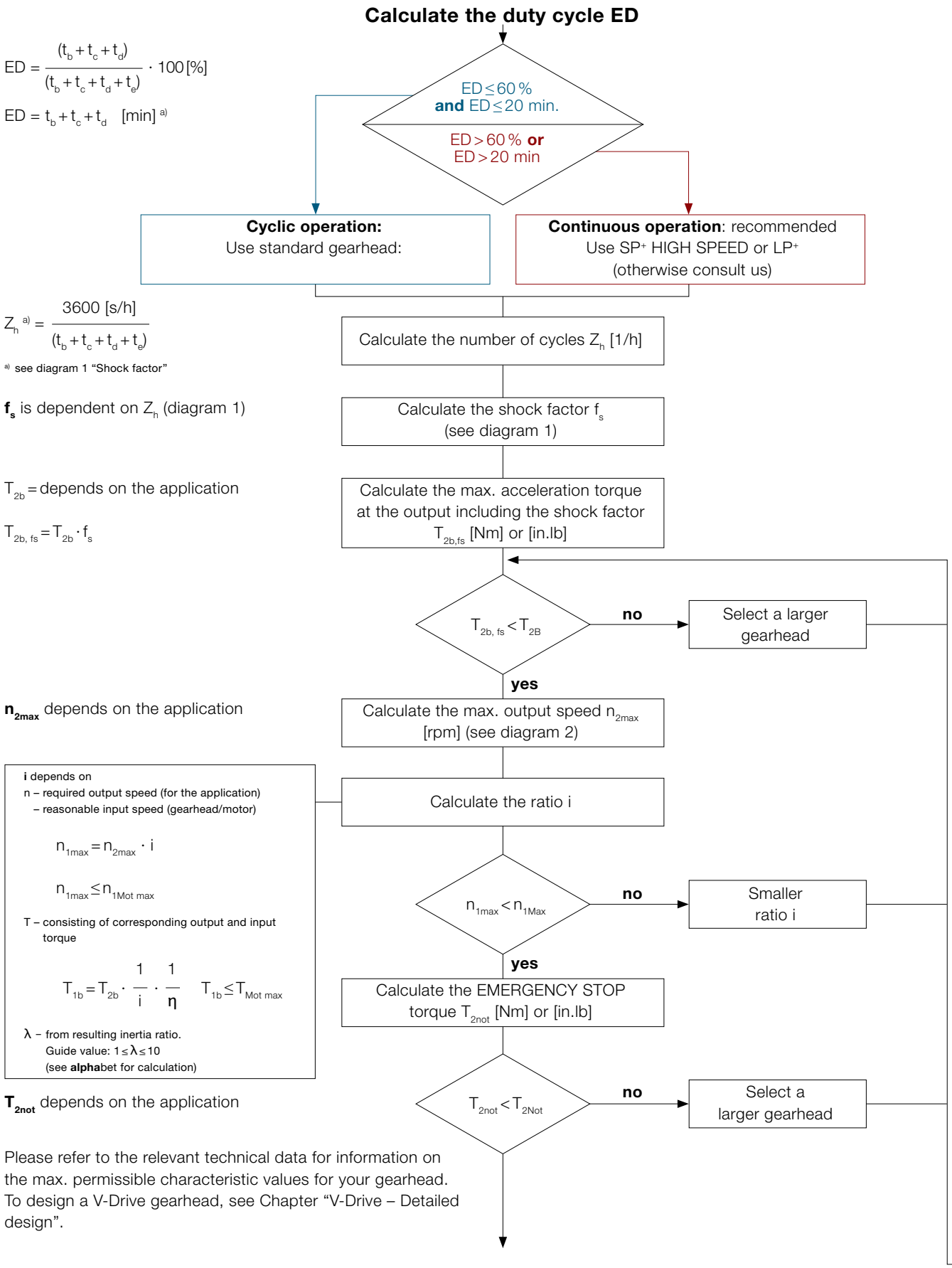
Quick gearhead selection

The quick gearhead selection feature is designed exclusively for calculating gearhead sizes approximately. Quick selection is not a substitute for the detailed design feature! To select a specific gearhead, proceed as described in the Chapter "Gearhead – Detailed design" or "V-Drive – Detailed design". For quick, convenient and reliable gearhead selection, we recommend using WITTENSTEIN alpha's cymex® design software.

Cyclic operation S5 Valid for ≤ 1000 cycles/hour Duty cycle < 60 % and < 20 min.[a)]	1. Calculate the max. motor acceleration torque using motor data **T_{MaxMot} [Nm] or [in.lb]** 2. Calculate the max. available acceleration torque at the gearhead output T_{2b} [Nm] or [in.lb] **$T_{2b} = T_{MaxMot} \cdot i$** 3. Compare the max. available acceleration torque T_{2b} [Nm] or [in.lb] with the max. permissible acceleration torque T_{2B} [Nm] or [in.lb] at the gearhead output **$T_{2b} \leq T_{2B}$**	4. Compare the bore hole diameter on the clamping hub (see technical data sheets) 5. Compare the motor shaft length L_{Mot} [mm] or [in] with the min. and max. dimensions in the corresponding dimension sheet
Continuous operation S1 Duty cycle ≥ 60 % or ≥ 20 min.[a)]	1. Select cyclic operation S5 2. Calculate the rated motor torque **T_{1NMot} [Nm] or [in.lb]** 3. Calculate the previous rated torque at the gearhead output T_{2n} [Nm] or [in.lb] **$T_{2n} = T_{1NMot} \cdot i$**	4. Compare the previous rated torque T_{2n} [Nm] or [in.lb] with the permissible nominal torque T_{2N} [Nm] or [in.lb] at the gearhead output **$T_{2n} \leq T_{2N}$** 5. Calculate the previous input speed **n_{1n} [rpm]** 6. Compare the previous input speed n_{1n} [rpm] with the permissible rated speed n_{1N} [rpm] **$n_{1n} \leq n_{1N}$**

[a)] recommended by WITTENSTEIN alpha. Please contact us if you require further assistance.

Cyclic operation **S5** and continuous operation **S1**



Please refer to the relevant technical data for information on the max. permissible characteristic values for your gearhead. To design a V-Drive gearhead, see Chapter "V-Drive – Detailed design".

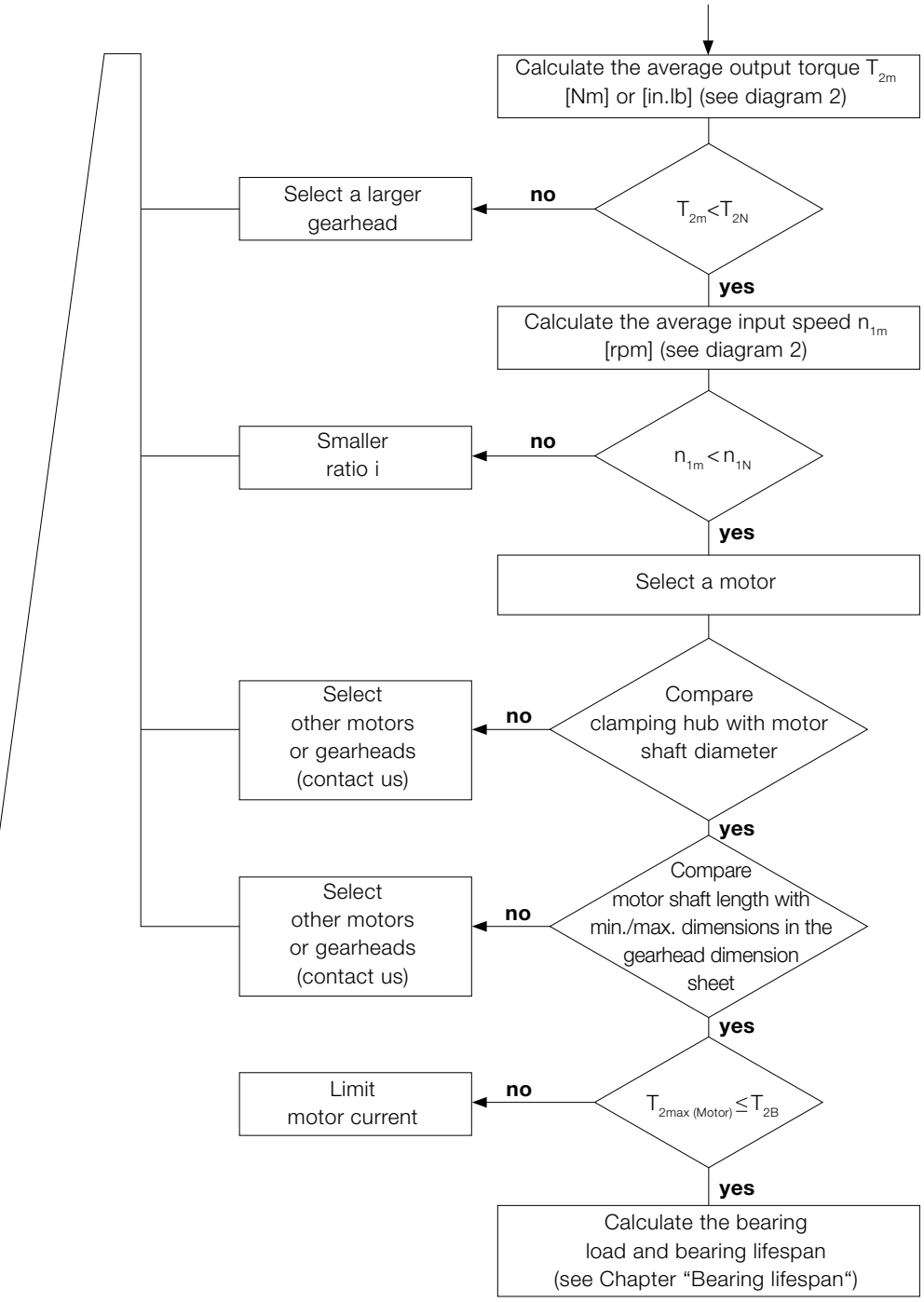


Diagram 1
Large number of cycles combined with short acceleration times may cause the drive train to vibrate. Use the shock factor f_s to include the resulting excess torque values in calculations.

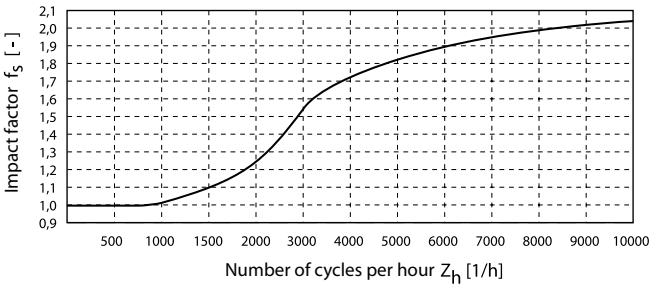
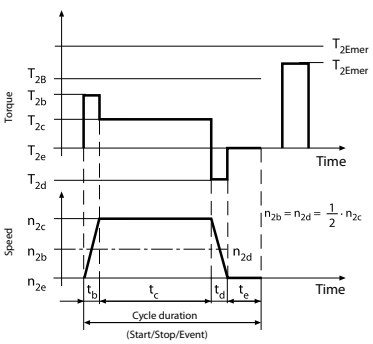
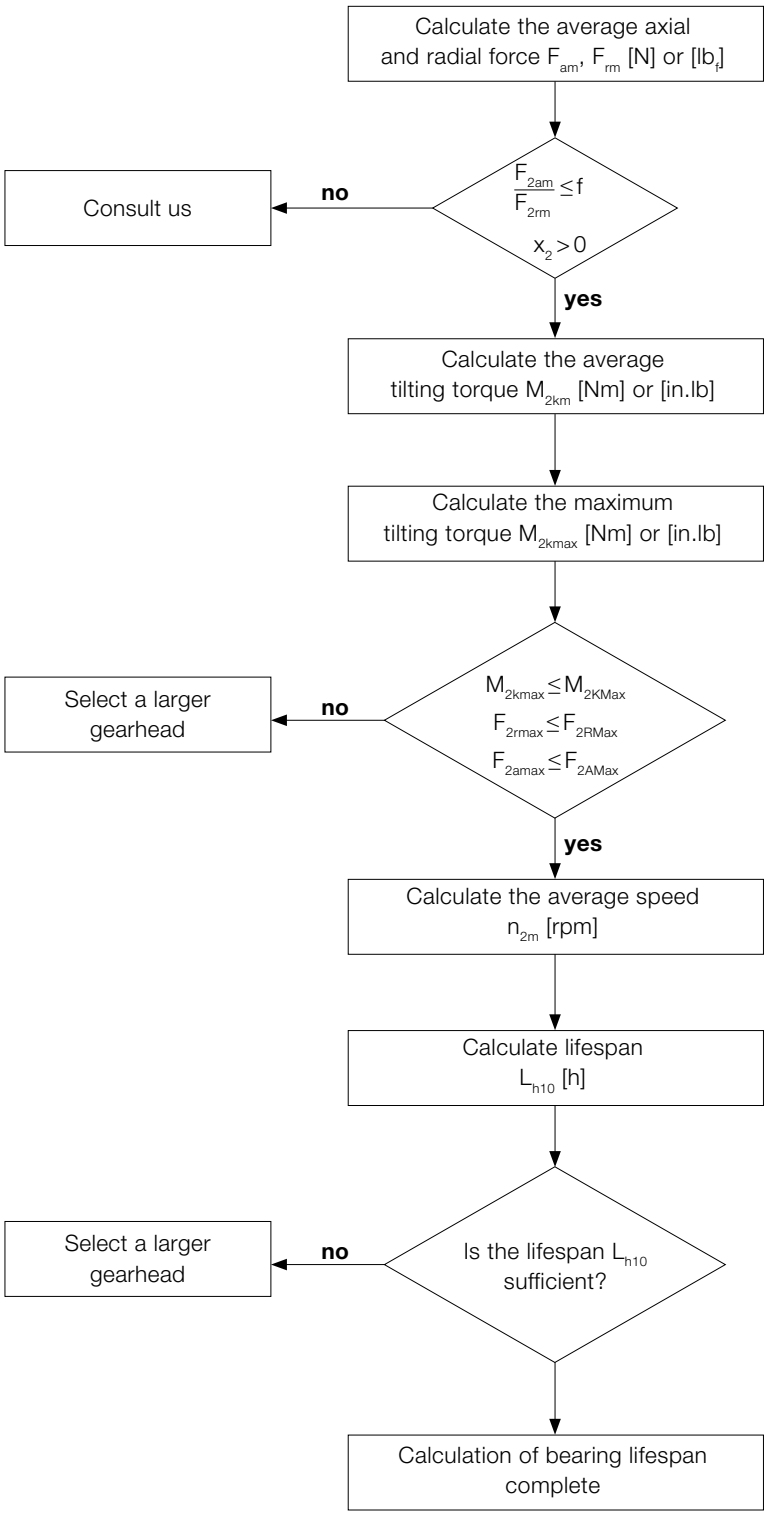


Diagram 2
Standard collective load at output
If the load on the gearhead in continuous operation S1 is less than or equal to the rated torque T_{2N}, the gearing is. At input speeds less than/equal to the rated speed n_{1N}, the temperature of the gearhead will not exceed 90 °C under average ambient conditions.



Bearing lifespan L_{h10} (output bearing)



$$F_{2am} = \sqrt[3]{\frac{|n_{2b}| \cdot t_b \cdot |F_{2ab}|^3 + \ldots + |n_{2n}| \cdot t_n| \cdot F_{2an}|^3}{|n_{2b}| \cdot t_b + \ldots + |n_{2n}| \cdot t_n}}$$

$$F_{2rm} = \sqrt[3]{\frac{|n_{2b}| \cdot t_b \cdot |F_{2rb}|^3 + \ldots + |n_{2n}| \cdot t_n| \cdot F_{2rn}|^3}{|n_{2b}| \cdot t_b + \ldots + |n_{2n}| \cdot t_n}}$$

$$M_{2km} = \frac{F_{2am} \cdot y_2 + F_{2rm} \cdot (x_2 + z_2)^{\,a)}}{W}$$

$$M_{2kmax} = \frac{F_{2amax} \cdot y_2 + F_{2rmax} \cdot (x_2 + z_2)^{\,a)}}{W}$$

a) x_2, y_2, z_2 in mm or in

$$n_{2m} = \frac{n_{2b} \cdot t_b + \ldots + n_{2n} \cdot t_n}{t_b + \ldots + t_n}$$

$$L_{h10} = \frac{16666}{n_{2m}} \cdot \left[\frac{K1_2}{M_{2km}} \right]^{p_2}$$

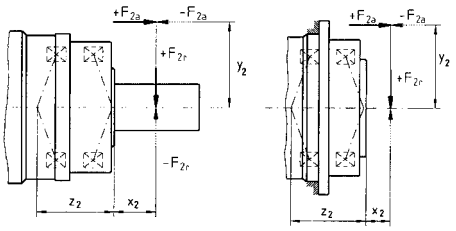
	metric	inch
W	1000	1

	TP+/TPK+	SP+/SPK+	LP+/LPB+ LPK+	alphira® (CP)
f	0.37	0.40	0.24	0.24

LP+/LPB+/LPK+		050	070	090	120	155
z_2	[mm]	20	28.5	31	40	47
	[in]	0.79	1.12	1.22	1.58	1.85
$K1_2$	[Nm]	75	252	314	876	1728
	[in.lb]	664	2230	2779	7753	15293
p_2		3	3	3	3	3

alphira® (CP)		040	060	080	115
z_2	[mm]	12.5	19.5	23.5	28.5
	[in]	0.49	0.77	0.93	1.12
$K1_2$	[Nm]	15.7	70.0	157.0	255.0
	[in.lb]	139	620	1389	2257
p_2		3	3	3	3

Example with output shaft and flange:

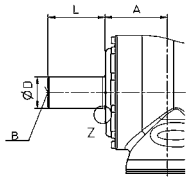


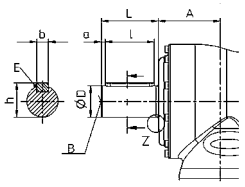
SP+/SPK+		060	075	100	140	180	210	240
z_2	[mm]	42.2	44.8	50.5	63.0	79.2	94.0	99.0
	[in]	1.66	1.76	1.99	2.48	3.12	3.70	3.90
$K1_2$	[Nm]	795	1109	1894	3854	9456	15554	19521
	[in.lb]	7036	9815	16762	34108	83686	137653	172761
p_2		3.33	3.33	3.33	3.33	3.33	3.33	3.33

TP+/TPK+		004	010	025	050	110	300	500
z_2	[mm]	57.6	82.7	94.5	81.2	106.8	140.6	157
	[in]	2.27	3.26	3.72	3.20	4.21	5.48	6.12
$K1_2$	[Nm]	536	1325	1896	4048	9839	18895	27251
	[in.lb]	4744	11726	16780	35825	87075	167220	241171
p_2		3.33	3.33	3.33	3.33	3.33	3.33	3.33

TK+/SK+/HG+/LK+: Calculation using cymex®.
Please contact us for further information.

Modular drive versions

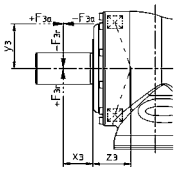




Solid shaft | with key

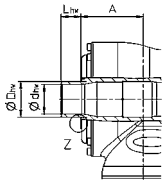
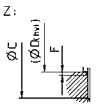
Gearhead types and sizes

			TK+ 004 SK+ 060 HG+ 060	SPK+ 075 TPK+ 010 TPK+ 025 MA	TK+ 010 SK+ 075 HG+ 075	SPK+ 100 TPK+ 025 TPK+ 050 MA
Dimensions of rearward drive						
Solid shaft diameter	$øD_{k6}$	mm	16	16	22	22
Solid shaft length	L	mm	28 ±0.15	28 ±0.15	36 ±0.15	36 ±0.15
Hollow shaft interface outer diameter	$øD_{h8}$	mm	18	18	24	24
Hollow shaft interface inner diameter	$ød_{h6}$	mm	15	15	20	20
Hollow shaft interface length	L_{hw}	mm	14	14	16	16
Distance from input axis	A	mm	42.9	42.9	52.6	52.6
Key dimensions (E = key as per DIN 6885, sheet 1, form A)	l	mm	25	25	32	32
	b_{h9}	mm	5	5	6	6
	a	mm	2	2	2	2
	h	mm	18	18	24.5	24.5
Output shaft threaded bore	B		M5x12.5	M5x12.5	M8x19	M8x19
Permissible load of rearward drive						
Max. acceleration torque [c]	T_{3B}		$= T_{2B} - T_{2b}$	Please contact us	$= T_{2B} - T_{2b}$	Please contact us
Nominal output torque [c]	T_{3N}		$= T_{2N} - T_{2n}$		$= T_{2N} - T_{2n}$	
EMERGENCY STOP torque [c]	T_{3Not}		$= T_{2Not} - T_{2not}$		$= T_{2Not} - T_{2not}$	
Max. axial force [b]	F_{3Amax}		1,500	1,500	1,800	1,800
Max. radial force [b]	F_{3Rmax}		2,300	2,300	3,000	3,000
Max. tilting torque	M_{3Kmax}		60	60	100	100
Calculation of average tilting torque at the rearward drive						
Factor for tilting torque calculation	z_3	mm	11.9	11.9	15.6	15.6
Distance between axial force and center of gearhead	y_3	mm	Application-dependent			
Distance between lateral force and shaft collar	x_3	mm	Application-dependent			

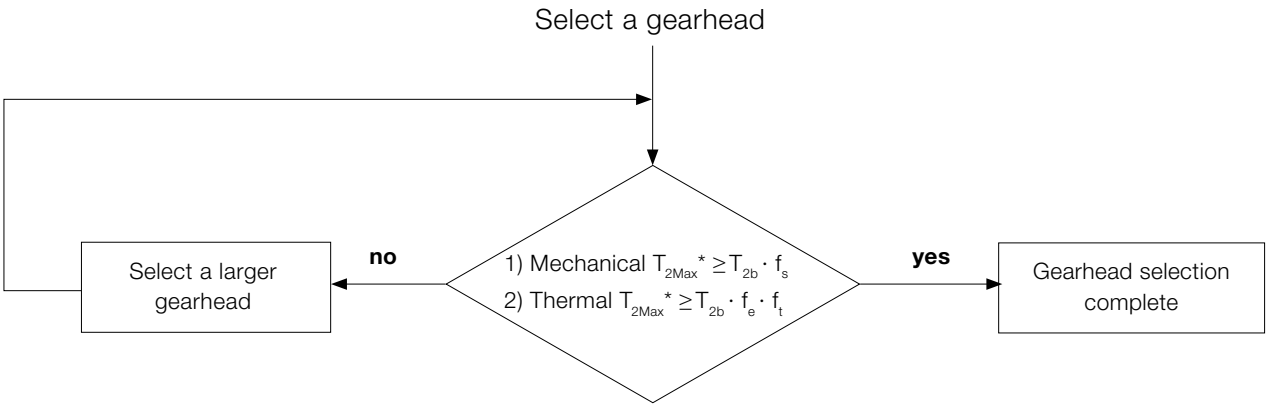


$$M3k = F_{3a} \cdot y_3 + F_{3r} \cdot (x_3 + z_3)$$

[a] Connection via shrink discs (see from page 354)
[b] Refers to center of shaft
[c] Index as small letter = existing value (application-dependent); index as capital letter = permissible value (see catalog values from page 148)

		
	No connection possible	No connection possible 
Hollow shaft interface**	on both sides	Closed cover

TK+ 025 SK+ 100 HG+ 100	SPK+ 140 TPK+ 050 TPK+ 110 MA	TK+ 050 SK+ 140 HG+ 140	SPK+ 180 SPK+ 240 TPK+ 110 TPK+ 500 TPK+ 300 MA	TK+ 110 SK+ 180 HG+ 180	SPK+ 210 TPK+ 300 TPK+ 500 MA
32	32	40	40	55	55
58 ±0.15	58 ±0.15	82 ±0.15	82 ±0.15	82 ±0.15	82 ±0.15
36	36	50	50	68	68
30	30	40	40	55	55
20	20	25	25	25	25
63.5	63.5	87	87	107.8	107.8
50	50	70	70	70	70
10	10	12	12	16	16
4	4	5	5	6	6
35	35	43	43	59	59
M12x28	M12x28	M16x36	M16x36	M20x42	M20x42
$= T_{2B} - T_{2b}$	Please contact us	$= T_{2B} - T_{2b}$	Please contact us	$= T_{2B} - T_{2b}$	Please contact us
$= T_{2N} - T_{2n}$		$= T_{2N} - T_{2n}$		$= T_{2N} - T_{2n}$	
$= T_{2Not} - T_{2not}$		$= T_{2Not} - T_{2not}$		$= T_{2Not} - T_{2not}$	
2,000	2,000	9,900	9,900	4,000	4,000
3,300	3,300	9,500	9,500	11,500	11,500
150	150	580	580	745	745
16.5	16.5	20	20	23.75	23.75
Application-dependent					
Application-dependent					



Cycles per hour	Load factor f_s
0	1
1000	1,3
3000	1,9
6000	2,2
10000	2,3

Duty cycle for each hour (DC%)	f_e for duty cycle
100	1
80	0,94
60	0,86
40	0,74
20	0,56

Temperature factor f_t

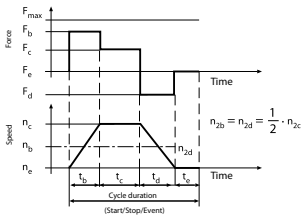
	VD 040						VD 050					
Ratio	**4**	**7**	**10**	**16**	**28**	**40**	**4**	**7**	**10**	**16**	**28**	**40**
n_{1N}= 500 rpm	0,53	0,53	0,53	0,53	0,53	0,53	0,53	0,53	0,53	0,53	0,53	0,53
n_{1N}= 1,000 rpm	0,53	0,53	0,53	0,53	0,53	0,53	0,53	0,53	0,53	0,53	0,53	0,53
n_{1N}= 2,000 rpm	0,53	0,53	0,53	0,53	0,53	0,53	0,53	0,53	0,53	0,56	0,61	0,53
n_{1N}= 3,000 rpm	0,64	0,89	0,96	0,88	0,96	0,84	0,57	0,75	0,78	0,86	0,95	0,79
n_{1N}= 4,000 rpm	1,03	1,15	1,24	1,29	1,40	1,25	0,89	1,16	1,22	1,16	1,28	1,23
	VD 063						**VD 080**					
Ratio	**4**	**7**	**10**	**16**	**28**	**40**	**4**	**7**	**10**	**16**	**28**	**40**
n_{1N}= 500 rpm	0,53	0,53	0,53	0,53	0,53	0,53	0,53	0,53	0,54	0,57	0,64	0,53
n_{1N}= 1,000 rpm	0,53	0,53	0,53	0,56	0,65	0,57	0,7	0,82	0,8	0,83	0,88	0,78
n_{1N}= 2,000 rpm	0,76	0,95	0,94	0,99	1,06	1,01	0,9	1,12	1,1	1,28	1,37	1,2
n_{1N}= 3,000 rpm	1	1,11	1,23	1,32	1,42	1,38	1,22	1,58	1,57	1,88	2,03	1,78
n_{1N}= 3,500 rpm	1,44	1,56	1,74	1,9	2,07	2,03	1,66	1,78	1,79	2,16	2,35	2,06
	VD 100											
Ratio	**4**	**7**	**10**	**16**	**28**	**40**						
n_{1N}= 500 rpm	0,62	0,7	0,72	0,73	0,79	0,69						
n_{1N}= 1,000 rpm	0,79	0,93	0,98	0,99	1,09	0,94						
n_{1N}= 2,000 rpm	1,18	1,3	1,4	1,44	1,62	1,53						
n_{1N}= 3,000 rpm	1,83	1,96	2,16	2,24	2,56	2,46						
n_{1N}= 4,000 rpm	-	-	-	-	-	-						

$T_{2Max}{}^{*}$ = Max. permissible torque at gearhead
T_{2b} Process torque

Ratios i = 28 and i = 40 are self-locking at zero speed.
The self-locking state may be overcome and therefore the gearhead should not replace a brake.
For applications that run at a continuous speed of 3,000 rpm or more in installation position F or G, please contact us.

* For applications with maximum precision requirements throughout lifespan, T_{2Servo} should be used

Bearing lifespan L_{h10} (output bearing)



Output (VDT⁺-, VDH⁺-, VDHe-, VDS⁺- & VDSe- version)

Calculate the average axial and radial force F_{2am}, F_{2rm} [N]

$\frac{F_{2am}}{F_{2rm}} \leq 0.4$; $x_2 > 0$

yes — Index "2" ≙ output

no

Please contact us!

$$F_{2am} = \sqrt[3]{\frac{n_{2b} \cdot t_b \cdot F_{2ab}{}^3 + \ldots + n_{2n} \cdot t_n \cdot F_{2an}{}^3}{n_{2b} \cdot t_b + \ldots + n_{2n} \cdot t_n}}$$

$$F_{2rm} = \sqrt[3]{\frac{n_{2b} \cdot t_b \cdot F_{2rb}{}^3 + \ldots + n_{2n} \cdot t_n \cdot F_{2rn}{}^3}{n_{2b} \cdot t_b + \ldots + n_{2n} \cdot t_n}}$$

$$M_{2km} = \frac{F_{2am} \cdot y_2 + F_{2rm} \cdot (x_2 + z_2)}{W}$$

Calculate the average tilting torque $M_{2k\,m}$ [Nm]

	metric
W	1,000

Z_2 [mm]	VDT⁺	VDH⁺/VDHe/ VDSe	VDS⁺
VD 040	-	57.25	-
VD 050	104	71.5	92.25
VD 063	113.5	82	111.5
VD 080	146.75	106.25	143.25
VD 100	196	145.5	181

$$M_{2\,k\,max} = \frac{F_{2\,a\,max} \cdot y_2 + F_{2\,r\,max} \cdot (x_2 + z_2)}{W}$$

Calculate the maximum tilting torque $M_{2k\,max}$ [Nm]

Type	VD 040	VD 050	VD 063	VD 080	VD 100
$M_{2K\,Max}$ [Nm]	205	409	843	1,544	3,059
$F_{2R\,Max}$ [N]	2,400	3,800	6,000	9,000	14,000
$F_{2A\,Max}$ [N]	3,000	5,000	8,250	13,900	19,500

$M_{2\,k\,max} \leq M_{2\,K\,Max}$
$F_{2\,r\,max} \leq F_{2\,R\,Max}$
$F_{2\,a\,max} \leq F_{2\,A\,Max}$

no

Select a larger gearhead

$$T_{2m} = \sqrt[3]{\frac{|n_{2b}| \cdot t_b \cdot |T_{2b}|^3 + \ldots + |n_{2n}| \cdot t_n \cdot |T_{2n}|^3}{|n_{2b}| \cdot t_b + \ldots + |n_{2n}| \cdot t_n}}$$

yes

$K1_2$ [Nm]	VDT⁺	VDH⁺/VDHe/ VDSe	VDS⁺
VD 040	-	1,230	-
VD 050	3,050	2,320	2,580
VD 063	4,600	3,620	5,600
VD 080	9,190	9,770	10,990
VD 100	20,800	15,290	20,400

$$n_{2\,m} = \frac{n_{2\,b} \cdot t_b + \ldots + n_{2\,n} \cdot t_n}{t_b + \ldots + t_n}$$

Calculate the average speed $n_{2\,m}$ [rpm]

P_t	T/H/S
i=4	1.5
i=7	0.72
i=10	0.6
i=16	0.5
i=28	0.4
i=40	0.36

$$L_{h10} = \frac{16666}{n_{2m}} \cdot \left[\frac{K1_2}{p_t \cdot T_{2m} + M_{2km}} \right]^{3.33}$$

Calculate lifespan L_{h10} [h]

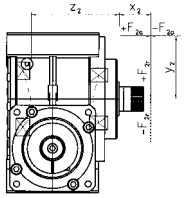
Is the lifespan L_{h10} sufficient?

no

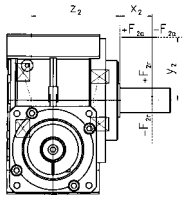
yes

Gearhead selection complete

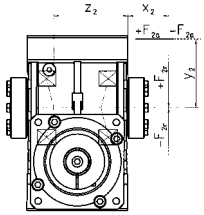
VDS⁺ involute



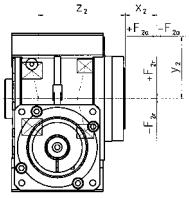
VDS⁺ / VDSe smooth, keywayed



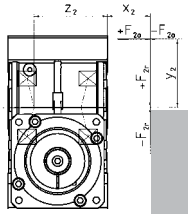
VDH⁺ /VDHe smooth



VDT⁺



VDH⁺ /VDHe keywayed



Rating for **torque limiters**

According to disengagement torque

As a rule, torque limiters are rated according to the required disengagement torque, which must be greater than the torque required for normal machine operation. The disengagement torque of the torque limiters is usually calculated in accordance with the drive specifications. The following calculation has proved to be a good rule of thumb:

$$T_{KN} \geq 1.5 \cdot T_{2b} \text{ [Nm]}$$

or

$$T_{KN} \geq 9550 \cdot \frac{P_{AN}}{n} \cdot 1.5 \text{ [Nm]}$$

T_{KN} = rated coupling torque [Nm]
T_{2b} = max. available acceleration torque [Nm]

T_{KN} = rated coupling torque [Nm]
P_{AN} = drive power [kw]
n = drive speed [rpm]

According to acceleration torque (start-up at no load)

S_A = shock factor
S_A = 1 (uniform load)
S_A = 2 (non-uniform load)
S_A = 3 (impact load)

$$T_{KN} \geq \alpha \cdot J_L \geq \frac{J_L}{J_A + J_L} \cdot T_{2b} \cdot S_A \text{ [Nm]}$$

Values of $S_A = 2-3$ are usual for servo drives on machine tools.

T_{KN} = rated coupling torque [Nm]
α = angular acceleration [1/s²]

$$\alpha = \frac{\omega}{t} = \frac{\pi \cdot n}{t \cdot 30} \left[\frac{1}{s^2}\right]$$

t = acceleration time [sec.]
ω = angular speed [1/s]
n = drive speed [rpm]
J_L = moment of inertia on load side [kgm²]
J_A = moment of inertia on drive side [kgm²]
T_{2b} = max. available acceleration torque [Nm]

According to acceleration and load torque

$$T_{KN} \geq \alpha \cdot J_L + T_{AN} \geq \left[\frac{J_L}{J_A + J_L} \cdot (T_{2b} - T_{AN}) + T_{AN}\right] \cdot S_A \text{ [Nm]}$$

S_A = shock factor
S_A = 1 (uniform load)
S_A = 2 (non-uniform load)
S_A = 3 (impact load)

Values of $S_A = 2\ 3$ are usual for servo drives on machine tools.

T_{KN} = rated coupling torque [Nm]
α = angular acceleration [1/s²]
t = acceleration time [sec.]
ω = angular speed [1/s]
n = drive speed [rpm]
J_L = moment of inertia on load side [kgm²]
T_{AN} = load torque [Nm]
J_A = moment of inertia on drive sidee [kgm²]
T_{2b} = max. available acceleration torque [Nm]

According to feed force

Spindle drive

$$T_{AN} = \frac{s \cdot F_V}{2000 \cdot \pi \cdot \eta} \text{ [Nm]}$$

T_{AN} = load torque [Nm]
S = ball screw pitch [mm]
F_V = feed force [N]
η = spindle efficiency

Timing belt drive

$$T_{AN} = \frac{d_0 \cdot F_V}{2000} \text{ [Nm]}$$

T_{AN} = load torque [Nm]
d_0 = pinion diameter (timing belt pulley) [mm]
F_V = feed force [N]

According to resonant frequency (TL 2 / 3 with bellows attachment)

The resonant frequency of the coupling must be higher or lower than the machine frequency. For the purpose of calculation, the drive is reduced to a two-mass system:

$$f_e = \frac{1}{2 \cdot \pi} \sqrt{C_T \cdot \frac{J_{Mach} + J_A}{J_{Mach} \cdot J_A}} \text{ [Hz]}$$

C_T = torsional rigidity of coupling [Nm/rad]
J_{Mach} = moment of inertia of machine [kgm²]
J_A = moment of inertia on drive side [kgm²]
f_e = resonant frequency of two-mass system [Hz]

According to torsional rigidity (TL 2 / 3 with bellows attachment)

Transmission errors due to a torsional load on the metal bellows:

$$\varphi = \frac{180}{\pi} \cdot \frac{T_{2b}}{C_T} \quad \textbf{[degrees]}$$

φ = angle of turn [degrees]
C_T = torsional rigidity of coupling [Nm/rad]
T_{2b} = max. available acceleration torque [Nm]

According to the function system

Load holding version: On TL 1 and TL models, the load holding version has a double load safety margin. Ensure that models with a bellows attachment (TL 2 / 3) are of adequate size. The blocking load in this case should not exceed the rated torque of the coupling.

Rating for **bellows couplings**

According to torque

In most cases, the couplings should be rated according to the maximum peak torque to be transmitted regularly. The peak torque must not exceed the rated torque of the coupling, i.e. the torque that can be transmitted continuously within the permissible speed and misalignment ranges. The following formula has proved to be a good rule of thumb:

$$T_{KN} \geq 1.5 \cdot T_{2b} \quad \textbf{[Nm]}$$

T_{KN} = rated coupling torque [Nm]
T_{2b} = max. available acceleration torque [Nm]

According to acceleration torques

For precise rating, the acceleration torque and the moment of inertia of the entire machine should be taken into consideration. Especially with servo motors, ensure that the acceleration or deceleration torque is several times greater than the rated torque.

$$T_{KN} \geq T_{2b} \cdot S_A \cdot \frac{J_L}{J_A + J_L} \quad \textbf{[Nm]}$$

T_{KN} = rated torque of coupling [Nm]

T_{2b} = max. available acceleration torque [Nm]
J_L = moment of inertia of machine [kgm²]
J_A = moment of inertia on drive side [kgm²]

S_A = shock factor
S_A = 1 (uniform load)
S_A = 2 (non-uniform load)
S_A = 3 – 4 (impact load)

Values of S_A = 2 3 are usual for servo drives on machine tools.

According to resonant frequency

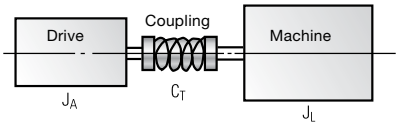
The resonant frequency of the coupling must be higher or lower than the machine frequency. For the purpose of calculation, the drive is reduced to a two-mass system:

$$f_e = \frac{1}{2 \cdot p} \sqrt{C_T \cdot \frac{J_A + J_L}{J_A \cdot J_L}} \quad \textbf{[Hz]}$$

C_T = torsional rigidity of coupling [Nm/rad]
f_e = natural frequency of 2-mass system [Hz]
f_{er} = excitation frequency of drive [Hz]

In practice you should use: $f_e \geq 2 \times f_{er}$

Two-mass system



According to torsional rigidity

Transmission errors due to a torsional load on the metal bellows:

$$\varphi = \frac{180}{\pi} \cdot \frac{T_{2b}}{C_T} \quad \textbf{[degrees]}$$

φ = angle of turn [degrees]
C_T = torsional rigidity of coupling [Nm/rad]
T_{2b} = max. available acceleration torque [Nm]

Sizing of a **Elastomer Coupling**

Temperature factor S_ϑ	**A**	**B**	**C**
Temperature (ϑ)	**Sh 98 A**	**Sh 64 D**	**Sh 80 A**
> -30 °C to -10 °C	1.5	1.7	1.4
> -10 °C to +30 °C	1.0	1.0	1.0
> +30 °C to +40 °C	1.2	1.1	1.3
> +40 °C to +60 °C	1.4	1.3	1.5
> +60 °C to +80 °C	1.7	1.5	1.8
> +80 °C to +100 °C	2.0	1.8	2.1
> +100 °C to +120 °C	-	2.4	-

Cycle of starts factor S_z

Z_h (Cycle of starts [1/h])	< 120	120 - 240	240 - 500	500 - 1000	1000 - 2000	> 240
S_z	1,0	1,3	1,5	1,7	2,1	on request

$$T_{KN} > T_{2n} \times S_\vartheta$$

$$T_{KMax} > T_{2b} \times S_\vartheta \times S_Z$$

T_{KN} = Rated torque of the coupling [Nm]
T_{KMax} = Max. torque of the coupling [Nm]
T_{2n} = Rated torque of the application [Nm]
T_{2b} = Max. acceleration torque of the application [Nm]
S_ϑ = Temperature factor
S_Z = Cycle of start factor

The **alpha**bet

Acceleration torque (T_{2B})

The acceleration torque T_{2B} is the maximum permissible torque that can briefly be transmitted at the output by the gearhead after ≤1000/h cycles. For >1000/h cycles, the → **Shock factor** must be taken into account. T_{2B} is the limiting parameter in cyclic operation.

Adapter plate

WITTENSTEIN alpha uses a system of standardized adapter plates to connect the motor and the gearhead, making it possible to mount an WITTENSTEIN alpha gearhead to any desired motor without difficulty.

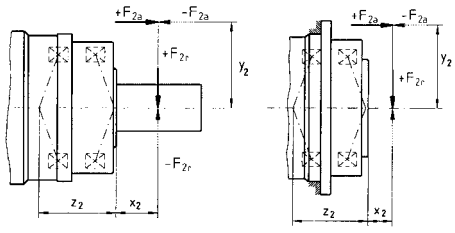
Angular minute

A degree is subdivided into 60 angular minutes (=60 arcmin=60'). In other words, if the torsional backlash is specified as 1 arcmin, for example, the output can be turned 1/60°. The repercussions for the actual application are determined by the arc length: $b = 2 \cdot \pi \cdot r \cdot \alpha° / 360°$. A pinion with a radius r=50 mm on a gearhead with standard torsional backlash j_t=3' can be turned b=0.04 mm.

Axial force (F_{2AMax})

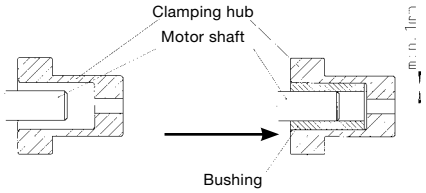
In the case of SP+/LP+/SPK+, the axial force F_{2AMax} acting on a gearhead runs parallel to its output shaft. On a TP+, the force runs perpendicular to its output shaft. It may be applied with axial offset via a lever arm y_2 under certain circumstances, in which case it also generates a bending moment.
If the axial force exceeds the permissible catalogue values, additional design features (e.g. axial bearings) must be implemented to absorb these forces.

Example with output shaft and flange:



Bushing

If the motor shaft diameter is smaller than the → **clamping hub**, a bushing is used to compensate the difference in diameter.



Clamping hub

The clamping hub ensures a frictional connection between the motor shaft and gearhead. A → **bushing** is used as the connecting element if the motor shaft diameter is smaller than that of the clamping hub.

Continuous operation (S1)

Continuous operation is defined by the → **duty cycle**. If the duty cycle is greater than 60 % or longer than 20 minutes, this qualifies as continuous operation. → **Operating modes**

Cyclic operation (S5)

Cyclic operation is defined via the → **duty cycle**. If the duty cycle is less than 60 % and shorter than 20 minutes, it qualified as cyclic operation **(→ operating modes)**.

cymex®

cymex® is the calculation software developed by our company for dimensioning complete drive trains. We can also provide training to enable you to make full use of all the possibilities provided by the software.

Degree of protection (IP)

The various degrees of protection are defined in DIN EN 60529 "Degrees of protection offered by enclosure (IP code)". The IP degree of protection (IP stands for International Protection) is represented by two digits. The first digit indicates the protection against the ingress of impurities and the second the protection against the ingress of water.

Example: **IP65**

Protection against impurities (Dust resistance)	Protection against water

Duty cycle (ED)

The duty cycle ED is determined by one cycle. The times for acceleration (t_b), constant travel if applicable (t_c) and deceleration (t_d) combined yield the duty cycle in minutes. The duty cycle is expressed as a percentage with inclusion of the pause time t_e.

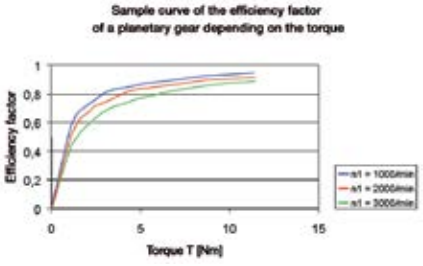
$$ED\,[\%] = \left[\frac{t_b + t_c + t_d}{t_b + t_c + t_d + t_e}\right] \cdot 100 \quad \frac{\text{Motion duration}}{\text{Cycle duration}}$$

$$ED\,[\text{min}] = t_b + t_c + t_d$$

Efficiency (η)

Efficiency [%] η is the ratio of output power to input power. Power lost through friction reduces efficiency to less than 1 or 100 %.
$\eta = P_{out} / P_{in} = (P_{in} - P_{lost}) / P_{in}$

WITTENSTEIN alpha always measures the efficiency of a gearhead during operation at full load (T_{2B}). If the input power or torque are lower, the efficiency rating is also lower due to the constant no-load torque. Power losses do not increase as a result. Speed also has an effect on efficiency, as shown in the example diagram above.



Emergency stop torque (T_{2Not})

The emergency stop torque [Nm] T_{2Not} is the maximum permissible torque at the gearhead output and must not be reached more than 1000 times during the life of the gearhead. It must never be exceeded!

→ Refer to this term for further details.

Ex symbol

Devices bearing the Ex symbol comply with EU Directive 94/9/EC (ATEX) and are approved for use in defined explosion-hazardous zones

Detailed information on explosion groups and categories, as well as further information on the relevant gearhead are available upon request.

HIGH SPEED (MC)

The HIGH SPEED version of our SP+ gearhead has been specially developed for applications in continuous operation at high input speeds, e.g. as found in the printing and packaging industries.

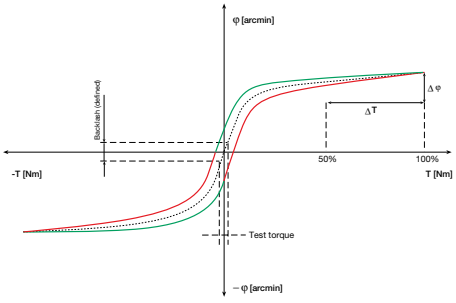
HIGH TORQUE (MA)

The HIGH TORQUE version of our TP+ gearhead has been specially developed for applications requiring extremely high torques and maximum rigidity.

MA = HIGH TORQUE
MC = HIGH SPEED
MF = standard versions of our WITTENSTEIN alpha servo gearheads

Hysteresis curve

The hysteresis is measured to determine the torsional rigidity of a gearhead. The result of this measurement is known as the hysteresis curve.



If the input shaft is locked, the gearhead is loaded with a torque that increases continuously up to T_{2B} and is then relieved at the output in both directions. The torsional angle is plotted against the torque. This yields a closed curve from which the → **torsional backlash** and → **torsional rigidity** can be calculated.

Jerk

Jerk is derived from acceleration and is defined as the change in acceleration within a unit of time. The term impact is used if the acceleration curve changes abruptly and the jerk is infinitely large.

Lateral force (F_R)

Lateral force is the force component acting at right angles to the output shaft with the SP+/LP+/SPK+ or parallel to the output flange with the TP+. It acts perpendicular to the axial force and can assume an axial distance of x_2 in relation to the shaft nut with the SP+/LP+) or shaft flange with the TP+, which acts as a lever arm. The lateral force produces a bending moment (see also axial force).

Mass moment of inertia (J)

The mass moment of inertia J is a measurement of the effort applied by an object to maintain its momentary condition (at rest or moving).

Mesh frequency (f_z)

The mesh frequency may cause problems regarding vibrations in an application, especially if the excitation frequency corresponds to the intrinsic frequency of the application.
The mesh frequency can be calculated for all SP+, TP+ , LP+ and alphira® gearheads using the formula $f_z = 1{,}8 \cdot n_2$ [rpm] and is therefore independent of the ratio if the output speed is the same.
If it does indeed become problematic, the intrinsic frequency of the system can be changed or another gearhead (e.g. hypoid gearhead) with a different mesh frequency can be selected.

NSF symbol

Lubricants certified as grade H1 by the NSF (NSF = National Sanitation Foundation) can be used in the food sector where occasional unavoidable contact with food cannot be excluded.

No load running torque (T_{012})

The no load running torque T_{012} is the torque which must be applied to a gearhead in order to overcome the internal friction; it is therefore considered lost torque. The values specified in the catalog are calculated by WITTENSTEIN alpha at a speed of $n_1 = 3000$ rpm and an ambient temperature of 20 °C.

T_{012}: 0 (no load) 1→2 (from input end to output end)

Nominal torque (T_{2N})

The nominal torque [Nm] T_{2N} is the torque continuously transmitted by a gearhead over a long period of time, i.e. in **→continuous operation** (without wear).

Operating modes (continuous operation **S1** and cyclic operation **S5**)

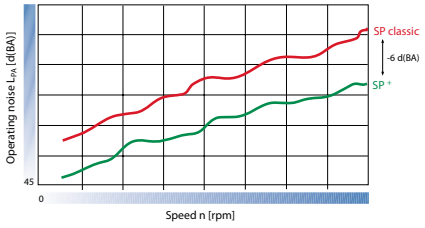
When selecting a gearhead, it is important to consider whether the motion profile is characterized by frequent acceleration and deceleration phases in cyclic operation (S5) as well as pauses, or whether it is designed for continuous operation (S1), i.e. with long phases of constant motion.

Operating noise (L_{PA})

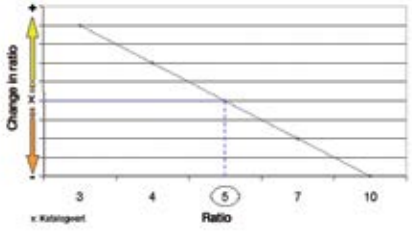
Low noise level L_{PA} is a factor of growing importance for environmental and health reasons. WITTENSTEIN alpha has succeeded in reducing the noise of the new SP+ gearheads by another 6 dB(A) over the former SP units (i.e. sound reduced to one quarter). Noise levels are now currently 64 - 70 dB(A) depending on the size of the gearhead.
The gear ratio and speed both affect the noise level. The relationships are demonstrated in the following trend graphs. As a general rule: A higher speed means a higher noise level, while a higher ratio means a lower noise level. The values specified in our catalog relate to gearheads with the ratio i = 10/100 at a speed of n = 3000 rpm.

Positioning accuracy

The positioning accuracy is determined by the angular deviation from a setpoint and equals the sum of the torsional angles due to load **→(torsional rigidity and torsional backlash)** and kinetics **→(synchronization error)** occurring simultaneously in practise.



Change in operating noise in relation to the ratio



Rate of mass moment of inertia (λ = Lambda)

The ratio of mass moment of inertia λ is the ratio of external inertia (application side) to internal inertia (motor and gearhead side). It is an important parameter determining the controllability of an application. Accurate control of dynamic processes becomes more difficult with differing mass moments of inertia and as λ becomes greater. WITTENSTEIN alpha recommends that a guideline value of $\lambda < 5$ is maintained. A gearhead reduces the external mass moment of inertia by a factor of $1/i^2$.

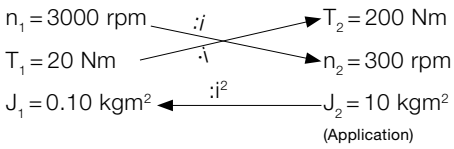
$$\lambda = \frac{J_{external}}{J_{internal}}$$

$J_{external}$ reduced to the gear input:
$J'_{external} = J_{external} / i^2$

Simple applications ≤ 10
Dynamic applications ≤ 5
Highlydynamic applications ≤ 1

Ratio (i)

The gear ratio i indicates the factor by which the gearhead transforms the three relevant parameters of motion (speed, torque and mass moment of inertia). The factor is a result of the geometry of the gearing elements (Example: i = 10).

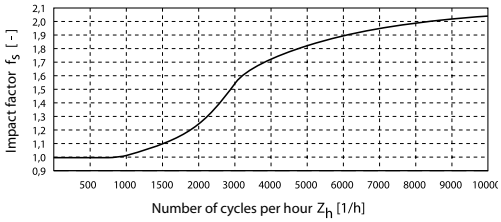


Safety notice

If your application has to meet special safety requirements (e.g. vertical axes, tensioned drives), we recommend using exclusively our alpheno®, RP+, TP+ and TP+ HIGH TORQUE products or contact WITTENSTEIN alpha for advice.

Shock factor (f_s)

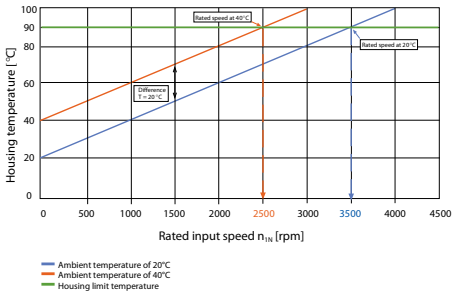
The maximum permissible acceleration torque during cyclic operation specified in the catalog applies for a cycle rate less than 1000/h. Higher cycle rates combined with short acceleration times can cause vibrations in the drive train. Use the shock factor f_s to include the resulting excess torque values in calculations.
The shock factor f_s can be determined with reference to the curve. This calculated value is multiplied by the actual acceleration torque T_{2b} and then compared with the maximum permissible acceleration torque T_{2B}. ($T_{2b} \cdot f_s = T_{2b,\,fs} < T_{2B}$)



Speed (n)

Two speeds are of relevance when dimensioning a gearhead: the maximum speed and the nominal speed at the input. The maximum permissible speed n_{1Max} must not be exceeded because it serves as the basis for dimensioning

→ **cyclic operation**. The nominal speed n_{1N} must not be exceeded in → **continuous operation**.
The housing temperature limits the nominal speed, which must not exceed 90 °C. The nominal input speed specified in the catalogue applies to an ambient temperature of 20 °C. As can be seen in the diagram below, the temperature limit is reached more quickly in the presence of an elevated outside temperature. In other words, the nominal input speed must be reduced if the ambient temperature is high. The values applicable to your gearhead are available from WITTENSTEIN alpha on request.



Synchronization error

The synchronization error is equal to the variations in speed measured between the input and output during one revolution of the output shaft. The error is caused by manufacturing tolerances and results in minute angular deviations and fluctuations in ratio.

T_{2Max}

T_{2Max} means the maximum torque which can be transmitted by the gearbox.
This value can be chosen for applications that can accept a slight increase in backlash over time.

T_{2Servo}

T_{2Servo} is a special value for precision applications in which a minimum backlash must be guaranteed over the life of the gearbox. The increase in backlash seen in other worm gears is less due to the optimized hollow flank teeth.

Technical data

The technical data relating to our products can be downloaded from our homepage. Alternatively, you can send your requests, suggestions and comments to the address below.

Tilting moment (M_{2K})

The tilting torque M_{2K} is a result of the → **axial and lateral forces** applied and their respective points of application in relation to the inner radial bearing on the output side.

Timing belt

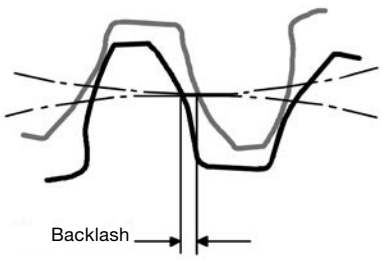
The AT profile of the Wittenstein standard belt pulley is a flank-centered profile for backlash-free torque transmission.
Effective diameter
d0 = Number of teeth z x Pitch p / Pi
Recommended preload per strand for linear drives Fv ≥ Fu
Radial force at the output shaft for the determination of the bearing life:
Fr = 2 x Fv

Torque (M)

The torque is the actual driving force of a rotary motion. It is the product of lever arm and force. $M = F \cdot l$

Torsional backlash (j_t)

Torsional backlash j_t is the maximum angle of torsion of the output shaft in relation to the input. Torsional backlash is measured with the input shaft locked.



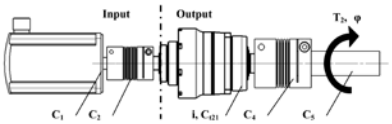
The output is then loaded with a defined test torque in order to overcome the internal gearhead friction. The main factor affecting torsional backlash is the face clearance between the gear teeth. The low torsional backlash of WITTENSTEIN alpha gearheads is due to their high manufacturing accuracy and the specific combination of gear wheels.

→ Refer to this term for further details.

Torsional rigidity (C_{t21})

Torsional rigidity [Nm/arcmin] C_{t21} is defined as the quotient of applied torque and generated torsion angle ($C_{t21} = \Delta T / \Delta\varphi$). It consequently shows the torque required to turn the output shaft by one angular minute. The torsional rigidity can be determined from the → **hysteresis curve**. Only the area between 50 % and 100 % of T_{2B} is considered for because this area of the curve profile can be considered linear.

Torsional rigidity C , Torsion angle Φ



Reduce all torsional rigidities to the output:

$$C_{(n),output} = C_{(n),input} * i^2$$

with i = Gear ratio [-]
$C_{(n)}$ = single stiffness [Nm/arcmin]

Note: the torsional rigidity C_{t21} of the gearbox always relates to the output.

Series connection of torsional rigidities

$$1/C_{ges} = 1/C_{1,output} + 1/C_{2,output} + \ldots + 1/C_{(n)}$$

Torsion angle Φ [arcmin]

$$\Phi = T_2 * 1/C_{ges}$$

with T_2 = Output torque [Nm]

WITTENSTEIN alpha speedline®

If required, we can deliver a new SP+, TP+ or LP+ within 24 or 48 hours ex works.

Formulae

Torque [Nm]	$T = J \cdot \alpha$	J = Mass moment of inertia [kgm^2] α = An [1/s^2]
Torque [Nm]	$T = F \cdot l$	F = Force [N] l = Lever, length [m]
Acceleration force [N]	$F_b = m \cdot a$	m = Mass [kg] a = Linear acceleration [m/s^2]
Frictional force [N]	$F_{frict} = m \cdot g \cdot \mu$	g = Acceleration due to gravity 9.81 m/s^2 μ = Coefficient of friction
Angular velocity [1/s]	$\omega = 2 \cdot \pi \cdot n / 60$	n = Speed [rpm] π = PI = 3.14...
Linear velocity [m/s]	$v = \omega \cdot r$	v = Linear velocity [m/s] r = Radius [m]
Linear velocity [m/s] (spindle)	$v_{sp} = \omega \cdot h / (2 \cdot \pi)$	h = Screw pitch [m]
Linear acceleration [m/s^2]	$a = v / t_b$	t_b = Acceleration time [s]
Angular acceleration [1/s^2]	$\alpha = \omega / t_b$	
Pinion path [mm]	$s = m_n \cdot z \cdot \pi / \cos \beta$	m_n = Standard module [mm] z = Number of teeth [-] β = Inclination angle [°]

Conversion table

1 mm	= 0.039 in
1 Nm	= 8.85 in lb
1 kgcm^2	= 8.85 x 10^{-4} in.lb.s^2
1 N	= 0.225 lb_f
1 kg	= 2.21 lb_m

Symbols

Symbol	Unit	Designation
C	Nm/arcmin	Rigidity
ED	%, min	Duty cycle
F	N	Force
f_s	–	Shock factor
f_t	–	Temperature factor
f_e	–	Factor for duty cycle
i	–	Ratio
j	arcmin	Backlash
J	kgm^2	Moment of inertia
K1	Nm	Factor for bearing calculation
L	h	Service life
L_{PA}	dB(A)	Operating noise
m	kg	Mass
M	Nm	Torque
n	rpm	Speed
p	–	Exponent for bearing calculation
η	%	Efficiency
t	s	Time
T	Nm	Torque
v	m/min	Linear velocity
x	mm	Distance between lateral force and shaft collar
y	mm	Distance between axial force and center of gearhead
z	mm	Factor for bearing calculation
Z	1/h	Number of cycles

Index

Capital letter	Permissible values
Small letter	Actual values
1	Drive
2	Output
3	Rearward drive (for hypoid gearheads)
A/a	Axial
B/b	Acceleration
c	Constant
cym	cymex® values (load-related characteristic values)
d	Deceleration
e	Pause
h	Hours
K/k	Tilting
m	Mean
Max/max	Maximum
Mot	Motor
N	Nominal
Not/not	Emergency stop
0	No load
R/r	Radial
t	Torsional
T	Tangential

Order information

Gearhead type
TP⁺ 004 – TP⁺ 500
SP⁺ 060 – SP⁺ 240
TK⁺ 004 – TK⁺ 110
TPK⁺ 010 – TPK⁺ 500
SK⁺ 060 – SK⁺ 180
SPK⁺ 075 – SPK⁺ 240
HG⁺ 060 – HG⁺ 180

Type code
S = Standard
A = Optimized mass moment of inertia**
B = Modular output combination (SK⁺, SPK⁺, TK⁺, TPK⁺, HG⁺)
E = Version in ATEX**
F = Food-grade lubrication**
G = Grease**
L = Low friction (SP⁺ 100 - 240 HIGH SPEED)
W = Corrosion resistant**

Gearhead variations
M = Motor attachment gearhead

Gearhead model
F = Standard
A = HIGH TORQUE (only TP⁺/TPK⁺)
C = HIGH SPEED (only SP⁺)

Number of stages
1 = 1-stage
2 = 2-stage
3 = 3-stage

* Order shrink discs separately, see section accessories, shrink discs on page 352
** Reduced specification available on request

Gearhead type
LP⁺ 050 – LP⁺ 155
LPB⁺ 070 – LPB⁺ 120

Type code
S = Standard
F = Food lubrication

Gearhead variations
M = Motor attachment gearhead

Gearhead model
E = Standard

Number of stages
1 = 1-stage
2 = 2-stage

Gearhead type
LK 050 – LK 155
LPK 050 – LPK 155
LPBK 070 – LPBK 120
CP 040 – CP 115

Gearhead variations
M = Motor attachment gearhead

Gearhead model
O = Standard
L = Food-grade grease

Number of stages
1 = 1-stage
2 = 2-stage
3 = 3-stage (LPK⁺)

Ratios
See technical data sheets.

Gearhead type
VDT = TP flange
VDH = hollow shaft
VDS = shaft

Gearhead version
e = economy
(only for VDH and VDS, size 040, 050 and 063)

Distance between axes
040, 050, 063, 080, 100

Gearhead variations
M = Motor attachment gearhead

Gearhead model
F = Standard
L = Food-grade grease
W = Corrosion resistant

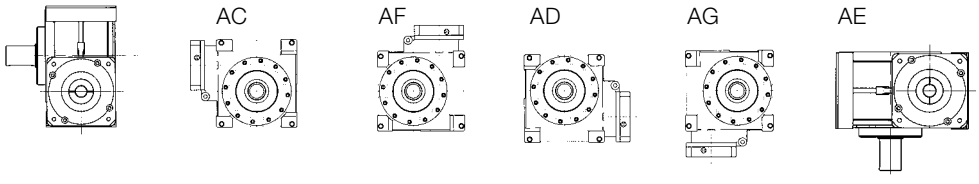
Number of stages
1 = 1-stage

** See section accessories, shrink discs on page 352

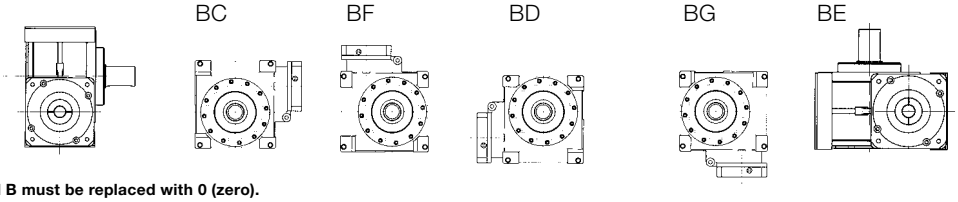
Mounting positions for V-Drive

Mounting position (only relevant for oil volume)

Output side A:
View of motor interface
Only valid for VDS⁺, VDSe and VDT⁺



Output side B:
View of motor interface
Only valid for VDS⁺, VDSe und VDT⁺



For VDH⁺, VDHe and VDS⁺/VDSe with Dual-shaft output, A and B must be replaced with 0 (zero).

Ratios
See technical data sheets.

Output shape
0 = smooth shaft/flange (no hollow shaft)
1 = shaft with key
2 = involute to DIN 5480
3 = system output
4 = other
5* = Hollow shaft interface / Flanged hollow shaft (TK+) Shaft mounted (SP+)
6* = 2 hollow shaft interfaces (HG+)
(see technical data sheets)

Clamping hub bore hole diameter
(see technical data sheets and clamping hub diameter table)

Backlash
1 = Standard
0 = Reduced
(see technical data sheets)

x = Special model

Ratios
See technical data sheets.

Output shape
0 = Smooth shaft/flange
1 = Shaft with key

Clamping hub bore hole diameter
(see technical data sheets and clamping hub diameter table)

Backlash
1 = Standard
(see technical data sheets)

Output shape
0 = Smooth shaft (for LP+ only)
1 = Shaft with key
LPBK+
1 = Centering on output side

Clamping hub bore hole diameter
1 = Standard
(see technical data sheets)

Backlash
1 = Standard

x = Special model

Ratios
4 (not for economy sizes 050 and 063)
7
10
16
28
40

Output shape
0 = smooth shaft/flange
1 = shaft with key
2 = involute to DIN 5480 (VDS+)
4 = other (see technical data sheets)
8 = Dual-shaft output, smooth (VDS+, VDSe)
9 = Dual-shaft output with key (VDS+, VDSe)

Clamping hub bore hole diameter
2 = 14 mm (040)
3 = 19 mm (050)
4 = 28 mm (063)
5 = 35 mm (080)
7 = 48 mm (100)

Backlash
1 = Standard

VDH – number of shrink discs**
0 = no shrink disc
1 = one shrink disc
2 = two shrink discs

x = Special model

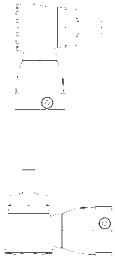
Mounting positions for right-angle gearheads

For information purposes only – not required when placing orders!

Permitted standard mounting positions for right-angle gearheads (see illustrations)

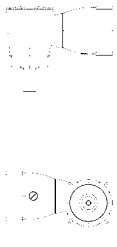
If the mounting position is different, contact WITTENSTEIN alpha

B5/V3
Output shaft, horizontal
Motor shaft upwards

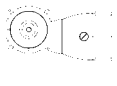


B5/V1
Output shaft, horizontal
Motor shaft downwards

V1/B5
Output shaft, vertical
Motor shaft, horizontal



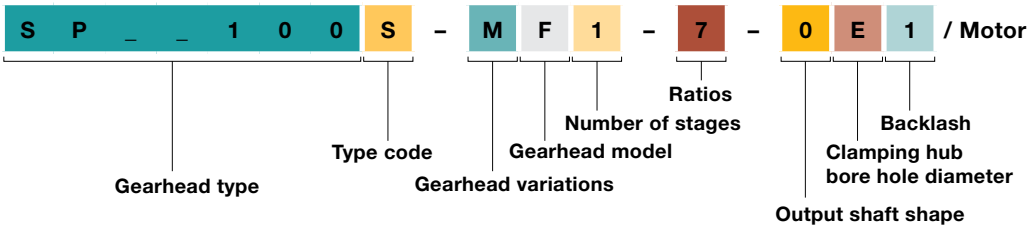
V3/B5
Output shaft, vertical, upwards
Motor shaft, horizontal



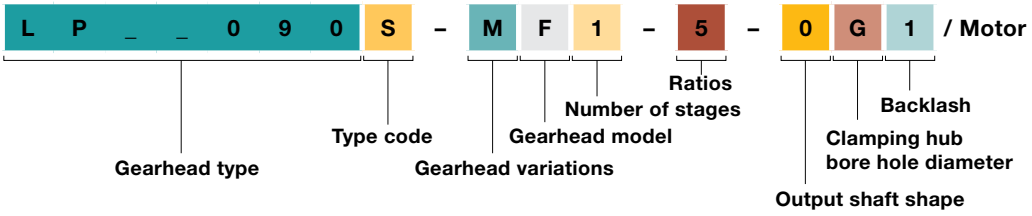
B5/B5
Output shaft, horizontal
Motor shaft, horizontal

Order codes

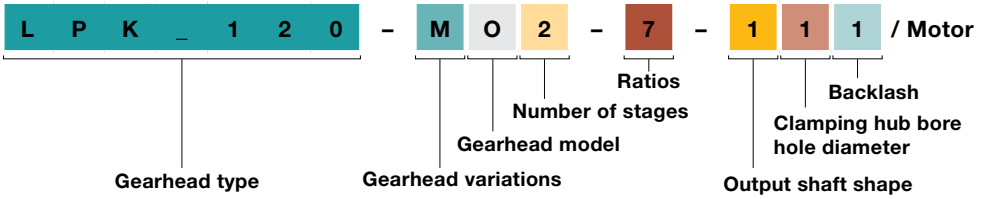
TP+/SP+/TK+/TPK+/SK+/SPK+/HG+



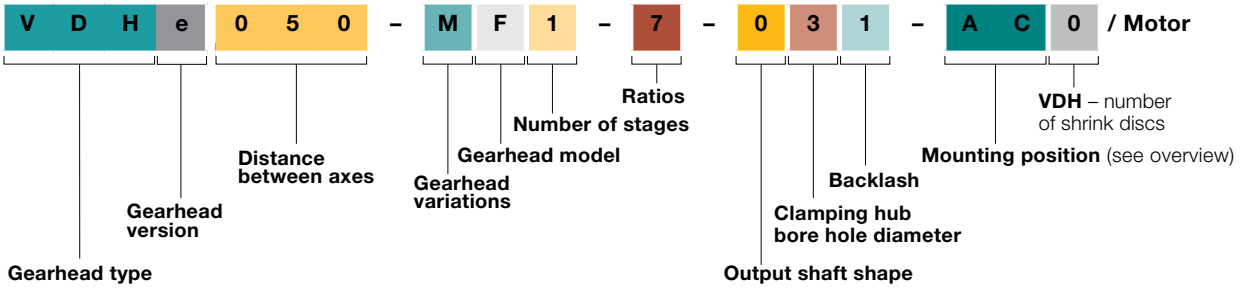
LP+/LPB+



LK+/LPK+/LPBK+/alphira® (CP)



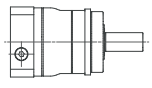
V-Drive



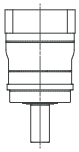
Mounting positions for coaxial gearheads

For information purposes only not required when placing orders!

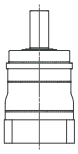
B5 – horizontal



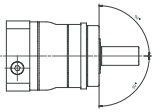
V1 – vertical Output shaft downwards



V3 – vertical Output shaft upwards



S – can be tilted ±90° from a horizontal position



Clamping hub diameter

(the technical data sheet contains all diameters available for TP+, SP+, TK+,TPK+, SK+, SPK+ and HG+ models)

Code letter	mm	Code letter	mm
B	11	I	32
C	14	K	38
D	16	L	42
E	19	M	48
G	24	N	55
H	28	O	60

Intermediate diameters possible in combination with a bushing with a minimum thickness of 1 mm.

Order codes

Order information

Rack and assembly jig

Rack type
ZST = Rack
ZMT = Assembly jig

Module
200 = 2.00
300 = 3.00
400 = 4.00
500 = 5.00
600 = 6.00

Version
PA5 = Premium Class
SB6 = Smart Class
VB6 = Value Class
PD5 = Assembly jig

Length
100 = Assembly jig (module 2 – 3)
156 = Assembly jig (module 4 – 6)
480 = Smart Class (module 2 – 4)
167/333 = Premium Class (module 2)
250 = Premium Class (module 3)
500 = Premium Class (module 2 – 6)
1000 = Value Class (module 2 – 6)

Premium Class+ and Value Class pinion

Designation
RMT = Pinion mounted ex works
RMX = Pinion mounted offset 180°
(for VC pinions only)

Module
200 = 2.00
300 = 3.00
400 = 4.00
500 = 5.00
600 = 6.00

Version
PC5 = Premium Class
VC6 = Value Class

Number of teeth
(see technical data sheet)

Premium Class RTP and Standard Class RSP pinions

Designation
RSP = Standard Class RSP pinion for SP
Involute output as per DIN 5480
RTP = Premium Class RTP pinion for TP output
RTPA = Premium Class RTP pinion for TP High Torque output

Gearhead size
For SP output:
060, 075, 100, 140, 180, 210, 240
For TP output:
004, 010, 025, 050, 110, 300, 500
(see technical data sheets)

Module
A02 = 2.00
A03 = 3.00
A04 = 4.00
A05 = 5.00
A06 = 6.00

Tolerance class
5e24 = Premium Class RTP/ RTPA
6e25 = Standard Class RSP

Number of teeth
(see technical data sheet)

Torque limiter, bellows and elastomer coupling

Model
Torque limiter
TL1 / TL 2 / TL3
Bellows coupling
BC2 / BC3 / BCT / EC2
Elastomer couplings
ELC / EL6

Series – Nominal torque
(see technical data sheets)

Length options
A = first series
B = second series only for TL2 / TL3 / BC2 / BC3 and EC2
Elastomer couplings
A = 98 Sh A
B = 64 Sh D
C = 80 Sh A

Version Torque limiter
W = Single position re-engagement (standard version)
D = Multi-position
G = Load holding
F = Full disengagement
X = Special
Bellows/Elastomer coupling
A = Standard
B = Self-opening clamp system (EC2 only)
S = Washdown (BC2 / BC3 / BCT)
Elastomer couplings
X = Sonder

Internal diameter D_1^{H7}
TL1: $D = D_1 = D_2$
(for miniature version, 1.5 –10 Nm)

Internal diameter version D_1
0 = smooth shaft
1 = with key to DIN 6885 Shape A
2 = Involute to DIN 5480
4 = Other (specific for key)
5 = Key connection (TL1 only, type C)

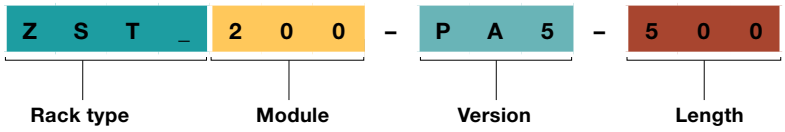
Internal diameter D_2^{H7}
Hole circle diameter D_3 (BCT)
TL1: $D = D_1 = D_2$
(for miniature version, 1.5 – 10 Nm)

Internal diameter version D_2
0 = smooth shaft
1 = with key to DIN 6885 Shape A
2 = Involute to DIN 5480
4 = Other (specific for key)
5 = Key connection (TL1 only, type C)

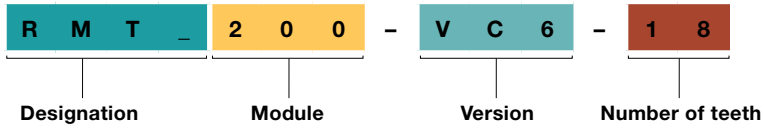
Adjustment range
(only for TL1 /TL2 /TL3)
A = first series
B = second series
C = third series
D = Fourth series (for TL1 only)

Disengagement torque
(only for TL1 / TL2 / TL3)

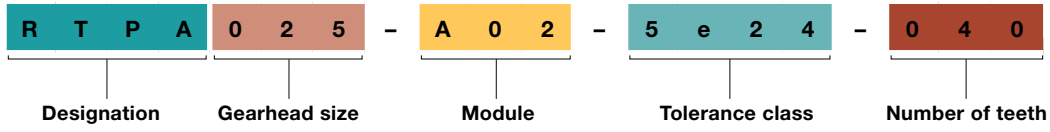
Order codes



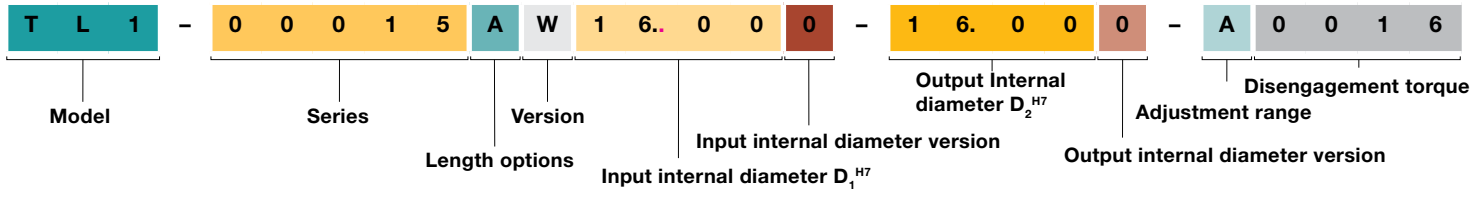
Premium Class+ and Value Class pinion



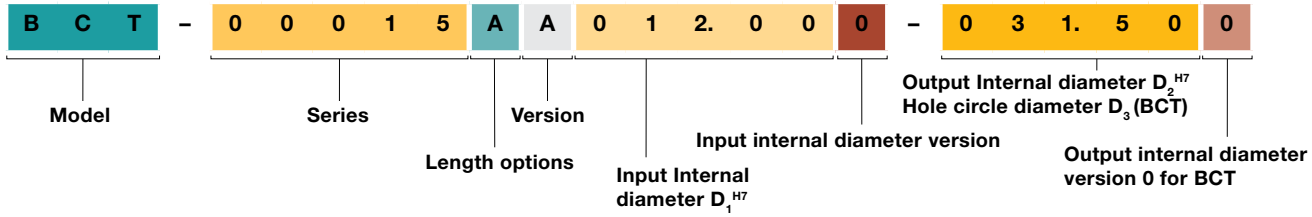
Premium Class RTP and Standard Class RSP pinions



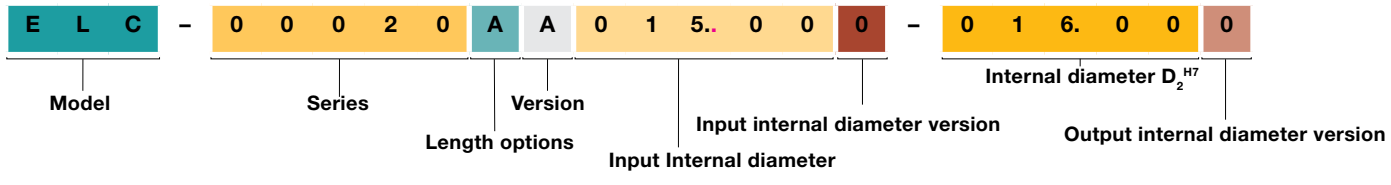
Torque limiter



Bellows couplings



Elastomer couplings



YOUR NOTE

YOUR NOTE